SYLLABUS FOR
Managerial Accounting

By Nut Khorn
(Course Facilitator)
For BBA students

1. Course Description:

This course focuses on the identification, gathering, and interpretation of information for planning, controlling, and evaluating the performance of a business. This course studies the measurement of the costs of producing goods or services and how to analyze and control these costs.

This course analyzes managerial accounting principles and systems through both process and job order costing. Additional managerial accounting topics include the following: cost behavior, cost-volume-profit analysis, budgeting and standard cost systems, decentralized operations, and product pricing.

2. Course objectives

The objectives of the course are to enable the student to:

- Compare and contrast between managerial accounting and financial accounting and assess how managerial accounting affects various management functions.
- Discuss ethical standards in an organization and assess their role in the field of managerial accounting.
- Define cost and distinguish between product costs and period costs.
- Analyze the fundamental manufacturing cost categories and diagram the flow of product costs in a manufacturing operation.
- Describe job-order costing system and evaluate its suitability in manufacturing and nonmanufacturing firms.
- Describe process costing and evaluate the suitability of process costing in manufacturing and nonmanufacturing firms.
- Compare and contrast traditional volume-based costing system and activity-based costing system.
- Interpret cost behavior patterns to estimate costs and assess the need for contribution approach to income statements.
- Graph CVP relationships and compute the break-even point using the contribution-margin and equation approach.
- Determine the criteria that decide the relevance of a cost or a benefit and explain the concepts of sunk costs, opportunity costs, and unit costs.
- Describe the key decision areas in capital budgeting and explain the concept of time value of money.
- Describe the elements of a budgeting framework and assess the need for a budgeting framework in an organization.
- Describe the various ways to set performance standards and assess the role of performance standards in cost management.
• Explain the role of responsibility accounting in achieving set goals and list the responsibility centers.
• Identify the components of a statement of cash flows and show how changes in noncash balance sheet accounts are represented on a statement of cash flows.

3. Course content

Chapter One: Managerial Accounting and the Business Environment
Chapter Two: Cost Terms, Concepts, and Classifications
Chapter Three: Systems Design: Job-Order Costing
Chapter Four: Systems Design: Process Costing
Chapter Five: Cost Behavior: Analysis and Use
Chapter Six: Cost-Volume-Profit Relationships
Chapter Seven: Variable Costing: A Tool for Management
Chapter Eight: Activity-Based Costing: A Tool to Aid Decision Making
Chapter Nine: Profit Planning
Chapter Ten: Standard Costs and the Balanced Scorecard
Chapter Eleven: Flexible Budgets and Overhead Analysis
Chapter Twelve: Segment Reporting and Decentralization
Chapter Thirteen: Relevant Costs for Decision Making
Chapter Fourteen: Capital Budgeting Decisions
Chapter Sixteen: “How Well Am I Doing?” Financial Statement Analysis
Appendix A: Pricing Products and Services
Appendix B: Profitability Analysis

4. Learning Resources:

Required textbook

**Bibliography**


4. **Mr. Chhinsy Moty** “the Lecturer of Accounting at IMS, UME, and Others”

5. **Mis Emily Zsunng** “ the Lecturer of Accounting at MVU”

**Additional Reading**

<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Year</th>
<th>ISBN</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Cost Accounting</em></td>
<td>Piyush Sinha</td>
<td>Vikas Publishing House</td>
<td>2002</td>
<td></td>
</tr>
</tbody>
</table>

Instructors can choose any of the following textbooks to accompany this course:


5. **Course requirement**

   Student should have basic knowledge of Business mathematics, financial accounting, and manufacturing company.

6. **Evaluation of the student performance**

   **Course assessment:**
   
   Attendance and participation………………... .20%
Quizzes, Homework Problems, Assignments…………40%
Mid-term Exam…………………… 20%
Final Examination ………….. 20%

Total: ………….. 100%

Suggested Course Evaluation Criteria

<table>
<thead>
<tr>
<th>Grade</th>
<th>Points</th>
<th>Point Range %</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4.0</td>
<td>93-100</td>
<td>Excellent</td>
</tr>
<tr>
<td>A-</td>
<td>3.7</td>
<td>90-92</td>
<td></td>
</tr>
<tr>
<td>B+</td>
<td>3.3</td>
<td>87-89</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3.0</td>
<td>83-86</td>
<td>Above Average</td>
</tr>
<tr>
<td>B-</td>
<td>2.7</td>
<td>80-82</td>
<td></td>
</tr>
<tr>
<td>C+</td>
<td>2.3</td>
<td>77-79</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>2.0</td>
<td>73-76</td>
<td>Average</td>
</tr>
<tr>
<td>C-</td>
<td>1.7</td>
<td>70-72</td>
<td></td>
</tr>
<tr>
<td>D+</td>
<td>1.3</td>
<td>66-69</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1.0</td>
<td>60-65</td>
<td>Below average</td>
</tr>
<tr>
<td>F</td>
<td>0.0</td>
<td>59 &amp; below</td>
<td>Failure</td>
</tr>
<tr>
<td>I</td>
<td>0.0</td>
<td></td>
<td>Incomplete</td>
</tr>
</tbody>
</table>

Work Requirement for a Managerial Accounting Major under Mr. Nut Khorn

- **I will apply the international standard when I teach all managerial accounting courses I will require that you do all the assigned work before class:**

  Read your textbook (slide presentation is not complete)
  Read the power point materials
  Do the assignments
  Prepare for all examinations.
  Internet research work.

- **To perform well in my courses, you need to spend about a minimum of 15 hours per week for this class.** If you do not want to make this commitment, then do not take my courses.

- You should be present in all my classes. If you do not show up for my lectures, I will consider you as absent (no need to give excuses).
• If you fail any of my courses (I hope you won’t), you must retake a new written examination plus an oral examination to prove that you know the subjects.

**Internet Web for this Courses:**

```plaintext
www.mhhe.com/garrison13e
When you search the web you will get power point presentation (Slide), quizzes, multiple choices, excel template, and so on.

Other webs to supporting of your course.
www.mhhe.com (General subjects)
www.mhhe.com/bh (Foundation of Financial Management)
www.mhhe.com/williams_basis14e (Financial & Managerial Accounting)
www.mhhe.com/garrison12e (Managerial Accounting)

www.wiley.com (General Subjects)
www.wiley.com/college/weygandt (Accounting Principles, Financial Accounting, Hospital Accounting, and Managerial Accounting)
General Research: www.en.wikipedia.org
www.mhhe.com/wild
```

☞ **Note:** When you research the entire web above you should enter the STUDENT CENTER OR STUDENT COMPONION.

### 7-HOME WORK AND ASSIGNMENT

Students **MUST COMPLY STRICTLY** with the following instructions in writing their Home Work, Individual Assignments, Group Case-study and Group Case-Study Presentation.

1. The student(s) is expected to do his/her own research in order to write up individual assignments and home work.
2. All Individual Assignments/Home work and Group Case-Study **MUST be type written on A-4 sized paper** with adequate margins. **You should include a TITLE PAGE and a LIST OF CONTENTS.**
3. Use headings and sub-headings to organize your report, including supporting material(s) as attachments.
4. All reference books/published materials you refer to should be properly referenced (arrange in this order: *name of author(s), year, and title of the book, publisher, and the country the book was published*) and this **must** be included in a bibliography at the end of the assignment.
5. Use **text referencing** when you cite somebody else’s work from your references. *Citation may mean direct quoting, or paraphrasing, or summarizing, or simply to make a statement of that author’s view of finding.* An example of text referencing: Beamer and Varner (2001), suggested that culture is not something we are born with, but rather it is learned.
6. **Number all pages** sequentially and securely staple and/or bind all sheets together.

---

**Chapter 1:**
By successfully completing this course, students must:

- Understand and remember:

  - Key accounting concepts/Theories
  - Formulas
  - Terminology

Practices All time
Chapter 01: Managerial Accounting and the Business Environment

OBJECTIVES

- Discuss ethical standards in an organization and assess their role in the field of managerial accounting.
- Analyze how the changing business environment has led to innovations in managerial accounting.
- Compare and contrast between managerial accounting and financial accounting and assess how managerial accounting affects various management functions.
- Outline the roles and responsibilities of a managerial accountant and describe the fundamental tools and practices used in managerial accounting.

Subtopics

- What Is Managerial Accounting?
- Managerial Accountants in an Organization
- Ethics in Managerial Accounting
- Changing Role of Managerial Accounting
What is Managerial Accounting?

Managerial accounting is concerned with providing information to managers – That is, people inside an organization who direct and control its operations. In contrast, financial accounting is concerned with providing information to stockholders, creditors, and other who are outside the organization.

1. The work of management and the need for managerial accounting information

Every organization – large and small – has managers. Someone must be responsible for making plans, organizing resources, directing personnel, and controlling operations.

1.1 Planning

The first step in planning is to identify alternatives and then to select from among the alternatives the one that does the best job of furthering organization’s objective.

Example the basic objective of God Vibrations, Inc., is to earn profits for the owners of the company by providing superior service at comparative price in as any market as possible.

1.2 Directing and motivating

In addition to planning for the future, managers must oversee day-to-day activities and keep the organization function smoothly. This requires the ability to motivate and effectively direct people. Managers assign tasks to employees, arbitrate disputes, answer questions, solve on-the-spot problems, and make any small decisions that effect customers and employee.

1.3 Controlling

In carrying out the control function, managers seek to ensure that the plan is being followed. Feedback, which signals whether operations are on track, is the key to effective control. In sophisticate organizations this feedback is provided by detailed reports of various type. One of these reports, which compare budgeted to actual results, is called performance report. Performance reports suggest where operations are not proceeding as planned and where some parts of the organization may require additional attention.
1.4 The planning and control cycle
The work of management can be summarized in a model as follow:
Exhibit 1 – 1 The planning and control cycle
1.5 Comparison of Financial and Managerial Accounting

a. Financial accounting
Financial accounting reports are prepared for the use of external parties such as shareholders and creditors. Financial accountants maintain the bookkeeping system of nominal ledger, purchase ledger, sale ledger, etc, and prepare financial statements as required by the law and accounting standards. Information produced from the financial accounting system is usually insufficient for management’s need.

b. Managerial accounting
Managerial accounting reports are prepared for managers inside the organization. Managerial accounting is a system for recording data and producing information about the costs, for the products produced by the organization and/or the services it provides. 

Exhibit 1-2 Comparison of Financial and Managerial Accounting
Accounting

Financial Accounting

- Repots to those outside the organization:
  - Owners
  - Lenders
  - Tax authority
  - Shareholders

- Emphasis is on summaries of financial consequences of past activities.

- Objectivity and verifiability of data are emphasized.

- Precision of information is required.

- Only summarized data for the entire organization

Managerial Accounting

- Repots to those inside the organization for:
  - Planning
  - Directing and motivating
  - Controlling
  - Performance evaluation

- Emphasis is on decisions affecting the future.

- Relevance and flexibility of data are emphasized.

- Timeliness of information is required.

- Detailed segment reports about department, products, customers, and employees are prepared.

- Need not follow GAAP and not mandatory.

- Mandatory for external rep.
2. Organizational structure

**Corporate Organization Chart**

- **Board of Directors**
  - President
  - **Purchasing**
  - **Personnel**
  - **Vice President Operations**
  - **Chief Financial Officer**
    - Treasurer
    - Controller

**CDP Organization Structure**

- **Board of Directors**
  - **Executive Committee**
    - **Executive Director**
      - Ms. Chea Puthca Sathya
    - **Chief Technical Advocate**
      - Att. Kong Pisey
    - **Administrative Manager**
      - Mr. Seng Kim Leng
  - **Finance Manager**
    - Ms. Chea Puthca Sathya
  - **Publications & Legal Advocacy**
    - Att. Bun Rithy
  - **Women Resource Center**
    - Ms. Meas Sohoun
  - **Center Against Trafficking**
    - Att. Young Phanit
  - **Legal Awareness Program**
    - Att. Cham Sovanly
  - **Battambang Office**
    - Att. Bun Rithy
  - **Siem Reap Office**
    - Att. Huy Varanara
  - **Kampong Cham Office**
    - Att. Kong Hong
  - **Phnom Penh Office**
    - Att. Hong Kim Soun
  - **Kampong Thom Office**
    - Att. Theoun Sophal
  - **Kratie Office**
    - Att. Theoun Sophal
2.1 Decentralization

Decentralization is the delegation of decision-making authority throughout an organization by providing managers at various operation levels with the authority to make decisions relating to their area of responsibility.

2.2 The Controller

In the United States the manager in charge of the accounting department is usually known as controller. The controller is the member of the top manager team who is given the responsibility of providing relevant and timely data to support planning and controlling activities and preparing financial statements for external users.

End of chapter 1
<table>
<thead>
<tr>
<th><strong>Key Terms on Chapter 01</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(See related pages)</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Budget</strong></th>
<th>A detailed plan for the future, usually expressed in formal quantitative terms.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business process</strong></td>
<td>A series of steps that are followed to carry out some task in a business.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Chief Financial Officer (CFO)</strong></td>
<td>The member of the top management team who is responsible for providing timely and relevant data to support planning and control activities and for preparing financial statements for external users.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Constraint</strong></td>
<td>Anything that prevents an organization or individual from getting more of what it wants.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>The process of instituting procedures and then obtaining feedback to ensure that all parts of the organization are functioning effectively and moving toward overall company goals.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Controller</strong></td>
<td>The member of the top management team who is responsible for providing relevant and timely data to managers and for preparing financial statements for external users. The controller reports to the CFO.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Controlling</strong></td>
<td>Ensuring that the plan is actually carried out and is appropriately modified as circumstances change.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Corporate</strong></td>
<td>The system by which a company is directed and controlled.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>governance</td>
<td>If properly implemented it should provide incentives for top management to pursue objectives that are in the interests of the company and it should effectively monitor performance.</td>
</tr>
<tr>
<td>Decentralization</td>
<td>The delegation of decision-making authority throughout an organization by providing managers with the authority to make decisions relating to their area of responsibility.</td>
</tr>
<tr>
<td>Directing and motivating</td>
<td>Mobilizing people to carry out plans and run routine operations.</td>
</tr>
<tr>
<td>Enterprise system</td>
<td>A software system that integrates data from across an organization into a single centralized database that enables all employees to access a common set of data.</td>
</tr>
<tr>
<td>Enterprise risk management</td>
<td>A process used by a company to help identify the risks that it faces and to develop responses to those risks that enable the company to be reasonably assured of meeting its goals.</td>
</tr>
<tr>
<td>Feedback</td>
<td>Accounting and other reports that help managers monitor performance and focus on problems and/or opportunities that might otherwise go unnoticed.</td>
</tr>
<tr>
<td>Financial accounting</td>
<td>The phase of accounting concerned with providing information to stockholders, creditors, and others outside the organization.</td>
</tr>
<tr>
<td>Finished goods</td>
<td>Units of product that have been completed but have not yet been sold to customers.</td>
</tr>
<tr>
<td>Just-in-time (JIT)</td>
<td>A production and inventory control system in which materials are purchased and units are produced only as needed to meet actual customer demand.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Lean thinking model</td>
<td>A five-step management approach that organizes resources around the flow of business processes and that pulls units through these processes in response to customer orders.</td>
</tr>
<tr>
<td>Line</td>
<td>A position in an organization that is directly related to the achievement of the organization's basic objectives.</td>
</tr>
<tr>
<td>Managerial accounting</td>
<td>The phase of accounting concerned with providing information to managers for use inside the organization.</td>
</tr>
<tr>
<td>Non-value-added activities</td>
<td>An activity that consumes resources but that does not add value for which customers are willing to pay.</td>
</tr>
<tr>
<td>Organization chart</td>
<td>A diagram of a company's organizational structure that depicts formal lines of reporting, communication, and responsibility between managers.</td>
</tr>
<tr>
<td>Performance report</td>
<td>A detailed report comparing budgeted data to actual data.</td>
</tr>
<tr>
<td>Planning</td>
<td>Selecting a course of action and specifying how the action will be implemented.</td>
</tr>
<tr>
<td>Planning and control cycle</td>
<td>The flow of management activities through planning, directing and motivating, and controlling, and then back to planning again.</td>
</tr>
<tr>
<td>Raw materials</td>
<td>Materials that are used to make a product.</td>
</tr>
<tr>
<td><strong>Sarbanes-Oxley Act</strong></td>
<td>Legislation enacted to protect the interests of stockholders who invest in publicly traded companies by improving the reliability and accuracy of the disclosures provided to them.</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Segment</strong></td>
<td>Any part of an organization that can be evaluated independently of other parts and about which the manager seeks financial data. Examples include a product line, a sales territory, a division, or a department.</td>
</tr>
<tr>
<td><strong>Six Sigma</strong></td>
<td>A method that relies on customer feedback and objective data gathering and analysis techniques to drive process improvement.</td>
</tr>
<tr>
<td><strong>Staff</strong></td>
<td>A position in an organization that is only indirectly related to the achievement of the organization's basic objectives. Such positions provide service or assistance to line positions or to other staff positions.</td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>A &quot;game plan&quot; that enables a company to attract customers by distinguishing itself from competitors.</td>
</tr>
<tr>
<td><strong>Supply chain</strong></td>
<td>A management approach that coordinates business processes across companies to better serve end consumers.</td>
</tr>
<tr>
<td><strong>Theory of Constraints (TOC)</strong></td>
<td>A management approach that emphasizes the importance of managing constraints.</td>
</tr>
<tr>
<td><strong>Value chain</strong></td>
<td>The major business functions that add value to a company's products and services such as research and development, product design, manufacturing, marketing, distribution, and customer service.</td>
</tr>
<tr>
<td><strong>Work in process</strong></td>
<td>Units of product that are only partially complete and will require further work before they are ready for sale to a customer.</td>
</tr>
</tbody>
</table>
Chapter 02: Cost Terms, Concepts, and Classifications

In this chapter, we have looked at some of the ways in which managers classify costs. How the costs will be used—for preparing external reports, predicting cost behavior, assigning costs to cost objects, or decision making—will dictate how the costs are classified.

For purposes of valuing inventories and determining expenses for the balance sheet and income statement, costs are classified as either product costs or period costs. Product costs are assigned to inventories and are considered assets until the products are sold. At the point of sale, product costs become cost of goods sold on the income statement. In contrast, period costs are taken directly to the income statement as expenses in the period in which they are incurred.

In a merchandising company, product cost is whatever the company paid for its merchandise. For external financial reports in a manufacturing company, product costs consist of all manufacturing costs. In both kinds of companies, selling and administrative costs are considered to be period costs and are expensed as incurred.

For purposes of predicting how costs will react to changes in activity, costs are classified into two categories—variable and fixed. Variable costs, in total, are strictly proportional to activity. The variable cost per unit is constant. Fixed costs, in total, remain at the same level for changes in activity that occur within the relevant range. The average fixed cost per unit decreases as the number of units increases.

For purposes of assigning costs to cost objects such as products or departments, costs are classified as direct or indirect. Direct costs can be conveniently traced to cost objects. Indirect costs cannot be conveniently traced to cost objects.

For purposes of making decisions, the concepts of differential cost and revenue, opportunity cost and sunk cost are vitally important. Differential costs and revenues are the costs and revenues that differ between alternatives. Opportunity cost is the benefit that is forgone when one alternative is selected over another. Sunk cost is a cost that occurred in the past and cannot be altered. Differential costs and opportunity costs should be carefully considered in decisions. Sunk costs are always irrelevant in decisions and should be ignored.

These various cost classifications are different ways of looking at costs. A particular cost, such as the cost of cheese in a taco served at Taco Bell, could be a manufacturing cost, a product cost, a variable cost, a direct cost, and a differential cost—all at the same time. Taco Bell is a manufacturer of fast food. The cost of the cheese in a taco is a manufacturing cost and, as such, it would be a product cost as well. In addition, the cost of cheese is variable with respect to the number of tacos served and it is a direct cost of serving tacos. Finally, the cost of the cheese in a taco is a differential cost of making and serving the taco.
In this chapter, the following learning objectives will be covered:

Identify and give examples of each of the three basic manufacturing cost categories.

Distinguish between product costs and period costs and give examples of each.

Prepare an income statement including calculation of the cost of goods sold.

Prepare a schedule of cost of goods manufactured.

Understand the differences between variable costs and fixed costs.

Understand the differences between direct and indirect costs.

Define and give examples of cost classifications used in making decisions: differential costs, opportunity costs, and sunk costs.

(Appendix 2A) Properly account for labor costs associated with idle time, overtime, and fringe benefits.

(Appendix 2B) Identify the four types of quality costs and explain how they interact.
(Appendix 2B) Prepare and interpret a quality cost report.

Subtopics

- Cost Concepts: An Overview
- General Cost Classifications
- Cost Classifications on Financial Statements
- Cost Classifications for Different Purposes

Objectives

- Define cost and distinguish between product costs and period costs.
- Analyze the fundamental manufacturing cost categories and diagram the flow of product costs in a manufacturing operation.
- Analyze the cost components on financial statements and prepare an income statement and a schedule of cost of goods manufactured for a manufacturer.
- Compare direct and indirect costs and distinguish between variable and fixed costs.
1. **General cost classification**

Costs are associated with all types of organizations – business, nonbusiness, manufacturing, retail, and service. Generally, the kind of costs that are incurred and the way in which these costs are classified depend on the type of organization involved.

1.1 **Manufacturing costs**

Most manufacturing companies divide manufacturing costs into three broad categories: direct materials, direct labor, and manufacturing overhead

   a. **Direct materials**

   The materials that go into the final product are called raw materials. Actually, raw materials refer to any materials that are used in final product; and the finished product of one company can be the raw materials of another company.

   Direct materials are those materials that become an integral part of the finished product and that can be physically and conveniently traced to it.

   b. **Direct labor**

   The term **direct labor** is served for those labor costs that can be easily traced to individual unit of product. Direct labor is sometimes called **touch labor**, since direct labor workers typically touch the product while it is being made.

   c. **Manufacturing overhead**

   **Manufacturing overhead**, the third element of manufacturing cost, included all cost of manufacturing except direct materials and direct labor. Manufacturing overhead includes items such as indirect materials; indirect labor; maintenance and repair production equipment; property taxes; depreciation, and insurance on manufacturing facilities...

   Various names are used for manufacturing overhead, such as **indirect manufacturing cost**, **factory overhead**, etc.
and factory burden. all these terms are synonymous of manufacturing overhead.

1.2 Nonmanufacturing cost

Generally, nonmanufacturing costs are subclassified into two categories:

a. Marketing or selling costs.

Include all costs necessary to secure customer orders and get the finished product or service into the hands of customer. These costs are often called order-getting and order-filling costs. Example of marketing costs include advertising, shipping, sales travel, sales commission, sales salaries, and cost of finished goods warehouses.

b. Administrative costs.

Include all executive, organizational, and clerical costs associated with the general management of an organization rather than with manufacturing, marketing or selling. Examples of administrative costs include general accounting, secretarial, public relation...

2. Product cost versus period costs

In addition to the distinction between manufacturing and nonmanufacturing costs, there are two other ways to look at costs. For instant, they can also be classified as either product costs or period costs.

2.1 Product costs

For financial accounting purpose, product costs include all the costs there are involved in acquiring or making a product

2.2 Period cost
**Period cost** are all cost that are not included in product costs. These cost are expense on the income statement in the period in which they are incurred.

A suggested above, *all selling and administrative expenses are considered to be period cost.*

**Exhibit 2 – 1**  Summary of cost terms

1. **Manufacturing costs or product costs**
   - Direct materials
   - Direct labor
   - Manufacturing overhead

2. **Nonmanufacturing costs or period costs**
   - Marketing or selling costs
   - Administrative costs

![Diagram showing the categories of costs: Product Costs and Period Costs.](image-url)
Cost Flow

Costs
- Raw materials purchases
- Direct labor
- Manufacturing overhead
- Selling and administrative

Balance Sheet
- Raw Materials inventory
- Work in Process inventory
- Finished Goods inventory
- Goods completed (Cost of Goods Manufactured)

Income Statement
- Cost of Goods Sold
- Selling and Administrative Expenses

Period costs
- Goods sold

Product costs
- Direct materials used in production
3. Cost classification on financial statements

The financial statements prepared by manufacturing company are more complex than the statements are prepared by a merchandising company.

3.1 The balance sheet

The balance sheet, or statement of financial position, of a manufacturing company is similar to that of a merchandising company has only one class of inventory – goods purchased from suppliers that are awaiting resale to customer. By contrast, manufacturing companies have three classes of inventories – raw materials, work in process, and finished goods.

Graham Manufacturing Company
Inventory Account

<table>
<thead>
<tr>
<th></th>
<th>Beginning balance</th>
<th>Ending balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>60,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Work in process</td>
<td>90,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Finished goods</td>
<td>125,000</td>
<td>175,000</td>
</tr>
</tbody>
</table>

In contrast, the inventory account at Reston Bookstore consist entirely of the cost of books the company has purchased from publisher for resale to the public

Reston Bookstore
Inventory account

<table>
<thead>
<tr>
<th></th>
<th>Beg. Bal</th>
<th>Ending Bal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merchandise inventory</td>
<td>$100,000</td>
<td>$150,000</td>
</tr>
</tbody>
</table>

3.2 The income statement

Exhibit 2 – 2 compares the income statements of Reston Bookstore and Graham Manufacturing. For purpose of
Illustration, these statements contain more detail about cost of goods sold than you will generally find and published financial statements.

**Exhibit 2 – 2** Comparative income statements:
Merchandise and manufacturing companies:

<table>
<thead>
<tr>
<th>Merchandise Company</th>
<th>Reston Bookstore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Cost of goods sold:</td>
<td></td>
</tr>
<tr>
<td>Beginning merchandise inventory</td>
<td>100,000</td>
</tr>
<tr>
<td>Add: purchases</td>
<td>650,000</td>
</tr>
<tr>
<td>Goods available for sale</td>
<td>750,000</td>
</tr>
<tr>
<td>Deduct: ending merch. Inventory</td>
<td>150,000</td>
</tr>
<tr>
<td>Gross margin</td>
<td>400,000</td>
</tr>
<tr>
<td>Less: operating expenses:</td>
<td></td>
</tr>
<tr>
<td>Selling expense</td>
<td>100,000</td>
</tr>
<tr>
<td>Administrative expense</td>
<td>200,000</td>
</tr>
<tr>
<td>Net income</td>
<td>100,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturing Company</th>
<th>Graham Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Cost of goods sold:</td>
<td></td>
</tr>
<tr>
<td>Beginning finished goods inventory</td>
<td>125,000</td>
</tr>
<tr>
<td>Add: cost of goods manufactured</td>
<td>850,000</td>
</tr>
<tr>
<td>Goods available for sale</td>
<td>975,000</td>
</tr>
<tr>
<td>Deduct: ending finis. goods inven.</td>
<td>175,000</td>
</tr>
<tr>
<td>Gross margin</td>
<td>700,000</td>
</tr>
<tr>
<td>Less: operating expenses:</td>
<td></td>
</tr>
<tr>
<td>Selling expense</td>
<td>125,000</td>
</tr>
<tr>
<td>Administrative expense</td>
<td>300,000</td>
</tr>
<tr>
<td>Net income</td>
<td>150,000</td>
</tr>
</tbody>
</table>
To determine the cost of goods sold in merchandising company like Reston Bookstore, we only need to know the opening and closing balance in the Merchandise Inventory account and purchases.

To determine the cost of goods sold in manufacturing company like Graham Manufacturing, we need to know the cost of goods manufactured and the opening and closing balance of Finished Goods Inventory account. The cost of goods manufactured consists of the manufacturing costs associated with goods that were finished during the period.

3.3 Schedule of Cost of Goods Manufactured

The cost of goods manufactured contains the three elements of product costs that we discussed earlier – direct materials, direct labor, and manufacturing overhead.

**Exhibit 2 – 3 Schedule of cost of goods manufactured**

<table>
<thead>
<tr>
<th>Direct materials:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Opening raw materials inventory...............</td>
<td>$ 60,000</td>
</tr>
<tr>
<td>Add: purchases of raw materials...............</td>
<td>400,000</td>
</tr>
<tr>
<td>Raw materials available for use...............</td>
<td>460,000</td>
</tr>
<tr>
<td>Deduct: closing raw materials inventory......</td>
<td>50,000</td>
</tr>
<tr>
<td>Raw materials used in production...............</td>
<td>410,000</td>
</tr>
<tr>
<td><strong>Direct labor</strong>..................................</td>
<td>60,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturing overhead:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance factory.............................</td>
<td>6,000</td>
</tr>
<tr>
<td>Indirect labor..................................</td>
<td>100,000</td>
</tr>
<tr>
<td>Machine rental...............................</td>
<td>50,000</td>
</tr>
<tr>
<td>Utilities, factory................................</td>
<td>75,000</td>
</tr>
<tr>
<td>Supplies........................................</td>
<td>21,000</td>
</tr>
<tr>
<td>Depreciation, factory.........................</td>
<td>90,000</td>
</tr>
<tr>
<td>Property taxes, factory........................</td>
<td>8,000</td>
</tr>
<tr>
<td><strong>Total overhead cost</strong>.........................</td>
<td>350,000</td>
</tr>
</tbody>
</table>

Total manufacturing costs:.................... | 820,000 |

**Add: opening work in process inventory**....| 90,000   |

**Deduct: closing work in process inventory**.| 60,000   |

**Cost of goods manufactured**..................| $850,000 |
Direct materials:
- Beginning raw materials inventory: $60,000
- Add: Purchases of raw materials: 400,000
- Raw materials available for use: 460,000
- Deduct: Ending raw materials inventory: 50,000
- Raw materials used in production: $410,000

Direct labor: 60,000

Manufacturing overhead:
- Insurance, factory: 6,000
- Indirect labor: 100,000
- Machine rental: 50,000
- Utilities, factory: 75,000
- Supplies: 21,000
- Depreciation, factory: 90,000
- Property taxes, factory: 8,000
- Total manufacturing overhead cost: 350,000

Total manufacturing cost: 820,000
- Add: Beginning work in process inventory: 90,000
- Deduct: Ending work in process inventory: 60,000
- Cost of goods manufactured (see Exhibit 2-2): $850,000

---

Manufacturing Costs in Financial Statements

Balance Sheet

Current assets sections of merchandising and manufacturing balance sheets

<table>
<thead>
<tr>
<th>MERCHANDISING COMPANY</th>
<th>MANUFACTURING COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance Sheet</td>
<td>Balance Sheet</td>
</tr>
<tr>
<td>December 31, 2011</td>
<td>December 31, 2011</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current assets</th>
<th>Current assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash</td>
<td>Cash</td>
</tr>
<tr>
<td>$100,000</td>
<td>$180,000</td>
</tr>
<tr>
<td>Receivables (net)</td>
<td>Receivables (net)</td>
</tr>
<tr>
<td>210,000</td>
<td>210,000</td>
</tr>
<tr>
<td>Merchandise inventory</td>
<td>Merchandise inventory</td>
</tr>
<tr>
<td>400,000</td>
<td></td>
</tr>
<tr>
<td>Prepaid expenses</td>
<td>Prepaid expenses</td>
</tr>
<tr>
<td>22,000</td>
<td>18,000</td>
</tr>
<tr>
<td>Total current assets</td>
<td>Total current assets</td>
</tr>
<tr>
<td>$732,000</td>
<td>$536,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inventories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished goods</td>
</tr>
<tr>
<td>$80,000</td>
</tr>
<tr>
<td>Work in process</td>
</tr>
<tr>
<td>25,200</td>
</tr>
<tr>
<td>Raw materials</td>
</tr>
<tr>
<td>128,000</td>
</tr>
<tr>
<td>Prepaid expenses</td>
</tr>
<tr>
<td>18,000</td>
</tr>
</tbody>
</table>
4 Cost classifications

4.1 For predicting cost behavior

Cost behavior means how a cost will react or respond to changes in the level of business activity. As the activity level rises and falls, a particular cost may rise and fall as well.

A. Variable cost

A variable cost is a cost that varies, in total, in direct proportion to change in the level of activity. The activity can be expressed in many ways, such as units produced, units sold, miles driven, hours worked. The cost of direct materials used during a period will varies, in total, in direct proportion to the number of units that are produced.

It is importance to note that when we speak of a cost as being variable, we mean the total cost rises and falls as the activity level rises and falls.

B. Fixed cost

A fixed cost is a cost that remains constant, in total, regardless of changes in the level of activity. Fixed costs are not affected by changes in the activity. Consequence, as the activity level rises and falls.
Costs are assigned to objectives for a variety of purpose including pricing, profitability studies, and control of spending. A cost objective is anything for which cost data are desired – including products, customer, jobs, and organization.

A. Direct cost

An **direct cost** is a cost that can be easily and conveniently traced to the particular cost object under consideration. *Direct Materials* and *Direct labor*.

B. Indirect cost
An **indirect cost** is a cost that can not be easily and conveniently traced to the particular cost object under consideration.

4.3 For decision making

A. Opportunity cost  
**Opportunity cost** is the potential benefit that is given up when one alternative is selected over another.

B. Sunk cost  
A **sunk cost** is a cost that has already been incurred and that can not be changed by any decision made now or in the future.
Formulas (Find COGS)

Net Sales

- COGS

= Gross profit / margin

- Operating Expense

= Net income / Loss.

Manufacturing Costs in Financial Statements

Cost of Goods Sold Components - (Periodic Inventory System)

1) Formula of Direct Materials

Beg. Raw Materials

+ Purchases of Raw Materials

= Raw Materials available for use

- Ending Raw Materials

= Raw Materials used in production
2) Direct Materials (DM) 
+ Direct Labor (DL) 
+ Manufacturing Overhead (MOH) 
= Total Manufacturing Costs

3) Total Manufacturing Costs 
+ Beg. Work in process (WIP) 
= Total Cost of WIP 
- Ending WIP 
= Cost of Goods Manufactured

4) Beg. Finished Goods 
+ Cost of Goods Manufactured 
= Goods Available for Sale 
- Ending Finished Goods 
= Cost of Goods Sold (COGS)
Key Terms

(See related pages)

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative costs</td>
<td>All executive, organizational, and clerical costs associated with the general management of an organization rather than with manufacturing or selling.</td>
</tr>
<tr>
<td>Common cost</td>
<td>A cost that is incurred to support a number of cost objects but that cannot be traced to them individually. For example, the wage cost of the pilot of a 747 airliner is a common cost of all of the passengers on the aircraft. Without the pilot, there would be no flight and no passengers. But no part of the pilot’s wage is caused by any one passenger taking the flight.</td>
</tr>
<tr>
<td>Conversion cost</td>
<td>Direct labor cost plus manufacturing overhead cost.</td>
</tr>
<tr>
<td>Cost behavior</td>
<td>The way in which a cost reacts to changes in the level of</td>
</tr>
<tr>
<td><strong>Cost object</strong></td>
<td>Anything for which cost data are desired. Examples of cost objects are products, customers, jobs, and parts of the organization such as departments or divisions.</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Cost of goods manufactured</strong></td>
<td>The manufacturing costs associated with the goods that were finished during the period.</td>
</tr>
<tr>
<td><strong>Differential cost</strong></td>
<td>A difference in cost between two alternatives. Also see <em>Incremental cost</em>.</td>
</tr>
<tr>
<td><strong>Differential revenue</strong></td>
<td>The difference in revenue between two alternatives.</td>
</tr>
<tr>
<td><strong>Direct cost</strong></td>
<td>A cost that can be easily and conveniently traced to a specified cost object.</td>
</tr>
<tr>
<td><strong>Direct labor</strong></td>
<td>Factory labor costs that can be easily traced to individual units of product. Also called <em>touch labor</em>.</td>
</tr>
<tr>
<td><strong>Direct materials</strong></td>
<td>Materials that become an integral part of a finished product and whose costs can be conveniently traced to it.</td>
</tr>
<tr>
<td><strong>Finished goods</strong></td>
<td>Units of product that have been completed but not yet sold to customers.</td>
</tr>
<tr>
<td><strong>Fixed cost</strong></td>
<td>A cost that remains constant, in total, regardless of changes in the level of activity within the relevant range. If a fixed cost is expressed on a per unit basis, it varies inversely with the level of activity.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Incremental cost</strong></td>
<td>An increase in cost between two alternatives. Also see <em>Differential cost.</em></td>
</tr>
<tr>
<td><strong>Indirect cost</strong></td>
<td>A cost that cannot be easily and conveniently traced to a specified cost object.</td>
</tr>
<tr>
<td><strong>Indirect labor</strong></td>
<td>The labor costs of janitors, supervisors, materials handlers, and other factory workers that cannot be conveniently traced to particular products.</td>
</tr>
<tr>
<td><strong>Indirect materials</strong></td>
<td>Small items of material such as glue and nails that may be an integral part of a finished product, but whose costs cannot be easily or conveniently traced to it.</td>
</tr>
<tr>
<td><strong>Inventoriable costs</strong></td>
<td>Synonym for <em>product costs.</em></td>
</tr>
<tr>
<td><strong>Manufacturing overhead</strong></td>
<td>All manufacturing costs except direct materials and direct labor.</td>
</tr>
<tr>
<td><strong>Opportunity cost</strong></td>
<td>The potential benefit that is given up when one alternative is selected over another.</td>
</tr>
<tr>
<td><strong>Period costs</strong></td>
<td>Costs that are taken directly to the income statement as expenses in the period in which they are incurred or accrued.</td>
</tr>
<tr>
<td><strong>Prime cost</strong></td>
<td>Direct materials cost plus direct labor cost.</td>
</tr>
<tr>
<td><strong>Product costs</strong></td>
<td>All costs that are involved in acquiring or making a product. In the case of manufactured goods, these costs consist of</td>
</tr>
</tbody>
</table>
direct materials, direct labor, and manufacturing overhead. Also see *Inventoriable costs.*

| **Raw materials** | Any materials that go into the final product. |
| **Relevant range** | The range of activity within which assumptions about variable and fixed cost behavior are valid. |
| **Schedule of cost of goods manufactured** | A schedule showing the direct materials, direct labor, and manufacturing overhead costs incurred during a period and the portion of those costs that are assigned to Work in Process and Finished Goods. |
| **Selling costs** | All costs that are incurred to secure customer orders and get the finished product or service into the hands of the customer. |
| **Sunk cost** | A cost that has already been incurred and that cannot be changed by any decision made now or in the future. |
| **Variable cost** | A cost that varies, in total, in direct proportion to changes in the level of activity. A variable cost is constant per unit. |
| **Work in process** | Units of product that are only partially complete. |
Problems

P2-1)  
The following data (in thousands of dollars) have been taken from the accounting records of Kovach Corporation for the just completed year.

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials inventory, beginning</td>
<td>$80</td>
</tr>
<tr>
<td>Raw materials inventory, ending</td>
<td>140</td>
</tr>
<tr>
<td>Work in process inventory, beginning</td>
<td>140</td>
</tr>
<tr>
<td>Work in process inventory, ending</td>
<td>100</td>
</tr>
<tr>
<td>Finished goods inventory, beginning</td>
<td>240</td>
</tr>
<tr>
<td>Finished goods inventory, ending</td>
<td>320</td>
</tr>
<tr>
<td>Administrative expenses</td>
<td>300</td>
</tr>
<tr>
<td>Direct labor</td>
<td>400</td>
</tr>
<tr>
<td>Manufacturing overhead</td>
<td>460</td>
</tr>
<tr>
<td>Purchases of raw materials</td>
<td>240</td>
</tr>
<tr>
<td>Sales</td>
<td>1,980</td>
</tr>
<tr>
<td>Selling expenses</td>
<td>280</td>
</tr>
</tbody>
</table>

Part (a) What was the cost of the raw materials used in production during the year (in thousands of dollars)?

Part (b) What was the cost of goods manufactured (finished) for the year (in thousands of dollars)?

Part (c) What was the cost of goods sold for the year (in thousands of dollars)?

Part (d) What was the net income for the year (in thousands of dollars)?

P2-2)  
The following information is taken from the December 31, 2005, adjusted trial balance and other records of OTW Company before the calendar year-end closing entries are recorded:
### Required

1. Prepare the 2005 schedule of cost of goods manufactured for the company.

2. Prepare the 2005 income statement for the company that reports separate categories for: (a) selling expenses, (b) general and administrative expenses, and, (3) income tax expense.

<table>
<thead>
<tr>
<th>Item</th>
<th>2005</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising expense</td>
<td>$14,000</td>
<td></td>
</tr>
<tr>
<td>Depreciation expense — Office equipment</td>
<td>5,100</td>
<td></td>
</tr>
<tr>
<td>Depreciation expense — Selling equipment</td>
<td>8,560</td>
<td></td>
</tr>
<tr>
<td>Depreciation expense — Factory equipment</td>
<td>32,420</td>
<td></td>
</tr>
<tr>
<td>Factory supervision</td>
<td>98,100</td>
<td></td>
</tr>
<tr>
<td>Factory supplies used</td>
<td>18,400</td>
<td></td>
</tr>
<tr>
<td>Factory utilities</td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>Inventories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw materials, December 31, 2004</td>
<td>112,350</td>
<td></td>
</tr>
<tr>
<td>Raw materials, December 31, 2005</td>
<td>212,000</td>
<td></td>
</tr>
<tr>
<td>Goods in process, December 31, 2004</td>
<td>13,300</td>
<td></td>
</tr>
<tr>
<td>Goods in process, December 31, 2005</td>
<td>17,080</td>
<td></td>
</tr>
<tr>
<td>Finished goods, December 31, 2004</td>
<td>122,500</td>
<td></td>
</tr>
<tr>
<td>Finished goods, December 31, 2005</td>
<td>156,000</td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
<td>700,000</td>
<td></td>
</tr>
<tr>
<td>Income taxes expense</td>
<td>212,000</td>
<td></td>
</tr>
<tr>
<td>Indirect labor</td>
<td>75,070</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous production costs</td>
<td>16,125</td>
<td></td>
</tr>
<tr>
<td>Office salaries expense</td>
<td>57,000</td>
<td></td>
</tr>
<tr>
<td>Rent expense — Office space</td>
<td>11,000</td>
<td></td>
</tr>
<tr>
<td>Rent expense — Selling space</td>
<td>31,800</td>
<td></td>
</tr>
<tr>
<td>Rent expense — Factory building</td>
<td>46,790</td>
<td></td>
</tr>
<tr>
<td>Maintenance — Factory equipment</td>
<td>34,500</td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>4,579,000</td>
<td></td>
</tr>
<tr>
<td>Sales discounts</td>
<td>42,500</td>
<td></td>
</tr>
<tr>
<td>Sales salaries expense</td>
<td>382,160</td>
<td></td>
</tr>
</tbody>
</table>

---

Compiled By Nut Khorn - Page 41 - www.nutkhorn.wordpress.com
Tommi Corporation incurred the following costs while manufacturing its product:

<table>
<thead>
<tr>
<th>Item</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials used in product</td>
<td>$120,000</td>
<td>$45,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depreciation on plant</td>
<td>60,000</td>
<td>19,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property taxes on store</td>
<td>7,500</td>
<td>21,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor costs of assembly-line workers</td>
<td>110,000</td>
<td>35,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factory supplies used</td>
<td>25,000</td>
<td>50,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$18,700</td>
<td>$19,500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Work-in-process inventory was $10,000 at January 1 and $14,000 at December 31. Finished goods inventory was $60,500 at January 1 and $50,600 at December 31.

**Instructions**

(a) Compute cost of goods manufactured.
(b) Compute cost of goods sold.

**P2-4**

Data are provided below for four cases. Each case is independent of the others.

**Required:**

Supply the missing data in the following cases.

<table>
<thead>
<tr>
<th>Case</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schedule of Cost of Goods Manufactured</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct materials</td>
<td>$7,200</td>
<td>$4,500</td>
<td>$8,000</td>
<td>$7,500</td>
</tr>
<tr>
<td>Direct labor</td>
<td>?</td>
<td>3,900</td>
<td>7,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Manufacturing overhead</td>
<td>5,500</td>
<td>4,000</td>
<td>?</td>
<td>4,900</td>
</tr>
<tr>
<td>Total manufacturing costs</td>
<td>18,700</td>
<td>?</td>
<td>19,500</td>
<td>?</td>
</tr>
<tr>
<td>Beginning work in process inventory</td>
<td>1,000</td>
<td>?</td>
<td>2,500</td>
<td>?</td>
</tr>
<tr>
<td>Ending work in process inventory</td>
<td>?</td>
<td>1,000</td>
<td>3,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Cost of goods manufactured</td>
<td>$17,700</td>
<td>$13,400</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

| **Income Statement** | | | | |
| Sales | $35,000 | $40,000 | $15,000 | $38,000 |
| Beginning finished goods inventory | 2,500 | 3,000 | ? | 4,000 |
| Cost of goods manufactured | ? | ? | ? | 19,300 |
| Goods available for sale | ? | ? | ? | ? |
| Ending finished goods inventory | ? | 1,200 | 12,000 | 2,000 |
| Cost of goods sold | 17,200 | ? | 10,000 | ? |
| Gross margin | 17,800 | ? | 5,000 | ? |
| Selling and administrative expenses | ? | 9,200 | ? | ? |
| Net operating income | $15,800 | $ ? | $3,000 | $11,100 |
Selected account balances for the year ended December 31 are provided below for Rolling Company:

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling and administrative salaries</td>
<td>$150,000</td>
</tr>
<tr>
<td>Insurance, factory</td>
<td>$7,500</td>
</tr>
<tr>
<td>Utilities, factory</td>
<td>$30,000</td>
</tr>
<tr>
<td>Purchases of raw materials</td>
<td>$165,000</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>$45,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td></td>
</tr>
<tr>
<td>Advertising expense</td>
<td>$76,000</td>
</tr>
<tr>
<td>Cleaning supplies, factory</td>
<td>$4,900</td>
</tr>
<tr>
<td>Sales commissions</td>
<td>$54,000</td>
</tr>
<tr>
<td>Rent, factory building</td>
<td>$110,000</td>
</tr>
<tr>
<td>Maintenance, factory</td>
<td>$22,500</td>
</tr>
</tbody>
</table>

Inventory balances at the beginning and end of the year were as follows:

<table>
<thead>
<tr>
<th></th>
<th>Beginning of the Year</th>
<th>End of the Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>$35,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Work in process</td>
<td>?</td>
<td>$27,500</td>
</tr>
<tr>
<td>Finished goods</td>
<td>$45,000</td>
<td>?</td>
</tr>
</tbody>
</table>

The total manufacturing costs for the year were $479,000; the goods available for sale totaled $520,000; and the cost of goods sold totaled $500,000.

Required:

1. Prepare a schedule of cost of goods manufactured and the cost of goods sold section of the company’s income statement for the year.
2. The company produced the equivalent of 10,000 units during the year. Compute the average cost per unit for direct materials used and the average cost per unit for rent on the factory building.
3. In the following year the company expects to produce 20,000 units. What average cost per unit and total cost would you expect to be incurred for direct materials? For rent on the factory building? (Assume that direct materials is a variable cost and that rent is a fixed cost.)
4. Explain to the president the reason for any difference in the average cost per unit between (2) and (3) above.

CHECK FIGURE (1) Cost of goods manufactured: $475,000

Various cost and sales data for Jaskot Company for the just completed year follow:

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished goods inventory, beginning</td>
<td>$22,000</td>
</tr>
<tr>
<td>Finished goods inventory, ending</td>
<td>$18,000</td>
</tr>
<tr>
<td>Depreciation, factory</td>
<td>$24,000</td>
</tr>
<tr>
<td>Administrative expenses</td>
<td>$36,000</td>
</tr>
<tr>
<td>Utilities, factory</td>
<td>$15,000</td>
</tr>
<tr>
<td>Maintenance, factory</td>
<td>$12,000</td>
</tr>
<tr>
<td>Supplies, factory</td>
<td>$6,000</td>
</tr>
<tr>
<td>Insurance, factory</td>
<td>$5,000</td>
</tr>
<tr>
<td>Purchases of raw materials</td>
<td>$102,500</td>
</tr>
</tbody>
</table>
Raw materials inventory, beginning .......... $8,000
Raw materials inventory, ending............. $10,000
Direct labor ...................................... $60,000
Indirect labor ..................................... $18,000
Work in process inventory, beginning ...... $10,000
Work in process inventory, ending .......... $12,000
Sales ............................................. $400,000
Selling expenses................................ $63,000

Required:

1. Prepare a schedule of cost of goods manufactured.
2. Prepare an income statement.
3. The company produced the equivalent of 10,000 units of product during the year just completed. What was the average cost per unit for direct materials? What was the average cost per unit for factory depreciation?
4. The company expects to produce 12,000 units of product during the coming year. What average cost per unit and what total cost would you expect the company to incur for direct materials at this level of activity? For factory depreciation? (In preparing your answer, assume that direct materials is a variable cost and that depreciation is a fixed cost that is computed on a straight-line basis.)
5. Explain to the president any difference in the average cost per unit between (3) and (4) above.

CHECK FIGURE (1) Cost of goods manufactured: $238,500

Madlinx Company was organized on April 1 of the current year. After five months of start-up losses, management had expected to earn a profit during September, the most recent month. Management was disappointed, however, when the income statement for September also showed a loss. September’s income statement follows:

Madlinx Company
Income Statement
For the Month Ended September 30

Sales ............................................. $725,000
Less operating expenses:
   Indirect labor cost....................... $ 22,000
   Utilities.................................  23,000
   Direct labor cost ...................... 115,000
   Depreciation, factory equipment ......  32,000
   Raw materials purchased ............ 275,000
   Depreciation, sales equipment ......  28,000
   Insurance ...............................  6,800
   Rent on facilities ......................  85,000
   Selling and administrative salaries ..  51,000
   Advertising ............................ 100,000  737,800
Net operating loss ........................... $(12,800)

After seeing the $12,800 loss for September, Madlinx’s president stated, “I was sure we’d be profitable within six months, but our six months are up and this loss for September is even worse than August’s. I think it’s time to start looking for someone to buy out the company’s assets—if we don’t, within a few
months there won’t be any assets to sell. By the way, I don’t see any reason to
look for a new controller. We’ll just limp along with Harry for the time being.”

The company’s controller resigned a month ago. Harry, a new
inexperienced assistant in the controller’s office, prepared the income statement
above. Additional information about the company follows:

a. Some 75% of the utilities cost and 65% of the insurance apply to factory operations. The
remaining amounts apply to selling and administrative activities.

b. Inventory balances at the beginning and end of September were:

<table>
<thead>
<tr>
<th>September 1</th>
<th>September 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>$12,000</td>
</tr>
<tr>
<td>Work in process</td>
<td>31,000</td>
</tr>
<tr>
<td>Finished goods</td>
<td>35,000</td>
</tr>
</tbody>
</table>

c. Only 70% of the rent on facilities applies to factory operations; the remainder applies to
selling and administrative activities.

The president has asked you to check over the income statement and
make a recommendation as to whether the company should look for a buyer for
its assets.

Required:

1. As one step in gathering data for a recommendation to the president, prepare a schedule of
cost of goods manufactured for September.
2. As a second step, prepare a new income statement for September.
3. Based on your statements prepared in (1) and (2) above, would you recommend that the
company look for a buyer?

P2-8

Selected account balances for the year ended December 31 are provided below
for Rolling Company:

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selling and administrative salaries</td>
<td>$55,000</td>
</tr>
<tr>
<td>Insurance, factory</td>
<td>$6,000</td>
</tr>
<tr>
<td>Utilities, factory</td>
<td>$10,000</td>
</tr>
<tr>
<td>Purchases of raw materials</td>
<td>$76,000</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>$3,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>?</td>
</tr>
<tr>
<td>Advertising expense</td>
<td>$26,000</td>
</tr>
<tr>
<td>Cleaning supplies, factory</td>
<td>$4,000</td>
</tr>
<tr>
<td>Sales commissions</td>
<td>$33,000</td>
</tr>
<tr>
<td>Rent, factory building</td>
<td>$49,000</td>
</tr>
<tr>
<td>Maintenance, factory</td>
<td>$15,000</td>
</tr>
</tbody>
</table>

Inventory balances at the beginning and end of the year were as follows:

<table>
<thead>
<tr>
<th>Inventory</th>
<th>Beginning of the year</th>
<th>End of the year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>$3,000</td>
<td>$9,000</td>
</tr>
</tbody>
</table>
The total manufacturing costs for the year were $242,000; the goods available for sale totaled $269,000; and the cost of goods sold totaled $229,000.

Required:

1. Prepare a schedule of cost of goods manufacturing in good form and the cost of goods sold section of the company’s income statement for the year.

2. The company produced the equivalent of 7,000 units during the year.

Compute the average cost per unit for direct materials used and the average per unit for rent on the factory building.

The cost of goods manufactured schedule shows each of the cost elements. Complete the following schedule for Lanier Manufacturing Company:

LANIER MANUFACTURING COMPANY
Cost of Goods Manufactured Schedule
For the Year Ended December 31, 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process (1/1)</td>
<td>$200,000</td>
</tr>
<tr>
<td>Direct materials</td>
<td></td>
</tr>
<tr>
<td>Raw materials inventory (1/1)</td>
<td>$?</td>
</tr>
<tr>
<td>Add: raw material purchases</td>
<td>$158,000</td>
</tr>
<tr>
<td>Less: raw material purchases</td>
<td>$6,500</td>
</tr>
<tr>
<td>Direct material used</td>
<td>$190,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td></td>
</tr>
<tr>
<td>Manufacturing overhead</td>
<td></td>
</tr>
<tr>
<td>Indirect labor</td>
<td>$18,000</td>
</tr>
<tr>
<td>Factory depreciation</td>
<td>$36,000</td>
</tr>
<tr>
<td>Factory utilities</td>
<td>$68,000</td>
</tr>
<tr>
<td>Total overhead</td>
<td>$122,000</td>
</tr>
<tr>
<td>Total manufacturing costs</td>
<td>$560,000</td>
</tr>
<tr>
<td>Total cost work in process</td>
<td>$?</td>
</tr>
<tr>
<td>Less: work in process (12/31)</td>
<td>$87,000</td>
</tr>
<tr>
<td>Cost of goods manufactured</td>
<td>$560,000</td>
</tr>
</tbody>
</table>

Hawkinson Company is manufacturer of toys. Its controller, Al Duryea, resigned on August 2010. An inexperienced assistant accountant has prepared the following income statement for the month of August 2010.

HAWKINSON COMPANY
Income Statement
For the Month Ended August 31, 2010

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales (net)</td>
<td>$670,000</td>
</tr>
<tr>
<td>Less: Operating expenses</td>
<td></td>
</tr>
</tbody>
</table>

Compiled By Nut Khorn -Page 46- www.nutkhorn.wordpress.com
Raw materials purchased $200,000
Direct labor cost $150,000
Advertising expense $80,000
Selling and administrating salaries $70,000
Rent on factory facilities $60,000
Depreciation on sales equipment $55,000
Depreciation on factory equipment $40,000
Indirect labor cost $20,000
Factory utilities $10,000
Factory insurance $5,000

Net loss $(20,000)

Prior to August 2010 the company has been profitable every month. The company’s president is concerned about the accuracy of the income statement above. As a friend of the president, you have been asked to review the income statement and make necessary corrections. After examining other manufacturing cost data, you have required additional information as follows:

1. Inventory balance at the beginning and end of August were:

<table>
<thead>
<tr>
<th></th>
<th>August 1</th>
<th>August 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials ..........</td>
<td>$18,000</td>
<td>$33,000</td>
</tr>
<tr>
<td>Work in process ........</td>
<td>25,000</td>
<td>21,000</td>
</tr>
<tr>
<td>Finished goods ..........</td>
<td>40,000</td>
<td>62,000</td>
</tr>
</tbody>
</table>

2. Only 70% of the utilities expense and 80% of the insurance expense apply to factory operations; the remaining amounts should be charged to selling and administrative activities.

Instructions:

(a) Prepare a cost of goods manufactured schedule for August 2010.

(b) Prepare a correct income statement for August 2010.

Manufacturing cost data for Natasha Company are presented below.

<table>
<thead>
<tr>
<th></th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials used</td>
<td>(a)</td>
<td>$68,400</td>
<td>$130,600</td>
</tr>
<tr>
<td>Direct labor</td>
<td>$ 57,400</td>
<td>$65,500</td>
<td>(g)</td>
</tr>
<tr>
<td>Manufacturing overhead</td>
<td>46,500</td>
<td>81,600</td>
<td>102,000</td>
</tr>
<tr>
<td>Total manufacturing costs</td>
<td>175,650</td>
<td>(d)</td>
<td>273,700</td>
</tr>
<tr>
<td>Work in process 1/1/11</td>
<td>(b)</td>
<td>15,600</td>
<td>(h)</td>
</tr>
<tr>
<td>Total cost of work in process</td>
<td>221,500</td>
<td>(e)</td>
<td>335,000</td>
</tr>
<tr>
<td>Work in process 12/31/11</td>
<td>(c)</td>
<td>11,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Cost of goods manufactured</td>
<td>180,725</td>
<td>(f)</td>
<td>(i)</td>
</tr>
</tbody>
</table>
**Instructions**
Indicate the missing amount for each letter (a) through (i).

**P2-12**
Incomplete manufacturing cost data for Heintz Company for 2011 are presented as follows for four different situations.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>$127,000</td>
<td>$140,000</td>
<td>$89,000</td>
<td>(a)</td>
<td>$33,000</td>
<td>(b)</td>
<td>$360,000</td>
</tr>
<tr>
<td>(2)</td>
<td>(c) 200,000</td>
<td>123,000</td>
<td>$430,000</td>
<td>(d)</td>
<td>(e) 40,000</td>
<td>(f) 470,000</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>80,000</td>
<td>100,000</td>
<td>(c) 257,000</td>
<td>(e) 60,000</td>
<td>(h) 80,000</td>
<td>(f) 270,000</td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>67,000</td>
<td>(g) 75,000</td>
<td>308,000</td>
<td>(h) 45,000</td>
<td>(i) 270,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Instructions**
(a) Indicate the missing amount for each letter.
(b) Prepare a condensed cost of goods manufactured schedule for situation (1) for the year ended December 31, 2011.

**P2-13**
Tart Corporation has the following cost records for June 2011.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indirect factory labor</td>
<td>$ 4,500</td>
</tr>
<tr>
<td>Direct materials used</td>
<td>25,000</td>
</tr>
<tr>
<td>Work in process, 6/1/11</td>
<td>3,000</td>
</tr>
<tr>
<td>Work in process, 6/30/11</td>
<td>2,800</td>
</tr>
<tr>
<td>Finished goods, 6/1/11</td>
<td>5,000</td>
</tr>
<tr>
<td>Finished goods, 6/30/11</td>
<td>9,500</td>
</tr>
<tr>
<td>Factory utilities</td>
<td>$ 400</td>
</tr>
<tr>
<td>Depreciation, factory equipment</td>
<td>1,400</td>
</tr>
<tr>
<td>Direct labor</td>
<td>30,000</td>
</tr>
<tr>
<td>Maintenance, factory equipment</td>
<td>1,800</td>
</tr>
<tr>
<td>Indirect materials</td>
<td>2,200</td>
</tr>
<tr>
<td>Factory manager's salary</td>
<td>5,000</td>
</tr>
</tbody>
</table>

**Instructions**
(a) Prepare a cost of goods manufactured schedule for June 2011.
(b) Prepare an income statement through gross profit for June 2011 assuming net sales are $85,100.

**The End of Chapter 02**
Chapter 3: System Design: Job Order Costing

LEARNING OBJECTIVE

1. Distinguish between process costing and job-order costing.

2. Identify the documents used in a job-order costing system.

3. Compute predetermined overhead rates and explain why estimated overhead costs (rather than the actual overhead costs) are used in the costing process.

4. Prepare journal entry to record costs in job-order costing system.

5. Apply overhead cost to work in process using predetermined overhead rate.

6. Prepare T-account to show the flow of costs in job-order costing system and prepare cost of goods manufactured.

7. Compute the under-or overapplied overhead cost and prepare the journal entry to close the balance in manufacturing overhead to the appropriate accounts.
3.1 Process and job-order costing

In computing the cost of a product or service, managers are faced with a difficult problem. Many costs (such as rent) do not change much from month to month, whereas production may change frequently, with production going up in one month and down in another.

Two costing systems are commonly used in manufacturing and in many service companies; these two systems are known as process costing and job-order costing.

We find out Cost per job

\[
\text{Cost per Job} = \frac{\text{Total Cost}}{\text{Units Completed}}
\]

3.2 Process costing

A process costing is used in situations where the company produce many units of a single product for long period at a time.

The basis approach in process costing is to accumulate cost in a particular operation or department for an entire period (month, quarter, year) and then to divide this total by number of units produced during the period.

\[
\text{Unit cost} = \frac{\text{Total manufacturing cost}}{\text{Total units produced}}
\]

3.3 Job-order costing

A job order costing system is used in situations where many different products are produced each period. In job-order costing system, costs are traced and allocated to the job and then the costs of the job are divided by the number of units in the job to arrive at average cost per unit.

Comparing Process and Job-Order Costing

<table>
<thead>
<tr>
<th></th>
<th>Job-Order</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of jobs worked</td>
<td>Many</td>
<td>Single Product</td>
</tr>
<tr>
<td>Cost accumulated by</td>
<td>Job</td>
<td>Department</td>
</tr>
<tr>
<td>Average cost computed</td>
<td>Job</td>
<td>Department</td>
</tr>
</tbody>
</table>
The Flow of Documents in a Job-Order Costing System

Notes to Manufacturing Overheads (Predetermined Overhead Rates =POHR)

At the beginning of the period:

Estimated total manufacturing overhead cost + Estimated total units in the allocation base = Predetermined overhead rate

During the period:

Predetermined overhead rate × Actual total units of the allocation base incurred during the period = Total manufacturing overhead applied

At the end of the period:

Actual total manufacturing overhead cost - Total manufacturing overhead applied = Underapplied (overapplied) overhead

A General Model of Cost Flows
3.4 The Job Cost Sheet

The *job cost sheet* is used by the accounting department to track the direct and indirect costs associated with a given job. We will look at a job cost sheet used by a hypothetical company called PearCo. The company has a job that calls for the construction of wooden cargo crates. You can see the separate sections for direct materials, direct labor, and manufacturing overhead. In addition, we have a section to summarize total costs of the job. A job number uniquely identifies each job. Direct material, direct labor and manufacturing overhead costs are accumulated for each job. The job cost sheet is a subsidiary ledger to the Work in Process account.
**JOB COST SHEET**

<table>
<thead>
<tr>
<th>Job Number</th>
<th>2B47</th>
<th>Date Initiated</th>
<th>March 2</th>
<th>Date Completed</th>
<th>March 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department</td>
<td>Milling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Item</td>
<td>Special order coupling</td>
<td>Unites Completed</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For Stock</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct Materials</th>
<th>Direct Labor</th>
<th>Manufacturing Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Req. No.</td>
<td>Amount</td>
<td>Ticket</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>14873</td>
<td>$ 660</td>
<td>843</td>
</tr>
<tr>
<td>14875</td>
<td>506</td>
<td>846</td>
</tr>
<tr>
<td>14912</td>
<td>238</td>
<td>850</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$1,404</strong></td>
<td><strong>851</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost Summary</th>
<th>Units Shipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials</td>
<td>$1,404</td>
</tr>
<tr>
<td>Direct Labor</td>
<td>$ 180</td>
</tr>
<tr>
<td>Manufacturing Overhead</td>
<td>$ 216</td>
</tr>
<tr>
<td>Total Product Cost</td>
<td>$1,800</td>
</tr>
<tr>
<td>Unit Product Cost</td>
<td>$ 900$*</td>
</tr>
</tbody>
</table>

*$1,800 ÷ 2 units = $900 per unit.
3.5 Job-Order Costing: The Flow of Costs

The transactions (in T-account and journal entry form) that capture the flow of costs in a job-order costing system are illustrated on the following steps.
A. Process costing and job-order costing are the two basic costing systems commonly used in manufacturing and in many service organizations.

1. Process costing is used in situations where a single homogeneous product such as bricks is produced for long periods of time.

2. Job-order costing is used in situations where many different products or services are produced each period. Examples include special-order printing and furniture manufacturing where products are typically produced in small batches. For example, two or three sofas of a particular design and fabric covering might be made in one batch. Each batch is called a "job." In a consulting company, a job would be a particular consulting project.

B. We begin our discussion of job-order costing with raw materials. When materials are purchased, their costs are recorded in the Raw Materials inventory account, which is an asset. If the materials are paid for with cash, the journal entry would look like this:

\[
\text{Raw Materials} \quad XXX \\
\text{Cash} \quad XXX
\]

1. When a job is started, materials are withdrawn from storage. The document that authorizes this withdrawal is called a materials requisition form. This form lists all the materials required to complete a specific job. The journal entry to record withdrawal of raw materials from the storeroom for use in production is:

\[
\text{Work in Process} \quad XXX \\
\text{Manufacturing Overhead} \quad XXX \\
\text{Raw Materials} \quad XXX
\]

Materials that are traced directly to jobs are classified as direct materials and are debited to Work in Process. Any materials that are not directly traced to jobs are classified as indirect materials and are debited to a special control account called Manufacturing Overhead.

2. When materials are placed into production, they are also recorded on a job cost sheet, which summarizes all production costs assigned to a particular job. Exhibit 3-2 in the text illustrates a job cost sheet.

C. Labor costs are recorded on time tickets or time sheets that are filled out by employees. These documents list the amount of time each employee works on specific jobs and tasks.
1. Labor time spent working directly on specific jobs is called direct labor. Labor time spent working on supportive tasks (e.g., supervision, maintenance, janitorial) is called indirect labor. The entry to record labor costs is:

\[
\begin{align*}
\text{Work in Process} & \quad XXX \\
\text{Manufacturing Overhead} & \quad XXX \\
\text{Salaries and Wages Payable} & \quad XXX
\end{align*}
\]

Direct labor costs are debited to Work in Process. Indirect labor costs are debited to the control account Manufacturing Overhead.

2. Direct labor costs are added to the individual job cost sheets at the same time they are recorded in the formal accounts.

D. As explained in Chapter 2, manufacturing overhead consists of indirect manufacturing costs that cannot be easily traced to individual products or jobs. Manufacturing overhead costs are assigned to jobs using a predetermined overhead rate.

1. The predetermined overhead rate is computed before the period begins and is based entirely on estimated data. Ordinarily, the rate is computed for an entire year to eliminate seasonal fluctuations. The formula is:

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

An allocation base is a measure of activity, such as direct labor-hours, direct labor cost, or machine-hours. The allocation base is something that all jobs have in common—for example, all of the jobs may require direct labor-hours. Ideally, the allocation base should actually cause variations in manufacturing overhead costs, but in practice this ideal is often ignored.

2. Suppose direct labor-hours is used as the allocation base; the estimated total manufacturing overhead cost for next year is $400,000; and, the estimated total number of direct labor-hours for next year is 10,000. Then the predetermined overhead rate would be $40 per direct labor-hour ($400,000 \div 10,000 \text{ direct labor-hours})

3. To assign overhead costs to a job, the predetermined overhead rate is multiplied by the actual amount of the allocation base incurred by the job. For example, suppose that a particular job incurs 20 direct labor-hours and the predetermined overhead rate is
$40 per direct labor-hour. Then $800 (20 direct labor-hours × $40 per direct labor-hour) of overhead cost would be applied to that job. This $800 is called the overhead applied. Note that this is not actual overhead spending on the job. The $800 may have little to do with any overhead that is actually caused by the job. It is simply a way of distributing the overhead costs that were estimated at the beginning of the year among the jobs worked on during the year.

4. The overhead that is applied to a job is entered on its job cost sheet and is recorded in the company’s formal accounts with the following journal entry:

\[
\begin{align*}
\text{Work in Process} & \hspace{1cm} XXX \\
\text{Manufacturing Overhead} & \hspace{1cm} XXX
\end{align*}
\]

Note that in this case, the Manufacturing Overhead control account is credited, rather than debited.

5. Turn to Exhibit 3-8 in the text to see how overhead costs flow through the accounts and onto the job cost sheets. Notice from the exhibit that applying overhead to jobs and recording actual overhead costs represent two separate and distinct processes. This is a key concept that you must understand.

6. Actual overhead costs are not charged to Work in Process. Instead, they are charged to the Manufacturing Overhead control account as we saw in the entries for indirect labor and indirect materials above. Note that actual overhead costs all appear as debits to Manufacturing Overhead.

E. When jobs are completed, their costs are transferred from Work in Process to Finished Goods. The journal entry is:

\[
\begin{align*}
\text{Finished Goods} & \hspace{1cm} XXX \\
\text{Work in Process} & \hspace{1cm} XXX
\end{align*}
\]

When completed products are sold, their costs are transferred from Finished Goods to Cost of Goods Sold. The journal entry is:

\[
\begin{align*}
\text{Cost of Goods Sold} & \hspace{1cm} XXX \\
\text{Finished Goods} & \hspace{1cm} XXX
\end{align*}
\]

F. Exhibits 3-10, 3-11 and 3-12 are key exhibits that summarize much of the material in the chapter. Study these exhibits with care. Note particularly how the manufacturing overhead costs are handled.

G. Generally, the amount of overhead cost applied to Work in Process will differ from the amount of actual overhead cost incurred. This difference is reflected in a debit or credit balance in the Manufacturing Overhead account.

1. If overhead applied is less than the actual overhead costs incurred, then overhead has been un-
derapplied. In this case, the Manufacturing Overhead account will have a debit balance.

2. If overhead applied to Work in Process exceeds the amount of overhead cost actually incurred, then overhead has been overapplied. In this case, the Manufacturing Overhead account will have a credit balance.

3. In addition to observing the balance in the Manufacturing Overhead account, underapplied or overapplied overhead can be computed as follows:

\[
\begin{align*}
\text{Actual overhead costs} & \quad \text{XXX} \\
\text{Less: Overhead costs applied to Work in Process*} & \quad \text{XXX} \\
\text{Underapplied (overapplied) overhead} & \quad \text{XXX}
\end{align*}
\]

* Predetermined overhead rate × Actual amount of the allocation base incurred during the period.

4. At the end of a period, underapplied or overapplied overhead may be closed out to Cost of Goods Sold or it may be allocated among Work in Process, Finished Goods, and Cost of Goods Sold.

   a. Closing out any balance to Cost of Goods Sold is simpler than the allocation method. If overhead has been underapplied, the entry would be:

   \[
   \begin{align*}
   \text{Cost of Goods Sold} & \quad \text{XXX} \\
   \text{Manufacturing Overhead} & \quad \text{XXX}
   \end{align*}
   \]

   This entry increases Cost of Goods Sold. If overhead has been underapplied, not enough overhead cost was applied to jobs during the period, and therefore costs are understated in the accounts. The journal entry above adjusts Cost of Goods Sold so that it is no longer understated.

   If overhead has been overapplied, the journal entry would be:

   \[
   \begin{align*}
   \text{Manufacturing Overhead} & \quad \text{XXX} \\
   \text{Cost of Goods Sold} & \quad \text{XXX}
   \end{align*}
   \]

   This entry decreases Cost of Goods Sold. If overhead has been overapplied, too much overhead cost was applied to jobs during the period, and therefore costs are overstated in the accounts. The above journal entry adjusts Cost of Goods Sold so that it is no longer overstated.

   b. Allocating any underapplied or overapplied overhead among inventory accounts and Cost of Goods Sold is more complex, but is considered to be more accurate. The allocation is based on the amount of the overhead applied from the current period that remains in the ending balances of the Work in Process, Finished Goods, and Cost of Goods Sold accounts. As-
uming that overhead is underapplied, the entry would be:

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in Process</td>
<td>XXX</td>
</tr>
<tr>
<td>Finished Goods</td>
<td>XXX</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>XXX</td>
</tr>
<tr>
<td>Manufacturing Overhead</td>
<td>XXX</td>
</tr>
</tbody>
</table>

H. For simplicity, the chapter assumes that a single “plant-wide” overhead rate is used. Many companies use *multiple overhead rates* rather than a single plant wide rate. In such a system, each processing department, work center, or business activity has its own predetermined overhead rate. These more complex systems will be investigated in a later chapter.

**Appendix 3A: The Predetermined Overhead Rate and Capacity**

A. Traditionally, the denominator in the predetermined overhead rate is the *estimated* total amount of the allocation base for the next year.

\[
\text{Predetermined overhead rate} = \frac{\text{Estimated total manufacturing overhead cost}}{\text{Estimated total amount of the allocation base}}
\]

This traditional approach can lead to some potential problems.

1. If demand falls due to a recession or other reason, the estimated total amount of the allocation base is likely to fall. For example, in a recession total sales are likely to fall and the company may use less overtime or lay off workers so that the total amount of direct labor-hours declines as well. Because manufacturing overhead cost tends to be relatively fixed, the predetermined overhead rate will rise as the general level of activity falls. This will result in higher product costs and may lead managers to attempt to increase prices—which would be unwise in a recession.
2. Under the traditional method, products and services are charged for the resources they *don't* use as well as the resources they do use. Suppose, for example, that a particular product uses 10% of the capacity of a machine. Under the traditional method, if the machine is expected to be idle 50% of the time, the product will be charged for 20% of the cost of the machine. In effect, the product will be charged 10% of the total cost of the machine for the time it uses and 10% of the total cost of the machine for the idle capacity it does not use.

B. An alternative to the traditional method is to base the predetermined overhead rate on the total amount of the allocation base at capacity. For example, suppose that the estimated amount of machine-hours for the upcoming year is 80,000 hours even though the plant has capacity for 100,000 hours. Under this approach, the predetermined overhead rate would be based on the capacity of 100,000 hours rather than on the expected usage of 80,000 hours. This method has a number of advantages:

1. Product costs are stable and do not increase as the level of activity declines and decrease as the level of activity rises.

2. Products are charged only for their share of the costs of the resources they actually use.

C. When the predetermined overhead rate is based on the total amount of the allocation base at capacity, overhead will ordinarily be underapplied. This is because of idle capacity. Rather than closing out this underapplied overhead to Cost of Goods Sold or allocating it among inventories and Cost of Goods Sold, the underapplied overhead is treated as a period expense and is separately disclosed as "Cost of Unused Capacity." This treatment makes the costs of idle capacity much more visible than under the conventional approach.
We are now ready to take a more detailed look at the flow of costs through the company’s formal accounting system. To illustrate, we shall consider a single month’s activity for Rand Company, a producer of gold and silver commemorative medallions. Rand Company has two jobs in process during April, the first month of its fiscal year. Job A, a special minting of 1,000 gold medallions commemorating the world junior hockey championships held in Halifax, was started during March and had $30,000 in manufacturing costs already accumulated on April 1. Job B, an order for 10,000 silver medallions commemorating the same event, was started in April.

**The Purchase and Issue of Materials**

On April 1, Rand Company had $7,000 in raw materials on hand. During the month, the company purchased an additional $60,000 in raw materials. The purchase is recorded in journal entry (1) below:

<table>
<thead>
<tr>
<th>Raw Materials</th>
<th>Accounts Payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>$60,000</td>
<td>$60,000</td>
</tr>
</tbody>
</table>

As explained in Chapter 2, Raw Materials is an asset account. Thus, when raw materials are purchased, they are initially recorded as an asset—not as an expense.

**Issue of Direct and Indirect Materials**

During April, $52,000 in raw materials were requisitioned from the storeroom for use in production. Entry (2) records the issue of the materials to the production departments.

<table>
<thead>
<tr>
<th>Work in Process</th>
<th>Manufacturing Overhead</th>
<th>Raw Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50,000</td>
<td>$2,000</td>
<td>$52,000</td>
</tr>
</tbody>
</table>

The materials charged to Work in Process represent direct materials for specific jobs. As these materials are entered into the Work in Process account, they are also recorded on the appropriate job cost sheets. This point is illustrated in Exhibit 3–6, where $28,000 of the $50,000 in direct materials is charged to job A’s cost sheet and the remaining $22,000
**Labour Cost**

As work is performed in various departments of Rand Company from day to day, employee time tickets are filled out by workers, collected, and forwarded to the Accounting Department. In the Accounting Department, the tickets are costed according to the various employee wage rates, and the resulting costs are classified as either direct or indirect labour. This costing and classification for April resulted in the following summary entry:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in Process</td>
<td>$60,000</td>
</tr>
<tr>
<td>Manufacturing Overhead</td>
<td>$15,000</td>
</tr>
<tr>
<td>Salaries and Wages Payable</td>
<td>$75,000</td>
</tr>
</tbody>
</table>

Only direct labour is added to the Work in Process account. For Rand Company, this amounted to $60,000 for April.

At the same time that direct labour costs are added to Work in Process, they are also added to the individual job cost sheets, as shown in Exhibit 3–7. During April, $40,000 of direct labour cost was charged to job A and the remaining $20,000 was charged to job B.

The labour costs charged to Manufacturing Overhead represent the indirect labour costs of the period, such as supervision, janitorial work, and maintenance.

**Manufacturing Overhead Costs**

Recall that all costs of operating the factory other than direct materials and direct labour are classified as manufacturing overhead costs. These costs are entered directly into the Manufacturing Overhead account as they are incurred. To illustrate, assume that Rand Company incurred the following general factory costs during April:

- Utilities (heat, water, and power) $21,000
- Rent on factory equipment $16,000
- Miscellaneous factory costs $3,000

**Total** $40,000
The following entry records the incurrence of these costs:

(4)

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Overhead</td>
<td>40,000</td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>40,000</td>
</tr>
</tbody>
</table>

In addition, let us assume that during April, Rand Company recognized $13,000 in accrued property taxes and that $7,000 in prepaid insurance expired on factory buildings and equipment. The following entry records these items:

(5)

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Overhead</td>
<td>20,000</td>
</tr>
<tr>
<td>Property Taxes Payable</td>
<td>13,000</td>
</tr>
<tr>
<td>Prepaid Insurance</td>
<td>7,000</td>
</tr>
</tbody>
</table>

Finally, let us assume that the company recognized $18,000 in depreciation on factory equipment during April. The following entry records the accrual of this depreciation:

(6)

<table>
<thead>
<tr>
<th>Account</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Overhead</td>
<td>18,000</td>
</tr>
<tr>
<td>Accumulated Depreciation</td>
<td>18,000</td>
</tr>
</tbody>
</table>

In short, all manufacturing overhead costs are recorded directly into the Manufacturing Overhead account as they are incurred day by day throughout a period. It is important to understand that Manufacturing Overhead is a control account for many—perhaps thousands—of subsidiary accounts such as Indirect Materials, Indirect Labour, Factory Utilities, and so forth. As the Manufacturing Overhead account is debited for costs during a period, the various subsidiary accounts are also debited. In the example above and also in the assignment material for this chapter, we omit the entries to the subsidiary accounts for the sake of brevity.

**The Procedures for Charging Manufacturing Overhead**

Since actual manufacturing costs are charged to the Manufacturing Overhead control account rather than to Work in Process, how are manufacturing overhead costs assigned to Work in Process? The answer is, by means of the predetermined overhead rate. Recall from our discussion earlier in the chapter that a predetermined overhead rate is established at the beginning of each year. The rate is calculated by dividing the estimated total manufacturing overhead cost for the year by the estimated total units in the allocation base (measured in machine-hours, direct labour-hours, or some other base). The predetermined overhead rate is then used to apply overhead costs to jobs. For example, if direct labour-hours is the allocation base, overhead cost is applied to each job by multiplying the number of direct labour-hours charged to the job by the predetermined overhead rate. To illustrate, assume that Rand Company has used machine-hours in computing its predetermined overhead rate and that this rate is $6 per machine-hour. Also assume that during April, 10,000 machine-hours were worked on job A and 5,000 machine-hours were worked on job B (a total of 15,000 machine-hours). Thus, $90,000 in overhead cost (15,000 machine-hours*$6 = $90,000) would be applied to Work in Process. The following entry records the application of Manufacturing Overhead to Work in Process:
The flow of costs through the Manufacturing Overhead account is shown in Exhibit 3–8. The “actual overhead costs” in the Manufacturing Overhead account shown in Exhibit 3–8 are the costs that were added to the account in entries (2)–(6). Observe that the incurrence of these actual overhead costs [entries (2)–(6)] and the application of overhead to Work in Process [entry (7)] represent two separate and entirely distinct processes.

Exhibit 3–8 The Flow of Costs in Overhead Application

Non-manufacturing Costs

In addition to manufacturing costs, companies also incur marketing and selling costs. As explained in Chapter 2, these costs should be treated as period expenses and charged directly to the income statement. Non-manufacturing costs should not go into the Manufacturing Overhead account. To illustrate the correct treatment of non-manufacturing costs, assume that Rand Company incurred the following selling and administrative costs during April:

Top-management salaries .................................. $21,000
Other office salaries .......................................... 9,000
Total salaries .................................................. $30,000
The following entry records these salaries:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>8)</td>
<td>Salaries Expense</td>
<td>$30,000</td>
</tr>
<tr>
<td></td>
<td>Salaries and Wages Payable</td>
<td>$30,000</td>
</tr>
</tbody>
</table>

Assume that depreciation on office equipment during April was $7,000. The entry is as follows:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>9)</td>
<td>Depreciation Expense</td>
<td>$7,000</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation</td>
<td>$7,000</td>
</tr>
</tbody>
</table>

Pay particular attention to the difference between this entry and entry (6) where we recorded depreciation on factory equipment. In journal entry (6), depreciation on factory equipment was debited to Manufacturing Overhead and is therefore a product cost. In journal entry (9) above, depreciation on office equipment was debited to Depreciation Expense. Depreciation on office equipment is considered to be a period expense rather than a product cost. Finally, assume that advertising was $42,000 and that other selling and administrative expenses in April totalled $8,000. The following entry records these items:

<table>
<thead>
<tr>
<th>Entry</th>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>10)</td>
<td>Advertising Expense</td>
<td>$42,000</td>
</tr>
<tr>
<td></td>
<td>Other Selling and Administrative Expense</td>
<td>$8,000</td>
</tr>
<tr>
<td></td>
<td>Accounts Payable</td>
<td>$50,000</td>
</tr>
</tbody>
</table>

Because the amounts in entries (8) through (10) all go directly into expense accounts, they will have no effect on the costing of Rand Company’s production for April. The same will be true of any other selling and administrative expenses incurred during April, including sales commissions, depreciation on sales equipment, rent on office facilities, insurance on office facilities, and related costs. The distinction between manufacturing overhead costs and non-manufacturing costs such as selling and administrative expenses is sometimes difficult because the type of cost, for example, depreciation or salaries, is the same but the classification is different. In practice, the classification has to be based on what the firm does to incur the costs. If it sells or markets, then this is not production and the distinction is clear. If, however, it administers, then the distinction depends on what is administered and how important it is to separate production administration from overall administration. For example, if all the company does is produce the Hibernia oil platform, then administration is production (manufacturing) overhead. However, if the company is administering many jobs and marketing new jobs at the same time, it may not be able to distinguish overhead from administrative time on the part of the senior management. Thus, unless costs are needed for a cost recovery billing, administration salaries expense may be the expeditious way to treat the salaries.

**Cost of Goods Manufactured**

When a job has been completed, the finished output is transferred from the production departments to the finished goods warehouse. By this time, the
Accounting Department will have charged the job with direct materials and direct labour cost, and manufacturing overhead will have been applied using the predetermined rate. A transfer of these costs must be made within the costing system that parallels the physical transfer of the goods to the finished goods warehouse. The costs of the completed job are transferred out of the Work in Process account and into the Finished Goods account. The sum of all amounts transferred between these two accounts represents the cost of goods manufactured for the period. (This point was illustrated earlier in Exhibit 2–4 in Chapter 2.) In the case of Rand Company, let us assume that job A was completed during April. The following entry transfers the cost of job A from Work in Process to Finished Goods:

\[
\begin{array}{l}
\text{Finished Goods} & \quad 158,000 \\
\text{Work in Process} & \quad 158,000 \\
\end{array}
\]

The $158,000 represents the completed cost of job A, as shown on the job cost sheet in Exhibit 3–8. Since job A was the only job completed during April, the $158,000 also represents the cost of goods manufactured for the month. Job B was not completed by month-end, so its cost will remain in the Work in Process account and carry over to the next month. If a balance sheet is prepared at the end of April, the cost accumulated thus far on job B will appear as “Work in process inventory” in the assets section.

**Cost of Goods Sold**

As units in finished goods are shipped to fill customers’ orders, the unit cost appearing on the job cost sheets is used as a basis for transferring the cost of the items sold from the Finished Goods account into the Cost of Goods Sold account. If a complete job is shipped, as in the case where a job has been done to a customer’s specifications, then it is a simple matter to transfer the entire cost appearing on the job cost sheet into the Cost of Goods Sold account. In most cases, however, only a portion of the units involved in a particular job will be immediately sold. In these situations, the unit cost must be used to determine how much product cost should be removed from Finished Goods and charged to Cost of Goods Sold. For Rand Company, we will assume that 750 of the 1,000 gold medallions in job A were shipped to customers by the end of the month for total sales revenue of $225,000. Since 1,000 units were produced and the total cost of the job from the job cost sheet was $158,000, the unit product cost was $158. The following journal entries would record the sale (all sales are on account):

\[
\begin{array}{l}
\text{Accounts Receivable} & \quad 225,000 \\
\text{Sales} & \quad 225,000 \\
\end{array}
\]

\[
\begin{array}{l}
\text{Cost of Goods Sold} & \quad 118,500 \\
\text{Finished Goods} & \quad 118,500 \\
\end{array}
\]

\[
($158 \text{ per unit } \times 750 \text{ units } = \$118,500)
\]
With entry (13), the flow of costs through our job-order costing system is completed.

**Summary of Cost Flows**

To pull the entire Rand Company example together, journal entries (1) through (13) are summarized in Exhibit 3–9. The flow of costs through the accounts is presented in T-account form in Exhibit 3–10.

<table>
<thead>
<tr>
<th>Entry</th>
<th>Account Description</th>
<th>Debit Amount</th>
<th>Credit Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Raw Materials</td>
<td>60,000</td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>Accounts Payable</td>
<td></td>
<td>60,000</td>
</tr>
<tr>
<td>(2)</td>
<td>Work in Process</td>
<td>50,000</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Overhead</td>
<td></td>
<td>52,000</td>
</tr>
<tr>
<td>(3)</td>
<td>Work in Process</td>
<td>60,000</td>
<td>15,000</td>
</tr>
<tr>
<td></td>
<td>Salaries and Wages Payable</td>
<td></td>
<td>75,000</td>
</tr>
<tr>
<td>(4)</td>
<td>Manufacturing Overhead</td>
<td>40,000</td>
<td>40,000</td>
</tr>
<tr>
<td></td>
<td>Accounts Payable</td>
<td></td>
<td>40,000</td>
</tr>
<tr>
<td>(5)</td>
<td>Manufacturing Overhead</td>
<td>20,000</td>
<td>13,000</td>
</tr>
<tr>
<td></td>
<td>Property Taxes Payable</td>
<td></td>
<td>7,000</td>
</tr>
<tr>
<td></td>
<td>Prepaid Insurance</td>
<td></td>
<td>7,000</td>
</tr>
<tr>
<td>(6)</td>
<td>Manufacturing Overhead</td>
<td>18,000</td>
<td>18,000</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation</td>
<td></td>
<td>18,000</td>
</tr>
<tr>
<td>(7)</td>
<td>Work in Process</td>
<td>90,000</td>
<td>90,000</td>
</tr>
<tr>
<td></td>
<td>Manufacturing Overhead</td>
<td></td>
<td>90,000</td>
</tr>
<tr>
<td>(8)</td>
<td>Salaries Expense</td>
<td>30,000</td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>Salaries and Wages Payable</td>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td>(9)</td>
<td>Depreciation Expense</td>
<td>7,000</td>
<td>7,000</td>
</tr>
<tr>
<td></td>
<td>Accumulated Depreciation</td>
<td></td>
<td>7,000</td>
</tr>
<tr>
<td>(10)</td>
<td>Advertising Expense</td>
<td>42,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Selling and Administrative Expense</td>
<td></td>
<td>8,000</td>
</tr>
<tr>
<td></td>
<td>Accounts Payable</td>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td>(11)</td>
<td>Finished Goods</td>
<td>158,000</td>
<td>158,000</td>
</tr>
<tr>
<td></td>
<td>Work in Process</td>
<td></td>
<td>158,000</td>
</tr>
<tr>
<td>(12)</td>
<td>Accounts Receivable</td>
<td>225,000</td>
<td>225,000</td>
</tr>
<tr>
<td></td>
<td>Sales</td>
<td></td>
<td>225,000</td>
</tr>
<tr>
<td>(13)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cost of Goods Sold ........................................118,500
Finished Goods ................................................118,500

**Exhibit 3–10** Summary of Cost Flows—Rand Company

<table>
<thead>
<tr>
<th>Accounts Receivable</th>
<th>Accounts Payable</th>
<th>Capital Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>XX*</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>(12) 225,000</td>
<td>(1) 60,000</td>
<td>(2) 52,000</td>
</tr>
<tr>
<td></td>
<td>(4) 40,000</td>
<td>(5) 7,000</td>
</tr>
<tr>
<td></td>
<td>(10) 50,000</td>
<td>(11) 150,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prepaid Insurance</th>
</tr>
</thead>
<tbody>
<tr>
<td>XX</td>
</tr>
<tr>
<td>(5) 7,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Raw Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 7,000</td>
</tr>
<tr>
<td>(1) 60,000</td>
</tr>
<tr>
<td>(2) 52,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work in Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 30,000</td>
</tr>
<tr>
<td>(2) 50,000</td>
</tr>
<tr>
<td>(3) 60,000</td>
</tr>
<tr>
<td>(7) 90,000</td>
</tr>
<tr>
<td>Bal. 72,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salaries and Wages Payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 150,000</td>
</tr>
<tr>
<td>(11) 150,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property Taxes Payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 13,000</td>
</tr>
<tr>
<td>(5) 13,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Finished Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 10,000</td>
</tr>
<tr>
<td>(11) 158,500</td>
</tr>
<tr>
<td>Bal. 49,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accumulated Depreciation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 18,000</td>
</tr>
<tr>
<td>(6) 18,000</td>
</tr>
<tr>
<td>(9) 7,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manufacturing Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) 2,000</td>
</tr>
<tr>
<td>(3) 15,000</td>
</tr>
<tr>
<td>(4) 40,000</td>
</tr>
<tr>
<td>(5) 20,000</td>
</tr>
<tr>
<td>(6) 13,000</td>
</tr>
<tr>
<td>Bal. 5,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capital Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 18,000</td>
</tr>
<tr>
<td>(6) 18,000</td>
</tr>
<tr>
<td>(9) 7,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 18,000</td>
</tr>
<tr>
<td>(6) 18,000</td>
</tr>
<tr>
<td>(9) 7,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Advertising Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 42,000</td>
</tr>
<tr>
<td>(10) 42,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Selling and Administrative Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 8,000</td>
</tr>
<tr>
<td>(10) 8,000</td>
</tr>
</tbody>
</table>
# Schedules of Cost of Goods Manufactured and Cost of Goods Sold

### Cost of Goods Manufactured

**Direct materials:**
- Raw materials inventory, beginning: $7,000
- Add: Purchases of raw materials: $60,000
- Total raw materials available: $67,000
- Deduct: Raw materials inventory, ending: $15,000
- Raw materials used in production: $52,000
- Less indirect materials included in manufacturing overhead: $2,000

**Direct labour:** $60,000

**Manufacturing overhead applied to work in process:** $90,000

Total manufacturing costs: $200,000
Add: Beginning work in process inventory: $30,000
Deduct: Ending work in process inventory: $72,000
Cost of goods manufactured: $158,000

### Cost of Goods Sold

- Finished goods inventory, beginning: $10,000
- Add: Cost of goods manufactured: $158,000
- Goods available for sale: $168,000
- Deduct: Finished goods inventory, ending: $49,500
- Unadjusted cost of goods sold: $118,500
- Add: Underapplied overhead: $5,000

Adjusted cost of goods sold: $123,500

*Note that the underapplied overhead is added to cost of goods sold. If overhead was overapplied, it would be deducted from costs of goods sold.*
Income Statement

**RAND COMPANY**
Income Statement
For the Month Ending April 30

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$225,000</td>
</tr>
<tr>
<td>Less cost of goods sold ($118,500 + $5,000)</td>
<td>123,500</td>
</tr>
<tr>
<td>Gross margin</td>
<td>101,500</td>
</tr>
<tr>
<td>Less selling and administrative expenses:</td>
<td></td>
</tr>
<tr>
<td>Salaries expense</td>
<td>$30,000</td>
</tr>
<tr>
<td>Depreciation expense</td>
<td>7,000</td>
</tr>
<tr>
<td>Advertising expense</td>
<td>42,000</td>
</tr>
<tr>
<td>Other expense</td>
<td>8,000</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td><strong>$ 14,500</strong></td>
</tr>
</tbody>
</table>

Summary

Job-order costing and process costing are widely used to track costs. Job-order costing is used in situations where the organization offers many different products or services, such as in furniture manufacturing, hospitals, and legal firms. Process costing is used where units of product are homogeneous, such as in flour milling or cement production.

Materials requisition forms and labour time tickets are used to assign direct materials and direct labour costs to jobs in a job-costing system. Manufacturing overhead costs are assigned to jobs through use of a predetermined overhead rate. The predetermined overhead rate is determined before the period begins by dividing the estimated total manufacturing cost for the period by the estimated total allocation base for the period. The most frequently used allocation bases are direct labour-hours and machine-hours. Overhead is applied to jobs by multiplying the predetermined overhead rate by the actual amount of the allocation base used by the job. Since the predetermined overhead rate is based on estimates, the actual overhead cost incurred during a period may be more or less than the amount of overhead cost applied to production. Such a difference is referred to as under- or overapplied overhead. The under or overapplied overhead for a period can be (1) closed out to Cost of Goods Sold or (2) allocated between Work in Process, Finished Goods, and Cost of Goods Sold or (3) carried forward to the end of the year. When overhead is underapplied, manufacturing overhead costs have been understated and therefore inventories and/or expenses must be adjusted upward. When overhead is overapplied, manufacturing overhead costs have been overstated and therefore inventories and/or expenses must be adjusted downward.
# Key Terms on Chapter 03

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Absorption costing</strong></td>
<td>A costing method that includes all manufacturing costs—direct materials, direct labor, and both variable and fixed manufacturing overhead—in the cost of a product.</td>
</tr>
<tr>
<td><strong>Allocation base</strong></td>
<td>A measure of activity such as direct labor-hours or machine-hours that is used to assign costs to cost objects.</td>
</tr>
<tr>
<td><strong>Bill of materials</strong></td>
<td>A document that shows the quantity of each type of direct material required to make a product.</td>
</tr>
<tr>
<td><strong>Cost driver</strong></td>
<td>A factor, such as machine-hours, beds occupied, computer time, or flight-hours, that causes overhead costs.</td>
</tr>
<tr>
<td><strong>Job cost sheet</strong></td>
<td>A form prepared for a job that records the materials, labor, and manufacturing overhead costs charged to that job.</td>
</tr>
<tr>
<td><strong>Job-order costing system</strong></td>
<td>A costing system used in situations where many different products, jobs, or services are produced each period.</td>
</tr>
<tr>
<td><strong>Materials requisition form</strong></td>
<td>A detailed source document that specifies the type and quantity of materials to be drawn from the storeroom and that identifies the job that will be charged for the cost of those materials.</td>
</tr>
<tr>
<td><strong>Multiple predetermined overhead rates</strong></td>
<td>A costing system with multiple overhead cost pools with a different predetermined overhead rate for each cost pool, rather than a single predetermined overhead rate for the entire company. Each production department is often treated as a separate overhead cost pool.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Normal cost system</strong></td>
<td>A costing system in which overhead costs are applied to a job by multiplying a predetermined overhead rate by the actual amount of the allocation base incurred by the job.</td>
</tr>
<tr>
<td><strong>Overapplied overhead</strong></td>
<td>A credit balance in the Manufacturing Overhead account that occurs when the amount of overhead cost applied to Work in Process exceeds the amount of overhead cost actually incurred during a period.</td>
</tr>
<tr>
<td><strong>Overhead application</strong></td>
<td>The process of charging manufacturing overhead cost to job cost sheets and to the Work in Process account.</td>
</tr>
<tr>
<td><strong>Plantwide overhead rate</strong></td>
<td>A single predetermined overhead rate that is used throughout a plant.</td>
</tr>
<tr>
<td><strong>Predetermined overhead rate</strong></td>
<td>A rate used to charge manufacturing overhead cost to jobs that is established in advance for each period. It is computed by dividing the estimated total manufacturing overhead cost for the period by the estimated total amount of the allocation base for the period.</td>
</tr>
<tr>
<td><strong>Process costing system</strong></td>
<td>A costing system used in situations where a single, homogeneous product (such as cement or flour) is produced for long periods of time.</td>
</tr>
<tr>
<td><strong>Time ticket</strong></td>
<td>A detailed source document that is used to record the amount of time an employee spends on various activities.</td>
</tr>
<tr>
<td><strong>Underapplied overhead</strong></td>
<td>A debit balance in the Manufacturing Overhead account that occurs when the amount of overhead cost actually incurred exceeds the amount of overhead cost applied to Work in Process during a period.</td>
</tr>
</tbody>
</table>
Review Problem: Job-Order Costing

Hogle Company is a manufacturing firm that uses job-order costing. On January 1, the beginning of its fiscal year, the company’s inventory balances were as follows:

- Raw materials . . . . . . . . . . . . . . . . . . . $20,000
- Work in process . . . . . . . . . . . . . . . . . . . 15,000
- Finished goods . . . . . . . . . . . . . . . . . . . . . 30,000

The company applies overhead cost to jobs on the basis of machine-hours worked. For the current year, the company estimated that it would work 75,000 machine-hours and incur $450,000 in manufacturing overhead cost. The following transactions were recorded for the year:

a. Raw materials were purchased on account, $410,000.
b. Raw materials were requisitioned for use in production, $380,000 ($360,000 direct materials and $20,000 indirect materials).
c. The following costs were incurred for employee services: direct labour, $75,000; indirect labour, $110,000; sales commissions, $90,000; and administrative salaries, $200,000.
d. Sales travel costs were incurred, $17,000.
e. Utility costs were incurred in the factory, $43,000.
f. Advertising costs were incurred, $180,000.
g. Depreciation was recorded for the year, $350,000 (80% relates to factory operations, and 20% relates to selling and administrative activities).
h. Insurance expired during the year, $10,000 (70% relates to factory operations, and the remaining 30% relates to selling and administrative activities).
i. Manufacturing overhead was applied to production. Due to greater than expected demand for its products, the company worked 80,000 machine-hours during the year.
j. Goods costing $900,000 to manufacture according to their job cost sheets were completed during the year.
k. Goods were sold on account to customers during the year at a total selling price of $1,500,000. The goods cost $870,000 to manufacture according to their job cost sheets.

Required

1. Prepare journal entries to record the preceding transactions.
2. Post the entries in (1) above to T-accounts (do not forget to enter the opening balances in the inventory accounts).
3. Is Manufacturing Overhead underapplied or overapplied for the year? Prepare a journal entry to close any balance in the Manufacturing Overhead account to Cost of Goods Sold. Do not allocate the balance between ending inventories and Cost of Goods Sold.
4. Prepare an income statement for the year and a statement of cost of goods manufactured.
## Solution to Review Problem

1. **Raw Materials**  
   - Accounts Payable: 410,000
   - Manufacturing Overhead: 20,000
   - Raw Materials: 380,000

2. **Work in Process**  
   - Manufacturing Overhead: 110,000
   - Sales Commissions Expense: 90,000
   - Administrative Salaries Expense: 200,000
   - Salaries and Wages Payable: 475,000

3. **Sales Travel Expense**  
   - Accounts Payable: 17,000

4. **Manufacturing Overhead**  
   - Accounts Payable: 43,000

5. **Advertising Expense**  
   - Accounts Payable: 180,000

6. **Depreciation Expense**  
   - Accumulated Depreciation: 350,000

7. **Insurance Expense**  
   - Prepaid Insurance: 10,000

8. **Work in process**  
   - Manufacturing Overhead: 480,000

9. **Finished Goods**  
   - Work in process: 900,000

10. **Accounts Receivable**  
    - Sales: 1,500,000
    - Cost of Goods Sold: 870,000
    - Finished Goods: 870,000
### Accounts Receivable

|   | (k) 1,500,000 |

### Manufacturing Overhead

<table>
<thead>
<tr>
<th>(b) 20,000</th>
<th>(i) 489,000</th>
<th>(k) 1,500,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) 110,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) 43,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) 200,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) 7,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>460,000</td>
<td>489,000</td>
</tr>
<tr>
<td></td>
<td>Bal. 29,000</td>
<td></td>
</tr>
</tbody>
</table>

### Prepaid Insurance

| (h) 10,000 |

### Accumulated Depreciation

| (g) 350,000 |

### Commissions Expense

| (c) 90,000 |

### Administrative Salary Expense

| (d) 200,000 |

### Sales Travel Expense

| (d) 17,000 |

### Advertising Expense

| (f) 180,000 |

### Raw Materials

<table>
<thead>
<tr>
<th>Bal. 20,000</th>
<th>(h) 380,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 410,000</td>
<td></td>
</tr>
<tr>
<td>(b) 50,000</td>
<td></td>
</tr>
</tbody>
</table>

### Work in Process

<table>
<thead>
<tr>
<th>Bal. 15,000</th>
<th>(j) 900,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) 360,000</td>
<td></td>
</tr>
<tr>
<td>(c) 75,000</td>
<td></td>
</tr>
<tr>
<td>(i) 480,000</td>
<td></td>
</tr>
<tr>
<td>Bal. 30,000</td>
<td></td>
</tr>
</tbody>
</table>

### Finished Goods

<table>
<thead>
<tr>
<th>Bal. 30,000</th>
<th>(k) 870,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>(j) 900,000</td>
<td></td>
</tr>
<tr>
<td>(l) 0,000</td>
<td></td>
</tr>
</tbody>
</table>

### Salaries and Wages Payable

| Bal. 475,000 |

### Depreciation Expense

| (g) 70,000 |

### Insurance Expense

| (h) 3,000 |

#### 3. Manufacturing overhead is overapplied for the year. The entry to close it out to Cost of Goods Sold is as follows:

- **Manufacturing Overhead** .................................................. 20,000
- **Cost of Goods Sold** ..................................................... 20,000
4.

**HOGLE COMPANY**

**Income Statement**

For the Year Ended December 31

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Less cost of goods sold ($870,000 – $20,000)</td>
<td>850,000</td>
</tr>
<tr>
<td>Gross margin</td>
<td>650,000</td>
</tr>
<tr>
<td>Less selling and administrative expenses:</td>
<td></td>
</tr>
<tr>
<td>Commissions expense</td>
<td>$ 90,000</td>
</tr>
<tr>
<td>Administrative salaries expense</td>
<td>200,000</td>
</tr>
<tr>
<td>Sales travel expense</td>
<td>17,000</td>
</tr>
<tr>
<td>Advertising expense</td>
<td>180,000</td>
</tr>
<tr>
<td>Depreciation expense</td>
<td>70,000</td>
</tr>
<tr>
<td>Insurance expense</td>
<td>3,000</td>
</tr>
<tr>
<td><strong>Total Less Selling and Administrative Expenses</strong></td>
<td>560,000</td>
</tr>
<tr>
<td><strong>Net income</strong></td>
<td>$ 90,000</td>
</tr>
</tbody>
</table>

**HOGLE COMPANY**

Schedule of Cost of Goods Manufactured and Cost of Goods Sold

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Materials:</td>
<td></td>
</tr>
<tr>
<td>Raw materials inventory, January 1</td>
<td>$ 20,000</td>
</tr>
<tr>
<td>Add: Purchases of raw materials</td>
<td>410,000</td>
</tr>
<tr>
<td>Total raw materials available</td>
<td>430,000</td>
</tr>
<tr>
<td>Deduct: Raw materials inventory, December 31</td>
<td>50,000</td>
</tr>
<tr>
<td>Raw materials used in production</td>
<td>380,000</td>
</tr>
<tr>
<td>Less: Indirect materials (below)</td>
<td>20,000</td>
</tr>
<tr>
<td>Direct materials used in production</td>
<td>$360,000</td>
</tr>
<tr>
<td>Direct Labour</td>
<td>75,000</td>
</tr>
<tr>
<td>Manufacturing Overhead:</td>
<td></td>
</tr>
<tr>
<td>Indirect materials</td>
<td>20,000</td>
</tr>
<tr>
<td>Indirect labour</td>
<td>110,000</td>
</tr>
<tr>
<td>Utilities</td>
<td>43,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>280,000</td>
</tr>
<tr>
<td>Insurance</td>
<td>7,000</td>
</tr>
<tr>
<td>Actual overhead costs</td>
<td>460,000</td>
</tr>
<tr>
<td>Add: Overapplied overhead</td>
<td>20,000</td>
</tr>
<tr>
<td>Overhead applied to work in process</td>
<td>480,000*</td>
</tr>
<tr>
<td>Total manufacturing costs</td>
<td>915,000</td>
</tr>
<tr>
<td>Add: Beginning work in process inventory</td>
<td>15,000</td>
</tr>
<tr>
<td>Deduct: Ending work in process inventory</td>
<td>930,000</td>
</tr>
<tr>
<td>Cost of goods manufactured</td>
<td>900,000</td>
</tr>
<tr>
<td>Add: Finished goods inventory, January 1</td>
<td>30,000</td>
</tr>
<tr>
<td>Goods available for sale</td>
<td>930,000</td>
</tr>
<tr>
<td>Deduct: Finished goods inventory, December 31</td>
<td>60,000</td>
</tr>
<tr>
<td>Cost of Goods Sold</td>
<td>870,000</td>
</tr>
<tr>
<td>Deduct: Overapplied overhead</td>
<td>20,000</td>
</tr>
<tr>
<td>Adjusted cost of goods sold</td>
<td>$850,000</td>
</tr>
</tbody>
</table>
Mortimer and Sons uses a job-order costing system to track the costs of its landscaping projects. The company provides garden design and installation services for its clients. The table below provides data concerning the three landscaping projects that were in progress during March. There was no work in process at the beginning of March.

<table>
<thead>
<tr>
<th>Project</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer-hours</td>
<td>25</td>
<td>30</td>
<td>15</td>
</tr>
<tr>
<td>Direct materials cost</td>
<td>$2,300</td>
<td>$2,000</td>
<td>$900</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$4,800</td>
<td>$5,100</td>
<td>$1,800</td>
</tr>
</tbody>
</table>

Actual overhead costs were $6,000 for March. Overhead costs are applied to projects on the basis of designer-hours since most of the overhead is related to the costs of the garden design studio. The predetermined overhead rate is $60 per designer-hour. The Alpha and Beta projects were completed in March; the Gamma project was not completed by the end of the month.

**Required:**

1. Compute the amount of overhead cost that would have been charged to each project during March.
2. Prepare a journal entry showing the completion of the Alpha and Beta projects and the transfer of costs to the Completed Projects (i.e., Finished Goods) account.
3. What is the balance in the Work in Process account at the end of the month?
4. What is the balance in the Overhead account at the end of the month? What is this balance called?
PROBLEM 3-2
Departmental Overhead Rates
(LO2, LO3, LO5)

CHECK FIGURE
(2) Overhead applied to Job L26: $1,520

Meyers Company has two departments, Cutting and Finishing. The company uses a job-order cost system and computes a predetermined overhead rate in each department. The Cutting Department bases its rate on machine-hours, and the Finishing Department bases its rate on direct labor cost. At the beginning of the year, the company made the following estimates:

<table>
<thead>
<tr>
<th>Department</th>
<th>Cutting</th>
<th>Finishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor-hours</td>
<td>1,300</td>
<td>12,000</td>
</tr>
<tr>
<td>Machine-hours</td>
<td>35,000</td>
<td>9,000</td>
</tr>
<tr>
<td>Manufacturing overhead cost</td>
<td>$315,000</td>
<td>$182,000</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$10,000</td>
<td>$140,000</td>
</tr>
</tbody>
</table>

**Required:**

1. Compute the predetermined overhead rate to be used in each department.
2. Assume that the overhead rates that you computed in (1) above are in effect. The job cost sheet for Job L26, which was started and completed during the year, showed the following:

<table>
<thead>
<tr>
<th>Department</th>
<th>Cutting</th>
<th>Finishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor-hours</td>
<td>3</td>
<td>25</td>
</tr>
<tr>
<td>Machine-hours</td>
<td>140</td>
<td>5</td>
</tr>
<tr>
<td>Materials requisitioned</td>
<td>$250</td>
<td>$125</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$21</td>
<td>$200</td>
</tr>
</tbody>
</table>

Compute the total overhead cost applied to Job L26.
3. Would you expect substantially different amounts of overhead cost to be assigned to some jobs if the company used a plantwide overhead rate based on direct labor cost, rather than using departmental rates? Explain. No computations are necessary.
PROBLEM 3-3
Comprehensive Problem
(LO3, LO4, LO5, LO6, LO7)

CHECK FIGURE
(3) underapplied by $ 4,000; (4) Net operating income: $ 13,000

Productos Elina S.A. of Buenos Aires, Argentina is a family-owned enterprise that makes lamps for the local market. These lamps are highly prized in the local market for their intricate ironwork and detailing. The company has been in business for over a hundred years and some of its lamps have been passed down from generation to generation. Productos Elina S.A. sells through an extensive network of salesmen who receive commissions on their sales. The Argentinian currency is the peso, which is denoted by $. All of the company’s transactions with customers, employees, and suppliers are conducted in cash; there is no credit.

The company uses a job-order costing system in which overhead is applied to jobs on the basis of direct labor cost. At the beginning of the year, it was estimated that the total direct labor cost for the year would be $120,000 and the total manufacturing overhead cost would be $240,000. At the beginning of the year, the inventory balances were as follows:

| Raw materials | $19,000 |
| Work in process | $25,000 |
| Finished goods | $50,000 |

During the year, the following transactions were completed:

a. Raw materials purchased for cash, $200,000.

b. Raw materials requisitioned for use in production, $195,000. (Materials costing $150,000 were charged directly to jobs; the remaining materials were indirect.)

c. Costs for employee services were incurred as follows:
   - Direct labor ....................  $130,000
   - Indirect labor ..................  $50,000
   - Sales commissions ...........  $20,000
   - Administrative salaries ..  $40,000

d. Rent for the year was $35,000. ($20,000 of this amount related to factory operations, and the remainder related to selling and administrative activities.)

e. Utility costs incurred in the factory, $77,000.

f. Advertising costs incurred, $80,000.

g. Depreciation recorded on equipment, $90,000. ($72,000 of this amount was on equipment used in factory operations; the remaining $18,000 was on equipment used in selling and administrative activities.)

h. Manufacturing overhead cost was applied to jobs, $ _____? _____.

i. Goods that had cost $530,000 to manufacture according to their job cost sheets were completed during the year.

j. Sales for the year totaled $750,000. The total cost to manufacture these goods according to their job cost sheets was $560,000.

**Required:**

1. Prepare journal entries to record the transactions for the year.

2. Prepare T-accounts for inventories, Manufacturing Overhead, and Cost of Goods Sold. Post relevant data from your journal entries to these T-accounts. (Don’t forget to enter the beginning balances in your inventory accounts.) Compute an ending balance in each account.

3. Is Manufacturing Overhead underapplied or overapplied for the year? Prepare a journal entry to close any balance in the Manufacturing Overhead account to Cost of Goods Sold.

4. Prepare an income statement for the year. (Do not prepare a schedule of cost of goods manufactured; all of the information needed for the income statement is available in the journal entries and T-accounts you have prepared.)
Natalie Lock Corporation is a manufacturing company that uses a job-order costing system. Overhead costs are applied to jobs on the basis of machine-hours. At the beginning of the year, management estimated that the company would incur $367,500 in manufacturing overhead costs and work 52,500 machine-hours.

Required:

1. Compute the company’s predetermined overhead rate.
2. Assume that during the year the company works only 49,000 machine-hours and incurs the following costs in the Manufacturing Overhead and Work in Process accounts:

<table>
<thead>
<tr>
<th></th>
<th>Manufacturing Overhead</th>
<th>Work in Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Maintenance)</td>
<td>50,000</td>
<td>(Direct materials) 735,000</td>
</tr>
<tr>
<td>(Indirect materials)</td>
<td>29,000</td>
<td>(Direct labor) 180,000</td>
</tr>
<tr>
<td>(Indirect labor)</td>
<td>109,000</td>
<td>(Overhead) ?</td>
</tr>
<tr>
<td>(Utilities)</td>
<td>76,000</td>
<td></td>
</tr>
<tr>
<td>(Insurance)</td>
<td>30,000</td>
<td></td>
</tr>
<tr>
<td>(Depreciation)</td>
<td>70,000</td>
<td></td>
</tr>
</tbody>
</table>

Copy the data in the T-accounts above onto your answer sheet. Compute the amount of overhead cost that would be applied to Work in Process for the year and make the entry in your T-accounts.

3. Compute the amount of underapplied or overapplied overhead for the year and show the balance in your Manufacturing Overhead T-account. Prepare a journal entry to close out the balance in this account to Cost of Goods Sold.

4. Explain why the manufacturing overhead was underapplied or overapplied for the year.
PROBLEM 3-5  
Journal Entries; T-Accounts; Cost Flows  
(LO4, LO5, LO7, LO8)

CHECK FIGURE  
(3) underapplied by $500; (4) Net operating income: $8,700

Basin Products, uses a job-order costing system. The company’s inventory balances on January 1, the start of its fiscal year, were as follows:

<table>
<thead>
<tr>
<th>Inventory Type</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw materials</td>
<td>$15,200</td>
</tr>
<tr>
<td>Work in process</td>
<td>$17,000</td>
</tr>
<tr>
<td>Finished goods</td>
<td>$24,000</td>
</tr>
</tbody>
</table>

During the year, the following transactions were completed:

a. Raw materials were purchased on account, $68,000.

b. Raw materials were issued from the storeroom for use in production, $70,000 (75% direct and 25% indirect).

c. Employee salaries and wages were accrued as follows: direct labor, $67,000; indirect labor, $29,000; and selling and administrative salaries $26,000.

d. Utility costs were incurred in the factory, $19,000.

e. Advertising costs were incurred, $30,000.

f. Prepaid insurance expired during the year, $9,000 (80% related to factory operations, and 20% related to selling and administrative activities).

g. Depreciation was recorded, $50,000 (70% related to factory assets, and 30% related to selling and administrative assets).

h. Manufacturing overhead was applied to jobs at the rate of 160% of direct labor cost.

i. Goods that cost $215,000 to manufacture according to their job cost sheets were transferred to the finished goods warehouse.

j. Sales for the year totaled $300,000 and were all on account. The total cost to manufacture these goods according to their job cost sheets was $218,000.

Required:

1. Prepare journal entries to record the transactions for the year.

2. Prepare T-accounts for Raw Materials, Work in Process, Finished Goods, Manufacturing Overhead, and Cost of Goods Sold. Post the appropriate parts of your journal entries to these T-accounts. Compute the ending balance in each account. (Don’t forget to enter the beginning balances in the inventory accounts.)

3. Is Manufacturing Overhead underapplied or overapplied for the year? Prepare a journal entry to close this balance to Cost of Goods Sold.

4. Prepare an income statement for the year. (Do not prepare a schedule of cost of goods manufactured; all of the information needed for the income statement is available in the journal entries and T-accounts you have prepared.)
PROBLEM 3-6
Overhead Analysis; Schedule of Cost Of Goods Manufactured
(LO3, LO5, LO6, LO8)

CHECK FIGURE
(2) Cost of goods manufactured: $870,000

Timeless Products uses a job-order costing system and applies overhead cost to jobs on the basis of direct materials used in production (not on the basis of raw materials purchased). In computing a predetermined overhead rate at the beginning of the year, the company’s estimates were: manufacturing overhead cost, $495,000; and direct materials to be used in production, $330,000. The company has provided the following data:

<table>
<thead>
<tr>
<th></th>
<th>Beginning</th>
<th>Ending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td>$30,000</td>
<td>$20,000</td>
</tr>
<tr>
<td>Work in Process</td>
<td>$50,000</td>
<td>$60,000</td>
</tr>
<tr>
<td>Finished Goods</td>
<td>$90,000</td>
<td>$100,000</td>
</tr>
</tbody>
</table>

The following actual costs were incurred during the year:

- Purchase of raw materials (all direct) $310,000
- Direct labor cost $80,000
- Indirect labor $140,000
- Property taxes $40,000
- Depreciation of equipment $125,000
- Maintenance $70,000
- Insurance $5,000
- Rent, building $90,000

Required:

1. a. Compute the predetermined overhead rate for the year.
   b. Compute the amount of underapplied or overapplied overhead for the year.
2. Prepare a schedule of cost of goods manufactured for the year.
3. Compute the Cost of Goods Sold for the year. (Do not include any underapplied or overapplied overhead in your Cost of Goods Sold figure.)
4. Job 576 was started and completed during the year. What price would have been charged to the customer if the job required $5,600 in direct materials and $3,000 in direct labor cost and the company priced its jobs at 25% above the job’s cost according to the company’s accounting system?
5. Direct materials made up $20,000 of the $60,000 ending Work in Process inventory balance. Supply the information missing below:

   Direct materials .......... $20,000
   Direct labor ............... ?
   Manufacturing overhead ...... ?
   Work in Process inventory .... $60,000
### PROBLEM 3-7

**T-Account Analysis of Cost Flows**  
(LO3, LO6, LO7, LO8)

**CHECK FIGURE**  
(3) Indirect labor: $50,000  
(7) Underapplied: $9,000

Selected ledger accounts of Gaynor Company are given below for the just completed year:

<table>
<thead>
<tr>
<th>Raw Materials</th>
<th>Manufacturing Overhead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 1/1</td>
<td>Debits 315,000</td>
</tr>
<tr>
<td></td>
<td>Credits ?</td>
</tr>
<tr>
<td>Debits 170,000</td>
<td></td>
</tr>
<tr>
<td>Bal. 12/31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bal. 12/31 ?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work in Process</th>
<th>Factory Wages Payable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 1/1</td>
<td>Debits 228,000</td>
</tr>
<tr>
<td>Direct Materials</td>
<td>Bal. 1/1 8,000</td>
</tr>
<tr>
<td>Direct Labor</td>
<td>. . . . . . . . . . . . . . . .</td>
</tr>
<tr>
<td>Overhead</td>
<td>Credits 230,000</td>
</tr>
<tr>
<td>Bal. 12/31</td>
<td>Bal. 12/31 10,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Finished Goods</th>
<th>Cost of Goods Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 1/1</td>
<td>Debits ?</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Bal. 12/31</td>
<td></td>
</tr>
</tbody>
</table>

**Required:**

1. What was the cost of raw materials put into production during the year?  
2. How much of the materials in (1) above consisted of indirect materials?  
3. How much of the factory labor cost for the year consisted of indirect labor?  
4. What was the cost of goods manufactured for the year?  
5. What was the cost of goods sold for the year (before considering underapplied or overapplied overhead)?  
6. If overhead is applied to production on the basis of direct labor cost, what rate was in effect during the year?  
7. Was manufacturing overhead underapplied or overapplied? By how much?  
8. Compute the ending balance in the Work in Process inventory account. Assume that this balance consists entirely of goods started during the year. If $5,000 of this balance is direct labor cost, how much of it is direct materials cost? Manufacturing overhead cost?
Patterson Furniture makes a variety of garden furniture that it sells to retailers such as Home Depot. The company uses a job-order costing system in which predetermined overhead rates are used to apply manufacturing overhead cost to jobs. The predetermined overhead rate in the Molding Department is based on machine-hours, and the rate in the Painting Department is based on direct labor cost. At the beginning of the year, the company’s management made the following estimates:

<table>
<thead>
<tr>
<th>Department</th>
<th>Molding</th>
<th>Painting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor-hours</td>
<td>22,000</td>
<td>98,000</td>
</tr>
<tr>
<td>Machine-hours</td>
<td>45,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Direct materials cost</td>
<td>$350,000</td>
<td>$315,000</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$190,000</td>
<td>$430,000</td>
</tr>
<tr>
<td>Manufacturing overhead cost</td>
<td>$360,000</td>
<td>$688,000</td>
</tr>
</tbody>
</table>

Job 435 was started on February 1 and completed on August 10. The company’s cost records show the following information concerning the job:

<table>
<thead>
<tr>
<th>Department</th>
<th>Molding</th>
<th>Painting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor-hours</td>
<td>30</td>
<td>115</td>
</tr>
<tr>
<td>Machine-hours</td>
<td>105</td>
<td>10</td>
</tr>
<tr>
<td>Materials placed into production</td>
<td>$180</td>
<td>$150</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$350</td>
<td>$970</td>
</tr>
</tbody>
</table>

Required:

1. Compute the predetermined overhead rate used during the year in the Molding Department. Compute the rate used in the Painting Department.
2. Compute the total overhead cost applied to Job 435.
3. What would be the total cost recorded for Job 435? If the job contained 40 units, what would be the unit product cost?
4. At the end of the year, the records of Patterson Furniture revealed the following actual cost and operating data for all jobs worked on during the year:

<table>
<thead>
<tr>
<th>Department</th>
<th>Molding</th>
<th>Painting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor-hours</td>
<td>20,000</td>
<td>95,000</td>
</tr>
<tr>
<td>Machine-hours</td>
<td>40,000</td>
<td>6,500</td>
</tr>
<tr>
<td>Direct materials cost</td>
<td>$325,000</td>
<td>$320,000</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$210,000</td>
<td>$445,000</td>
</tr>
<tr>
<td>Manufacturing overhead cost</td>
<td>$310,000</td>
<td>$730,000</td>
</tr>
</tbody>
</table>

What was the amount of underapplied or overapplied overhead in each department at the end of the year?
Homework for Chapter 03

P3-1: Foley Company uses a job-order costing system. The following data relate to the month of October, the first month of the company’s fiscal year:

a. Raw materials purchased on account, $210,000.

b. Raw materials issued to production, $190,000 (80% direct and 20% indirect).

c. Direct labor cost incurred, $49,000, and indirect labor cost incurred, $21,000.

d. Depreciation recorded on factory equipment, $105,000.

e. Other manufacturing overhead costs incurred during October, $130,000 (credit Accounts Payable).

f. The company applies manufacturing overhead cost to production on the basis of $4 per machine-hour. There were 75,000 machine-hours recorded for October.

g. Production orders costing $510,000 according to their job cost sheets were completed during October and transferred to Finished Goods.

h. Production orders that had cost $450,000 to complete according to their job cost sheets were shipped to customers during the month. These goods were sold at 50% above cost. The goods were sold on account.

Required:
1. Prepare journal entries to record the information given above.
2. Prepare T-accounts for Manufacturing Overhead and Work in Process. Post the relevant information above to each account. Compute the ending balance in each account, assuming that Work in Process has a beginning balance of $35,000.

P3-2:
Estimated cost and operating data for three companies for the upcoming year are given below:

<table>
<thead>
<tr>
<th>Company</th>
<th>Direct labor-hours</th>
<th>Machine-hours</th>
<th>Raw materials cost</th>
<th>Manufacturing overhead cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>60,000</td>
<td>25,000</td>
<td>$300,000</td>
<td>432,000</td>
</tr>
<tr>
<td>B</td>
<td>30,000</td>
<td>90,000</td>
<td>$160,000</td>
<td>270,000</td>
</tr>
<tr>
<td>C</td>
<td>40,000</td>
<td>18,000</td>
<td>$240,000</td>
<td>384,000</td>
</tr>
</tbody>
</table>

Predetermined overhead rates are computed using the following bases in the three companies:

<table>
<thead>
<tr>
<th>Company</th>
<th>Overhead Rate Based on—</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Direct labor-hours</td>
</tr>
<tr>
<td>B</td>
<td>Machine-hours</td>
</tr>
<tr>
<td>C</td>
<td>Raw materials cost</td>
</tr>
</tbody>
</table>

Required:
1. Compute the predetermined overhead rate to be used in each company.
2. Assume that Company A works on three jobs during the upcoming year. Direct labor-hours
recorded by job are: job 308, 7,000 hours; job 309, 30,000 hours; and job 310, 21,000 hours.

How much overhead cost will the company apply to Work in Process for the year? If actual costs are $420,000 for the year, will overhead be underapplied or overapplied? By how much?

---

**P3-3**

Ravsten Company is a manufacturing firm that uses a job-order cost system. On January 1, the beginning of the current year, the company’s inventory balances were as follows:

- Raw materials . . . . . . . . . . . . . . . . . . . . $16,000
- Work in process . . . . . . . . . . . . . . . . . . 10,000
- Finished goods . . . . . . . . . . . . . . . . . . . .30,000

The company applies overhead cost to jobs on the basis of machine-hours. For the current year, the company estimated that it would work 36,000 machine-hours and incur $153,000 in manufacturing overhead cost. The following transactions were recorded for the year:

a. Raw materials purchased on account, $200,000.
b. Raw materials requisitioned for use in production, $190,000 (80% direct and 20% indirect).
c. The following costs were incurred for employee services:
   - Direct labor . . . . . . . . . . . . . . . . . . . . . . $160,000
   - Indirect labor . . . . . . . . . . . . . . . . . . . 27,000
   - Sales commissions . . . . . . . . . . . . . . . . 36,000
   - Administrative salaries . . . . . . . . . . . . . . 80,000
d. Heat, power, and water costs incurred in the factory, $42,000.
e. Prepaid insurance expired during the year, $10,000 (90% relates to factory operations, and 10% relates to selling and administrative activities).
f. Advertising costs incurred $50,000.
g. Depreciation recorded for the year, $60,000 (85% relates to factory operations and 15% relates to selling and administrative activities).
h. Manufacturing overhead cost was applied to production. The company recorded 40,000 machine-hours for the year.
i. Goods that cost $480,000 to manufacture according to their job cost sheets were transferred to the finished goods warehouse.
j. Sales for the year totaled $700,000 and were all on account. The total cost to manufacture these goods according to their job cost sheets was $475,000.

**Required:**

1. Prepare journal entries to record the transactions given above.
2. Prepare T-accounts for inventories, Manufacturing Overhead, and Cost of Goods Sold. Post relevant data from your journal entries to these T-accounts (don’t forget to enter the opening balances in your inventory accounts). Compute an ending balance in each account.
3. Is Manufacturing Overhead underapplied or overapplied for the year? Prepare a journal entry to close any balance in the Manufacturing Overhead account to Cost of Goods Sold.

4. Prepare an income statement for the year. (Do not prepare a schedule of cost of goods manufactured; all of the information needed for the income statement is available in the journal entries and T-accounts you have prepared.)
Chapter 4: Systems Design: Process Costing

Process costing is used in situations where homogeneous products or services are produced on a continuous basis. Costs flow through the manufacturing accounts in basically the same way in a process costing system as in a job-order costing system. However, costs are accumulated by department rather than by job in process costing. In process costing, the equivalent units of production must be determined for each cost category in each department. Under the weighted-average method, the equivalent units of production equals the number of units transferred out to the next department or to finished goods plus the equivalent units in ending work in process inventory. The equivalent units in ending inventory equals the product of the number of partially completed units in ending work in process inventory and their percentage of completion with respect to the specific cost category.

Under the weighted-average method, the cost per equivalent unit for a specific cost category is computed by adding the cost of beginning work in process inventory and the cost added during the period and then dividing the result by the equivalent units of production. The cost per equivalent unit is then used to value the ending work in process inventory and the units transferred out to the next department or to finished goods.

Costs are transferred from one department to the next until the last processing department. At that point, the cost of completed units is transferred to finished goods.

LEARNING OBJECTIVE

1. Prepare journal entries to record the flows of materials, labor, and overhead through a process costing system.
2. Compute the equivalent units of production for a period by the weighted-average method.
3. Prepare a quantity schedule for a period by weighted-average method.
4. Prepare a cost reconciliation for a period by the weighted-average method.
5. Compute the equivalent units of production for a period by FIFO method.
6. Prepare a quantity schedule for a period by the FIFO method.
7. Compute the cost per equivalent unit for a period by the FIFO method.
8. Prepare a cost reconciliation for a period by the FIFO method.
**Comparison of job-order and process costing**

In some ways process costing is very similar to job-order costing, and in some ways it is very different.

**Similarities between job-order and process costing**

The similarities that exist between job-order and process costing can be summarized as follows:

a. The same basis purpose exist in both systems, which are assigned materials, labor, and overhead cost to products and to provide a mechanism for computing unit costs.

b. Both systems maintain and use the same basis manufacturing accounts, including Manufacturing Overhead, Raw Materials, Work in Process, and Finished Goods.

c. The flow of costs through the manufacturing accounts is basically the same in both systems.

**Difference between Job-order and Process Costing**

Exhibit 4 – 1 Difference between job-order and process costing

<table>
<thead>
<tr>
<th><strong>Job-order costing</strong></th>
<th><strong>Process costing</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Many differences job are worked on during each period, which each job having difference production requirement.</td>
<td>1. A single product is produced either on a continuous basis or for long periods of time. All units of product are identical.</td>
</tr>
<tr>
<td>2. Costs are accumulated by individual job.</td>
<td>2. Costs are accumulated by department.</td>
</tr>
<tr>
<td>3. The <em>job cost sheet</em> is the key document controlling the accumulation of cost by a job.</td>
<td>3. The <em>department production report</em> is the key document showing the accumulation and disposition of costs by a department.</td>
</tr>
<tr>
<td>4. Unit costs are computed by job on the job cost sheet.</td>
<td>4. Unit costs are computed by department on the production dep. report.</td>
</tr>
</tbody>
</table>
A perspective of process cost flows

Process departments

A process department is any location in an organization where work is performed on a product and where materials, labor, or overhead cost are added to the product. For example, a potato chip factory operated by Nalley’s might have three processing departments – one for preparing potatoes, one for cooking, and one for inspecting and packing. A brick factory might have three processing departments – one for mixing and molding clay into brick form and one for firing the molded brick.

Exhibit 4 – 2 The processing department

The flow of materials, labor, and overhead

Cost accumulation is simpler in a process costing system than in a job-order costing system. In process costing system, instead of having to trace costs to hundreds of different jobs, costs are traced to only a few processing departments.
Materials, labor, and overhead cost entries

a. Materials costs
Assuming that the first processing department in a company is department A, the journal entry for placing materials into process as follows:

Dr Work in process – Department A.... ....XXX
Cr Raw materials............................. ................. XXX

If other materials are subsequently added in department B, the entry is the following:

Dr Work in process – Department B.... ....XXX
Cr Raw materials............................. ................. XXX

b. Labor cost

Dr Work in process – Department A.... ....XXX
Work in process – Department B............. XXX
Cr Salaries and wages payable.............. ................. XXX

c. Overhead costs
If a company has two processing departments, Department A and Department B, the following journal entry is used to apply overhead costs to products:

Dr Work in process – Department A........ XXX
Work in process – Department B........ XXX
Cr Manufacturing overhead.......................... .......... XXX

d. Completing the cost flows
One department has been completed in a department; the units are transferred to the next department for further processing. The following journal entry is used to transfer the cost of partially completed units from Department A to Department B.

Dr Work in process – Department B..... XXX
Cr Work in process – Department A............ XXX

After processing has been completed in Department B, the costs of the completed units are then transferred to the finished goods inventory account.

Dr Finished goods............................. ....XXX
Cr Work in process – Department B............. XXX

Finally, when a customer’s order is filled and units are sold, the costs of the units are transferred to cost of goods sold.
Equivalent units of production

After materials, labor, and overhead costs have been accumulated in a department, the department’s output must be determined so that unit costs can be computed. The difficulty is that a department usually has some partially completed units in its ending inventory. It does not seem reasonable to count these partially completed units as equivalent to fully completed units.

Equivalent units = Number of partially completed units \times \text{percentage completion}

There are two different ways of computing the equivalent units of production for a period.

Weighted-Average method

Under the weighted-average method, a department’s equivalent units are computed as follows:

Equivalent units of production = \text{Units transferred to next department} \\
\text{or to finished goods} + \text{Equivalent units in ending work in process inventory}

Consider the Shaping and Milling Department at Double Diamond. The department uses computerized milling machine to precisely shape the wooden core and metal sheets that will be used to form the backbone of the ski. The following activities took place in the department in May

<table>
<thead>
<tr>
<th>Units</th>
<th>Percent Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Material</td>
</tr>
<tr>
<td>Work in process, May 1</td>
<td>200</td>
</tr>
<tr>
<td>Units started into production during May</td>
<td>5,000</td>
</tr>
<tr>
<td>Units completed during May and transferred to the next department</td>
<td>4,800</td>
</tr>
<tr>
<td>Work in process, May 31</td>
<td>400</td>
</tr>
</tbody>
</table>
Solution: The equivalent units are computed as the following:

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units transferred to the next department</td>
<td>4,800</td>
<td>4,800</td>
</tr>
<tr>
<td>Work in process, May 31:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>400 units @ 40%</td>
<td>160</td>
<td></td>
</tr>
<tr>
<td>400 units @ 25%</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Equivalent units of production</td>
<td>4,960</td>
<td>4,900</td>
</tr>
</tbody>
</table>

**Production report – Weighted-Average**

The production report developed in this section contains the information requested by the president. The purpose of the production report is to summarize for management all of the activity that take place in a department’s Work in process account for a period.

The production report has three separate parts:

1. A quantity schedule, which shows the flow of units through the department and a computation of equivalent units.
2. A computation of costs per equivalent units.
3. A reconciliation of all cost flows into and out of the department during the period.

**Shaping and Milling Department**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, Beginning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units in process</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Stage of completion with respect to materials</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Stage of completion with respect to conversion</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Costs in the beginning inventory:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials cost</td>
<td>$3,000</td>
<td></td>
</tr>
<tr>
<td>Conversion cost</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td>Total cost in process</td>
<td>$4,000</td>
<td></td>
</tr>
<tr>
<td>Units started into production during May</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Units completed and transferred out</td>
<td>4,800</td>
<td></td>
</tr>
<tr>
<td>Costs added to production during May:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials cost</td>
<td>$74,000</td>
<td></td>
</tr>
<tr>
<td>Conversion cost</td>
<td>70,000</td>
<td></td>
</tr>
<tr>
<td>Total cost added in the department</td>
<td>$114,000</td>
<td></td>
</tr>
</tbody>
</table>
Work in process ending:

Units in process.................................................. 400
Stage of completion with respect to materials...... 40%
Stage of completion with respect to conversion.... 25%

**The General Formulas of Production Report in each department**

\[ \text{Beg. Bal} + \text{Costs Added} - \text{Ending Bal} = \text{Transferred Out} \]

\[ \text{Beg. Bal} + \text{Costs Added} = \text{Transferred Out} + \text{Ending Bal} \]

The costs charged to a department consist of the beginning inventory plus costs added during the period and transferred in from the preceding department. These costs are titled “Cost to be accounted for” on a production report.

![Diagram of Work in Process—Department A]

The costs charged to a department are accounted for by showing the amount transferred out plus the amount in the ending inventory.
There are 3 steps in preparing the production report in each department.

**DOUBLE DIAMOND SKIS**

*Shaping and Milling Department Production Report (Weighted-Average Method)*

### Step 1: Quantity Schedule and Equivalent Units

<table>
<thead>
<tr>
<th>Unit to be accounted for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, May 1 (50% materials; 30% conversion added last month)......</td>
</tr>
<tr>
<td>Started into production..................................</td>
</tr>
<tr>
<td>Total units...............................................</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Quantity Schedule</td>
</tr>
<tr>
<td>200</td>
</tr>
<tr>
<td>5,200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Units accounted for as follows:</th>
<th>Equivalent Units (EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred to next department...</td>
<td></td>
</tr>
<tr>
<td>Work in process, May 31 (40% materials; 20% conversion added this month)....</td>
<td></td>
</tr>
<tr>
<td>Total units and equivalent units of production.................................</td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>Materials</td>
</tr>
<tr>
<td>4,800</td>
<td>4,800</td>
</tr>
<tr>
<td>400</td>
<td>160</td>
</tr>
<tr>
<td>5,200</td>
<td>4,960</td>
</tr>
</tbody>
</table>

### Step 2: Cost per equivalent unit

<table>
<thead>
<tr>
<th>Cost to be accounted for:</th>
<th>Total Cost</th>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, May 1...........................................</td>
<td>$ 4,000</td>
<td>$ 3,000</td>
<td>$ 1,000</td>
</tr>
<tr>
<td>Cost added in Shaping and Milling................................</td>
<td>144,000</td>
<td>74,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Total costs (a)..................................................</td>
<td>148,000</td>
<td>77,000</td>
<td>71,000</td>
</tr>
</tbody>
</table>

| Equivalent units of production (above) (b).........................| 4,960      | 4,900     |

| Cost per EU, (a)/(b).................................................| $15.524    | + $14.490 = $30.014 |
**FIFO Method**

The formula for computing the equivalent units of production under the FIFO method is more complex than under weighted-average method.

Equivalent units of production = Equivalent units to complete opening inventory*  
+ Units stated and completed during period  
+ Equivalent units in ending work in process inventory

**Base on example above: Under FIFO method**

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Cost</th>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, May 1:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>200 units @ (100% - 50%)</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>200 units @ (100% - 30%)</td>
<td>140</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Units started and completed in May | 4,600 | 4,600 | 4,600
| Work in process, May 31: | | |
| 400 units @ 40% | | 160 |
| 400 units @ 25% | | 100 |
| Equivalent units of production | 4,860 | 4,840 |
# Production Report (FIFO)

## Quantity Schedule and Equivalent Units

<table>
<thead>
<tr>
<th>Unit to be accounted for:</th>
<th>Quantity Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, May 1 (50% materials; 30% conversion added last month)</td>
<td>200</td>
</tr>
<tr>
<td>Started into production</td>
<td>5,000</td>
</tr>
<tr>
<td>Total units</td>
<td>5,200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Units accounted for as follows:</th>
<th>Equivalent Units (EU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred to next department from the beginning inventory</td>
<td>200</td>
</tr>
<tr>
<td>Started and completed this month</td>
<td>4,600</td>
</tr>
<tr>
<td>Work in process, May 31 (40% materials) 20% conversion added this month</td>
<td>400</td>
</tr>
<tr>
<td>Total units and equivalent units of production</td>
<td>5,200</td>
</tr>
</tbody>
</table>

## Cost per equivalent unit

<table>
<thead>
<tr>
<th>Cost to be accounted for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, May 1</td>
</tr>
<tr>
<td>Cost added in Shaping and Milling</td>
</tr>
<tr>
<td>Total costs (a)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equivalent units of production (above) (b)</th>
<th>$4,860</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per EU, (a)/(b)</td>
<td>$15.226</td>
</tr>
<tr>
<td>$14,463 = $29,589</td>
<td>-</td>
</tr>
</tbody>
</table>
Cost Reconciliation

<table>
<thead>
<tr>
<th>Cost accounted for as follows:</th>
<th>Total Cost</th>
<th>Equivalent Units (above)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transferred to next department:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From the opening inventory:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost from the opening inventory...</td>
<td>$4,000</td>
<td></td>
</tr>
<tr>
<td>Cost to complete these units:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials, at $15.226 per EU.....</td>
<td>1,523.......</td>
<td>100</td>
</tr>
<tr>
<td>Conversion, at 14.463 per EU.....</td>
<td>2,025</td>
<td>140</td>
</tr>
<tr>
<td>Total cost........................</td>
<td>7,548</td>
<td></td>
</tr>
<tr>
<td>Units started and completed this month, at $29.689 per unit.......</td>
<td>136,570</td>
<td>4,600</td>
</tr>
<tr>
<td>Total cost transferred.........</td>
<td>144,118</td>
<td></td>
</tr>
</tbody>
</table>

| Work in process, May 31:       |            |                          |
| Materials, at $15.226 per EU..... | 2,436 | 160                      |
| Conversion, at 14.463 per EU..... | 1,446 | 100                      |
| Total work in process, May 31.......... | 3,882 |                          |
| Total cost........................ | $148,00    |                          |

Key Terms

(See related pages)

Conversion cost
Direct labor cost plus manufacturing overhead cost.

Equivalent units
The product of the number of partially completed units and their percentage of completion with respect to a particular cost. Equivalent units are the number of complete whole units one could obtain from the materials and effort contained in partially completed units.

Equivalent units of production (weighted-average method)
The units transferred to the next department (or to finished goods) during the period plus the equivalent units in the department's ending work in process inventory.

FIFO method
A method of accounting for cost flows in a process costing system in which equivalent units and unit costs relate only to work done during the current period.

Operation costing
A hybrid costing system used when products have some common characteristics and some individual characteristics.

Process costing
A costing method used when essentially homogeneous products are produced on a continuous basis.

Processing department
An organizational unit where work is performed on a product and where materials, labor, or overhead costs are added to the product.

Weighted-average method
A method of process costing that blends together units and costs from both the current and prior periods.
Problems

PROBLEM 4-1
Cost Flows
(LO1)

CHECK FIGURE
May 31 Bending Department WIP: $41,600

Techno Co., produces a special kind of tool that is widely used by construction. The tool is produced in two production departments: Bending and Drilling. Raw materials are introduced at various points in the Bending Department.

The following incomplete Work in Process account has been provided for the Bending Department for May:

<table>
<thead>
<tr>
<th>Work in Process —Bending Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 1 balance</td>
</tr>
<tr>
<td>May costs added:</td>
</tr>
<tr>
<td>Raw materials (200,000 units)</td>
</tr>
<tr>
<td>Direct labor</td>
</tr>
<tr>
<td>Overhead</td>
</tr>
<tr>
<td>May 31 balance</td>
</tr>
</tbody>
</table>

The May 1 work in process inventory in the Bending Department consists of the following elements: raw materials, $16,346; direct labor, $3,556; and overhead, $6,400. Costs incurred during May in the Drilling Department were: materials used, $98,000; direct labor, $53,900; and overhead cost applied to production, $55,000.

Required:

1. Prepare journal entries to record the costs incurred in both the Bending Department and Drilling Department during May. Key your entries to the items (a) through (g) below.
   a. Raw materials were issued for use in production.
   b. Direct labor costs were incurred.
   c. Manufacturing overhead costs for the entire factory were incurred, $245,000. (Credit Accounts Payable.)
   d. Manufacturing overhead cost was applied to production using a predetermined overhead rate.
   e. Units that were complete with respect to processing in the Bending Department were transferred to the Drilling Department, $551,000.
   f. Units that were complete with respect to processing in the Drilling Department were transferred to Finished Goods, $800,000.
   g. Completed units were sold on account, $1,500,000. The Cost of Good Sold was $790,000.

2. Post the journal entries from (1) above to T-accounts. The following account balances existed at the beginning of May. (The beginning balance in the Bending Department’s Work in Process account is given above.)

   Raw Materials ........................................ $585,000
   Work in Process—Drilling Department ...... $86,000
   Finished Goods ....................................... $25,000

After posting the entries to the T-accounts, find the ending balances in the inventory accounts and the manufacturing overhead accounts.
Laura Houldsworth Co. manufactures porcelain dolls that go through three processing departments prior to completion. Information about work in the first department, Molding, is given below for July:

Production data:
- Units in process, July 1 (materials 100% complete; conversion 75% complete) : 12,000
- Units started into production during July : 110,000
- Units completed and transferred out : 107,000
- Units in process, July 31 (materials 50% complete; conversion 40% complete) : ?

Cost data:
- Work in process inventory, July 1:
  - Materials cost : $9,600
  - Conversion cost : $8,370
- Cost added during July:
  - Materials cost : $84,290
  - Conversion cost : $100,110

Materials are added at several stages during the molding process, whereas labor and overhead costs are incurred uniformly. The company uses the weighted-average method.

Required:

1. Compute the equivalent units of production.
2. Compute the costs per equivalent unit for the month.
3. Determine the total cost of ending work in process inventory and the total cost of units transferred to the next department.
4. Prepare a cost reconciliation between the costs determined in part (3) above and the cost of beginning work in process inventory and costs added in July.
PROBLEM 4-3
Interpreting a Report—Weighted-Average Method
(LO2, LO3, LO4)

CHECK FIGURE
(1) Materials: 248,000 equivalent units (2) Conversion: $1.10 per unit (3) 175,000 units

Cooperative Santa Maria of southern Sonora state in Mexico makes a unique syrup using cane sugar and local herbs. The syrup is sold in small bottles and is prized as a flavoring for drinks and for use in desserts. The bottles are sold for $11.00 each. (The Mexican currency is the peso and is denoted by $.) The first stage in the production process is carried out in the Mixing Department, which removes foreign matter from the raw materials and mixes them in the proper proportions in large vats. The company uses the weighted-average method in its process costing system.

A hastily prepared report for the Mixing Department for May appears below:

Quantity Schedule
Units to be accounted for:
Work in process, May 1 (materials 70% complete; conversion 60% complete) ....... 45,000
Started into production ........................................ 210,000
Total units to be accounted for .................. ... 255,000

Units accounted for as follows:
Transferred to the next department.............. 220,000
Work in process, May 30 (materials 80% complete, conversion 50% complete) ...... 35,000
Total units accounted for ......................... 255,000

Cost Reconciliation
Cost to be accounted for:
Work in process, May 1.............................. $ 98,200
Cost added during the month ...................... .. 869,850
Total cost ............................................ $968,050

Cost accounted for as follows:
Work in process, May 31........................... $ 99,050
Transferred to the next department.............. 869,000
Total cost ............................................ $968,050

Required:

1. What were the equivalent units for the month?
2. What were the costs per equivalent unit for the month? The beginning inventory consisted of the following costs: materials, $78,950; and conversion cost, $19,250. The costs added during the month consisted of: materials, $627,850; and conversion cost, $242,000.
3. How many of the units transferred to the next department were started and completed during the month?
4. The manager of the Mixing Department, anxious to make a good impression on the new owner, stated, “Materials prices jumped from about $2.50 per unit in April to $2.90 per unit in May, but due to good cost control I was able to hold our materials cost to less than $2.90 per unit for the month.” Should this manager be rewarded for good cost control? Explain.

Cooperative Santa Maria has just been acquired by another company, and the management of the acquiring company wants some additional information about Cooperative Santa Maria’s operations.
PROBLEM 4-4
Cost Flows
(LO1)

CHECK FIGURE
December 31 Drying Department WIP: $98,000

Seaside Company, produces a dried fish product that goes through two departments—Drying and Salting. The company has prepared the following summary of production and costs for the Drying Department for December using the weighted-average method.

Drying Department costs:
- Work in process inventory, December 1 ....................... $115,360
- Materials added during December .............................. 630,800
- Labor added during December ........................................ 167,720
- Overhead applied during December .............................. 269,120
- Total departmental costs ........................................... $1,183,000

The general ledger also shows the following costs incurred in the Salting Department during December: materials used, $150,000; direct labor cost incurred, $95,000; and overhead cost applied to products, $160,000.

Required:

1. Prepare journal entries as follows to record activity in the company during December. Key your entries to the letters (a) through (g) below.
   a. Raw materials were issued to the two departments for use in production.
   b. Direct labor costs were incurred in the two departments.
   c. Manufacturing overhead costs were incurred, $450,000. (Credit Accounts Payable.) The company maintains a single Manufacturing Overhead account for the entire plant.
   d. Manufacturing overhead cost was applied to production in each department using predetermined overhead rates.
   e. Units completed with respect to processing in the Drying Department were transferred to the Salting Department, $1,085,000.
   f. Units completed with respect to processing in the Salting Department were transferred to Finished Goods, $1,500,000.
   g. Units were sold on account, $2,500,000. The Cost of Good Sold was $1,200,000.

2. Post the journal entries from (1) above to T-accounts. Balances in selected accounts on December 1 are given below:
   - Raw Materials ................................................. $850,000
   - Work in Process—Salting Department ....... $80,000
   - Finished Goods ............................................... $40,000

   After posting the entries to the T-accounts, find the ending balance in the inventory accounts and the Manufacturing Overhead accounts.
PROBLEM 4-5  
Equivalent Units; Cost per Equivalent Unit; Applying Costs—Weighted-Average Method  
(LO2, LO3, LO4)  

CHECK FIGURE  
April 30 WIP: $44,800  

Tropical Break, Ltd. of Fiji makes blended tropical fruit drinks in two stages. Fruit juices are extracted from fresh fruits and then blended in the Blending Department. The blended juices are then bottled and packaged for shipping in the Bottling Department. The following information pertains to the operations of the Blending Department for April. (The currency in Fiji is the Fijian dollar.)

<table>
<thead>
<tr>
<th>Percent Completed</th>
<th>Units</th>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, beginning</td>
<td>10,000</td>
<td>100%</td>
<td>70%</td>
</tr>
<tr>
<td>Started into production</td>
<td>160,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed and transferred out</td>
<td>150,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work in process, ending</td>
<td>20,000</td>
<td>80%</td>
<td>25%</td>
</tr>
</tbody>
</table>

| Work in process, beginning | $22,000 | $11,900 |
| Cost added during April | $359,800 | $236,100 |

**Required:**

Assume that the company uses the weighted-average method.  
1. Determine the equivalent units for April for the Mixing Department.  
2. Compute the costs per equivalent unit for April for the Mixing Department.  
3. Determine the total cost of ending work in process inventory and the total cost of units transferred to the next department in April.  
4. Prepare a report that reconciles the total costs assigned to the ending work in process inventory and the units transferred out with the costs in beginning inventory and costs added during the month.
PROBLEM 4-6  
Analysis of Work in Process Account—Weighted-Average Method  
(LO1, LO2, LO3, LO4)  

CHECK FIGURE  
(1) Materials: $0.82 per unit; March 31 WIP $21,040  

Dillon Corporation manufactures an industrial cleaning compound that goes through three processing departments—Grinding, Mixing, and Cooking. All raw materials are introduced at the start of work in the Grinding Department. The Work in Process T-account for the Grinding Department for a recent month is given below:

```
<table>
<thead>
<tr>
<th>Inventory, March 1 (15,000 units; conversion 1/3 completed)</th>
<th>18,933</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed and transferred to mixing ( ? units)</td>
<td></td>
</tr>
<tr>
<td>March costs added:</td>
<td></td>
</tr>
<tr>
<td>Raw material (170,000 units)</td>
<td>139,229</td>
</tr>
<tr>
<td>Labor and overhead</td>
<td>246,938</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Inventory, March 31 (12,000 units; conversion 2/3 completed)</td>
<td></td>
</tr>
</tbody>
</table>
```  

The March 1 work in process inventory consists of $12,471 in materials cost and $6,462 in conversion cost. The company uses the weighted-average method.  

**Required:**  

1. Determine the equivalent units of production for March.  
2. Determine the costs per equivalent unit for March.  
3. Determine the total cost of the units completed and transferred to the next department during March and the total cost of ending work in process inventory.  
4. What criticism can be made of the unit costs that you have computed if they are used to evaluate how well costs have been controlled?
PROBLEM 4-7  
Equivalent Units; Costing Inventories; Journal Entries; Cost of Goods Sold—Weighted-Average Method  
(LO1, LO2, LO3, LO4)  

CHECK FIGURES  
(1) Labor: $2.20 per equivalent unit  
(2) December 31 WIP: $528,000  
(4) COGS: $3,465,000  

You are employed by Tuff Soles Corporation, a manufacturer of boots. The company’s chief financial officer is trying to verify the accuracy of the ending work in process and finished goods inventories prior to closing the books for the year. You have been asked to assist in this verification. The year-end balances shown on Tuff Soles Corporation’s books are as follows:

<table>
<thead>
<tr>
<th>Units</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, December 31 (labor and overhead 40% complete)</td>
<td>200,000</td>
</tr>
<tr>
<td>Finished goods, December 31</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Materials are added to production at the beginning of the manufacturing process, and overhead is applied to each product at the rate of 50% of direct labor cost. There was no finished goods inventory at the beginning of the year. A review of Tuff Soles Corporation’s inventory and cost records has disclosed the following data:

<table>
<thead>
<tr>
<th>Costs</th>
<th>Units</th>
<th>Materials</th>
<th>Labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, January 1 (labor and overhead 60% complete)</td>
<td>150,000</td>
<td>$153,000</td>
<td>$194,400</td>
</tr>
<tr>
<td>Units started into production</td>
<td>900,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost added during the year:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials cost</td>
<td>$1,233,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labor cost</td>
<td>$1,851,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Units completed during the year</td>
<td>850,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The company uses the weighted-average cost method.

**Required:**

1. Determine the equivalent units and costs per equivalent unit for materials, labor, and overhead for the year.
2. Determine the amount of cost that should be assigned to the ending work in process and finished goods inventories.
3. Prepare the necessary correcting journal entry to adjust the work in process and finished goods inventories to the correct balances as of December 31.
4. Determine the cost of goods sold for the year assuming there is no underapplied or overapplied overhead.

PROBLEM 4-8  Equivalent Units, Cost per Equivalent Unit, Applying Costs—FIFO Method  
(LO5, LO6, LO7)  

CHECK FIGURE  
(4) Ending work in process: $40,800  

Honeybutter, Inc., manufactures a product that goes through two departments prior to completion. The following information is available about work in the first department, the Mixing Department, during June.

<table>
<thead>
<tr>
<th>Percent Completed</th>
</tr>
</thead>
</table>

---

Compiled By Nut Khorn  
www.nutkhorn.wordpress.com
Cost in the beginning work in process inventory and cost added during June were as follows for the Mixing Department:

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, beginning</td>
<td>$24,500</td>
<td>$9,500</td>
</tr>
<tr>
<td>Cost added during June</td>
<td>$377,600</td>
<td>$274,200</td>
</tr>
</tbody>
</table>

The company uses the FIFO method to compute unit product costs.

**Required:**

1. Determine the equivalent units for June for the Mixing Department.
2. Compute the costs per equivalent unit for June for the Mixing Department.
3. Determine the total cost of ending work in process inventory and the total cost of units transferred to the next department in June.
4. Prepare a report that reconciles the total costs assigned to the ending work in process inventory and to the units transferred out with the costs in beginning inventory and costs added during the period.
PROBLEM 4-9  
Equivalent Units; Applying Costs—FIFO Method  
(LO5, LO6, LO7)

CHECK FIGURE  
(2) Materials: $0.60 per equivalent unit; (3) Ending work in process: $67,200

Reuter Company manufactures a single product and uses process costing. The company’s product goes through two processes, Etching and Wiring. The following activity was recorded in the Etching Department during July:

Production data:  
- Units in process, July 1: materials 70% complete; conversion 20% complete ................ 50,000  
- Units started into production ...................... 480,000  
- Units in process, July 31: materials 80% complete; conversion 40% complete ................ 80,000

Cost data:  
- Work in process inventory, July 1:  
  - Materials cost ........................................................... $21,000  
  - Conversion cost ....................................................... $9,000  
- Cost added during July:  
  - Materials cost ........................................................... $287,400  
  - Conversion cost ....................................................... $424,800

Materials are added at several stages during the etching process. The company uses the FIFO cost method.

**Required:**

1. Compute the equivalent units of production.  
2. Compute the costs per equivalent unit for July.  
3. Determine the cost of ending work in process inventory and of the units transferred to the Wiring Department.  
4. Prepare a cost reconciliation between the costs determined in part (3) above and the cost of beginning inventory and costs added during July.
PROBLEM 4-10
Equivalent Units; Cost per Equivalent Unit; Applying Costs—FIFO Method
(LO5, LO6, LO7)

CHECK FIGURE
(3) Ending work in process: $7,660

Tropical Break, Ltd. of Fiji makes blended tropical fruit drinks in two stages. Fruit juices are extracted from fresh fruits and blended in the Blending Department. The blended juices are then bottled and packed for shipping in the Bottling Department. The following information pertains to the operations of the Blending Department for April. (The currency in Fiji is the Fijian dollar.)

<table>
<thead>
<tr>
<th>Percent Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units</td>
</tr>
<tr>
<td>Work in process, beginning ..........</td>
</tr>
<tr>
<td>Work in process, ending...............</td>
</tr>
</tbody>
</table>

A total of 260,000 units were started into production in April and 270,000 units were completed and transferred to the Bottling Department in April.

Cost in the beginning work in process inventory and cost added during April were as follows for the Blending Department:

<table>
<thead>
<tr>
<th>Materials</th>
<th>Conversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work in process, beginning ..........</td>
<td>$12,000</td>
</tr>
<tr>
<td>Cost added during April ...............</td>
<td>$157,685</td>
</tr>
</tbody>
</table>

The company uses the FIFO method to compute unit product costs.

**Required:**

1. Determine the equivalent units of production for April.
2. Compute the costs per equivalent unit for April.
3. Determine the cost of ending work in process inventory and of the units transferred to the Bottling Department in April.
4. Prepare a report that reconciles the total costs assigned to the ending work in process inventory and to the units transferred out with the costs in beginning inventory and costs added during the month.
PROBLEM 4-11
Equivalent Units; Applying Costs—FIFO Method
(LO5, LO6, LO7)

CHECK FIGURE
(2) Conversion: $2.60 per unit; (3) Ending work in process: $20,800

Machine Parts, Ltd. makes metal components that go through two processes, Drilling and Welding. The following activity was recorded in the Drilling Department during January:

Production data:
- Units in process, January 1; conversion 60% complete .......... 5,000
- Units started into production ........................................... 270,000
- Units completed and transferred to Welding .................... ?
- Units in process, January 31; conversion 50% complete.... 10,000

Cost data:
- Work in process inventory, January 1:
  - Materials cost ........................................................... $3,000
  - Conversion cost ....................................................... $7,500
- Cost added during the month:
  - Materials cost .......................................................... $210,600
  - Conversion cost ......................................................... $694,200

All materials are added at the beginning of work in the Drilling Department. Conversion costs are added uniformly during processing. The company uses the FIFO cost method.

Required:

1. Compute the equivalent units of production.
2. Compute the costs per equivalent unit for the month.
3. Determine the cost of ending work in process inventory and of the units transferred to the next department.
4. Prepare a cost reconciliation between the costs determined in part (3) above and the cost of beginning inventory and costs added during the month.