Job-Order Costing

After studying Chapter 5, you should be able to:

1. Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.

2. Compute the predetermined overhead rate, and use the rate to assign overhead to units or services produced.

3. Identify and set up the source documents used in job-order costing.

4. Describe the cost flows associated with job-order costing.

5. (Appendix) Prepare the journal entries associated with job-order costing.

6. (Appendix) Allocate support department costs to producing departments.
Founded in 1883 just north of Chicago, Washburn Guitars manufactures high-quality acoustic and electric guitars for musicians ranging from garage bands to some of the world’s most famous bands. (See www.washburn.com/artists/index.aspx for a listing of artists playing Washburn guitars.) Washburn produces many guitar series. Each series has many different models that require the use of varied resources. For example, one of Washburn’s recent offerings is the Damen Idol, which retails for $2,249. The Damen is named after Damen Avenue in Chicago’s Wicker Park, which according to VP of Marketing Kevin Lello is “a hot spot for the finest alternative, pop and punk musicians.” As an example of the complexity and individuality of Washburn’s guitars, the Damen model features a mahogany body, flame maple top, mahogany neck with cream binding, rosewood fingerboard, Seymour Duncan Custom pickups in the bridge and a Seymour Duncan ’59 in the neck, a Tone Pros Bridge and Tailpiece, and numerous other options for frets, scaling, finishing, and tuning. Currently playing the Damen Idol are Joe Trohman from Fall Out Boy, Aaron Dugan of Matisyahu, Mike Kennerty from The All American Rejects, Shaun Glass from Soil, and Marty Casey from the Lovehammers and INXS. Many guitar buyers, including most professionals, request various product customizations. For example, Washburn’s Custom Shop Pilsen guitar was made especially for Billy Sawilchik to play the National Anthem at Game 2 of the 2005 American League Championship Series between the White Sox and Angels. While customization can create great publicity for Washburn, it also creates significant design and product differences between guitars, even those within the same model line of a given series. This variability results in resource consumption differences, which means that Washburn must estimate the cost of each guitar job according to how the customer desires to customize the order. Washburn managers rely heavily on their effective job-order costing system to help them understand the costs associated with such product alterations. This ensures that Washburn continues to be profitable well into the twenty-first century.
Objective 1
Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.

Characteristics of the Job-Order Environment

Companies can be divided into two major types, depending on whether or not their products/services are unique. Manufacturing and service firms producing unique products or services require a job-order accounting system. Washburn Guitars falls into this category. On the other hand, those firms producing similar products or services can use a process-costing accounting system. BP, one of the world’s largest oil producers, falls into this latter category as its barrels of oil are indistinguishable from one another. The characteristics of a company’s actual production process give rise to whether it needs a job-order or a process-costing accounting system.

Here’s The Real Kicker

In the 1970s, Kicker began operations in Steve Irby’s garage. Steve was an engineering student at Oklahoma State University and also a keyboard player with a local band. The band needed speakers but couldn’t afford new ones. Steve and his father built wooden boxes and fitted them with secondhand components. Word spread, and other bands asked for speakers. Steve partnered with a friend to fill the orders. Then, a friend who worked in the oil fields asked if Steve could rig up speakers for his pickup truck. Long days bouncing over rough fields went more smoothly with music, but the built-in audio systems at the time were awful. Steve designed and built a speaker to fit behind the driver’s seat, and Kicker was born.

Job-Order Production and Costing

Firms operating in job-order industries produce a wide variety of services or products that are quite distinct from each other. Customized or built-to-order products fit into this category, as do services that vary from customer to customer. A job, then, is one distinct unit or set of units. For example, it may be a remodeling job for the Ruiz family, or a set of 12 tables for the children’s reading room of the local library. Common job-order processes include printing, construction, furniture making, medical and dental services, automobile repair, and beautician services. Often a job is associated with a particular customer order. The key feature of job-order costing is that the cost of one job differs from that of another and must be kept track of separately.

For job-order production systems, costs are accumulated by job. This approach to assigning costs is called a job-order costing system. In a job-order firm, collecting costs by job provides vital information for management. For example, prices frequently are based on costs in a job-order environment.

Process Production and Costing

Firms in process industries mass-produce large quantities of similar or homogeneous products. Examples of process manufacturers include food, cement, petroleum, and chemical firms. One gallon of paint is the same as another gallon; one bottle of aspirin is the same as another bottle. The important point is that the cost of one unit of a product is identical to the cost of another. Service firms can also use a process-costing approach. For example, check-clearing departments of banks incur a uniform cost to clear a check, no matter the size of the check or the name of the payee.

Process firms accumulate production costs by process or by department for a given period of time. The output for the process for that period of time is measured.
Unit costs are computed by dividing the process costs for the given period by the output of the period. This approach to cost accumulation is known as a process-costing system and is examined in detail in Chapter 6. A comparison of job-order costing and process costing is given in Exhibit 5-1.

**Comparison of Job-Order and Process Costing**

<table>
<thead>
<tr>
<th>Job-Order Costing</th>
<th>Process Costing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Wide variety of distinct products</td>
<td>1. Homogeneous products</td>
</tr>
<tr>
<td>2. Costs accumulated by job</td>
<td>2. Costs accumulated by process or department</td>
</tr>
<tr>
<td>3. Unit cost computed by dividing total job costs by units produced on that job</td>
<td>3. Unit cost computed by dividing process costs of the period by the units produced in the period</td>
</tr>
</tbody>
</table>

**Production Costs in Job-Order Costing**

While the variety of product-costing definitions discussed in Chapter 2 applies to both job-order and process costing, we will use the traditional definition to illustrate job-order costing procedures. That is, production costs consist of direct materials, direct labor, and overhead. Direct materials and direct labor are typically fairly easy to trace to individual jobs. In fact, this tracing will be considered later in this chapter in the section on source documents. It is overhead that presents the problem. By definition, overhead is all production costs other than direct materials and direct labor. Some of these might be easily traced to jobs, but most cannot. The solution is to apply overhead to production. The next section examines in detail the way overhead is treated.

**Normal Costing and Overhead Application**

Unit costs are very important because managers need accurate cost information on materials, labor, and overhead when making decisions. For example, Bechtel Construction, whose projects include the Channel Tunnel connecting England and France and Boston’s “Big Dig,” typically bills its clients at set points throughout construction. As a result, it is important that the unit cost be generated in a timely fashion. Job-order costing using a normal cost system will give the company the unit cost information it needs.

**Actual Costing versus Normal Costing**

Two ways are commonly used to measure the costs associated with production: actual costing and normal costing. Actual costing requires the firm to use the actual cost of all direct materials, direct labor, and overhead used in production to determine unit cost.

While intuitively reasonable, this method has drawbacks. Normal costing requires the firm to assign actual costs of direct materials and direct labor to units produced and to apply overhead to units based on a predetermined estimate. Normal costing is more widely used in practice.

**Actual Costing** In an actual cost system, only actual costs of direct materials, direct labor, and overhead are used to determine unit cost. Strict actual cost systems are rarely used.
because they cannot provide accurate unit cost information on a timely basis. Per-unit computation of the direct materials and direct labor costs is not the problem. The main problem with using actual costing is overhead. Overhead items do not have the direct relationship that direct materials and direct labor do. For example, how much of a security guard’s salary should be assigned to a unit of product or service? Even if the firm averages overhead cost by totaling manufacturing overhead costs for a given period and then divides this total by the number of units produced, distorted costs can occur. The distortion can be traced to uneven incurring of overhead costs and uneven production from period to period.

The first problem is that many overhead costs are not incurred uniformly throughout the year. For example, actual repair cost occurs whenever a machine breakdown occurs. This timing can make overhead costs in the month of a machine breakdown higher than in other months. The second problem, nonuniform production levels, can mean that low production in one month would give rise to high unit overhead costs, and high production in another month would give rise to low unit overhead costs. Yet the production process and total overhead costs may remain unchanged. Clearly, one solution would be to wait until the end of the year to total the actual overhead costs and divide by the total actual production.

Unfortunately, waiting until the end of the year to compute a unit overhead cost is unacceptable. A company needs unit cost information throughout the year. This information is needed on a timely basis both for interim financial statements and to help managers make decisions such as pricing. Most decisions requiring unit cost information simply cannot wait until the end of the year. Managers must react to day-to-day conditions in the marketplace in order to maintain a sound competitive position.

Normal Costing Normal costing solves the problems associated with actual costing. A normal cost system determines unit cost by adding actual direct materials, actual direct labor, and estimated overhead. Overhead can be estimated by approximating the year’s actual overhead at the beginning of the year and then using a predetermined rate throughout the year to obtain the needed unit cost information. Virtually all firms use normal costing.

Importance of Unit Costs to Manufacturing Firms

Unit cost is a critical piece of information for a manufacturer. Unit costs are essential for valuing inventory, determining income, and making a number of important decisions.

Disclosing the cost of inventories and determining income are financial reporting requirements that a firm faces at the end of each period. In order to report the cost of its inventories, a firm must know the number of units on hand and the unit cost. The cost of goods sold (COGS), used to determine income, also requires knowledge of the units sold and their unit cost.

It should be pointed out that full cost information is useful as an input for a number of important internal decisions as well as for financial reporting. In the long run, for any product to be viable, its price must cover its full cost. Decisions to introduce a new product, to continue a current product, and to analyze long-run prices are examples of important internal decisions that rely on full unit cost information.

Importance of Unit Costs to Service Firms

Like manufacturing firms, service and nonprofit firms also require unit cost information. Conceptually, the way companies accumulate and assign costs is the same whether or not the firm is a manufacturer. The service firm must first identify
the service “unit” being provided. A hospital would accumulate costs by patient, patient day, and type of procedure (e.g., X-ray, complete blood count test). A governmental agency must also identify the service provided. For example, city government might provide household trash collection and calculate the cost by truck run or number of houses served.

Service firms use cost data in much the same way that manufacturing firms do. They use costs to determine profitability, the feasibility of introducing new services, and so on. However, because service firms do not produce physical products, they do not need to value work in process and finished goods inventories. Of course, they may have supplies, and the inventory of supplies is simply valued at historical cost.

Nonprofit firms must track costs to be sure that they provide their services in a cost-efficient way. Governmental agencies have a fiduciary responsibility to taxpayers to use funds wisely. Fiduciary responsibility requires accurate accounting for costs. Without such responsibility, questionable results can occur, such as the federal government’s alleged $400 hammer scandals (see Chapter 11 for a discussion of ethics and cost-plus pricing). 1

A cost accounting system measures and assigns costs so that the unit cost of a product or service can be determined. Unit cost is a critical piece of information for both manufacturing and service firms. Bidding is a common requirement in the markets for specialized products and services (e.g., such as bids for special tools, audits, legal services, and medical tests and procedures). For example, it would be virtually impossible for Ernst & Young to submit a meaningful bid to one of its large audit clients without knowing the unit costs of the products or services to be produced. Because unit cost information is so vital, its accuracy is essential.

Normal Costing and Estimating Overhead

In normal costing, overhead must be estimated and applied to production. The basics of overhead application can be described in three steps. The first step is to calculate the predetermined overhead rate. The second step is to apply overhead to production throughout the year. The third step is to reconcile the difference between the total actual overhead incurred during the year and the total overhead applied to production.

Calculating the Predetermined Overhead Rate

The predetermined overhead rate is calculated at the beginning of the year by dividing the total estimated annual overhead by the total estimated level of associated activity or cost driver. Estimated overhead is simply the firm’s best estimate of the amount of overhead (utilities, indirect labor, depreciation, etc.) to be incurred in the coming year. The estimate is often based on last year’s figures and is adjusted for anticipated changes in the coming year.

The associated activity level depends on which activity is best associated with overhead. Often, the activity chosen is the number of direct labor hours or the direct labor cost. This makes sense when much of overhead cost is associated with direct labor (e.g., fringe benefits, worker safety training programs, the cost of running the personnel department). The number of machine hours could be a good choice for a company with automated production. Then, much of the overhead cost might consist of equipment maintenance, depreciation on machinery, electricity to run the machinery, and so on. The estimated activity level is simply the number of direct labor hours, or machine hours, expected for that activity in the coming year.

The predetermined overhead rate is calculated using the following formula:

\[
\text{Overhead rate} = \frac{\text{Estimated annual overhead}}{\text{Estimated annual activity level}}
\]

Notice that the predetermined overhead rate includes estimated amounts in both the numerator and the denominator. This estimation is necessary because the predetermined overhead rate is calculated in advance, usually at the beginning of the year. It is impossible to use actual overhead or actual activity level for the year because at that time, the company does not know what the actual levels will be. Therefore, only estimated or budgeted amounts are used in calculating the predetermined overhead rate.

### Applying Overhead to Production

Once the overhead rate has been computed, the company can begin to apply overhead to production. **Applied overhead** is found by multiplying the predetermined overhead rate by the actual use of the associated activity for the period. Suppose that a company has an overhead rate of $5 per machine hour. In the first week of January, the company used 9,000 hours of machine time. The overhead applied to the week’s production is $45,000 ($5 \times 9,000). The total cost of product for that first week is the actual direct materials and direct labor, plus the applied overhead. The concept is the same for any time period. So, if the company runs its machines for 50,000 hours in the month of January, applied overhead for January would be $250,000 ($5 \times 50,000). **Cornerstone 5-1** shows how to calculate the predetermined overhead rate and how to use that rate to apply overhead to production.

### Reconciling Applied Overhead with Actual Overhead

Recall that two types of overhead must be taken into consideration. One is actual overhead, and those costs are tracked throughout the year in the overhead account. The second type is applied overhead. Overhead applied to production is computed throughout the year and is added to actual direct materials and actual direct labor to get total product cost. At the end of the year, however, it is time to reconcile any difference between actual and applied overhead and to correct the cost of goods sold account to reflect actual overhead spending.

Suppose that Proto Company had actual overhead of $400,000 for the year but had applied $390,000 to production. Notice that the amount of overhead applied to

### HOW TO Calculate the Predetermined Overhead Rate and Apply Overhead to Production

**Information:**
At the beginning of the year, Argus Company estimated the following costs:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$360,000</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>720,000</td>
</tr>
</tbody>
</table>

Argus uses normal costing and applies overhead on the basis of direct labor cost. (Direct labor cost is equal to total direct labor hours worked multiplied by the wage rate.) For the month of February, direct labor cost was $56,000.

**Required:**
1. Calculate the predetermined overhead rate for the year.
2. Calculate the overhead applied to production in February.

**Calculation:**
1. Predetermined overhead rate = \( \frac{\$360,000}{\$720,000} \) = 0.50, or 50 percent of direct labor cost
2. Overhead applied to February production = 0.50 \times \$56,000 = \$28,000
production ($390,000) differs from the actual overhead ($400,000). Since the prede-
termined overhead rate is based on estimated data, applied overhead will rarely equal
actual overhead. Since only $390,000 was applied in our example, the firm has underapplied overhead by $10,000. If applied overhead had been $410,000, then too
much overhead would have been applied to production. The firm would have overapplied overhead by $10,000. The difference between actual overhead and applied over-
head is called an overhead variance. If actual overhead is greater than applied overhead, then the variance is called underapplied overhead. If actual overhead is
less than applied overhead, then the variance is called overapplied overhead. If over-
head has been underapplied, then product cost has been understated; in this case, the
cost appears lower than it really is. Conversely, if overhead has been overapplied, then
product cost has been overstated; in this case, the cost appears higher than it really is.

Exhibit 5-2 illustrates the concepts of over- and underapplied overhead.

Overhead variances occur because it is impossible to perfectly estimate future
overhead costs and production activity. The presence of overhead variances is virtually
inevitable. A problem arises if the overhead variances are not corrected. At year-end,
costs reported on the financial statements must be actual, not estimated, amounts.
Thus, something must be done with the overhead variance. Most often, the entire
overhead variance is assigned to Cost of Goods Sold. This practice is justified on the
basis of materiality, the same principle used to justify expensing the entire cost of a
pencil sharpener in the period acquired rather than depreciating its cost over the life
of the sharpener. Since the overhead variance is usually relatively small, the method of
disposition is not a critical matter. All production costs should appear in cost of
goods sold eventually. Thus, the overhead variance is added to Cost of Goods Sold, if
underapplied, and subtracted from Cost of Goods Sold, if overapplied. For example,
assume that Proto Company has an ending balance in its cost of goods sold account
equal to $607,000. The underapplied overhead variance of $10,000 would be added
to produce a new adjusted balance of $617,000. (Since applied overhead was
$390,000, and actual overhead was $400,000, production costs were understated by
$10,000. Cost of Goods Sold must be increased to correct the problem.) If the var-
iance had been overapplied, it would have been subtracted from Cost of Goods Sold
to produce a new balance of $597,000. Cornerstone 5-2 shows how to reconcile
actual overhead with applied overhead for the Argus Company example.

If the overhead variance is material, or large, another approach would be taken.
That approach, allocating the variance among the ending balances of Work in Proc-
ess, Finished Goods, and Cost of Goods Sold, is discussed in more detail in later
accounting courses.

**Actual and Applied Overhead**

![Actual and Applied Overhead Diagram]

_**Exhibit 5-2***_
Departmental Overhead Rates

The description of overhead application so far has emphasized the plantwide overhead rate. A **plantwide overhead rate** is a single overhead rate calculated by using all estimated overhead for a factory divided by the estimated activity level across the entire factory. However, some companies believe that multiple overhead rates give more accurate costing information. Service firms, or service departments of manufacturing firms, can also use separate overhead rates to charge out their services.

Departmental overhead rates are a widely used type of multiple overhead rate. A **departmental overhead rate** is simply estimated overhead for a department divided by the estimated activity level for that same department. The steps involved in calculating and applying overhead are the same as those involved for one plantwide overhead rate. The company has as many overhead rates as it has departments. **Cornerstone 5-3** shows how to calculate and apply departmental overhead rates.

It is important to realize that departmental overhead rates simply carve total overhead into two or more parts. The departments can be added back to get plantwide overhead. **Cornerstone 5-4** shows how this is done.

### HOW TO Reconcile Actual Overhead with Applied Overhead

**Information:**

At the beginning of the year, Argus Company estimated the following:

<table>
<thead>
<tr>
<th>Overhead</th>
<th>$360,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor cost</td>
<td>$720,000</td>
</tr>
</tbody>
</table>

By the end of the year, actual data are:

<table>
<thead>
<tr>
<th>Overhead</th>
<th>$375,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor cost</td>
<td>$750,000</td>
</tr>
</tbody>
</table>

Argus uses normal costing and applies overhead on the basis of direct labor cost. At the end of the year, Cost of Goods Sold (before adjusting for any overhead variance) is $632,000.

**Required:**

1. Calculate the overhead variance for the year.
2. Dispose of the overhead variance by adjusting Cost of Goods Sold.

**Calculation:**

1. Predetermined overhead rate = $360,000 / $720,000 = 0.50 of direct labor cost

   Overhead applied for the year = 0.50 × $750,000 = $375,000

<table>
<thead>
<tr>
<th>Actual overhead</th>
<th>$375,400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied overhead</td>
<td>375,000</td>
</tr>
<tr>
<td>Overhead variance—underapplied</td>
<td>$400</td>
</tr>
</tbody>
</table>

2.  

   | Unadjusted COGS       | $632,000 |
   | Add: Overhead variance—underapplied | 400       |
   | Adjusted COGS         | $632,400 |

---

**Cornerstone 5-3**

**Cornerstone 5-4**
HOW TO Calculate Predetermined Departmental Overhead Rates and Apply Overhead to Production

Information:
At the beginning of the year, Sorrel Company estimated the following:

<table>
<thead>
<tr>
<th>Machining Department</th>
<th>Assembly Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead $240,000</td>
<td>$360,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>Direct labor hours 135,000</td>
<td>240,000</td>
<td>375,000</td>
</tr>
<tr>
<td>Machine hours 200,000</td>
<td>—</td>
<td>200,000</td>
</tr>
</tbody>
</table>

Sorrel uses departmental overhead rates. In the machining department, overhead is applied on the basis of machine hours. In the assembly department, overhead is applied on the basis of direct labor hours. Actual data for the month of June are as follows:

<table>
<thead>
<tr>
<th>Machining Department</th>
<th>Assembly Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead $22,500</td>
<td>$30,750</td>
<td>$53,250</td>
</tr>
<tr>
<td>Direct labor hours 11,000</td>
<td>20,000</td>
<td>31,000</td>
</tr>
<tr>
<td>Machine hours 17,000</td>
<td>—</td>
<td>17,000</td>
</tr>
</tbody>
</table>

Required:
1. Calculate the predetermined overhead rates for the machining and assembly departments.
2. Calculate the overhead applied to production in each department for the month of June.
3. By how much has each department’s overhead been overapplied? Underapplied?

Calculation:
1. Machining department overhead rate = \( \frac{\$240,000}{200,000} \) = $1.20 per machine hour
   
   Assembly department overhead rate = \( \frac{\$360,000}{240,000} \) = $1.50 per direct labor hour

2. Overhead applied to machining in June = $1.20 \times 17,000 = $20,400
   Overhead applied to assembly in June = $1.50 \times 20,000 = $30,000

<table>
<thead>
<tr>
<th>Machining Department</th>
<th>Assembly Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual overhead $22,500</td>
<td>$30,750</td>
</tr>
<tr>
<td>Applied overhead 20,400</td>
<td>30,000</td>
</tr>
<tr>
<td>Underapplied overhead $ 2,100</td>
<td>$ 750</td>
</tr>
</tbody>
</table>

Considerable emphasis has been placed on describing how overhead costs are treated because this is the key to normal costing. Now it is time to see how normal costing is used to develop unit costs in the job-order costing system.
Unit Costs in the Job-Order System

In a job-order environment, predetermined overhead rates are always used because the completion of a job rarely coincides with the completion of a fiscal year. Therefore, in the remainder of this chapter, normal costing is used.

The unit cost of a job is the total cost of the job (materials used on the job, labor worked on the job, and applied overhead) divided by the number of units in the job. Although the concept is simple, the practical reality of the computation can be somewhat more complex because of the record keeping involved. Let’s look at a simple example.

Suppose that Stan Johnson forms a new company, Johnson Leathergoods, which specializes in the production of custom leather products. Stan believes that there is a market for one-of-a-kind leather purses, briefcases, and backpacks. In January, its first month of operation, he obtains two orders: the first is for 20 leather backpacks for a local sporting goods store; the second is for 10 distinctively tooled briefcases for the coaches of a local college. Stan agrees to provide these orders at a price of cost plus 50 percent. The first order, the backpacks, will require direct materials (leather,
thread, buckles), direct labor (cutting, sewing, assembling), and overhead. Assume that overhead is applied using direct labor hours. Suppose that the materials cost $1,000 and the direct labor costs $1,080 (120 hours at $9 per hour). If the predetermined overhead rate is $2 per direct labor hour, then the overhead applied to this job is $240 (120 hours at $2 per hour). The total cost of the backpacks is $2,320, and the unit cost is $116, computed as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,080</td>
</tr>
<tr>
<td>Overhead</td>
<td>240</td>
</tr>
<tr>
<td>Total cost</td>
<td>$2,320</td>
</tr>
<tr>
<td>÷ Number of units</td>
<td>÷ 20</td>
</tr>
<tr>
<td>Unit cost</td>
<td>$ 116</td>
</tr>
</tbody>
</table>

Since cost is so closely linked to price in this case, it is easy to see that Stan will charge the sporting goods store $3,480 (cost of $2,320 plus 50 percent of $2,320), or $174 per backpack.

This is a simplified example of how Stan will arrive at the total cost of a single job. But how does he know that actual materials will cost $1,000 or that actual direct labor for this particular job will come to $1,080? In order to determine those figures, Stan will need to keep track of costs using a variety of source documents. These documents are described in the next section.

**Keeping Track of Job Costs with Source Documents**

Accounting for job-order production begins by preparing the source documents that are used to keep track of the costs of jobs. In a job-order firm, where price is so often based on cost, it is critically important to keep careful track of the costs of a job. Ethical issues arise when a firm adds costs from one job to the job-order sheet of another job. The first job is undercosted and underpriced while the second job is overcosted and overpriced. Customers rely on the professionalism and honesty of the job-order firm in record keeping.

**Job-Order Cost Sheet**

Every time a new job is started, a job-order cost sheet is prepared. The earlier computation for Stan’s backpack job, which lists the total cost of materials, labor, and overhead for a single job, is the simplest example of a job-order cost sheet. The job-order cost sheet is prepared for every job; it is subsidiary to the work in process account and is the primary document for accumulating all costs related to a particular job. Exhibit 5-3 illustrates a simple job-order cost sheet.

---

**Job-Order Cost Sheet**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,080</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>240</td>
</tr>
<tr>
<td>Total cost</td>
<td>$2,320</td>
</tr>
<tr>
<td>÷ Number of units</td>
<td>÷ 20</td>
</tr>
<tr>
<td>Unit cost</td>
<td>$ 116</td>
</tr>
</tbody>
</table>
The job-order cost sheet contains all information pertinent to a job. For a simple job, the job-order cost sheet is quite brief, containing only the job description (backpacks) and cost of materials, labor, and overhead added during the month.

Johnson Leathergoods had only two jobs in January; these could be easily identified by calling them “Backpacks” and “Briefcases.” Some companies may find that the customer’s name is sufficient to identify a job. For example, a construction company may identify its custom houses as the “Kumar Residence” or the “Malkovich Residence.”

As more and more jobs are produced, a company will usually find it most convenient to number them. For example, you will number them as Job 13, Job 22, or Job 44. Perhaps the job number starts with the year so that the first job of 2008 is 2008-1, the second is 2008-2, and so on. The key point is that each job is unique and must have a uniquely identifiable name. This name, or job-order number, heads the job-order cost sheet.

Work in process consists of all incomplete work. In a job-order system, this will be all of the unfinished jobs. The balance in Work in Process at the end of the month will be the total of all the job-order cost sheets for the incomplete jobs.

A job-order costing system must have the ability to identify the quantity of direct materials, direct labor, and overhead consumed by each job. In other words, documentation and procedures are needed to associate the manufacturing inputs used by a job with the job itself. This need is satisfied through the use of materials requisitions for direct materials, time tickets for direct labor, and source documents for other activity drivers that might be used in applying overhead.

Materials Requisitions

The cost of direct materials is assigned to a job by the use of a source document known as a materials requisition form, which is illustrated in Exhibit 5-4. Notice that the form asks for the type, quantity, and unit price of the direct materials issued and, most importantly, the number of the job. Using this form, the cost accounting department can enter the cost of direct materials onto the correct job-order cost sheet.

If the accounting system is automated, this posting may entail directly entering the data at a computer terminal, using the materials requisition forms as source docu-
ments. A program enters the cost of direct materials into the record for each job. In addition to providing essential information for assigning direct materials costs to jobs, the materials requisition form may also include other data items, such as a requisition number, a date, and a signature. These items are useful for maintaining proper control over a firm’s inventory of direct materials. The signature, for example, transfers responsibility for the materials from the storage area to the person receiving the materials, usually a production supervisor.

No attempt is made to trace the cost of other materials, such as supplies, lubricants, and on the like, to a particular job. You will recall that these indirect materials are assigned to jobs through the predetermined overhead rate.

**Time Tickets**

Direct labor must be associated with each particular job. The means by which direct labor costs are assigned to individual jobs is the source document known as a *time ticket* (Exhibit 5-5). Each day, the employee fills out a time ticket that identifies his or her name, wage rate, and the hours worked on each job. These time tickets are collected and transferred to the cost accounting department where the information is used to post the cost of direct labor to individual jobs. Again, in an automated system, posting involves entering the data into the computer.

Time tickets are used only for direct laborers. Since indirect labor is common to all jobs, these costs belong to overhead and are allocated using one or more predetermined overhead rates.

**Source Documents for Other Activity**

The company may use an overhead application base other than direct labor hours. In that case, other source documents may be required. For example, machine hours may be used to apply overhead. Then, a new document must be developed. A source document that will track the machine hours used by each job can be modeled on job time tickets.

**Concept Q&A**

Suppose that Johnson Leathergoods created an automated tooling department and decides to track the number of machine hours used on each job. Design a source document for this purpose.

Possible Answer: The form might be similar to the time ticket shown in Exhibit 5-5. However, the hourly rate and amount columns could be deleted and a column added for the initials of the worker entering the information. The form might be similar to the time ticket shown in Exhibit 5-5. These time tickets are used only for direct laborers. Since indirect labor is common to all jobs, these costs belong to overhead and are allocated using one or more predetermined overhead rates.

**Time Ticket**

<table>
<thead>
<tr>
<th>Job Time Ticket #: 008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Name: Ed Wilson</td>
</tr>
<tr>
<td>Date: January 12, 20xx</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Start Time</th>
<th>Stop Time</th>
<th>Total Time</th>
<th>Hourly Rate</th>
<th>Amount</th>
<th>Job Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00</td>
<td>10:00</td>
<td>2</td>
<td>$9</td>
<td>$18</td>
<td>Backpacks</td>
</tr>
<tr>
<td>10:00</td>
<td>11:00</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>Backpacks</td>
</tr>
<tr>
<td>11:00</td>
<td>12:00</td>
<td>1</td>
<td>9</td>
<td>9</td>
<td>Backpacks</td>
</tr>
<tr>
<td>1:00</td>
<td>5:00</td>
<td>4</td>
<td>9</td>
<td>36</td>
<td>Backpacks</td>
</tr>
</tbody>
</table>

Approved by: Jim Lawson
(Department Supervisor)
All completed job-order cost sheets of a firm can serve as a subsidiary ledger for the finished goods inventory. Then, the work in process account consists of all of the job-order cost sheets for the unfinished jobs. The finished goods inventory account consists of all the job-order cost sheets for jobs that are complete but not yet sold. As finished goods are sold and shipped, the cost records will be pulled (or deleted) from the finished goods inventory file. These records then form the basis for calculating a period’s cost of goods sold. We will examine the flow of costs through these accounts next.

### The Flow of Costs through the Accounts

Cost flow describes the way costs are accounted for from the point at which they are incurred to the point at which they are recognized as an expense on the income statement. The principal interest in a job-order costing system is the flow of manufacturing costs. Accordingly, we begin with a description of exactly how the three manufacturing cost elements—direct materials, direct labor, and overhead—flow through Work in Process account, into Finished Goods, and, finally, into Cost of Goods Sold.

The simplified job-shop environment provided by Johnson Leathergoods will continue to serve as an example. To start the business, Stan leased a small building and bought the necessary production equipment. Recall that he obtained two orders for January: one for 20 backpacks for a local sporting goods store and a second for 10 briefcases for the coaches of a local college. Both orders will be sold for manufacturing costs plus 50 percent. Stan expects to average two orders per month for the first year of operation.

Stan created two job-order cost sheets, one for each order. The first job-order cost sheet is for the backpacks; the second is for the briefcases.

### Accounting for Materials

Since the company is just starting business, it has no beginning inventories. To produce the backpacks and briefcases in January and to have a supply of materials on hand at the beginning of February, Stan purchases, on account, $2,500 of raw materials (leather, webbing for backpack straps, heavy-duty thread, buckles). Physically, the materials are put in a materials storeroom. In the accounting records, the raw materials and the accounts payable accounts are each increased by $2,500. Raw Materials is an inventory account (it appears on the balance sheet under current assets). It also is the controlling account for all raw materials. Any purchase increases the raw materials account.

When the production supervisor needs materials for a job, materials are removed from the storeroom. The cost of the materials is removed from the raw materials account and added to the work in process account. Of course, in a job-order environment, the materials moved from the storeroom to work stations on the factory floor must be “tagged” with the appropriate job name. Suppose that Stan needs $1,000 of materials for the backpacks and $500 for the briefcases. Then, the job-order cost sheet for the backpacks would show $1,000 for direct materials, and the job-order cost sheet for the briefcases would show $500 for direct materials. Exhibit 5-6 summarizes the raw materials cost flow into these two jobs.

The raw materials account increased by $2,500 due to purchases and decreased by $1,500 as materials were withdrawn for use in production. So, what is the balance in the raw materials account after these two transactions? It is $1,000. This is calculated by taking the beginning balance in the raw materials account of $0, adding $2,500 of purchases, and subtracting $1,500 of materials used in production.

### Accounting for Direct Labor Cost

Since two jobs were in progress during January, Stan must determine not only the total number of direct labor hours worked but also the time worked on each job. The backpacks required 120 hours at an average wage rate of $9 per hour, for a total
direct labor cost of $1,080. For the briefcases, the total was $450, based on 50 hours at an average hourly wage of $9. These amounts are posted to each job’s cost sheet. The summary of the labor cost flows is given in Exhibit 5-7. Notice that the direct labor costs assigned to the two jobs exactly equal the total labor costs assigned to Work in Process. Remember that the labor cost flows reflect only direct labor cost. Indirect labor is assigned as part of overhead.

More accounts are involved in this transaction than meets the eye in Exhibit 5-7. Accounting for labor cost is a complex process because the company must keep track of FICA, Medicare, federal and state unemployment taxes, vacation time, and so on. We will concentrate on the concept that direct labor adds to the cost of the product or service and not on the details of the various labor-related accounts.
Accounting for Overhead

The use of normal costing means that actual overhead costs are not assigned directly to jobs. Overhead is applied to each job by using a predetermined rate. Actual overhead costs incurred must be accounted for as well, but on an overall (not a job-specific) basis.

Overhead costs can be assigned using a single plantwide overhead rate or departmental rates. Typically, direct labor hours is the measure used to calculate a plantwide overhead rate, and departmental rates are based on drivers such as direct labor hours, machine hours, or direct materials dollars. The use of a plantwide rate has the virtue of being simple and reduces data collection requirements. To illustrate these two features, assume that total estimated overhead cost for Johnson Leathergoods is $9,600, and the estimated direct labor hours total 4,800 hours. Accordingly, the predetermined overhead rate is:

$$\text{Overhead rate} = \frac{\$9,600}{4,800} = \$2 \text{ per direct labor hour}$$

For the backpacks, with a total of 120 hours worked, the amount of applied overhead cost posted to the job-order cost sheet is $240 ($2 \times 120). For the briefcases, the applied overhead cost is $100 ($2 \times 50). Note also that assigning overhead to jobs only requires a rate and the direct labor hours used by the job. Since direct labor hours are already being collected to assign direct labor costs to jobs, overhead assignment will not demand any additional data collection.

Accounting for Actual Overhead Costs

Overhead has been applied to the jobs, but what about the actual overhead incurred? To illustrate how actual overhead costs are recorded, assume that Johnson Leathergoods incurred the following indirect costs for January:

- Lease payment $200
- Utilities 50
- Equipment depreciation 100
- Indirect labor 65
- Total overhead costs $415

It is important to understand that the actual overhead costs never enter the work in process account. The usual procedure is to record actual overhead to the overhead control account. Then, at the end of a period (typically a year), actual overhead is reconciled with applied overhead, and, if the variance is immaterial, it is closed to Cost of Goods Sold.

For Johnson Leathergoods at the end of January, actual overhead incurred is $415, while applied overhead is $340. Therefore, the overhead variance of $75 ($415 – $340) means that overhead is underapplied for the month of January.

The flow of overhead costs is summarized in Exhibit 5-8. Notice that the total overhead applied from all jobs is entered in the work in process account.

Let’s take a moment to recap. The cost of a job includes direct materials, direct labor, and applied overhead. These costs are entered on the job-order cost sheet. Work in Process, at any point in time, is the total of the costs on all open job-order cost sheets. When the job is complete, it must leave Work in Process and be entered into Finished Goods or Cost of Goods Sold.

Accounting for Finished Goods

When a job is complete, direct materials, direct labor, and applied overhead amounts are totaled to yield the manufacturing cost of the job. Simultaneously, the costs of the completed job are transferred from the work in process account to the finished goods account.
For example, assume that the backpacks were finished in January with the completed cost sheet shown in Exhibit 5-8. Since the backpacks are finished, the total manufacturing costs of $2,320 must be transferred from the work in process account to the finished goods account. A summary of the cost flows occurring when a job is finished is shown in Exhibit 5-9.

Summary of Overhead Cost Flows

<table>
<thead>
<tr>
<th>Actual Overhead Account</th>
<th>Applied Overhead Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease</td>
<td>$200</td>
</tr>
<tr>
<td>Utilities</td>
<td>50</td>
</tr>
<tr>
<td>Equipment depreciation</td>
<td>100</td>
</tr>
<tr>
<td>Indirect labor</td>
<td>65</td>
</tr>
<tr>
<td>Total actual overhead</td>
<td>$115</td>
</tr>
</tbody>
</table>

Work-in-Process Account

<table>
<thead>
<tr>
<th>Job: Backpacks</th>
<th>Job: Briefcases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,080</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>240</td>
</tr>
<tr>
<td>Total cost</td>
<td>$2,320</td>
</tr>
<tr>
<td>Number of units</td>
<td>20</td>
</tr>
<tr>
<td>Unit cost</td>
<td>$116</td>
</tr>
</tbody>
</table>

Summary of Cost Flows from Work in Process to Finished Goods

| Work-in-Process Account BEFORE Transfer of Backpacks to Finished Goods |
|---------------------------|--------------------------|
| Job: Backpacks                | Job: Briefcases            |
| Direct materials             | $1,000 | Direct materials | $500 |
| Direct labor                 | 1,080 | Direct labor     | 450 |
| Applied overhead             | 240  | Applied overhead  | 180 |
| Total cost                   | $2,320 | Total cost       | $1,850 |
| Number of units              | 20   | Number of units  | 10  |
| Unit cost*                   | $116 | Unit cost        |     |

| Work-in-Process Account AFTER Transfer of Backpacks to Finished Goods |
|---------------------------|--------------------------|
| Job: Briefcases           |                           |
| Direct materials           | $500                      |
| Direct labor               | 450                       |
| Applied overhead           | 180                       |
| Total cost                 | $1,850                    |
| Number of units            |                           |
| Unit cost                  |                           |

<table>
<thead>
<tr>
<th>Finished Goods Account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning balance</td>
</tr>
<tr>
<td>Add: Completed backpacks</td>
</tr>
<tr>
<td>Less: Jobs sold</td>
</tr>
<tr>
<td>Ending balance</td>
</tr>
</tbody>
</table>

\(^1\) Unit cost information is included for backpacks because they are finished. The briefcases are still in process, so no unit cost is calculated.
The completion of a job is an important step in the flow of manufacturing costs. The cost of the finished job must be removed from Work in Process, added to Finished Goods, and, eventually, added to the cost of goods sold on the income statement. To ensure accuracy in computing these costs, a cost of goods manufactured statement is prepared. The schedule of the cost of goods manufactured presented in Exhibit 5-10 summarizes the production activity of Johnson Leathergoods for January. It is important to note that applied overhead is used to arrive at the cost of goods manufactured. Both work in process and finished goods inventories are carried at normal cost rather than actual cost.

Notice that ending work in process is $1,050. Where did this figure come from? Of the two jobs, the backpacks were finished and transferred to finished goods. The briefcases are still in process, however, and the manufacturing costs assigned thus far are direct materials, $500; direct labor, $450; and overhead applied, $100. The total of these costs gives the cost of ending work in process. You may want to check these figures against the job-order cost sheet for briefcases shown at the top right of Exhibit 5-9.

### Accounting for Cost of Goods Sold

In a job-order firm, units can be produced for a particular customer, or they can be produced with the expectation of selling the units later. If a job is produced especially for a customer (as with the backpacks) and then shipped to the customer, then the cost of the finished job becomes the cost of goods sold. When the backpacks are finished, Cost of Goods Sold increases by $2,320, while Work in Process decreases by the same amount (the job is no longer incomplete, so its costs cannot stay in Work in Process). Then, the sale is recognized by increasing both Sales Revenue and Accounts Receivable by $3,480 (cost plus 50 percent of cost, or $2,320 + $1,160).

A schedule of cost of goods sold usually is prepared at the end of each reporting period (e.g., monthly and quarterly). Exhibit 5-11 presents such a schedule for Johnson Leathergoods for January. Typically, the overhead variance is not material and, therefore, is closed to the cost of goods sold account. The cost of goods sold before an adjustment for an overhead variance is called normal cost of goods sold. After the adjustment for the period’s overhead variance takes place, the result is called the

---

### Exhibit 5-10

#### Schedule of Cost of Goods Manufactured

<table>
<thead>
<tr>
<th>Johnson Leathergoods</th>
<th>Schedule of Cost of Goods Manufactured</th>
<th>For the Month of January</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beginning raw materials inventory</td>
<td>$ 0</td>
<td></td>
</tr>
<tr>
<td>Purchases of raw materials</td>
<td>2,500</td>
<td></td>
</tr>
<tr>
<td>Total raw materials available</td>
<td>$2,500</td>
<td></td>
</tr>
<tr>
<td>Ending raw materials</td>
<td>1,000</td>
<td></td>
</tr>
<tr>
<td>Total raw materials used</td>
<td>$1,500</td>
<td></td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,530</td>
<td></td>
</tr>
<tr>
<td>Overhead:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lease</td>
<td>$ 200</td>
<td></td>
</tr>
<tr>
<td>Utilities</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Depreciation</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Indirect labor</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Total overhead applied</td>
<td>$ 415</td>
<td></td>
</tr>
<tr>
<td>Less: Underapplied overhead</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Overhead applied</td>
<td>340</td>
<td></td>
</tr>
<tr>
<td>Current manufacturing costs</td>
<td>$3,370</td>
<td></td>
</tr>
<tr>
<td>Add: Beginning work in process</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total manufacturing costs</td>
<td>$3,370</td>
<td></td>
</tr>
<tr>
<td>Less: Ending work in process</td>
<td>1,050</td>
<td></td>
</tr>
<tr>
<td>Cost of goods manufactured</td>
<td>$2,320</td>
<td></td>
</tr>
</tbody>
</table>
adjusted cost of goods sold. It is this latter figure that appears as an expense on the income statement.

However, closing the overhead variance to the cost of goods sold account is not done until the end of the year. Variances are expected each month because of nonuniform production and nonuniform actual overhead costs. As the year unfolds, these monthly variances should, by and large, offset each other so that the year-end variance is small. Nonetheless, to illustrate how the year-end overhead variance would be treated, we will close out the overhead variance experienced by Johnson Leathergoods in January.

Notice that there are two cost of goods sold figures in Exhibit 5-11. The first is normal cost of goods sold and is equal to actual direct materials, actual direct labor, and applied overhead for the jobs that were sold. The second figure is adjusted cost of goods sold. The adjusted cost of goods sold is equal to normal cost of goods sold plus or minus the overhead variance. In this case, overhead has been underapplied (actual overhead of $415 is $75 higher than the applied overhead of $340), so this amount is added to normal cost of goods sold. If the overhead variance shows overapplied overhead, then that amount will be subtracted from normal cost of goods sold.

Suppose that the backpacks had not been ordered by a customer but had been produced with the expectation that they could be sold through a subsequent marketing effort. Then, all 20 units might not be sold at the same time. Assume that on January 31, there were 15 backpacks sold. In this case, the cost of goods sold figure is the unit cost times the number of units sold ($116 × 15, or $1,740). The unit cost figure is found on the cost sheet in Exhibit 5-9.

Sometimes it is simpler to use a briefer version of the job-order cost sheet in order to calculate ending Work in Process, Finished Goods, and Cost of Good Sold. (This is particularly true when working homework and test questions.) Cornerstone 5-5 shows how to set up such a version to calculate account balances.

**Accounting for Nonmanufacturing Costs**

Manufacturing costs, however, are not the only costs experienced by a firm. Nonmanufacturing costs are also incurred. Recall that costs associated with selling and general administrative activities are period costs. Selling and administrative costs are never assigned to the product; they are not part of the manufacturing cost flows.

To illustrate how these costs are accounted for, assume Johnson Leathergoods had the following additional transactions in January:

Advertising circulars $ 75
Sales commission 125
Office salaries 500
Depreciation, office equipment 50

The first two transactions fall in the category of selling expense and the last two into the category of administrative expense. So, the selling expense account would increase by $200 ($75 + $125), and the administrative expense account would increase by $550 ($500 + $50).
**HOW TO Prepare Brief Job-Order Cost Sheets**

*Information:*  
At the beginning of June, Galway Company had two jobs in process, Job 78 and Job 79, with the following accumulated cost information:

<table>
<thead>
<tr>
<th></th>
<th>Job 78</th>
<th>Job 79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,000</td>
<td>$800</td>
</tr>
<tr>
<td>Direct labor</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>750</td>
<td>1,250</td>
</tr>
<tr>
<td>Balance, June 1</td>
<td>$2,350</td>
<td>$3,050</td>
</tr>
</tbody>
</table>

During June, two more jobs (80 and 81) were started. The following direct materials and direct labor costs were added to the four jobs during the month of June:

<table>
<thead>
<tr>
<th></th>
<th>Job 78</th>
<th>Job 79</th>
<th>Job 80</th>
<th>Job 81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$500</td>
<td>$1,110</td>
<td>$900</td>
<td>$100</td>
</tr>
<tr>
<td>Direct labor</td>
<td>400</td>
<td>1,400</td>
<td>2,000</td>
<td>320</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>$500</td>
<td>$1,750</td>
<td>2,500</td>
<td>400</td>
</tr>
</tbody>
</table>

At the end of June, Jobs 78, 79, and 80 were completed. Only Job 79 was sold. On June 1, the balance in Finished Goods was zero.

**Required:**
1. Calculate the overhead rate based on direct labor cost.
2. Prepare a brief job-order cost sheet for the four jobs. Show the balance as of June 1 as well as direct materials and direct labor added in June. Apply overhead to the four jobs for the month of June, and show the ending balances.

**Calculation:**
1. Ordinarily, the predetermined overhead rate is calculated using estimated overhead and, in this case, estimated direct labor cost. Those figures were not given. However, it is possible to work backward from the applied overhead by the beginning of June for Jobs 78 and 79.

   \[
   \text{Applied overhead} = \text{Predetermined overhead rate} \times \text{Actual activity level}
   \]

   For Job 78,

   \[
   \frac{750}{600} = \text{Predetermined overhead rate} \times \frac{600}{600}
   \]

   Predetermined overhead rate = 1.25, or 125 percent of direct labor cost

   (The predetermined overhead rate using Job 79 is identical.)

2. 

<table>
<thead>
<tr>
<th></th>
<th>Job 78</th>
<th>Job 79</th>
<th>Job 80</th>
<th>Job 81</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beginning balance, June 1</td>
<td>$2,350</td>
<td>$3,050</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Direct materials</td>
<td>500</td>
<td>1,110</td>
<td>900</td>
<td>100</td>
</tr>
<tr>
<td>Direct labor</td>
<td>400</td>
<td>1,400</td>
<td>2,000</td>
<td>320</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>500</td>
<td>1,750</td>
<td>2,500</td>
<td>400</td>
</tr>
<tr>
<td>Total, June 30</td>
<td>$3,750</td>
<td>$7,310</td>
<td>$5,400</td>
<td>$820</td>
</tr>
</tbody>
</table>
Controlling accounts accumulate all of the selling and administrative expenses for a period. At the end of the period, all of these costs flow to the period’s income statement. An income statement for Johnson Leathergoods is shown in Exhibit 5-12.

With the preparation of the income statement, the flow of costs through the manufacturing, selling, and administrative expense accounts is complete. A more detailed look at the actual accounting for these cost flows is undertaken in Appendix 5-A to this chapter.

### Summary of Learning Objectives

**LO1.** Describe the differences between job-order costing and process costing, and identify the types of firms that would use each method.

- Job-order firms collect costs by job.
- Job-order firms produce heterogeneous products/services—each unit or batch has a different total cost.
- Job-order firms include construction, custom cabinetry, dentistry, medical services, and automotive repair.
Summary of Important Equations

1. Predetermined overhead rate = Estimated annual overhead / Estimated annual activity level
2. Applied overhead = Predetermined overhead rate × Actual activity usage
3. Overhead variance = Applied overhead – Actual overhead
4. Adjusted COGS = Unadjusted COGS ± Overhead variance
   (Note: Applied overhead > Actual overhead means Overapplied overhead
    Applied overhead < Actual overhead means Underapplied overhead)
5. Departmental overhead rate = Estimated departmental overhead / Estimated departmental activity level
6. Total product cost = Total direct materials + Total direct labor + Applied overhead
7. Unit product cost = Total product cost / Number of units
Appendix 5A: Journal Entries Associated with Job-Order Costing

The transactions that flow through the accounts in job-order costing are entered into the accounting system by making journal entries and posting them to the accounts. Let’s summarize the various transactions that occurred during the month of January for Johnson Leathergoods.

1. Purchased raw materials costing $2,500 on account.
2. Requisitioned materials costing $1,500 for use in production.
3. Recognized direct labor costing $1,530 (that is, it was not paid in cash but was shown as a liability in the wages payable account).
4. Applied overhead to production at the rate of $2 per direct labor hour. A total of 170 direct labor hours were worked.
5. Incurred actual overhead costs of $415.
6. Completed the backpack job and transferred it to Finished Goods.
7. Sold the backpack job at cost plus 50 percent.

The journal entries for each of the above transactions are as follows:

1. Raw Materials 2,500
   Accounts Payable 2,500
2. Work in Process 1,500
   Raw Materials 1,500
3. Work in Process 1,530
   Wages Payable 1,530
4. Work in Process 340
   Overhead Control 340
5. Overhead Control 415
   Lease Payable 200
   Utilities Payable 50
   Accumulated Depreciation 100
   Wages Payable 65
6. Finished Goods 2,320
   Work in Process 2,320
7. Cost of Goods Sold 2,320
   Finished Goods 2,320
   Accounts Receivable 3,480
   Sales Revenue 3,480
8. Cost of Goods Sold 75
   Overhead Control 75

Key Terms

Actual cost system, 53
Adjusted cost of goods sold, 69
Applied overhead, 56
Departmental overhead rate, 58
Job, 52
Job-order cost sheet, 61
Job-order costing system, 52
Materials requisition form, 62
Normal cost of goods sold, 68
Normal cost system, 54
Overapplied overhead, 57
Overhead variance, 57
Plantwide overhead rate, 58
Predetermined overhead rate, 55
Process-costing system, 53
Time ticket, 63
Underapplied overhead, 57

OBJECTIVE Prepare the journal entries associated with job-order costing.
Journal entry 1 shows that the purchase of materials increases the raw materials account as well as the accounts payable account. In other words, the company has increased both assets (materials on hand) and liabilities (through Accounts Payable).

Entry 2 shows the transfer from the materials storeroom to the factory floor. In other words, the materials are no longer awaiting requisition; they are being used. Therefore, the work in process account goes up, but the raw materials account goes down.

Entry 3 recognizes the contribution of direct labor. The amount of direct labor wages is added to Work in Process and also is added to the liability account, Wages Payable.

Entry 4 recognizes the application of overhead to the jobs. Since 170 hours of direct labor were worked, and the overhead rate is $2 per direct labor hour, then $340 has been applied to overhead. Notice that this overhead application increases the work in process account and shows as a credit to Overhead Control.
Entry 5 shows that the actual overhead incurred is debited to Overhead Control. The credit is to the various payable accounts.

Entry 6 shows the transfer of the backpack job from Work in Process to Finished Goods. We find the appropriate cost by referring to the job-order cost sheet in Exhibit 5-9.

Entry 7 consists of two journal entries. First, we recognize the cost of the backpack job by debiting Cost of Goods Sold for the cost and crediting Finished Goods. This entry mirrors the physical movement of the backpacks out of the warehouse and to the customer. Second, the sales price is shown. It is very important to separate the cost of the job from the sale. This always requires two entries.

Finally, in entry 8, we check the overhead control account. It has a debit balance of $75, indicating that the overhead variance is $75 underapplied. To bring the balance to zero, then, Overhead Control must be credited $75, and Cost of Goods Sold must be debited $75.

Exhibit 5-13 summarizes these journal entries and posts them to the appropriate accounts.

**Summary of Appendix 5A**

In job-order costing, materials and direct labor are charged to the work in process account (Raw Materials and Wages Payable are credited, respectively). Overhead costs are assigned to Work in Process using a predetermined rate. Actual overhead costs are accumulated in the overhead control account. The cost of completed units is credited to Work in Process and is debited to Finished Goods. When goods are sold, the cost is debited to Cost of Goods Sold and is credited to Finished Goods.

**Appendix 5B: Support Department Cost Allocation**

The costs of resources shared by two or more services or products are referred to as common costs. For example, the cost of a maintenance department is shared by producing departments that use these services. How to assign these shared costs to individual producing departments is the focus of this appendix.

**Types of Departments**

Nearly every company or factory has producing departments and support departments. Producing departments are directly responsible for creating the products or services sold to customers. For example, a public accounting firm might have producing departments devoted to auditing, tax, and management advisory services. In a factory, producing departments are those that work directly on the products being manufactured, such as the grinding and assembly departments. Support departments provide essential services for producing departments, but they do not actually make the product or service being sold. Examples include the maintenance, grounds, engineering, housekeeping, personnel, and photocopying departments.

Once producing and support departments have been identified, overhead costs that belong exclusively to each department are identified—these are direct overhead costs. For example, a factory cafeteria would have direct costs such as food, salaries of cooks and servers, depreciation on dishwashers and stoves, and supplies (e.g., dishwasher detergent, napkins, plastic forks). Direct overhead costs of a producing department would include supplies, supervisory salaries, and depreciation on equipment used in that department. Overhead that cannot easily be assigned to a producing or support department is assigned to a catchall department such as “general factory.”

Once the direct overhead costs of each department are determined, the next step is to assign the support department costs to producing departments. These costs are assigned to producing departments by using causal factors (drivers) that measure the consumption of the services. Each producing department’s share of the support department costs is added to that department’s direct overhead cost. This total
Estimated overhead is then divided by a unit-level driver to obtain a predetermined overhead rate for each producing department. Overhead rates are calculated only for producing departments because products only pass through producing departments. Exhibit 5-14 summarizes the steps involved. Steps 1 through 4 are explained in this Appendix, steps 5 and 6 are explained in Cornerstone 5-3 of this chapter.

**ETHICS** Deliberations about discontinuing a support department need to be kept confidential. Ethical professional practice requires this and more. For example, it may be tempting to use confidential information about the discontinuance of a support department to provide an unfair advantage to a friend or relative who may be the owner of an outside service firm that essentially would be replacing the support department.

Clearly, then, there are good reasons for allocating support department costs. The validity of these reasons, however, depends on the accuracy and fairness of the cost assignments made.

**Methods of Support Department Cost Allocation**

A plantwide overhead rate adds together all of the direct overhead costs of the producing departments and all costs of any support departments to calculate a single plantwide overhead rate and assign overhead to units produced. However, many firms find that a single overhead rate does not adequately assign costs to various products. In that case, departmental overhead rates may be used. Then it is necessary to allocate support department costs to the producing departments in order to calculate departmental overhead rates.

The three methods of assigning costs of multiple support departments to producing departments are the **direct method**, the **sequential method**, and the **reciprocal method**. The direct method ignores interactions and assigns support department costs directly to producing departments. Ignoring these interactions and allocating service costs directly to producing departments may produce unfair and inaccurate cost assignments. For example, the power department, although a support department, may use 30 percent of the services of the maintenance department. By not assigning some maintenance costs to the power department, its costs are understated. As a result, a producing department that is a heavy user of power and an average or below-average user of maintenance may then receive, under the direct method, a cost allocation that is understated. The sequential method considers some of the interaction effects, and the reciprocal method fully considers all interactions. In determining which support department cost allocation method to use, companies must determine the extent of support department interaction and weigh the individual costs and benefits of each method. In the next three sections, the direct, sequential, and reciprocal methods are discussed.
Direct Method  The direct method ignores support department interactions and assigns support department costs only to the producing departments. The direct method is the simplest and most straightforward way to assign support department costs. For those choosing to use a single rate to assign service costs, the total service costs are assigned to producing departments in proportion to the producing departments’ expected or normal usage.

Exhibit 5-15 illustrates the lack of support department reciprocity on cost allocation by using the direct method. We see that by using the direct method, support department cost is assigned to producing departments only. No cost from one support department is given to another support department. Thus, no support department interaction is recognized. Cornerstone 5-6 shows how the direct method is used to assign the costs of two support departments to two producing departments. Notice that the interactions of the service departments are ignored and do not enter the calculations for assigning costs to producing departments.

Sequential Method of Allocation  The sequential (or step) method of allocation recognizes that interactions among support departments occur. However, the sequential method does not fully account for support department interaction. Cost allocations are performed in a step-down fashion, following a predetermined ranking procedure. Usually, the sequence is defined by ranking the support departments in order of the amount of service rendered, from the greatest to the least, where degree of service is measured by the direct costs of each support department.

**CONCEPT Q&A**

What is the major disadvantage of the direct method?

Possible Answer: It ignores the interactions that may exist among support departments.

---

**Illustration of the Direct Method**

Suppose there are two support departments, Power and Maintenance, and two producing departments, Grinding and Assembly, each with a “bucket” of directly traceable overhead cost.

**Objective:** Distribute all maintenance and power costs to Grinding and Assembly using the direct method.

Direct method—Allocate maintenance and power costs only to Grinding and Assembly.

After allocation—Zero cost in maintenance and power; all overhead cost is in Grinding and Assembly.
Exhibit 5-16 provides a visual portrayal of the sequential method. First, the support departments are ranked, usually in accordance with direct costs; here, the power department is first, then the maintenance department. Next, power costs are allocated to the maintenance department and the two producing departments. Finally, the costs of the maintenance department are allocated only to producing departments. The costs of the maintenance department are assigned to all support departments below it in the sequence and to all producing departments. Finally, the costs of the maintenance department are allocated only to producing departments. The costs of the support department rendering the greatest service are assigned to all support departments below it in the sequence and to all producing departments. Also, note that the costs allocated from a support department are its direct costs plus any costs it receives in allocations from other support departments.
Cornerstone 5-7 shows how to assign support department cost to producing departments by using the sequential method. The power department will be allocated first since its direct cost is higher, followed by the maintenance department. Note that the allocation ratios for the maintenance department ignore the usage by the power department because Power is above Maintenance in the allocation sequence. Unlike the direct method, the sequential method recognizes some interactions among the support departments. The reciprocal method corrects this deficiency.

**Reciprocal Method of Allocation** The reciprocal method of allocation recognizes all interactions among support departments. Under the reciprocal method, one support department’s use by another figures in determining the total cost of each support department, where the total cost reflects

**CONCEPT Q&A**

**Q:** Why is the sequential method considered to be more accurate than the direct method?

**Possible Answer:** The sequential method considers some of the interactions among the support departments.
interactions among the support departments. Then, the new total of support department costs is allocated to the producing departments. This method fully accounts for support department interaction by using a system of simultaneous linear equations. The reciprocal method is not widely used due to its complexity. This method will not be illustrated; rather, its complete description is left to a more advanced course.

Another factor in allocating support department cost is the rapid change in technology. Many firms currently find that support department cost allocation is useful for them. However, the move toward activity-based costing and just-in-time manufacturing can virtually eliminate the need for support department cost allocation.

Appendix 5B: Summary of Learning Objectives

LO5. Prepare the journal entries associated with job-order costing.
LO6. Allocate support department costs to producing departments.
Review Problems

I. Job Cost Using Plantwide and Departmental Overhead Rates

Lindberg Company uses a normal job-order costing system. There are two departments, Assembly and Finishing, through which most jobs pass. Selected budgeted and actual data for the past year follow:

<table>
<thead>
<tr>
<th></th>
<th>Assembly</th>
<th>Finishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeted overhead</td>
<td>$330,000</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Actual overhead</td>
<td>110,000</td>
<td>520,000</td>
</tr>
<tr>
<td>Expected activity (direct labor hours)</td>
<td>150,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Expected machine hours</td>
<td>25,000</td>
<td>125,000</td>
</tr>
</tbody>
</table>

During the year, several jobs were completed. Data pertaining to one such job, Job 330, follow:

- Direct materials: $730,000
- Direct labor cost:
  - Assembly (5,000 hours @ $12 per hr.): $60,000
  - Finishing (400 hours @ $12 per hr.): $4,800
- Machine hours used:
  - Assembly: 100
  - Finishing: 1,200
  - Units produced: 10,000

Lindberg Company uses a plantwide predetermined overhead rate based on direct labor hours (DLH) to assign overhead to jobs.

Required:
1. Compute the predetermined overhead rate.
2. Using the predetermined rate, compute the per-unit manufacturing cost for Job 330. (Round the unit cost to the nearest cent.)
3. Recalculate the unit manufacturing cost for Job 330 using departmental overhead rates. Use direct labor hours for Assembly and machine hours for Finishing.

Solution:
1. Predetermined overhead rate = $1,330,000/175,000 = $7.60 per DLH. Add the budgeted overhead for the two departments, and divide by the total expected direct labor hours (DLH = 150,000 + 25,000).
II. Calculation of Work in Process and Cost of Goods Sold with Multiple Jobs

KKB (Kennedy Kitchen and Bath) Company designs and installs upscale kitchens and bathrooms. On May 1, there were three jobs in process, Jobs 77, 78, and 79. During May, two more jobs were started, Jobs 80 and 81. By May 31, Jobs 77, 78, and 80 were completed. The following data were gathered:

<table>
<thead>
<tr>
<th>Job</th>
<th>5/1 Balance</th>
<th>Direct materials</th>
<th>Direct labor</th>
<th>Applied Overhead</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>$875</td>
<td>$690</td>
<td>$450</td>
<td>$675</td>
<td>$2,690</td>
</tr>
<tr>
<td>78</td>
<td>$1,140</td>
<td>$320</td>
<td>$420</td>
<td>$630</td>
<td>$2,510</td>
</tr>
<tr>
<td>79</td>
<td>$410</td>
<td>$500</td>
<td>$80</td>
<td>$120</td>
<td>$1,110</td>
</tr>
<tr>
<td>80</td>
<td>$0</td>
<td>$3,500</td>
<td>$1,800</td>
<td>$2,700</td>
<td>$8,000</td>
</tr>
<tr>
<td>81</td>
<td>$0</td>
<td>$2,750</td>
<td>$1,300</td>
<td>$1,950</td>
<td>$6,000</td>
</tr>
</tbody>
</table>

Overhead is applied at the rate of 150 percent of direct labor cost. Jobs are sold at cost plus 30 percent. Operating expenses for May totaled $2,700.

Required:
1. Prepare job-order cost sheets for each job as of May 31.
2. Calculate the ending balance in Work in Process (as of May 31) and Cost of Goods Sold for May.
3. Construct an income statement for KKB Company for the month of May.

Solution:

1. 

<table>
<thead>
<tr>
<th>Job</th>
<th>5/1 Balance</th>
<th>Direct materials (DM)</th>
<th>Direct labor (DL)</th>
<th>Applied Overhead (AO)</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>$875</td>
<td>$690</td>
<td>$450</td>
<td>$675</td>
<td>$2,690</td>
</tr>
<tr>
<td>78</td>
<td>$1,140</td>
<td>$320</td>
<td>$420</td>
<td>$630</td>
<td>$2,510</td>
</tr>
<tr>
<td>79</td>
<td>$410</td>
<td>$500</td>
<td>$80</td>
<td>$120</td>
<td>$1,110</td>
</tr>
<tr>
<td>80</td>
<td>$0</td>
<td>$3,500</td>
<td>$1,800</td>
<td>$2,700</td>
<td>$8,000</td>
</tr>
<tr>
<td>81</td>
<td>$0</td>
<td>$2,750</td>
<td>$1,300</td>
<td>$1,950</td>
<td>$6,000</td>
</tr>
</tbody>
</table>

2. Ending balance in Work in Process = Job 79 + Job 81
   = $1,110 + $6,000
   = $7,110

Cost of Goods Sold for May = Job 77 + Job 78 + Job 80
   = $2,690 + $2,510 + $8,000
   = $13,200
Barok Manufacturing produces machine parts on a job-order basis. Most business is obtained through bidding. Most firms competing with Barok bid full cost plus a 20 percent markup. Recently, with the expectation of gaining more sales, Barok reduced its markup from 25 percent to 20 percent. The company operates two service departments and two producing departments. The budgeted costs and the normal activity levels for each department are given below.

### Service Departments

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct overhead costs</td>
<td>$100,000</td>
<td>$200,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Number of employees</td>
<td>8</td>
<td>7</td>
<td>30</td>
</tr>
<tr>
<td>Maintenance hours</td>
<td>2,000</td>
<td>200</td>
<td>6,400</td>
</tr>
<tr>
<td>Machine hours</td>
<td>---</td>
<td>---</td>
<td>10,000</td>
</tr>
<tr>
<td>Labor hours</td>
<td>---</td>
<td>---</td>
<td>1,000</td>
</tr>
</tbody>
</table>

The direct costs of Department A are allocated on the basis of employees; those of Department B are allocated on the basis of maintenance hours. Departmental overhead rates are used to assign costs to products. Department C uses machine hours, and Department D uses labor hours.

The firm is preparing to bid on a job (Job K) that requires three machine hours per unit produced in Department C and no time in Department D. The expected prime costs per unit are $67.

**Required:**

1. Allocate the service costs to the producing departments by using the direct method.
2. What will the bid be for Job K if the direct method of allocation is used?
3. Allocate the service costs to the producing departments by using the sequential method.
4. What will the bid be for Job K if the sequential method is used?

**Solution:**

1. **Service Departments**

<table>
<thead>
<tr>
<th>Service Departments</th>
<th>Producing Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Direct overhead costs</td>
<td>$100,000</td>
</tr>
<tr>
<td>Department A&lt;sup&gt;a&lt;/sup&gt;</td>
<td>(100,000)</td>
</tr>
<tr>
<td>Department B&lt;sup&gt;b&lt;/sup&gt;</td>
<td>---</td>
</tr>
<tr>
<td>Total</td>
<td>$0</td>
</tr>
</tbody>
</table>

<sup>a</sup> Department A costs are allocated on the basis of the number of employees in the producing departments, Departments C and D. The percentage of Department A cost allocated to Department C = 30/(30 + 30) = 0.50. Cost of Department A allocated to Department C = 0.50 × $100,000 = $50,000. The percentage of Department A cost allocated to Department D = 30/(30 + 30) = 0.50. Cost of Department A allocated to Department D = 0.50 × $100,000 = $50,000.

<sup>b</sup> Department B costs are allocated on the basis of maintenance hours used in the producing departments, Departments C and D. The percentage of Department B cost allocated to Department C = 6,400/(6,400 + 1,600) = 0.80. Cost of Department B allocated to Department C = 0.80 × $200,000 = $160,000. The percentage of Department B cost allocated to Department D = 1,600/(6,400 + 1,600) = 0.20. Cost of Department B allocated to Department D = 0.20 × $200,000 = $40,000.
Discussion Questions

1. What are job-order costing and process costing? What types of firms use job-order costing? Process costing?
2. Give some examples of service firms that might use job-order costing, and explain why it is used in those firms.
3. What is normal costing? How does it differ from actual costing?
4. Why are actual overhead rates seldom used in practice?
5. Explain how overhead is assigned to production when a predetermined overhead rate is used.
6. What is underapplied overhead? When Cost of Goods Sold is adjusted for underapplied overhead, will the cost increase or decrease? Why?
7. What is overapplied overhead? When Cost of Goods Sold is adjusted for overapplied overhead, will the cost increase or decrease? Why?
8. Suppose that you and a friend decide to set up a lawn mowing service next summer. Describe the source documents that you would need to account for your activities.
9. Why might a company decide to use departmental overhead rates instead of a plantwide overhead rate?
10. What is the role of materials requisition forms in a job-order costing system? Time tickets? Predetermined overhead rates?

2. Department C: Overhead rate = $310,000/10,000 = $31 per machine hour.
   Product cost and bid price:
   
<table>
<thead>
<tr>
<th></th>
<th>Service Departments</th>
<th>Producing Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Direct overhead costs</td>
<td>$100,000</td>
<td>$200,000</td>
</tr>
<tr>
<td>Department B(^a)</td>
<td>40,000</td>
<td>(200,000)</td>
</tr>
<tr>
<td>Department A(^b)</td>
<td>(140,000)</td>
<td>—</td>
</tr>
<tr>
<td>Total</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

\(^a\) Department B ranks because its direct costs are higher than those of Department A. Department B costs are allocated on the basis of maintenance hours used in Department A, and producing Departments C and D. Percent of Department B cost allocated to Department A = 0.20 × 200,000 = $40,000. The percentage of Department B cost allocated to Department C = 6,400/(2,000 + 6,400 + 1,600) = 0.64. Cost of Department B allocated to Department D = 0.64 × $200,000 = $128,000. The percentage of Department B cost allocated to Department D = 1,600/(2,000 + 6,400 + 1,600) = 0.16. Cost of Department B allocated to Department D = 0.16 × $200,000 = $32,000.

\(^b\) Department A costs are allocated on the basis of number of employees in the producing departments, Departments C and D. The percentage of Department A cost allocated to Department C = 30/(30 + 30) = 0.50. Cost of Department A allocated to Department C = 0.50 × $140,000 = $70,000. The percentage of Department A cost allocated to Department D = 30/(30 + 30) = 0.50. Cost of Department A allocated to Department D = 0.50 × $140,000 = $70,000. (Note: Department A cost is no longer $100,000. It is $140,000 due to the $40,000 that was allocated from Department B.)

4. Department C: Overhead rate = $298,000/10,000 = $29.80 per machine hour.
   Product cost and bid price:
   
<table>
<thead>
<tr>
<th></th>
<th>Prime cost</th>
<th>$67.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead (3 × $29.80)</td>
<td>89.40</td>
<td></td>
</tr>
<tr>
<td>Total unit cost</td>
<td>$156.40</td>
<td></td>
</tr>
</tbody>
</table>

   Bid price = $156.40 × 1.2 = $187.68
11. Carver Company uses a plantwide overhead rate based on direct labor cost. Suppose that during the year, Carver raises its wage rate for direct labor. How would that affect overhead applied? The total cost of jobs?
12. What is an overhead variance? How is it accounted for typically?
13. Is the cost of a job related to the price charged? Explain.
14. If a company decides to increase advertising expense by $25,000, how will that affect the predetermined overhead rate? Eventual cost of goods sold?
15. How can a departmental overhead system be converted to a plantwide overhead system?
16. (Appendix 5B) Describe the difference between producing and support departments.
17. (Appendix 5B) Assume that a company has decided not to allocate any support department costs to producing departments. Describe the likely behavior of the managers of the producing departments. Would this be good or bad? Explain why allocation would correct this type of behavior.
18. (Appendix 5B) Why is it important to identify and use causal factors to allocate support department costs?
19. (Appendix 5B) Identify some possible causal factors for the following support departments:
   a. Cafeteria
   b. Custodial services
   c. Laundry
   d. Receiving, shipping, and storage
   e. Maintenance
   f. Personnel
   g. Accounting
20. (Appendix 5B) Explain the difference between the direct method and the sequential method.

Multiple-Choice Exercises

**5-1 Which of the following statements is true?**

a. Job-order costing is used only in manufacturing firms.
b. The job cost sheet is subsidiary to the work in process account.
c. Job-order costing is simpler to use than process costing because the record-keeping requirements are less.
d. Process costing is used only for services.
e. All of the above are true.

**5-2 The ending balance of which of the following accounts is calculated by summing the totals of the open (unfinished) job-order cost sheets?**

a. Raw Materials
b. Work in Process
c. Finished Goods
d. Cost of Goods Sold
e. Overhead Control

**5-3 In a normal costing system, the cost of a job includes**

a. actual direct materials, actual direct labor, and actual overhead.
b. estimated direct materials, estimated direct labor, and estimated overhead.
c. actual direct materials, actual direct labor, actual overhead, and actual selling cost.
d. actual direct materials, actual direct labor, and estimated (applied) overhead.
e. none of the above. Job-order costing requires the use of actual, not normal, costing.
5-4 The predetermined overhead rate is
a. calculated at the end of each month.
b. calculated at the end of the year.
c. equal to actual overhead divided by actual activity level for a period.
d. equal to estimated overhead divided by actual activity level for a period.
e. calculated at the beginning of the year.

5-5 The predetermined overhead rate equals
a. actual overhead divided by actual activity level for a period.
b. estimated overhead divided by estimated activity level for a period.
c. actual overhead minus estimated overhead.
d. actual overhead multiplied by actual activity level for a period.
e. one-twelfth of estimated overhead.

5-6 Applied overhead is
a. an important part of normal costing.
b. never used in normal costing.
c. an important part of actual costing.
d. the predetermined overhead rate multiplied by estimated activity level.
e. the predetermined overhead rate multiplied by estimated activity level for the month.

5-7 The overhead variance is overapplied if
a. actual overhead is less than applied overhead.
b. actual overhead is more than applied overhead.
c. applied overhead is less than actual overhead.
d. estimated overhead is less than applied overhead.
e. estimated overhead is more than applied overhead.

5-8 Which of the following is typically a job-order costing firm?
a. Paint manufacturer
b. Pharmaceutical manufacturer
c. Large regional medical center
d. Cement manufacturer
e. Cleaning products manufacturer

5-9 Which of the following is typically a process-costing firm?
a. Paint manufacturer
b. Custom cabinetmaker
c. Large regional medical center
d. Law office
e. Custom framing shop

5-10 When materials are requisitioned for use in production in a job-order costing firm, the cost of materials is added to the
a. raw materials account.
b. work in process account.
c. finished goods account.
d. accounts payable account.
e. cost of goods sold account.

5-11 When a job is completed, the total cost of the job is
a. subtracted from the raw materials account.
b. subtracted from the work in process account.
c. subtracted from the finished goods account.
d. added to the accounts payable account.
e. subtracted from the cost of goods sold account.

5-12 The costs of a job are accounted for on the
a. materials requisition sheet.
b. time ticket.
c. requisition for overhead application.
d. job-order cost sheet.
e. sales invoice.

5-13 Wilson Company has a predetermined overhead rate of $5 per direct labor hour. The job-order cost sheet for Job 145 shows 1,000 direct labor hours costing $10,000 and materials requisitions totaling $7,500. Job 145 had 500 units completed and transferred to Finished Goods. What is the cost per unit for Job 145?
a. $35  
b. $135  
c. $30  
d. $45  
e. $22,500

5-14 Those departments responsible for creating products or services that are sold to customers are referred to as
a. revenue generating departments.
b. support departments.
c. cost centers.
d. production departments.
e. none of the above.

5-15 Those departments that provide essential services to producing departments are referred to as
a. revenue generating departments.
b. support departments.
c. profit centers.
d. production departments.
e. none of the above.

5-16 An example of a producing department is
a. a materials storeroom.
b. the maintenance department.
c. engineering design.
d. assembly.
e. all of the above.

5-17 An example of a support department is
a. data processing.
b. personnel.
c. a materials storeroom.
d. payroll.
e. all of the above.

5-18 The method that assigns support department costs only to producing departments in proportion to each department’s usage of the service is known as
a. the sequential method.
b. the proportional method.
c. the reciprocal method.
d. the direct method.
e. none of the above.

5-19 The method that assigns support department costs by giving partial recognition to support department interactions is known as
a. the sequential method.
b. the proportional method.
c. the reciprocal method.
d. the direct method.
e. none of the above.

5-20 The method that assigns support department costs by giving full recognition to support department interactions is known as
a. the sequential method.
b. the proportional method.
c. the reciprocal method.
d. the direct method.
e. none of the above.

5-21 (Appendix 5A) When a job costing $2,000 is finished, the following journal entry is made:
a. Cost of Goods Sold 2,000
   Finished Goods 2,000
b. Finished Goods 2,000
   Cost of Goods Sold 2,000
c. Finished Goods 2,000
   Work in Process 2,000
d. Work in Process 2,000
   Finished Goods 2,000
e. Cost of Goods Sold 2,000
   Sales 2,000

Cornerstone Exercises

OBJECTIVE 2
CORNERSTONE 5-1
Cornerstone Exercise 5-22 PREDETERMINED OVERHEAD RATE, OVERHEAD APPLICATION
At the beginning of the year, Kreskin Company estimated the following costs:

\[
\begin{array}{ll}
\text{Overhead} & 450,000 \\
\text{Direct labor cost} & 600,000
\end{array}
\]

Kreskin uses normal costing and applies overhead on the basis of direct labor cost. (Direct labor cost is equal to total direct labor hours worked multiplied by the wage rate.) For the month of December, direct labor cost was $38,900.

Required:
1. Calculate the predetermined overhead rate for the year.
2. Calculate the overhead applied to production in December.

OBJECTIVE 2
CORNERSTONE 5-2
Cornerstone Exercise 5-23 OVERHEAD VARIANCE (OVER- OR UNDERAPPLIED), CLOSING TO COST OF GOODS SOLD
At the end of the year, Kreskin Company provided the following actual information:

\[
\begin{array}{ll}
\text{Overhead} & 456,500 \\
\text{Direct labor cost} & 607,200
\end{array}
\]
Kreskin uses normal costing and applies overhead at the rate of 75 percent of direct labor cost. At the end of the year, Cost of Goods Sold (before adjusting for any overhead variance) was $890,000.

**Required:**

1. Calculate the overhead variance for the year.
2. Dispose of the overhead variance by adjusting Cost of Goods Sold.

**Cornerstone Exercise 5-24 PREDETERMINED DEPARTMENTAL OVERHEAD RATES, APPLYING OVERHEAD TO PRODUCTION**

At the beginning of the year, Badger Company estimated the following:

<table>
<thead>
<tr>
<th></th>
<th>Cutting Department</th>
<th>Sewing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$378,000</td>
<td>$450,000</td>
<td>$828,000</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>131,200</td>
<td>200,000</td>
<td>331,200</td>
</tr>
<tr>
<td>Machine hours</td>
<td>210,000</td>
<td>—</td>
<td>210,000</td>
</tr>
</tbody>
</table>

Badger uses departmental overhead rates. In the cutting department, overhead is applied on the basis of machine hours. In the sewing department, overhead is applied on the basis of direct labor hours. Actual data for the month of June are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Cutting Department</th>
<th>Sewing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$32,612</td>
<td>$35,750</td>
<td>$68,362</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>11,800</td>
<td>16,000</td>
<td>27,800</td>
</tr>
<tr>
<td>Machine hours</td>
<td>17,840</td>
<td>—</td>
<td>17,840</td>
</tr>
</tbody>
</table>

**Required:**

1. Calculate the predetermined overhead rates for the cutting and sewing departments.
2. Calculate the overhead applied to production in each department for the month of June.
3. By how much has each department’s overhead been overapplied? Underapplied?

**Cornerstone Exercise 5-25 CONVERT DEPARTMENTAL DATA TO PLANTWIDE DATA, PLANTWIDE OVERHEAD RATE, APPLY OVERHEAD TO PRODUCTION**

At the beginning of the year, Badger Company estimated the following:

<table>
<thead>
<tr>
<th></th>
<th>Cutting Department</th>
<th>Sewing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$378,000</td>
<td>$450,000</td>
<td>$828,000</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>131,200</td>
<td>200,000</td>
<td>331,200</td>
</tr>
<tr>
<td>Machine hours</td>
<td>210,000</td>
<td>—</td>
<td>210,000</td>
</tr>
</tbody>
</table>

Badger has decided to use a plantwide overhead rate based on direct labor hours. Actual data for the month of June are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Cutting Department</th>
<th>Sewing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$32,612</td>
<td>$35,750</td>
<td>$68,362</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>11,800</td>
<td>16,000</td>
<td>27,800</td>
</tr>
<tr>
<td>Machine hours</td>
<td>17,840</td>
<td>—</td>
<td>17,840</td>
</tr>
</tbody>
</table>

**Required:**

1. Calculate the predetermined plantwide overhead rate.
2. Calculate the overhead applied to production for the month of June.
3. Calculate the overhead variance for the month of June.
Cornerstone Exercise 5-26 PREPARE JOB-ORDER COST SHEETS, PREDETERMINED OVERHEAD RATE, ENDING BALANCE OF WIP, FINISHED GOODS, AND COGS

At the beginning of June, Donegal Company had two jobs in process, Job 44 and Job 45, with the following accumulated cost information:

<table>
<thead>
<tr>
<th></th>
<th>Job 44</th>
<th>Job 45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$4,600</td>
<td>$ 500</td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,200</td>
<td>1,000</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>750</td>
<td>1,300</td>
</tr>
<tr>
<td>Balance, June 1</td>
<td>$6,550</td>
<td>$2,800</td>
</tr>
</tbody>
</table>

During June, two more jobs (46 and 47) were started. The following direct materials and direct labor costs were added to the four jobs during the month of June:

<table>
<thead>
<tr>
<th></th>
<th>Job 44</th>
<th>Job 45</th>
<th>Job 46</th>
<th>Job 47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$1,500</td>
<td>$6,100</td>
<td>$ 800</td>
<td>$700</td>
</tr>
<tr>
<td>Direct labor</td>
<td>1,000</td>
<td>2,400</td>
<td>2,000</td>
<td>600</td>
</tr>
</tbody>
</table>

At the end of June, Jobs 44, 45, and 47 were completed. Only Job 45 was sold. On June 1, the balance in Finished Goods was zero.

Required:
1. Calculate the overhead rate based on direct labor cost.
2. Prepare a brief job-order cost sheet for the four jobs. Show the balance as of June 1 as well as direct materials and direct labor added in June. Apply overhead to the four jobs for the month of June, and show the ending balances.

Cornerstone Exercise 5-27 (APPENDIX 5B) ASSIGNING SUPPORT DEPARTMENT COSTS BY USING THE DIRECT METHOD

Vanderber Company manufactures a product in a factory that has two producing departments, Cutting and Sewing, and two support departments, S1 and S2. The activity driver for S1 is number of employees, and the activity driver for S2 is number of maintenance hours. The following data pertain to Vanderber Company:

<table>
<thead>
<tr>
<th>Support Departments</th>
<th>Producing Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1</td>
</tr>
<tr>
<td>Direct costs</td>
<td>$180,000</td>
</tr>
<tr>
<td>Normal activity:</td>
<td></td>
</tr>
<tr>
<td>Number of employees</td>
<td>—</td>
</tr>
<tr>
<td>Maintenance hours</td>
<td>1,200</td>
</tr>
</tbody>
</table>

Required:
1. Calculate the cost assignment ratios to be used under the direct method for Departments S1 and S2. (Each support department will have two ratios—one for Cutting and the other for Sewing.)
2. Allocate the support department costs to the producing departments by using the direct method.

Cornerstone Exercise 5-28 (APPENDIX 5B) SEQUENTIAL DIRECT METHOD

Lanoka Company manufactures pottery in two producing departments: Shaping and Firing. Three support departments support the following production departments: Power, General Factory, and Human Resources. Budgeted data on the five departments are as follows:
Support Departments | Producing Departments
---|---
General Power | Shaping | Firing
Direct overhead costs | $90,000 | $75,000 | $234,000
Kilowatt-hours | — | 13,000 | 25,000 | 30,000 | 70,000
Square feet | 2,000 | 6,000 | 24,000 | 8,000
Direct labor hours | — | — | 4,000 | 6,000

Power is allocated on the basis of kilowatt-hours, general factory is allocated on the basis of square footage, and human resources is allocated on the basis of direct labor hours. The company does not break overhead into fixed and variable components.

**Required:**
1. Calculate the cost assignment ratios to be used under the sequential method for power and general factory.
2. Allocate the overhead costs to the producing departments by using the sequential method.

### Exercises

**Exercise 5-29 JOB-ORDER COSTING VERSUS PROCESS COSTING**

- Paint manufacturing
- Auto manufacturing
- Toy manufacturing
- Custom cabinet making
- Airplane manufacturing (e.g., 767s)
- Personal computer assembly
- Furniture making
- Custom furniture making
- Dental services
- Hospital services
- Paper manufacturing
- Auto repair
- Architectural services
- Landscape design services
- Light bulb manufacturing

**Required:**
1. Identify each of these preceding types of businesses as either job-order or process costing.

**Exercise 5-30 JOB-ORDER COSTING VERSUS PROCESS COSTING**

- Auto manufacturing
- Dental services
- Auto repair
- Costume making

**Required:**
1. For each of the given types of industries, give an example of a firm that would use job-order costing. Then, give an example of a firm that would use process costing.
Exercise 5-31  CALCULATING THE PREDETERMINED OVERHEAD RATE, APPLYING OVERHEAD TO PRODUCTION

At the beginning of the year, Natrina Company estimated the following:

| Overhead  | $570,000 |
| Direct labor hours | 95,000 |

Natrina uses normal costing and applies overhead on the basis of direct labor hours. For the month of March, direct labor hours were 7,400.

Required:
1. Calculate the predetermined overhead rate for Natrina.
2. Calculate the overhead applied to production in March.

Exercise 5-32  CALCULATING THE PREDETERMINED OVERHEAD RATE, APPLYING OVERHEAD TO PRODUCTION, RECONCILING OVERHEAD AT THE END OF THE YEAR, ADJUSTING COST OF GOODS SOLD FOR UNDER- AND OVERAPPLIED OVERHEAD

At the beginning of the year, Olivar Company estimated the following:

| Overhead  | $216,000 |
| Direct labor hours | 80,000 |

Olivar uses normal costing and applies overhead on the basis of direct labor hours. For the month of January, direct labor hours were 7,950. By the end of the year, Olivar showed the following actual amounts:

| Overhead  | $226,000 |
| Direct labor hours | 82,600 |

Assume that unadjusted Cost of Goods Sold for Olivar was $235,670.

Required:
1. Calculate the predetermined overhead rate for Olivar.
2. Calculate the overhead applied to production in January.
3. Calculate the total applied overhead for the year. Was overhead over- or underapplied? By how much?

Exercise 5-33  CALCULATING DEPARTMENTAL OVERHEAD RATES AND APPLYING OVERHEAD TO PRODUCTION

At the beginning of the year, Videosym Company estimated the following:

<table>
<thead>
<tr>
<th>Assembly Department</th>
<th>Testing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$620,000</td>
<td>$180,000</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>155,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Machine hours</td>
<td>80,000</td>
<td>120,000</td>
</tr>
</tbody>
</table>

Videosym uses departmental overhead rates. In the assembly department, overhead is applied on the basis of direct labor hours. In the testing department, overhead is applied on the basis of machine hours. Actual data for the month of March are as follows:

<table>
<thead>
<tr>
<th>Assembly Department</th>
<th>Testing Department</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead</td>
<td>$53,000</td>
<td>$15,500</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>13,000</td>
<td>1,680</td>
</tr>
<tr>
<td>Machine hours</td>
<td>6,800</td>
<td>13,050</td>
</tr>
</tbody>
</table>

Required:
1. Calculate the predetermined overhead rates for the assembly and testing departments.
2. Calculate the overhead applied to production in each department for the month of March.
3. By how much has each department’s overhead been overapplied? Underapplied?

**Exercise 5-34 JOB-ORDER COST SHEET**

On June 1, Job 24 had a beginning balance of $330. During June, direct materials of $475 and direct labor of $280 were added to the job. Overhead is applied to production at the rate of 75 percent of direct labor cost.

**Required:**
1. Set up a simple job-order cost sheet for Job 24. What is the total cost of Job 24?
2. If Job 24 consisted of five units, what is the unit cost?

**Exercise 5-35 SOURCE DOCUMENTS**

For each of the following independent situations, give the source document that would be referred to for the necessary information.

**Required:**
1. Direct materials costing $460 are requisitioned for use on a job.
2. Greiner’s Garage uses a job-order costing system. Overhead is applied to jobs based on direct labor hours. Which source document gives the number of direct labor hours worked on Job 2005-276?
3. Pasilla Investigative Services bills clients on a monthly basis for costs to date. Job 3-48 involved an investigator following the client’s business partner for a week by automobile. Mileage is billed at number of miles times $0.75.
4. The foreman on the Jackson job wonders what the actual direct materials cost was for that job.

**Exercise 5-36 APPLYING OVERHEAD TO JOBS, COSTING JOBS**

Herron Company designs and builds retaining walls for individual customers. On August 1, there were two jobs in process: Job 730 with a beginning balance of $10,400, and Job 731 with a beginning balance of $8,600. Herron applies overhead at the rate of $11 per direct labor hour. Direct labor wages average $10 per hour.

Data on August costs for all jobs are as follows:

<table>
<thead>
<tr>
<th>Job</th>
<th>Direct materials</th>
<th>Direct labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>730</td>
<td>$1,200</td>
<td>1,800</td>
</tr>
<tr>
<td>731</td>
<td>$8,000</td>
<td>4,000</td>
</tr>
<tr>
<td>732</td>
<td>$2,100</td>
<td>200</td>
</tr>
<tr>
<td>733</td>
<td>$3,000</td>
<td>800</td>
</tr>
</tbody>
</table>

During August, Jobs 732 and 733 were started. Job 730 was completed on August 17, and the client was billed at cost plus 40 percent. All other jobs remained in process.

**Required:**
1. Calculate the number of direct labor hours that were worked on each job in August.
2. Calculate the overhead applied to each job during the month of August.
3. Prepare job-order cost sheets for each job as of the end of August.
5. What is the price of Job 730?

**Exercise 5-37 APPLYING OVERHEAD TO JOBS, COSTING JOBS**

Perrine Company builds internal conveyor equipment to client specifications. On October 1, Job 877 was in process with a cost of $20,520 to date.

During October, Jobs 878, 879, and 880 were started. Data on costs added during October for all jobs are as follows:

<table>
<thead>
<tr>
<th>Job</th>
<th>Direct materials</th>
<th>Direct labor</th>
</tr>
</thead>
<tbody>
<tr>
<td>877</td>
<td>$13,960</td>
<td>13,800</td>
</tr>
<tr>
<td>878</td>
<td>$7,000</td>
<td>10,000</td>
</tr>
<tr>
<td>879</td>
<td>$350</td>
<td>1,500</td>
</tr>
<tr>
<td>880</td>
<td>$4,800</td>
<td>4,000</td>
</tr>
</tbody>
</table>
Overhead is applied to production at the rate of 85 percent of direct labor cost. Job 878 was completed on October 28, and the client was billed at cost plus 50 percent. All other jobs remained in process.

**Required:**
1. Prepare a brief job-order cost sheet showing the October 1 balances of all four jobs, plus the direct materials and direct labor costs during October. (There is no need to calculate applied overhead at this point or to total the costs.)
2. Calculate the overhead applied during October, and complete the job-order cost sheet for each job as of the end of October.
3. Calculate the balance in Work in Process on October 31.
4. What is the price of Job 878?

**Exercise 5-38 BALANCE OF WORK IN PROCESS AND FINISHED GOODS, COST OF GOODS SOLD**
Voeltr Company uses job-order costing. At the end of the month, the following information was gathered:

<table>
<thead>
<tr>
<th>Job #</th>
<th>Total Cost</th>
<th>Complete?</th>
<th>Sold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>$ 610</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>302</td>
<td>1,300</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>303</td>
<td>460</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>304</td>
<td>2,670</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>305</td>
<td>3,800</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>306</td>
<td>230</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>307</td>
<td>300</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>308</td>
<td>650</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>309</td>
<td>1,035</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>310</td>
<td>217</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

The beginning balance of Finished Goods was zero.

**Required:**
1. Calculate the balance in Work in Process at the end of the month.
2. Calculate the balance in Finished Goods at the end of the month.

**Exercise 5-39 JOB-ORDER COST SHEETS, BALANCE IN WORK IN PROCESS AND FINISHED GOODS**
Berne Company, a job-order costing firm, worked on three jobs in July. Data are as follows:

<table>
<thead>
<tr>
<th>Job 73</th>
<th>Job 74</th>
<th>Job 75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance, 7/1</td>
<td>$ 8,450</td>
<td>$ 0</td>
</tr>
<tr>
<td>Direct materials</td>
<td>$ 7,450</td>
<td>$12,300</td>
</tr>
<tr>
<td>Direct labor</td>
<td>$12,000</td>
<td>$10,500</td>
</tr>
<tr>
<td>Machine hours</td>
<td>400</td>
<td>350</td>
</tr>
</tbody>
</table>

Overhead is applied to jobs at the rate of $20 per machine hour. By July 31, Jobs 73 and 75 were completed. Jobs 70 and 73 were sold. Job 74 remained in process. On July 1, the balance in Finished Goods was $49,000 (consisting of Job 70 for $19,000 and Job 72 for $30,000).

Berne prices its jobs at cost plus 30 percent. During July, variable marketing expenses were 10 percent of sales, and fixed marketing expenses were $2,000; administrative expenses were $4,800.

**Required:**
1. Prepare job-order cost sheets for all jobs in process during July, showing all costs through July 31.
2. Calculate the balance in Work in Process on July 31.
3. Calculate the balance in Finished Goods on July 31.
5. Prepare an income statement for Berne Company for the month of July.

**Exercise 5-40 COST FLOWS**

Consider the following independent jobs. Overhead is applied in Department 1 at the rate of $6 per direct labor hour. Overhead is applied in Department 2 at the rate of $8 per machine hour. Direct labor wages average $10 per hour in each department.

<table>
<thead>
<tr>
<th>Job 213</th>
<th>Job 214</th>
<th>Job 217</th>
<th>Job 225</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sales revenue</td>
<td>$ ?</td>
<td>$4,375</td>
<td>$5,600</td>
</tr>
<tr>
<td>Price per unit</td>
<td>$ 12</td>
<td>$ ?</td>
<td>$ $ 14</td>
</tr>
<tr>
<td>Materials used in production</td>
<td>$ 365</td>
<td>$ ?</td>
<td>$ 488</td>
</tr>
<tr>
<td>Department 1, Direct labor cost</td>
<td>$ ?</td>
<td>$ 700</td>
<td>$2,000</td>
</tr>
<tr>
<td>Department 1, Machine hours</td>
<td>15</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>Department 2, Direct labor cost</td>
<td>$ 50</td>
<td>$ 100</td>
<td>$ ?</td>
</tr>
<tr>
<td>Department 2, Machine hours</td>
<td>25</td>
<td>50</td>
<td>?</td>
</tr>
<tr>
<td>Department 1, Overhead applied</td>
<td>$ 90</td>
<td>$ ?</td>
<td>$1,200</td>
</tr>
<tr>
<td>Department 2, Overhead applied</td>
<td>$ ?</td>
<td>$ 400</td>
<td>$ 160</td>
</tr>
<tr>
<td>Total manufacturing cost</td>
<td>$ 855</td>
<td>$3,073</td>
<td>$ ?</td>
</tr>
<tr>
<td>Number of units</td>
<td>?</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>Unit cost</td>
<td>$8.55</td>
<td>$ ?</td>
<td>$ 9.87</td>
</tr>
</tbody>
</table>

**Required:**
1. Fill in the missing data for each job.

**Exercise 5-41 JOB COST FLOWS**

Ionia Company uses a normal job-order costing system. The company has two departments through which most jobs pass. Overhead is applied using a plantwide overhead rate of $12 per direct labor hour. During the year, several jobs were completed. Data pertaining to one such job, Job 9-601, follow:

- Direct materials: $18,000
- Direct labor cost:
  - Department A (6,000 hours @ $6): $30,000
  - Department B (1,000 hours @ $6): $ 6,000
- Machine hours used:
  - Department A: 100
  - Department B: 1,200
- Units produced: 10,000

**Required:**
1. Compute the total cost of Job 9-601.
2. Compute the per-unit manufacturing cost for Job 9-601.

For Requirements 3 and 4, assume that Ionia uses departmental overhead rates. In Department A, overhead is applied at the rate of $3 per direct labor hour. In Department B, overhead is applied at the rate of $7 per machine hour.

3. Compute the total cost of Job 9-601.

**Exercise 5-42 CALCULATION OF WORK IN PROCESS AND COST OF GOODS SOLD WITH MULTIPLE JOBS**

Greenthumb Landscape Design designs landscape plans and plants the material for clients. On April 1, there were three jobs in process, Jobs 68, 69, and 70. During April, two more jobs were started, Jobs 71 and 72. By April 30, Jobs 69, 70, and 72 were completed and sold. The following data were gathered:
Balance, April 1 $540 $1,230 $990
Direct materials 700 560 75 $3,500 $2,750
Direct labor 500 600 90 2,500 2,000

Overhead is applied at the rate of 120 percent of direct labor cost. Jobs are sold at cost plus 40 percent. Selling and administrative expenses for April totaled $3,670.

Required:
1. Prepare job-order cost sheets for each job as of April 30.
2. Calculate the ending balance in Work in Process (as of April 30) and Cost of Goods Sold for April.
3. Construct an income statement for Greenthumb Landscape Design for the month of April.

Exercise 5-43 (APPENDIX 5A) JOURNAL ENTRIES

Garrity, Inc. uses a job-order costing system. During the month of May, the following transactions occurred:

a. Purchased materials on account for $27,800.
b. Requisitioned materials totaling $21,000 for use in production. Of the total, $9,300 was for Job 58, $6,900 for Job 59, and the remainder for Job 60.
c. Incurred direct labor for the month of $27,000, with an average wage of $15 per hour. Job 58 used 800 hours; Job 59, 600 hours; and Job 60, 400 hours.
d. Incurred and paid actual overhead of $15,500 (credit Various Payables).
e. Charged overhead to production at the rate of $7.50 per direct labor hour.
f. Completed and transferred Jobs 58 and 59 to Finished Goods.
g. Sold Job 57 (see beginning balance of Finished Goods) and Job 58 to their respective clients on account for a price of cost plus 40 percent.

Beginning balances as of May 1 were:

<table>
<thead>
<tr>
<th></th>
<th>Materials</th>
<th>Work in Process</th>
<th>Finished Goods (Job 58)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$ 5,170</td>
<td>0</td>
<td>31,400</td>
</tr>
</tbody>
</table>

Required:
1. Prepare the journal entries for transactions (a) through (g).
2. Prepare brief job-order cost sheets for Jobs 58, 59, and 60.
3. Calculate the ending balance of Raw Materials.
5. Calculate the ending balance of Finished Goods.

Exercise 5-44 (APPENDIX 5B) DIRECT METHOD OF SUPPORT DEPARTMENT COST ALLOCATION

Dexter Company is divided into two operating divisions: Battery and Small Motors. The company allocates power and human resources costs to each operating division using the direct method. Power costs are allocated on the basis of the number of machine hours and human resources costs on the basis of the number of employees. Support department cost allocations using the direct method are based on the following data:

<table>
<thead>
<tr>
<th>Support Departments</th>
<th>Operating Divisions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Power</td>
</tr>
<tr>
<td>Overhead costs</td>
<td>$100,000</td>
</tr>
<tr>
<td>Machine hours</td>
<td>2,000</td>
</tr>
<tr>
<td>Number of employees</td>
<td>20</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>15,000</td>
</tr>
</tbody>
</table>
Required:
1. Calculate the allocation ratios for Power and Human Resources. (Carry these calculations out to three significant digits.)
2. Allocate the support service costs to the producing departments.
3. Assume departmental overhead rates are based on direct labor hours. Calculate the overhead rate for the Battery Division and for the Small Motors Division. (Round overhead rates to the nearest cent.)

Exercise 5-45 (APPENDIX 5B) SEQUENTIAL METHOD OF SUPPORT DEPARTMENT COST ALLOCATION

Refer to Exercise 5-44 for data. Now assume that Dexter Company uses the sequential method to allocate support department costs to the producing departments. Human Resources is allocated first in the sequential method for Dexter.

Required:
1. Calculate the allocation ratios for Power and Human Resources. (Carry these calculations out to three significant digits.)
2. Allocate the support service costs to the producing departments.
3. Assume departmental overhead rates are based on direct labor hours. Calculate the overhead rate for the Battery Division and for the Small Motors Division. (Round overhead rates to the nearest cent.)

Problems

Problem 5-46 OVERHEAD APPLICATION AND JOB-ORDER COSTING

Julian Company is a job-order costing firm that uses a plantwide overhead rate based on direct labor hours. Estimated information for the year is as follows:

<table>
<thead>
<tr>
<th>Overhead</th>
<th>$665,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct labor hours</td>
<td>100,000</td>
</tr>
</tbody>
</table>

Julian worked on five jobs in July. Data are as follows:

<table>
<thead>
<tr>
<th>Job</th>
<th>Job 210</th>
<th>Job 211</th>
<th>Job 212</th>
<th>Job 213</th>
<th>Job 214</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balance, July 1</td>
<td>$32,780</td>
<td>$51,770</td>
<td>$29,600</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Direct materials</td>
<td>$25,500</td>
<td>$39,800</td>
<td>$24,450</td>
<td>$13,600</td>
<td>$18,420</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$60,000</td>
<td>$28,500</td>
<td>$41,500</td>
<td>$23,000</td>
<td>$21,300</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>4,000</td>
<td>1,900</td>
<td>2,700</td>
<td>1,500</td>
<td>1,400</td>
</tr>
</tbody>
</table>

By July 31, Jobs 210 and 212 were completed and sold. The remaining jobs were in process.

Required:
1. Calculate the plantwide overhead rate for Julian Company.
2. Prepare job-order cost sheets for each job showing all costs through July 31.

Problem 5-47 JOB COST, SOURCE DOCUMENTS

Spade Millhone Detective Agency performs investigative work for a variety of clients. Recently, Alban Insurance Company asked Spade Millhone to investigate a series of suspicious claims for whiplash. In each case, the claimant was driving on a freeway and was suddenly rear-ended by an Alban-insured client. The claimants were all driving old, uninsured automobiles. The Alban clients reported that the claimants suddenly changed lanes in front of them, and the accidents were unavoidable. Alban suspected that these “accidents” were the result of insurance fraud. Basically, the claimants cruised the
freeways in virtually worthless cars, attempting to cut in front of expensive late-model 
cars that would surely be insured. Alban believed that the injuries were faked. 

Rex Spade spent 37 hours shadowing the claimants and taking pictures as necessary. 
His surveillance methods located the office of a doctor used by all claimants. He also 
took pictures of claimants performing tasks that they had sworn were now impossible to 
perform due to whiplash injuries. Victoria Millhone spent 48 hours using the Internet to 
research court records in surrounding states to locate the names of the claimants and 
their doctor. She found a pattern of similar insurance claims for each of the claimants. 

Spade Millhone Detective Agency bills clients for detective time at $120 per hour. 
Mileage is charged at $0.50 per mile. The agency logged in 510 miles on the Alban job. 
The film and developing amounted to $120.

Required:
1. Prepare a job-order cost sheet for the Alban job.
2. Why is overhead not specified in the charges? How does Spade Millhone charge cli-
   ents for the use of overhead (e.g., the ongoing costs of their office—supplies, paper 
   for notes and reports, telephone, utilities)?
3. The mileage is tallied from a source document. Design a source document for this 
   use, and make up data for it that would total the 510 miles driven on the Alban job.

Problem 5-48 CALCULATING ENDING WORK IN PROCESS, INCOME 
STATEMENT
Uehler Prosthetics Company produces artificial limbs for individuals. Each prosthetic is 
unique. On January 1, three jobs, identified by the name of the person being fitted with 
the prosthesis, were in process with the following costs:

<table>
<thead>
<tr>
<th></th>
<th>Asher</th>
<th>Styne</th>
<th>Wollner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$100</td>
<td>$ 340</td>
<td>$ 780</td>
</tr>
<tr>
<td>Direct labor</td>
<td>350</td>
<td>700</td>
<td>1,050</td>
</tr>
<tr>
<td>Applied overhead</td>
<td>280</td>
<td>560</td>
<td>840</td>
</tr>
<tr>
<td>Total</td>
<td>$730</td>
<td>$1,600</td>
<td>$2,670</td>
</tr>
</tbody>
</table>

During the month of January, two more jobs were started, Johns and Burton. Mate-
rials and labor costs incurred by each job in January are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Asher</th>
<th>Styne</th>
<th>Wollner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asher</td>
<td>$ 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Styne</td>
<td>550</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wollner</td>
<td>860</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Johns</td>
<td>1,310</td>
<td>1,650</td>
<td></td>
</tr>
<tr>
<td>Burton</td>
<td>260</td>
<td>180</td>
<td></td>
</tr>
</tbody>
</table>

Wollner and Johns’ prosthetics were completed and sold by January 31.

Required:
1. If overhead is applied on the basis of direct labor dollars, what is the overhead rate?
2. Prepare simple job-order cost sheets for each of the five jobs in process during Janu-
   ary.
3. What is the ending balance of Work in Process on January 31? What is the Cost of 
   Goods Sold in January?
4. Suppose that Uehler Company prices its jobs at cost plus 20 percent. In addition, 
during January, marketing and administrative costs of $850 were incurred. Prepare 
an income statement for the month of January.

Problem 5-49 OVERHEAD APPLIED TO JOBS, DEPARTMENTAL OVERHEAD 
RATES
Watson Products Inc. uses a normal job-order costing system. Currently, a plantwide 
overhead rate based on machine hours is used. Marlon Burke, the plant manager, has 
heard that departmental overhead rates can offer significantly better cost assignments
than a plantwide rate can offer. Watson has the following data for its two departments for the coming year:

<table>
<thead>
<tr>
<th></th>
<th>Department A</th>
<th>Department B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead costs (expected)</td>
<td>$50,000</td>
<td>$22,000</td>
</tr>
<tr>
<td>Normal activity (machine hours)</td>
<td>20,000</td>
<td>16,000</td>
</tr>
</tbody>
</table>

**Required:**

1. Compute a predetermined overhead rate for the plant as a whole based on machine hours.
2. Compute predetermined overhead rates for each department using machine hours. (Carry your calculations out to three decimal places.)
3. Job 73 used 20 machine hours from Department A and 50 machine hours from Department B. Job 74 used 50 machine hours from Department A and 20 machine hours from Department B. Compute the overhead cost assigned to each job using the plantwide rate computed in Requirement 1. Repeat the computation using the departmental rates found in Requirement 2. Which of the two approaches gives the fairer assignment? Why?
4. Repeat Requirement 3, assuming the expected overhead cost for Department B is $40,000 (not $22,000). For this company, would you recommend departmental rates over a plantwide rate?

**Problem 5-50 OVERHEAD RATES, UNIT COSTS**

Xanning Company manufactures specialty tools to customer order. There are three producing departments. Departmental information on budgeted overhead and various activity measures for the coming year is as follows:

<table>
<thead>
<tr>
<th></th>
<th>Welding</th>
<th>Assembly</th>
<th>Finishing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated overhead</td>
<td>$200,000</td>
<td>$22,000</td>
<td>$250,000</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>4,500</td>
<td>10,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$90,000</td>
<td>$150,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Machine hours</td>
<td>5,000</td>
<td>1,000</td>
<td>2,000</td>
</tr>
</tbody>
</table>

Currently, overhead is applied on the basis of machine hours using a plantwide rate. However, Janine, the controller, has been wondering whether it might be worthwhile to use departmental overhead rates. She has analyzed the overhead costs and drivers for the various departments and decided that Welding and Finishing should base their overhead rates on machine hours and that Assembly should base its overhead rate on direct labor hours.

Janine has been asked to prepare bids for two jobs with the following information:

<table>
<thead>
<tr>
<th></th>
<th>Job 1</th>
<th>Job 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$4,500</td>
<td>$8,600</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$1,000</td>
<td>$2,000</td>
</tr>
<tr>
<td>Direct labor hours:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Assembly</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Finishing</td>
<td>30</td>
<td>80</td>
</tr>
<tr>
<td>Number of machine hours:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Assembly</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>Finishing</td>
<td>110</td>
<td>165</td>
</tr>
</tbody>
</table>

The typical bid price includes a 30 percent markup over full manufacturing cost.

**Required:**

1. Calculate a plantwide rate for Xanning Company based on machine hours. What is the bid price of each job using this rate?
2. Calculate departmental overhead rates for the producing departments. What is the bid price of each job using these rates? (Round all answers to the nearest dollar.)
Problem 5-51 CALCULATE JOB COST AND USE IT TO CALCULATE PRICE

Suppose that back in the 1970s, Steve was asked to build speakers for two friends. The first friend, Jan, needed a speaker for her band. The second friend, Ed, needed a speaker built into the back of his hatchback automobile. Steve figured the following costs for each:

<table>
<thead>
<tr>
<th></th>
<th>Jan’s Job</th>
<th>Ed’s Job</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials (in $)</td>
<td>50</td>
<td>75</td>
</tr>
<tr>
<td>Labor hours</td>
<td>10</td>
<td>20</td>
</tr>
</tbody>
</table>

Steve knew that Jan’s job would be easier, since he had experience in building the type of speaker she needed. Her job would not require any special equipment or specialized fitting. Ed’s job, on the other hand, required specialized design and precise fitting. Steve thought he might need to build a mock-up of the speaker first, to fit it into the space. In addition, he might have to add to his tool collection to complete the job. Normally, Steve figured a wage rate of $6 per hour and charged 20 percent of labor and materials as an overhead rate.

**Required:**

1. Prepare job-order cost sheets for the two jobs, showing total cost.
2. Which cost do you think is more likely to be accurate? How might Steve build in some of the uncertainty of Ed’s job into a budgeted cost?

Problem 5-52 (APPENDIX 5A) UNIT COST, ENDING WORK IN PROCESS, JOURNAL ENTRIES

During August, Pamell Inc. worked on two jobs. Data relating to these two jobs follow:

<table>
<thead>
<tr>
<th></th>
<th>Job 64</th>
<th>Job 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units in each order</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>Units sold</td>
<td>50</td>
<td>—</td>
</tr>
<tr>
<td>Materials requisitioned (in $)</td>
<td>1,240</td>
<td>985</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>410</td>
<td>583</td>
</tr>
<tr>
<td>Direct labor cost</td>
<td>$6,150</td>
<td>$8,745</td>
</tr>
</tbody>
</table>

Overhead is assigned on the basis of direct labor hours at a rate of $12. During August, Job 64 was completed and transferred to Finished Goods. Job 65 was the only unfinished job at the end of the month.

**Required:**

1. Calculate the per-unit cost of Job 64.
2. Compute the ending balance in the work in process account.
3. Prepare the journal entries reflecting the completion and sale on account of Job 64. The selling price is 160 percent of cost.

Problem 5-53 (APPENDIX 5A) JOURNAL ENTRIES, JOB COSTS

The following transactions occurred during the month of April for Kearney Company.

a. Purchased materials costing $3,000 on account.

b. Requisitioned materials totaling $1,700 for use in production, $500 for Job 443 and the remainder for Job 444.

c. Recorded 50 hours of direct labor on Job 443 and 100 hours on Job 444 for the month. Direct laborers are paid at the rate of $8 per hour.

d. Applied overhead using a plantwide rate of $7.50 per direct labor hour.

e. Incurred and paid in cash actual overhead for the month of $1,230.

f. Completed and transferred Job 443 to Finished Goods.

g. Sold on account Job 442, which had been completed and transferred to Finished Goods in March, for cost (2,000) plus 25 percent.
Required:
1. Prepare journal entries for transactions (a) through (e).
2. Prepare job-order cost sheets for Jobs 443 and 444. Prepare journal entries for transactions (f) and (g).
3. Prepare a statement of cost of goods manufactured for April. Assume that the beginning balance in the raw materials account was $1,400 and that the beginning balance in the work in process account was zero.

Problem 5-54 (APPENDIX 5A) PREDETERMINED OVERHEAD RATES, VARIANCES, COST FLOWS

Barrymore Costume Company, located in New York City, sews costumes for plays and musicals. Barrymore considers itself primarily a service firm, as it never produces costumes without a pre-existing order and only purchases materials to the specifications of the particular job. Any finished goods ending inventory is temporary and is zeroed out as soon as the show producer pays for the order. Overhead is applied on the basis of direct labor cost. During the first quarter of the year, the following activity took place in each of the accounts listed:

<table>
<thead>
<tr>
<th>Work in Process</th>
<th>Finished Goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bal. 17,000</td>
<td>Complete 245,000</td>
</tr>
<tr>
<td>DL 80,000</td>
<td></td>
</tr>
<tr>
<td>OH 140,000</td>
<td>Complete 245,000</td>
</tr>
<tr>
<td>DM 40,000</td>
<td></td>
</tr>
<tr>
<td>Bal. 32,000</td>
<td>Sold 210,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overhead</th>
<th>Cost of Goods Sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>138,500</td>
<td>210,000</td>
</tr>
<tr>
<td>140,000</td>
<td>Bal. 1,500</td>
</tr>
</tbody>
</table>

Job 32 was the only job in process at the end of the first quarter. A total of 1,000 direct labor hours at $10 per hour were charged to Job 32.

Required:
1. Assuming that overhead is applied on the basis of direct labor cost, what was the overhead rate used during the first quarter of the year?
2. What was the applied overhead for the first quarter? The actual overhead? The under- or overapplied overhead?
3. What was the cost of the goods manufactured for the quarter?
4. Assume that the overhead variance is closed to the cost of goods sold account. Prepare the journal entry to close out the overhead control account. What is the adjusted balance in Cost of Goods Sold?
5. For Job 32, identify the costs incurred for direct materials, direct labor, and overhead.

Problem 5-55 (APPENDIX 5A) OVERHEAD APPLICATION, JOURNAL ENTRIES, JOB COST

At the beginning of the year, Paxton Company budgeted overhead of $180,000 as well as 15,000 direct labor hours. During the year, Job K456 was completed with the following information: direct materials cost, $2,340; direct labor cost, $3,600. The average wage for Paxton Company employees is $10 per hour.

By the end of the year, 15,400 direct labor hours had actually been worked, and Paxton Company incurred the following actual overhead costs for the year:

- Equipment lease: $5,000
- Depreciation on building: $20,000
- Indirect labor: $100,000
- Utilities: $15,000
- Other overhead: $45,000

OBJECTIVE 2 4 5
Chapter 5  Job-Order Costing

Required:
1. Calculate the overhead rate for the year.
2. Calculate the total cost of Job K456.
3. Prepare the journal entries to record actual overhead and to apply overhead to pro-
duction for the year.
4. Is overhead overapplied or underapplied? By how much?
5. Assuming that the normal cost of goods sold for the year is $700,000, what is the
adjusted cost of goods sold?

Problem 5-56 (APPENDIX 5A) JOURNAL ENTRIES, T-ACCOUNTS
Lowder Inc. builds custom conveyor systems for warehouses and distribution centers.
During the month of July, the following occurred:
a. Purchased materials on account for $42,630.
b. Requisitioned materials totaling $27,000 for use in production: $12,500 for Job
   703 and the remainder for Job 704.
c. Recorded direct labor payroll for the month of $26,320 with an average wage of
   $14 per hour. Job 703 required 780 direct labor hours; Job 704 required 1,100
direct labor hours.
d. Incurred and paid actual overhead of $19,950.
e. Charged overhead to production at the rate of $10 per direct labor hour.
f. Completed Job 703 and transferred it to finished goods.
g. Kept Job 704, which was started during July, in process at the end of the month.
h. Sold Job 700, which had been completed in May, on account for cost plus 30
   percent.

Beginning balances as of July 1 were:

<table>
<thead>
<tr>
<th>Account</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td>$ 6,070</td>
</tr>
<tr>
<td>Work in Process (for Job 703)</td>
<td>$10,000</td>
</tr>
<tr>
<td>Finished Goods (for Job 700)</td>
<td>$ 6,240</td>
</tr>
</tbody>
</table>

Required:
1. Prepare the journal entries for events (a) through (e).
2. Prepare simple job-order cost sheets for Jobs 703 and 704.
3. Prepare the journal entries for events (f) and (h).
4. Calculate the ending balances of the following:
   a. Raw Materials
   b. Work in Process
   c. Finished Goods

Problem 5-57 (APPENDIX 5B) SUPPORT DEPARTMENT COST ALLOCATION
MedServices Inc. is divided into two operating departments: Laboratory and Tissue Pathology. The company allocates delivery and accounting costs to each operating department. Delivery costs include the costs of a fleet of vans and drivers that drive throughout the state each day to clinics and doctors’ offices to pick up samples and deliver them to the centrally located laboratory and tissue pathology offices. Delivery costs are allocated on the basis of number of samples. Accounting costs are allocated on the basis of the number of transactions processed. No effort is made to separate fixed and variable costs; however, only budgeted costs are allocated. Allocations for the coming year are based on the following data:

<table>
<thead>
<tr>
<th></th>
<th>Support Departments</th>
<th>Producing Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delivery</td>
<td>Accounting</td>
</tr>
<tr>
<td>Overhead costs</td>
<td>$240,000</td>
<td>$270,000</td>
</tr>
<tr>
<td>Number of samples</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Transactions processed</td>
<td>2,000</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Laboratory</td>
<td>Pathology</td>
</tr>
<tr>
<td>Overhead costs</td>
<td>$345,000</td>
<td>$456,000</td>
</tr>
<tr>
<td>Number of samples</td>
<td>70,200</td>
<td>46,800</td>
</tr>
<tr>
<td>Transactions processed</td>
<td>24,700</td>
<td>13,300</td>
</tr>
</tbody>
</table>
Required:
1. Assign the support department costs by using the direct method.
2. Assign the support department costs by using the sequential method.

Problem 5-58 (APPENDIX 5B) SUPPORT DEPARTMENT COST ALLOCATION: COMPARISON OF METHODS OF ALLOCATION

Bender Automotive Works Inc. manufactures a variety of front-end assemblies for automobiles. A front-end assembly is the unified front of an automobile that includes the headlamps, fender, and surrounding metal/plastic. Bender has two producing departments: Drilling and Assembly. Usually, the front-end assemblies are ordered in batches of 100.

Two support departments provide support for Bender’s operating units: Maintenance and Power. Budgeted data for the coming quarter follow. The company does not separate fixed and variable costs.

<table>
<thead>
<tr>
<th>Support Departments</th>
<th>Producing Departments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maintenance</td>
</tr>
<tr>
<td>Overhead costs</td>
<td>$320,000</td>
</tr>
<tr>
<td>Machine hours</td>
<td>—</td>
</tr>
<tr>
<td>Kilowatt-hours</td>
<td>40,000</td>
</tr>
<tr>
<td>Direct labor hours</td>
<td>—</td>
</tr>
</tbody>
</table>

The predetermined overhead rate for Drilling is computed on the basis of machine hours; direct labor hours are used for Assembly.

Recently, a truck manufacturer requested a bid on a three-year contract that would supply front-end assemblies to a nearby factory. The prime costs for a batch of 100 front-end assemblies are $1,817. It takes two machine hours to produce a batch in the drilling department and 50 direct labor hours to assemble the 100 front-end assemblies in the assembly department.

Bender’s policy is to bid full manufacturing cost, plus 15 percent.

Required:
1. Prepare bids for Bender Automotive Works by using each of the following allocation methods:
   a. Direct method.
   b. Sequential method.
2. Which method most accurately reflects the cost of producing the front-end assemblies? Why?

Cases

Case 5-59 OVERHEAD ASSIGNMENT: ACTUAL AND NORMAL ACTIVITY COMPARED

Reynolds Printing Company specializes in wedding announcements. Reynolds uses an actual job-order costing system. An actual overhead rate is calculated at the end of each month using actual direct labor hours and overhead for the month. Once the actual cost of a job is determined, the customer is billed at actual cost plus 50 percent.

During April, Mrs. Lucky, a good friend of owner Jane Reynolds, ordered three sets of wedding announcements to be delivered May 10, June 10, and July 10, respectively. Reynolds scheduled production for each order on May 7, June 7, and July 7, respectively. The orders were assigned job numbers 115, 116, and 117, respectively.
Reynolds assured Mrs. Lucky that she would attend each of her daughters’ weddings. Out of sympathy and friendship, she also offered a lower price. Instead of cost plus 50 percent, she gave her a special price of cost plus 25 percent. Additionally, she agreed to wait until the final wedding to bill for the three jobs.

On August 15, Reynolds asked her accountant to bring her the completed job-order cost sheets for Jobs 115, 116, and 117. She also gave instructions to lower the price as had been agreed upon. The cost sheets revealed the following information:

<table>
<thead>
<tr>
<th></th>
<th>Job 115</th>
<th>Job 116</th>
<th>Job 117</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of direct materials</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
</tr>
<tr>
<td>Cost of direct labor (5 hours)</td>
<td>25.00</td>
<td>25.00</td>
<td>25.00</td>
</tr>
<tr>
<td>Cost of overhead</td>
<td>200.00</td>
<td>400.00</td>
<td>400.00</td>
</tr>
<tr>
<td>Total cost</td>
<td>$475.00</td>
<td>$675.00</td>
<td>$675.00</td>
</tr>
<tr>
<td>Total price</td>
<td>$593.75</td>
<td>$843.75</td>
<td>$843.75</td>
</tr>
<tr>
<td>Number of announcements</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

Reynolds could not understand why the overhead costs assigned to Jobs 116 and 117 were so much higher than those for Job 115. She asked for an overhead cost summary sheet for the months of May, June, and July, which showed that actual overhead costs were $20,000 each month. She also discovered that direct labor hours worked on all jobs were 500 hours in May and 250 hours each in June and July.

**Required:**

1. How do you think Mrs. Lucky will feel when she receives the bill for the three sets of wedding announcements?
2. Explain how the overhead costs were assigned to each job.
3. Assume that Reynolds’s average activity is 500 hours per month and that the company usually experiences overhead costs of $240,000 each year. Can you recommend a better way to assign overhead costs to jobs? Recompute the cost of each job and its price given your method of overhead cost assignment. Which method do you think is best? Why?

**Case 5-60 ASSIGNING OVERHEAD TO JOBS—ETHICAL ISSUES**

Tonya Martin, CMA and controller of the Parts Division of Gunderson Inc., was meeting with Doug Adams, manager of the division. The topic of discussion was the assignment of overhead costs to jobs and their impact on the division’s pricing decisions. Their conversation was as follows:

**Tonya:** Doug, as you know, about 25 percent of our business is based on government contracts, with the other 75 percent based on jobs from private sources won through bidding. During the last several years, our private business has declined. We have been losing more bids than usual. After some careful investigation, I have concluded that we are overpricing some jobs because of improper assignment of overhead costs. Some jobs are also being underpriced. Unfortunately, the jobs being overpriced are coming from our higher-volume, labor-intensive products; thus, we are losing business.

**Doug:** I think I understand. Jobs associated with our high-volume products are being assigned more overhead than they should be receiving. Then, when we add our standard 40 percent markup, we end up with a higher price than our competitors, who assign costs more accurately.

**Tonya:** Exactly. We have two producing departments, one labor-intensive and the other machine-intensive. The labor-intensive department generates much less overhead than the machine-intensive department. Furthermore, virtually all of our high-volume jobs are labor-intensive. We have been using a plantwide rate based on direct labor hours to assign overhead to all jobs. As a result, the high-volume, labor-intensive jobs receive a greater share of the machine-intensive department’s overhead than they deserve. This problem can be greatly alleviated by switching to departmen-
tal overhead rates. For example, an average high-volume job would be assigned $100,000 of overhead using a plantwide rate and only $70,000 using departmental rates. The change would lower our bidding price on high-volume jobs by an average of $42,000 per job. By increasing the accuracy of our product costing, we can make better pricing decisions and win back much of our private-sector business.

Doug: Sounds good. When can you implement the change in overhead rates?

Tonya: It won’t take long. I can have the new system working within four to six weeks—certainly by the start of the new fiscal year.

Doug: Hold it. I just thought of a possible complication. As I recall, most of our government contract work is done in the labor-intensive department. This new overhead assignment scheme will push down the cost on the government jobs, and we will lose revenues. They pay us full cost plus our standard markup. This business is not threatened by our current costing procedures, but we can’t switch our rates for only the private business. Government auditors would question the lack of consistency in our costing procedures.

Tonya: You do have a point. I thought of this issue also. According to my estimates, we will gain more revenues from the private sector than we will lose from our government contracts. Besides, the costs of our government jobs are distorted; in effect, we are overcharging the government.

Doug: They don’t know that and never will unless we switch our overhead assignment procedures. I think I have the solution. Officially, let’s keep our plantwide overhead rate. All of the official records will reflect this overhead costing approach for both our private and government business. Unofficially, I want you to develop a separate set of books that can be used to generate the information we need to prepare competitive bids for our private-sector business.

Required:
1. Do you believe that the solution proposed by Doug is ethical? Explain.
2. Suppose that Tonya decides that Doug’s solution is not right and objects strongly. Further suppose that, despite Tonya’s objections, Doug insists strongly on implementing the action. What should Tonya do?