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Chapter 2 Solutions

Questions

1. Companies that produce unique products or provide unique services, easily distinguished from other products or services, are likely to use a job costing system. Examples include custom home builders, auto mechanics, and tax accountants.

Companies that produce identical units of product in batches are likely to use a process costing system. Examples include producers of soft drinks, snack foods (chips, cookies, and the like), milk, and paint.

2. The materials requisition form includes the type, quantity, and cost of materials being requested and placed into production, and the job number where the materials will be used.

3. Job cost sheets accumulate manufacturing costs incurred for each job, and serve as a subsidiary ledger to the Work in Process Inventory account. This form includes the job number, customer name, and manufacturing costs incurred (direct materials, direct labor, and manufacturing overhead applied).

4. A timesheet is used by workers to track the hours spent on each job and includes the employee's name, date, job number, and hours worked for each job.

5. A predetermined overhead rate is used to allocate manufacturing overhead costs to jobs. The term used to describe this process is *overhead applied*.

6. Boeing uses a job costing system to track production costs for each jetliner it produces, including direct materials, direct labor, and manufacturing overhead costs. This information helps management in a variety of ways. Job costing provides cost information that is important in assessing profitability for each jetliner produced, and helps with establishing prices for future customer orders. Job costing also helps in evaluating the inputs required to produce jetliners, and whether the use of these inputs are efficient.

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7. *Normal costing system* is the term used to describe a cost system that tracks actual direct materials and *actual* direct labor costs for each job, and charges manufacturing overhead to jobs using a *predetermined overhead rate*.

A predetermined overhead rate is used for several reasons.

- Actual overhead costs can fluctuate from month to month causing high amounts of overhead to be charged to jobs during high cost periods. Normal costing smoothes out these fluctuations.
- Actual overhead cost data is typically only available at the end of the month, quarter, or year. Managers do not like to wait for this information to figure out the cost of jobs.
- The price charged to customers is often established based on product cost. Managers want a way to estimate manufacturing overhead–a predetermined overhead rate provides the means to do this.
- Bookkeeping is simplified. The accountant simply uses a predetermined rate to record manufacturing overhead costs.

8. The two important factors to consider when selecting an allocation base are that the base must have some link to overhead costs (that is, must drive overhead costs), and the base must be relatively easy to measure (for example, direct labor hours are easy to measure–simply use timesheets to track this data).

9. Actual manufacturing overhead costs incurred are recorded as a debit to the Manufacturing Overhead account. Manufacturing overhead applied to jobs is recorded as a credit to the Manufacturing Overhead account. The difference between the two amounts is called *overapplied* or *underapplied* overhead.

10. Manufacturing overhead is underapplied when overhead applied is *less* than actual overhead costs incurred, resulting in a debit balance in the Manufacturing Overhead account. Manufacturing overhead is overapplied when overhead applied is *more* than actual overhead costs incurred, resulting in a credit balance in the Manufacturing Overhead account.

11. The first option is to close the Manufacturing Overhead account to Cost of Goods Sold. This is appropriate when the balance is not significant (i.e., immaterial). The second option is to close the Manufacturing Overhead account to three different accounts–Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold–in proportion to the account balances in each of these accounts. This is appropriate when the Manufacturing Overhead account balance is significant (i.e., material).

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12. Although job costing systems in service organizations are similar to job costing systems used by manufacturing companies, differences are as follows:

- Service organizations tend to use fewer materials.
- Account names are slightly different–Raw Materials Inventory is called Parts Inventory or Supplies, Finished Goods Inventory is not applicable, Cost of Goods Sold is called Cost of Services, and Manufacturing Overhead is simply called Overhead.
- Costs are often tracked by customer (or client) rather than by product.

13. It is important for movie studios to have cost information for each movie, because stakeholders (actors, directors, etc.) are often paid based on the profit derived from the movie. Cost information is necessary to calculate the profitability of each movie, so a job costing system is used to track this information.

14. A job costing system tracks actual direct materials, direct labor, and manufacturing overhead costs for each job. Deducting these actual production costs from sales revenue provides a profitability measure for each job. Management often compares actual profit to estimated profit for each job to assess whether profit goals were achieved.

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Brief Exercises

15. Product Costs at Custom Furniture Company

Dan is concerned with the lack of profits shown on last month's income statement. The price for each piece of furniture is based on a 70 percent markup of estimated product costs, but the income statement shows lower profits than expected.

Leslie proposed to compare actual costs to estimated costs for the three costliest jobs, and evaluate whether the estimates were reasonable based on this comparison.

16. Job Costing Versus Process Costing

1. Process costing
2. Job costing
3. Process costing
4. Job costing
5. Job costing
6. Process costing
7. Process costing
8. Job costing

17. Job Costing Versus Process Costing

1. Job costing
2. Process costing
3. Job costing
4. Process costing
5. Job costing
6. Process costing
7. Process costing
8. Job costing

18. Recording Purchase and Transfer of Raw Materials in T Accounts

a. and b.

Raw Materials Inventory	
(Oct. 5) 15,000	6,000 (Oct. 8)
	1,000 (Oct. 10)

Work in Process Inventory	
(Oct. 8) 6,000	

Manufacturing Overhead	
(Oct. 10) 1,000	

Accounts Payable	
	15,000 (Oct. 5)

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19. Calculating Predetermined Overhead Rate

The predetermined overhead rate is calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity in allocation base}}$$

$$= \frac{\$8{,}000{,}000 \text{ estimated overhead costs}}{20{,}000 \text{ direct labor hours}}$$

$$= \underline{\$400 \text{ per direct labor hour}}$$

Each job will be charged $400 in manufacturing overhead for each direct labor hour worked.

20. Service Organization Accounts

Manufacturing	Service
1. Raw Materials Inventory	Parts Inventory (or Supplies)
2. Work in Process Inventory	Work in Process (if applicable)
3. Finished Goods Inventory	Not applicable
4. Cost of Goods Sold	Cost of Services (or other expense accounts)
5. Manufacturing Overhead	Overhead (or Service Overhead)

21. Evaluating Profitability of Jobs

The company uses a 70 percent markup on estimated product costs to establish the sales price for each job. However, actual results on the income statement showed significantly less profit than the 70 percent would provide. The accountant at Custom Furniture Company suggested comparing actual costs to estimated costs to evaluate whether actual costs were in line with the initial estimates.

This analysis showed that actual direct materials costs were significantly higher than originally estimated resulting in lower profitability than expected for each job.

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Exercises: Set A

22. Raw Materials Inventory Journal Entries

a.

1.	Raw Materials Inventory	55,000	
	Accounts Payable		55,000
2.	Work in Process Inventory	48,000	
	Raw Materials Inventory		48,000
3.	Manufacturing Overhead	14,000	
	Raw Materials Inventory		14,000

b.

Raw Materials Inventory

beg. bal.	45,000		
(1)	55,000	48,000	(2)
		14,000	(3)
end. bal.	38,000		

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23. Work in Process Inventory Related Journal Entries

a.

1.	Work in Process Inventory	340,000	
	Raw Materials Inventory		340,000
2.	Work in Process Inventory	810,000	
	Wages Payable		810,000
3.	Work in Process Inventory	660,000	
	Manufacturing Overhead		660,000
4.	Finished Goods Inventory	1,960,000	
	Work in Process Inventory		1,960,000

b.

Work in Process Inventory

beg. bal.	900,000		
(1)	340,000	1,960,000	(4)
(2)	810,000		
(3)	660,000		
end. bal.	750,000		

24. Cost of Goods Sold Journal Entries

a.

1.	Finished Goods Inventory	445,000	
	Work in Process Inventory		445,000
2.	Cost of Goods Sold	470,000	
	Finished Goods Inventory		470,000

b.

Finished Goods Inventory

beg. bal.	650,000		
(1)	445,000	470,000	(2)
end. bal.	625,000		

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25. Income Statement (with cost of goods sold adjustment)

Yamamoto, Inc.
Income Statement
Year Ended December 31

Sales		$3,050,000
Cost of goods sold before adjustment for underapplied overhead	$700,000	
Adjustment for underapplied overhead*	23,000	
Cost of goods sold		723,000
Gross profit		$2,327,000
Less operating (nonmanufacturing) expenses:		
Selling		575,000
General and administrative		330,000
Operating profit		$1,422,000

* This represents the amount of overhead underapplied to jobs and closed out to Cost of Goods Sold at the end of the year.

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26. Manufacturing Overhead Allocation Base and Calculating the Cost of Jobs

a. The predetermined overhead rate is calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity in allocation base}}$$

Using Direct Labor Hours:

$$= \frac{\$3{,}000{,}000 \text{ estimated overhead costs}}{50{,}000 \text{ direct labor hours}}$$

$$= \underline{\$60.00 \text{ per direct labor hour}}$$

Using Direct Labor Costs:

$$= \frac{\$3{,}000{,}000 \text{ estimated overhead costs}}{\$600{,}000 \text{ direct labor cost}}$$

= <u>$5.00 per direct labor dollar cost</u> (or 500% of direct labor cost)

Using Machine Hours:

$$= \frac{\$3{,}000{,}000 \text{ estimated overhead costs}}{80{,}000 \text{ machine hours}}$$

$$= \underline{\$37.50 \text{ per machine hour}}$$

b. The goal is to allocate overhead using an allocation base that drives (or causes) overhead costs. If Brenner's production process is highly mechanized, overhead costs are likely driven by machine use. The more machine hours used, the higher the overhead costs incurred. Thus, there is a link between machine hours and overhead costs and using machine hours as an allocation base is preferable. Machine hours are also easily tracked, making implementation relatively simple.

c. Three different cost calculations are required:

	Direct Labor Hours	Direct Labor Cost	Machine Hours
Direct materials	$ 6,000	$ 6,000	$ 6,000
Direct labor	4,000	4,000	4,000
Manufacturing overhead	18,000*	20,000**	26,250***
Total cost of Job #128	$28,000	$30,000	$36,250

* $18,000 = $60 rate x 300 direct labor hours
** $20,000 = $5 rate (or 500 percent) x $4,000 direct labor cost
*** $26,250 = $37.50 rate x 700 machine hours

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Exercises: Set B

27. Raw Materials Inventory Journal Entries

a.

1.	Raw Materials Inventory	50,000	
	Accounts Payable		50,000
2.	Work in Process Inventory	17,000	
	Raw Materials Inventory		17,000
3.	Manufacturing Overhead	8,000	
	Raw Materials Inventory		8,000

b.

Raw Materials Inventory

beg. bal.	110,000		
(1)	50,000	17,000	(2)
		8,000	(3)
end. bal.	135,000		

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28. Work in Process Inventory Journal Entries

a.

1.	Work in Process Inventory	40,000	
	Raw Materials Inventory		40,000
2.	Work in Process Inventory	70,000	
	Wages Payable		70,000
3.	Work in Process Inventory	200,000	
	Manufacturing Overhead		200,000
4.	Finished Goods Inventory	290,000	
	Work in Process Inventory		290,000

b.

Work in Process Inventory

beg. bal.	300,000		
(1)	40,000	290,000	(4)
(2)	70,000		
(3)	200,000		
end. bal.	320,000		

29. Cost of Goods Sold Journal Entries

a.

1.	Finished Goods Inventory	17,000	
	Work in Process Inventory		17,000
2.	Cost of Goods Sold	14,000	
	Finished Goods Inventory		14,000

b.

Finished Goods Inventory

beg. bal.	25,000		
(1)	17,000	14,000	(2)
end. bal.	28,000		

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30. Income Statement (with cost of goods sold adjustment)

Milan Company
Income Statement
Year Ended December 31

Sales		$5,000,000
Cost of goods sold before adjustment for overapplied overhead	$2,900,000	
Adjustment for overapplied overhead*	(109,000)	
Cost of goods sold		2,791,000
Gross profit		$2,209,000
Less operating (nonmanufacturing) expenses:		
Selling		825,000
General and administrative		570,000
Operating profit		$ 814,000

* This represents the amount of overhead overapplied to jobs and closed out to Cost of Goods Sold at the end of the year.

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31. Manufacturing Overhead Allocation Base and Calculating the Cost of Jobs

a. The predetermined overhead rate is calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity in allocation base}}$$

Using Direct Labor Hours:

$$= \frac{\$800{,}000 \text{ estimated overhead costs}}{10{,}000 \text{ direct labor hours}}$$

$$= \underline{\$80 \text{ per direct labor hour}}$$

Using Direct Labor Costs:

$$= \frac{\$800{,}000 \text{ estimated overhead costs}}{\$200{,}000 \text{ direct labor cost}}$$

= <u>$4 per direct labor dollar cost</u> (or 400% of direct labor cost)

Using Machine Hours:

$$= \frac{\$800{,}000 \text{ estimated overhead costs}}{4{,}000 \text{ machine hours}}$$

$$= \underline{\$200 \text{ per machine hour}}$$

b. The goal is to allocate overhead using an allocation base that drives (or causes) overhead costs. If Kimmel's production process involves more direct labor than automated processes, overhead costs are likely driven by direct labor. The more direct labor hours used, the higher the overhead costs incurred. Thus, there is a link between direct labor hours (or direct labor costs) and overhead costs, and using direct labor as an allocation base is preferable. Direct labor hours and costs are also easily tracked, making implementation relatively simple.

c. Three different cost calculations are required:

	Direct Labor Hours	Direct Labor Cost	Machine Hours
Direct materials	$1,750	$1,750	$1,750
Direct labor	860	860	860
Manufacturing overhead	6,400*	3,440**	4,000***
Total cost of Job #15B	$9,010	$6,050	$6,610

* $6,400 = $80 rate x 80 direct labor hours
** $3,440 = $4 rate (or 400 percent) x $860 direct labor cost
*** $4,000 = $200 rate x 20 machine hours

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Problems

32. Actual and Applied Manufacturing Overhead

a.

Manufacturing Overhead	95,000	
Raw Materials Inventory		40,000
Wages Payable		36,000
Prepaid Rent		6,000
Accumulated Depreciation, Equipment		13,000

b.

Work in Process Inventory	122,400*	
Manufacturing Overhead		122,400

c.

Manufacturing Overhead

(a)	95,000	122,400	(b)
		27,400	end. bal.

d. Manufacturing Overhead has a credit balance of $27,400 as shown in part *c*, and thus is overapplied. The entry to close Manufacturing Overhead is:

Manufacturing Overhead	27,400	
Cost of Goods Sold		27,400

* $122,400 = $24 x 5,100 machine hours

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33. Actual and Applied Manufacturing Overhead

a.

Manufacturing Overhead	637,500	
Raw Materials Inventory		335,000
Wages Payable		275,000
Accumulated Depreciation, Factory		18,000
Utilities Payable (or Accounts Payable)		9,500

b.

Work in Process Inventory	600,000*	
Manufacturing Overhead		600,000

c.

Manufacturing Overhead			
(a)	637,500	600,000	(b)
end. bal.	37,500		

d. Manufacturing Overhead has a debit balance of $37,500 as shown in part *c*, and thus is underapplied. The entry to close Manufacturing Overhead is:

Cost of Goods Sold	37,500	
Manufacturing Overhead		37,500

* $600,000 = $2 (or 200%) x $300,000 direct labor cost

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34. Calculating the Cost of Jobs, Making Journal Entries, and Preparing an Income Statement

a.

	Job #1	Job #2	Job #3	Job #4	Total
Direct materials	$2,800	$1,250	$1,550	$ 780	$ 6,380
Direct labor	500	430	465	210	1,605
Manufacturing overhead ($30 x direct labor hrs)	900	750	840	450	2,940
Total cost	$4,200	$2,430	$2,855	$1,440	$10,925

b.

1. Raw Materials Inventory 14,400
   Accounts Payable 14,400

2. Work in Process Inventory 6,380
   Manufacturing Overhead 1,075
   Raw Materials Inventory 7,455

3. Work in Process Inventory 1,605
   Manufacturing Overhead 985
   Wages Payable 2,590

4. Work in Process Inventory 2,940
   Manufacturing Overhead 2,940

5. Finished Goods Inventory 9,485
   Work in Process Inventory 9,485
   ($9,485 = $4,200 Job #1 + $2,430 Job #2 + $2,855 Job #3)

6. Cost of Goods Sold 6,630
   Finished Goods Inventory 6,630
   ($6,630 = $4,200 Job #1 + $2,430 Job #2)

   Accounts Receivable 9,500
   Sales 9,500
   ($9,500 = $6,000 Job #1 + $3,500 Job #2)

c. Fit Right, Inc. made $1,070 in gross profit from the sale of Job 2 ($1,070 = $3,500 revenue - $2,430 cost). Note that the gross profit is the profit earned before covering selling, general and administrative costs.

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34. (continued)

d.

Fit Right, Inc.
Income Statement
Month Ended July 31

Sales	$9,500
Cost of goods sold	6,630
Gross profit	$2,870
Deduct operating (nonmanufacturing) expenses:	
Selling	1,000
General and administrative	2,200
Operating loss	$ (330)

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35. Calculating the Cost of Jobs, Making Journal Entries, and Preparing an Income Statement

a.

	Job 1	Job 2	Job 3	Total
Direct materials	$38,800	$19,300	$22,500	$ 80,600
Direct labor	7,400	5,900	3,250	16,550
Manufacturing overhead (160% x direct labor cost)	11,840	9,440	5,200	26,480
Total Cost	$58,040	$34,640	$30,950	$123,630

b.

1. Raw Materials Inventory	225,000	
Accounts Payable		225,000
2. Work in Process Inventory	80,600	
Manufacturing Overhead	43,500	
Raw Materials Inventory		124,100
3. Work in Process Inventory	16,550	
Manufacturing Overhead	4,850	
Wages Payable		21,400
4. Work in Process Inventory	26,480	
Manufacturing Overhead		26,480
5. Finished Goods Inventory	58,040	
Work in Process Inventory		58,040
6. Cost of Goods Sold	58,040	
Finished Goods Inventory		58,040
Accounts Receivable	70,000	
Sales		70,000

c. Dirt Bikes, Inc., made $11,960 in gross profit from the sale of Job 1 ($11,960 = $70,000 revenue - $58,040 cost). Note that the gross profit is the profit earned before covering selling, general and administrative costs.

d.

Dirt Bikes, Inc.
Income Statement
Month Ended April 30

Sales	$70,000
Cost of goods sold	58,040
Gross profit	11,960
Less operating (nonmanufacturing) expenses:	
Selling	2,000
General and administrative	5,500
Operating profit	$ 4,460

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36. Calculating the Cost of Jobs and Making Journal Entries for a Service Company

a.

	Job 1	Job 2	Job 3	Job 4	Total
Direct labor	$ 6,000	$ 6,800	$2,200	$350	$15,350
Service overhead (120% of direct labor cost)	7,200	8,160	2,640	420	18,420
Total cost	$13,200	$14,960	$4,840	$770	$33,770

b.

1.	Supplies	6,000	
	Accounts Payable		6,000
2.	Service Overhead	3,200	
	Supplies		3,200
3.	Work in Process	15,350	
	Service Overhead	3,600	
	Wages Payable		18,950
4.	Work in Process	18,420	
	Service Overhead		18,420
5.	Cost of Services	28,160	
	Work in Process		28,160
	($28,160 = $13,200 + $14,960)		
	Accounts Receivable	41,000	
	Revenue		41,000
	($41,000 = $20,000 + $21,000)		

c. Tax Services, Inc., made $6,800 in gross profit for Job 1 ($6,800 = $20,000 revenue –$13,200 cost), and $6,040 in gross profit for Job 2 ($6,040 = $21,000 revenue – $14,960 cost). Note that the gross profit is the profit earned before covering selling, general and administrative costs.

d. Jobs 3 and 4 are still in process at the end of the first half of February. The cost for each of these jobs is $4,840 and $770, respectively. Thus, total Work in Process is $5,610.

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37. Calculating the Cost of Jobs and Making Journal Entries for a Service Company

a.

	Job 1	Job 2	Job 3	Total
Direct labor	$1,500	$1,700	$400	$3,600
Service overhead				
($10 per direct labor hour)	500	600	100	1,200
Total Cost	$2,000	$2,300	$500	$4,800

b.

1.	Supplies	1,500	
	Accounts Payable		1,500
2.	Service Overhead	800	
	Supplies		800
3.	Work in Process	3,600	
	Service Overhead	900	
	Wages Payable		4,500
4.	Work in Process	1,200	
	Service Overhead		1,200
5.	Cost of Services	2,000	
	Work in Process		2,000
	Accounts Receivable	3,000	
	Sales Revenue		3,000

c. Westley Company made $1,000 in gross profit for Job #1 ($1,000 = $3,000 revenue - $2,000 cost). Note that the gross profit is the profit earned before covering selling, general and administrative costs.

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38. Closing Manufacturing Overhead: Two Approaches

a. The Manufacturing Overhead account has a credit balance of $90,000. Thus, overhead is overapplied–too much overhead has been applied to jobs.

b. When the balance in the Manufacturing Overhead account is immaterial, the account is typically closed to cost of goods sold. Since overhead is overapplied, cost of goods sold is decreased. The entry is:

Manufacturing Overhead	90,000	
Cost of Goods Sold		90,000

c. When the balance in the Manufacturing Overhead account is material, it should be closed to three different accounts–WIP Inventory, Finished Goods Inventory, and Cost of Goods Sold–in proportion to the account balances in these three accounts. Again, since overhead is overapplied, these three accounts are decreased. The entry is:

Manufacturing Overhead	90,000	
Work in Process Inventory		9,000*
Finished Goods Inventory		27,000*
Cost of Goods Sold		54,000*

* Amounts are calculated as follows:

Account	Account Balance	Percent of Total	Allocation Amount (% x $90,000)
WIP Inventory	$ 100,000	10%	$ 9,000
Finished Goods Inventory	300,000	30%	27,000
Cost of Goods Sold	600,000	60%	54,000
Total	$1,000,000	100%	$90,000

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39. Closing Manufacturing Overhead: Two Approaches

a. The Manufacturing Overhead account has a debit balance of $60,000. Thus, overhead is underapplied–not enough overhead has been applied to jobs.

b. When the balance in the Manufacturing Overhead account is immaterial, the account is typically closed to Cost of Goods Sold. Since overhead is underapplied, Cost of Goods Sold is increased. The entry is:

Cost of Goods Sold	60,000	
Manufacturing Overhead		60,000

c. When the balance in the Manufacturing Overhead account is material, it should be closed to three different accounts–WIP Inventory, Finished Goods Inventory, and Cost of Goods Sold–in proportion to the account balances in these three accounts. Again, since overhead is underapplied, these three accounts are increased. The entry is:

Work in Process Inventory	6,000*	
Finished Goods Inventory	12,000*	
Cost of Goods Sold	42,000*	
Manufacturing Overhead		60,000

* Amounts are calculated as follows:

Account	Account Balance	Percent of Total	Allocation Amount (% x $60,000)
WIP Inventory	$ 200,000	10%	$ 6,000
Finished Goods Inventory	400,000	20%	12,000
Cost of Goods Sold	1,400,000	70%	42,000
Total	$2,000,000	100%	$60,000

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Skill-Building Cases

40. Ethics: Shifting Hours Using Job Costing

a. The fee arrangement for the Anderson job provides for revenues to equal cost plus 50 percent. Because Heston Company is under budget on this job, there is an incentive to charge more time to it and collect additional fees. Since the Hinkle Corporation job revenue is simply $50,000 regardless of actual cost, there is an incentive to keep costs to a minimum–even if hours must be charged to the wrong job.

b. Charging time worked on the Hinkle job to the Anderson job is not ethical. It would create problems for management within Heston Company who prepare bids for new jobs based on historical information, and who rely on cost information to make future decisions. In addition, if cost information is falsified as Isabel is proposing, Anderson Company would pay more than its fair share for the work being performed.

Toby should first look to the company's established policies for ethical conflict resolution. If Heston Corporation does not have policies in place or if following the organization's policies does not resolve the conflict, the next step is to discuss the conflict with Toby's immediate superior. However, Toby's immediate supervisor (Isabel) is involved in the conflict, so approaching someone who supervises her would be best. If Isabel's superior is not receptive to Toby's concerns, the next step is to approach top management, or the board of directors of the company.

As stated in the IMA's statement, if the ethical conflict still exists after exhausting all levels of internal review, two additional options exist: (1) "Clarify relevant ethical issues by initiating a confidential discussion with an IMA Ethics Counselor or other impartial advisor to obtain a better understanding of possible courses of action" or (2) "Consult your own attorney as to legal obligations and rights concerning the ethical conflict."

41. Internet Project: Automation and Overhead Allocation

a. Answers will vary.

b. When direct labor is the most significant product cost, it is reasonable to assume that manufacturing overhead costs are driven by labor–the more labor being utilized, the higher the cost of overhead. As production processes shift toward automation, labor costs become a smaller part of total production costs, and overhead increases (resulting from increased machine maintenance, utilities, depreciation costs, and the like). Thus, using direct labor or direct labor costs as an allocation base is no longer reasonable. Some other allocation base such as machine hours would be better.

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42. Group Project: Labor Costs at General Motors and Toyota

a. Answers will vary. Several possibilities are as follows:
1. GM is unionized and likely pays its workers a higher rate. According to the article, hourly wages for Toyota's workers average $35 (including benefits). Hourly wages for GM workers average $81 (including benefits).
2. Toyota's workers may be more efficient than GM's workers.
3. Toyota may have more automation and fewer assembly workers than GM.
4. Toyota's new factory includes state-of-the-art production equipment, while GM's factory is 50 years old and is more difficult to upgrade.

b. Assembly line labor is only one component of production. Other production costs to consider include costs for direct materials and manufacturing overhead items (for example, salaried supervisors, equipment depreciation, and maintenance). As production facilities become increasingly automated, direct labor costs decrease in proportion to total production costs. This makes the evaluation of direct materials and manufacturing overhead costs even more important.

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Comprehensive Cases

43. Journal Entries, Closing Manufacturing Overhead, and Preparing an Income Statement

a.

Raw Materials Inventory			
beg. bal.	500,000		
(1) purchase	300,000	420,000 to production (2)	
end. bal.	380,000		

Manufacturing Overhead			
(2) indirect matls	60,000	1,800,000 overhead applied (8)	
(5) indirect labor	540,000		
(7) factory costs	1,320,000		
bal. before adj.	120,000		

Work in Process Inventory			
beg. bal.	700,000		
(2) direct matl	360,000	2,030,000 completed goods (11)	
(4) direct labor	800,000		
(8) overhead applied	1,800,000		
end. bal.	1,630,000		

Cost of Goods Sold			
(13) goods sold	2,570,000		
bal. before adj.	2,570,000		

Finished Goods Inventory			
beg. bal.	1,800,000		
(11) completed goods	2,030,000	2,570,000 goods sold (13)	
end. bal.	1,260,000		

b.

1.	Raw Materials Inventory	300,000	
	Accounts Payable		300,000
2.	Work in Process Inventory	360,000	
	Manufacturing Overhead	60,000	
	Raw Materials Inventory		420,000
3.	Accounts Payable	300,000	
	Cash		300,000
4.	Work in Process Inventory	800,000	
	Wages Payable		800,000
5.	Manufacturing Overhead	540,000	
	Wages Payable		540,000
6.	Wages Payable	1,200,000	
	Cash		1,200,000
7.	Manufacturing Overhead	1,320,000	
	Accumulated Depreciation, Building		580,000
	Prepaid Insurance		220,000
	Accounts Payable		80,000
	Cash		440,000

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43.b. (continued)

8.	Work in Process Inventory	1,800,000	
	Manufacturing Overhead		1,800,000
	($20 x 90,000 machine hours)		
9.	Selling Expenses	430,000	
	Cash		430,000
10.	G&A Expenses	265,000	
	Cash		265,000
11.	Finished Goods Inventory	2,030,000	
	Work in Process Inventory		2,030,000
12.	Accounts Receivable	3,800,000	
	Sales		3,800,000
13.	Cost of Goods Sold	2,570,000	
	Finished Goods Inventory		2,570,000
14.	Cash	3,300,000	
	Accounts Receivable		3,300,000

c.

Cost of Goods Sold	120,000	
Manufacturing Overhead		120,000

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43. (continued)

d.

Jansen, Inc.
Income Statement
Year Ended December 31, 2016

Sales	$3,800,000
Cost of goods sold ($2,570,000 + $120,000*)	2,690,000
Gross profit	$1,110,000
Less operating (nonmanufacturing) expenses:	
Selling	430,000
General and administrative	265,000
Operating profit	$ 415,000

* $120,000 is added to Cost of Goods Sold to reflect the adjustment necessary at year end to close out the Manufacturing Overhead account to Cost of Goods Sold. See entry in part ***c***.

e. Companies with overapplied or underapplied overhead use a *normal costing* system of allocating overhead costs to products. Normal costing uses a predetermined overhead rate rather than actual costs to apply overhead costs to products.

At Jansen, Inc., overhead was underapplied for the period, which means overhead costs applied to products during the period were less than actual overhead costs incurred during the period. That is, the company did not apply enough overhead costs to its products during the year. To make up for this lack of overhead costs being recorded, the amount of underapplied overhead is added to cost of goods sold on the income statement.

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44. Journal Entries, Closing Manufacturing Overhead, and Preparing an Income Statement

a.

Raw Materials Inventory		
beg. bal.	50,000	
(1) purchase	30,000	41,000 to production (2)
end. bal.	39,000	

Manufacturing Overhead	
(2) indirect matls 5,000	270,000 overhead applied (8)
(5) indirect labor 134,000	
(7) factory costs 110,000	
	bal. before adj. 21,000

Work in Process Inventory		
beg. bal.	60,000	
(2) direct matl	36,000	478,000 completed goods (11)
(4) direct labor	140,000	
(8) overhead applied	270,000	
end. bal.	28,000	

Cost of Goods Sold	
(13) goods sold 415,000	
bal. before adj. 415,000	

Finished Goods Inventory		
beg. bal.	90,000	
(11) completed goods	478,000	415,000 goods sold (13)
end. bal.	153,000	

b.

1.	Raw Materials Inventory	30,000	
	Accounts Payable		30,000
2.	Work in Process Inventory	36,000	
	Manufacturing Overhead	5,000	
	Raw Materials Inventory		41,000
3.	Accounts Payable	30,000	
	Cash		30,000
4.	Work in Process Inventory	140,000	
	Wages Payable		140,000
5.	Manufacturing Overhead	134,000	
	Wages Payable		134,000
6.	Wages Payable	180,000	
	Cash		180,000
7.	Manufacturing Overhead	110,000	
	Accumulated Depreciation, Equipment		22,000
	Prepaid Rent		36,000
	Accounts Payable		33,000
	Cash		19,000

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44.b (continued)

8.	Work in Process Inventory	270,000	
	Manufacturing Overhead		270,000
	($30 x 9,000 direct labor hours)		
9.	Selling Expenses	63,000	
	Cash		63,000
10.	G&A Expenses	18,000	
	Cash		18,000
11.	Finished Goods Inventory	478,000	
	Work in Process Inventory		478,000
12.	Accounts Receivable	780,000	
	Sales		780,000
13.	Cost of Goods Sold	415,000	
	Finished Goods Inventory		415,000
14.	Cash	380,000	
	Accounts Receivable		380,000

c.

Manufacturing Overhead	21,000	
Cost of Goods Sold		21,000

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44. (continued)

d.

Mountain Nursery Company
Income Statement
Year Ended December 31, 2016

Sales	$780,000
Cost of goods sold ($415,000 – $21,000*)	394,000
Gross profit	386,000
Less operating (nonmanufacturing) expenses:	
Selling	63,000
General and administrative	18,000
Operating profit	$305,000

* $21,000 is deducted from Cost of Goods Sold to reflect the adjustment necessary at year end to close out the Manufacturing Overhead account to Cost of Goods Sold. See entry in part ***c***.

e. Companies with overapplied or underapplied overhead use a *normal costing* system of allocating overhead costs to products. Normal costing uses a predetermined overhead rate rather than actual costs to apply overhead costs to products.

At Mountain Nursery Company, overhead was overapplied for the period, which means overhead costs applied to products during the period were more than actual overhead costs incurred during the period. That is, the company applied too much in overhead costs to its products during the year. To make up for this excess of overhead costs being recorded, the amount of overapplied overhead is deducted from cost of goods sold on the income statement.

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Chapter 2

How Is Job Costing Used to Track Production Costs?

Chapter summary: This chapter introduces students to job costing and how product costs are assigned to jobs

Class action item: Have the students read the opening vignette at the beginning of chapter 2 for Custom Furniture Company.

Discussion Question: Ask the class to identify the issues presented by the owner of Custom Furniture Company.

After studying Chapter 2, students should be able to:

- Distinguish between job costing and process costing.
- Understand how direct materials and direct labor costs are assigned to jobs.
- Understand how manufacturing overhead costs are assigned to jobs.
- Apply job costing methods to service organizations.
- Use a job costing system to track costs and evaluate profitability for each job.

1. Differentiating Job Costing from Process Costing

- Distinguish between job costing and process costing.

Section Outline

- This segment focuses on the differences between job costing and process costing systems.
- Job costing systems record revenues and costs for unique products; ones that can be easily distinguished from other products.
- Process costing systems record revenues and costs for batches of identical units of product.
- Table 2.1 and Figure 2.1 provide examples that will help students understand the difference between products leading to the use of job costing versus process costing.

Class Activity

Allow approximately 5 minutes to work Review Problem 2.1 with the class. This review problem presents several real companies and asks students to identify which type of costing system, job or process, would be appropriate for each company presented.

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In-Class and Homework Suggestions

- Question: 1
- Brief Exercises: 15, 16, 17

Key Terms

- Job
- Job costing system
- Process costing system

2. How a Job Costing System Works

- Understand how direct materials and direct labor costs are assigned to jobs.

Section Outline

- This segment focuses on how to track product costs using a job costing system. Students must have a basic understanding of how to use debits and credits to record transactions before proceeding with this segment.
- The following documents are used to track product costs for each job:
  - Materials requisition form: Tracks materials taken out of raw materials inventory and placed in production, and identifies the job in which the materials will be used.
  - Timesheet: Tracks the hours that workers spend on each job.
  - Job cost sheet: Tracks all product cost information for each job. Costs come from the material requisition forms and timesheets. Job cost sheets serve as a subsidiary ledger for the Work in Process Inventory account.
- Figures 2.2, 2.3, 2.4, and 2.5 show in detail how the documents described above are used to track product costs for each job.

Class Activity

- Allow approximately 15 minutes to work Review Problem 2.2 with the class. This review problem requires students to record journal entries for product cost transactions.

In-Class and Homework Suggestions

- Questions: 2, 3, 4

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Key Terms

- Materials requisition form
- Job cost sheet
- Timesheet

3. Assigning Manufacturing Overhead Costs to Jobs

- Understand how manufacturing overhead costs are assigned to jobs.

Section Outline

- This segment focuses on how manufacturing overhead can be allocated to jobs using a predetermined overhead rate. Actual overhead information is not available until the end of the period, so most managers use a normal costing system to apply overhead based on estimates. The predetermined overhead rate is calculated as follows:

$$\text{Predetermined overhead rate} = \frac{\text{Estimated overhead costs}}{\text{Estimated activity in allocation base}}$$

- A Manufacturing Overhead account is used to track actual overhead costs (debits) and applied overhead (credits). This account is typically closed to Cost of Goods Sold at the end of the period.
- Figure 2.6 shows how manufacturing overhead is recorded on a job cost sheet.

Class Activity

Allow approximately 20 minutes to work Review Problem 2.3 with the class. This review problem requires students to calculate a predetermined overhead rate, and to record journal entries related to manufacturing overhead.

In-Class and Homework Suggestions

- Questions: 5, 6, 7, 8, 9, 10, 11
- Brief Exercise: 18, 19
- Exercises: 22 (set A), 23 (set A), 24 (set A), 27 (set B), 28 (set B), 29 (set B)
- Problems: 32, 33, 38, 39
- Skill-Building Cases: 41
- Comprehensive Cases: 43, 44

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Key Terms

- Allocation base
- Predetermined overhead rate
- Overhead applied
- Cost driver
- Normal costing
- Clearing account
- Underapplied overhead
- Overapplied overhead

4. Job Costing in Service Organizations

- Apply job costing methods to service organizations.

Section Outline

- This segment focuses on how to use a job costing system in a service organization setting.
- Job costing systems in service organizations are similar to those used by manufacturing companies.
- Service organizations use fewer materials than manufacturing organizations, the account names they use are slightly different, and they often track costs by customer rather than by product. Table 2.2 provides examples of how account names can differ from a manufacturing organization to a service organization.

Class Activity

Allow approximately 5 minutes to work Review Problem 2.4 with the class. This review problem requires students to describe the similarities and differences in how services companies and manufacturing companies account for product costs.

In-Class and Homework Suggestions

- Question: 12, 13
- Brief Exercise: 20

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5. Chapter Wrap-Up: Summary of Cost Flows at Custom Furniture Company

- Use a job costing system to track costs and evaluate profitability for each job.

Section Outline

- This segment focuses on how to use a job costing system to evaluate profitability of individual jobs.
- In addition to tracking product costs related to each job, job costing systems can also track revenue and resulting profit for each job.
- A job costing system can be used to identify areas of concern by comparing the cost estimate before starting the job with information on the completed job cost sheet. This type of analysis often leads to changes in the production process and revised estimates for future jobs.
- Figures 2.7, 2.8, and 2.9, tie the examples in the chapter together for Custom Furniture Company, and lead to a discussion about job profitability. Figure 2.10, and the related narrative at Custom Furniture Company, provides an example of how profitability can be measured for individual jobs.

Class Activity

Allow approximately 30 minutes to work Review Problem 2.5 with the class. This review problem requires students to calculate production costs for individual jobs, make journal entries related to product costs, and to assess profitability of individual jobs.

In-Class and Homework Suggestions

- Question: 14
- Brief Exercise: 21
- Exercises: 25 (set A), 26 (set A), 30 (set B), 31 (set B)
- Problems: 34, 35, 36, 37
- Skill-Building Cases: 40, 42

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Managerial Accounting

By: Kurt Heisinger and Joe Hoyle

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Chapter 2
How is Job Costing Used to Track Production Costs?

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Distinguish between job costing and process costing.

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What is a job costing system and why is it used?

- A job costing system tracks revenues and costs for each unique job.
- Used to compare actual and budgeted revenues and costs.
- Used to assess profitability of each job.
- Used to track revenues and costs throughout production process.

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How is a process costing system different than a job costing system?

- A process costing system tracks revenues and costs for companies producing identical products in batches.

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What types of companies use job costing and process costing?

Table 2.1 Job Costing Versus Process Costing

Job Costing	Process Costing
Custom homes	Oil
Custom vans	Chemicals
House painting services	Paint
Movies	Lumber
Airplanes	Milk
Bridges	Pencils
Legal services	Paper

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Understand how direct materials and direct labor costs are assigned to jobs.

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What are the product costs for a manufacturing company (from chapter 1)?

- Direct materials
- Direct labor
- Manufacturing overhead

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How do we account for the purchase of raw materials?

- Journal entry assuming Custom Furniture Company purchased $4,500 in raw materials on May 2:

May 2	Raw materials inventory	4,500	
	Accounts payable		4,500

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How do we account for the purchase of raw materials?

- This purchase of raw materials is further illustrated in the T-accounts that follow. Assume the beginning balance for raw material inventory is $25,000. Beginning balances are only provided for inventory accounts since the focus of this chapter is on manufacturing costs that flow through these accounts.

Raw Materials Inventory			
Beg. bal.	25,000		
(May 2)	4,500		

Accounts Payable			
		Beg. bal.	XX
		4,500	(May 2)

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How are raw materials requisitioned for production?

- Materials Requisition Form is used to track materials ordered for each job.
- The following form is used at Custom Furniture Company to order materials for job 50:

Materials Requisition Form for Custom Furniture Company

Date May 3 Materials Requisition No. 205
Job Number Charged 50

Quantity	Item Number	Description	Total Cost
40 feet	C230	Cherry wood planks	$240
25 feet	M120	Mahogany trim	$130
Total			$370

Supervisor's Signature _____

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How do we account for the transfer of raw materials to production as direct materials?

- Journal entry assuming Custom Furniture Company transferred $370 in direct materials out of raw materials inventory into production for job 50:

May 3	WIP inventory	370	
	Raw materials inventory		370

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- This flow of direct materials from one account to another is further illustrated in the T-accounts that follow. Assume the beginning balance for work-in-process inventory is $35,000.

Raw Materials Inventory				WIP Inventory			
Beg. bal.	25,000			Beg. bal.	35,000		
(May 2)	4,500	370	(May 3) →	(May 3)	370		

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What is a job cost sheet and how is it used?

- A job cost sheet tracks manufacturing costs for each job.
- Serves as the subsidiary ledger for the WIP Inventory account.
- Custom Furniture Company job cost sheet for job 50 with direct materials:

Job Cost Sheet for Job No. 50

Customer Diana Sanchez
Description Cherry wood dining room table with mahogany trim

Date Started May 3
Date Completed

Date	Direct Materials*		Direct Labor				Manufacturing Overhead
	Req. No	Cost	Timesheet No.	Hrs.	Rate	Cost	$30 per direct labor hour
5/3	205	$370					

Summary of Costs:

Direct Materials	$
Direct Labor	
Mfg. Overhead	
Total Cost	$

$370 comes from the total in Figure 2.2

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How do we account for the use of direct labor in production?

- Journal entry assuming Custom Furniture Company used $120 in direct labor for job 50:

May 4	WIP inventory	120	
	Wages payable		120

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- Recording these direct labor costs is further illustrated in the T-accounts that follow. Again, beginning balances are only provided for inventory accounts since the focus of this chapter is on manufacturing costs that flow through these accounts.

WIP Inventory			
Beg. bal.	35,000		
(May 3)	370		
(May 4)	120		

Wages Payable			
		Beg. bal.	XX
		120	(May 4)

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How do we track direct labor hours used in production?

- Information is tracked using a timesheet for each employee.
- The following timesheet is for one employee at Custom Furniture Company:

Name Tim Wallace Timesheet No. 311
Date May 4

Job Number	Hours	Rate	Total Cost
50	6	$15	$ 90
51	2	15	$ 30
Total			$120

Supervisor's Signature _____

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What does the updated job cost sheet look like for job 50?

Job Cost Sheet for Job No. 50

Customer Diana Sanchez
Description Cherry wood dining room table with mahogany trim

Date Started May 3
Date Completed _____

	Direct Materials		Direct Labor*				Manufacturing Overhead
Date	Req. No	Cost	Timesheet No.	Hrs.	Rate	Cost	$30 per direct labor hour
5/3	205	$370					
5/4			311	6	$15	$90	

Summary of Costs:

Direct Materials	$
Direct Labor	
Mfg. Overhead	
Total Cost	$

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Understand how manufacturing overhead costs are assigned to jobs.

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What costs are included in manufacturing overhead?

- All costs related to production other than direct materials and direct labor.
- Examples:
  - Factory rent
  - Factory utilities
  - Indirect labor (production supervisors)
  - Indirect materials
  - Factory equipment depreciation
  - Factory maintenance

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How do we account for manufacturing overhead costs?

- Predetermined overhead rate is used to allocate manufacturing overhead to jobs (this is called *normal costing*).
- Predetermined overhead rate typically uses direct labor hours, direct labor costs, or machine hours as the allocation base.

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- Predetermined overhead rate is calculated as:

  Estimated overhead costs / Estimated activity in allocation base

- Predetermined rate calculation for Custom Furniture Company:

  = $1,140,000 estimated overhead costs / 38,000 estimated direct labor hours

  = $30 per direct labor hour

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How is the predetermined overhead rate used to apply manufacturing overhead costs to jobs?

- Journal entry assuming six direct labor hours were charged to job 50 using the rate of $30 per direct labor hour:

May 4	WIP inventory	180	
	Manufacturing overhead		180

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Chapter 2 – Section 3

- Recording the application of overhead costs to a job is further illustrated in the T-accounts that follow.

Manufacturing Overhead	
	180 (May 4)

WIP Inventory	
Beg. bal.	35,000
(May 3)	370
(May 4)	120
(May 4)	180

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What does the updated job cost sheet look like for job 50?

Job Cost Sheet for Job No. 50

Customer Diana Sanchez
Description Cherry wood dining room table with mahogany trim

Date Started May 3
Date Completed

	Direct Materials		Direct Labor				Manufacturing Overhead
Date	Req. No	Cost	Timesheet No.	Hrs.	Rate	Cost	$30 per direct labor hour
5/3	205	$370					
5/4			311	6	$15	$90	$180*

Summary of Costs:

Direct Materials	$ 370
Direct Labor	90
Mfg. Overhead	180
Total Cost	$ 640

Overhead applied

**$180 = $30 per direct labor hour × 6 direct labor hours.*

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What information flows through the Manufacturing Overhead account?

- Actual overhead costs are recorded as a debit to Manufacturing Overhead.
- Overhead costs applied to jobs are recorded as a credit to Manufacturing Overhead.
- The Manufacturing Overhead account is a clearing account.

Manufacturing Overhead	
(debit)	*(credit)*
Actual overhead costs incurred	Overhead costs applied to jobs

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What do the terms overapplied and underapplied overhead mean?

- Underapplied overhead: As shown in the manufacturing overhead account at the end of the reporting period, actual overhead costs are *higher* than overhead costs applied to jobs.
- Overapplied overhead: As shown in the manufacturing overhead account at the end of the reporting period, actual overhead costs are *lower* than overhead costs applied to jobs.

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How is the manufacturing overhead account closed at the end of the period?

- Companies typically close the manufacturing overhead account to cost of goods sold at the end of the period if the amount is not significant.
- If overhead is *underapplied* by $2,000, the journal entry to close the account is:

Cost of goods sold	2,000	
Manufacturing overhead		2,000

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- If overhead is *overapplied* by $3,000, the journal entry to close the account is:

Manufacturing overhead	3,000	
Cost of goods sold		3,000

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Apply job costing methods to service organizations.

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How does job costing work in a service company setting?

- Same as manufacturing except service companies use fewer materials and the account names are slightly different.

Table 2.2 Accounts Used in Service Organizations and Manufacturing Organizations

Manufacturing Organization Account Name	Service Organization Account Name	Financial Statement
Raw materials inventory	Parts inventory or supplies	Balance sheet (asset)
Work-in-process inventory	Work in process*	Balance sheet (asset)
Finished goods	(Not applicable)	Balance sheet (asset)
Cost of goods sold	Cost of services (or other expense accounts)	Income statement (expense)
Manufacturing overhead	Overhead (or service overhead)	None (clearing account)
*Some service companies do not use a work-in-process account but instead simply charge costs directly to expense accounts.		

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Use a job costing system to track costs and evaluate profitability for each job.

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How is job costing used to perform job profitability analysis at Custom Furniture Company?

	Job 40		Job 44		Job 45	
	Estimate	Actual[a]	Estimate	Actual[a]	Estimate	Actual[a]
Sales price[b]	$ 18,360	$ 18,360	$ 27,030	$ 27,030	$ 13,260	$ 13,260
Direct materials	$ 1,500	$ 3,500	$ 2,800	$ 3,800	$ 1,100	$ 2,500
Direct labor	3,300	3,800	4,500	4,700	2,400	2,300
Manufacturing overhead	6,000	6,200	8,600	8,900	4,300	4,100
Total production costs	$ 10,800	$ 13,500	$ 15,900	$ 17,400	$ 7,800	$ 8,900
Gross profit	$ 7,560	$ 4,860	$ 11,130	$ 9,630	$ 5,460	$ 4,360
Gross profit as percent of total production cost[c]	70%	36%	70%	55%	70%	49%[d]

[a] Product costs are from the job cost sheet, and the sales price is based on the original bid.
[b] Based on 70 percent markup of estimated total production costs. For example, job 40's sales price of $18,360 = $10,800 × 170 percent.
[c] Equals gross profit divided by total production costs. Company target is 70 percent.
[d] Rounded.

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