2-73. Brackett Hospital wants to determine, to the extent possible, the actual cost for each patient stay. It is a general health care facility with all basic services but does not perform specialized services such as organ transplants.

Requirements:
- a. For each of the following classify as a direct or indirect cost with respect to each patient.
- b. Classify each item as fixed or variable with respect to the number of patient-days (sum of days each patient was in hospital) the hospital incurs.

<table>
<thead>
<tr>
<th>Item</th>
<th>Direct</th>
<th>Indirect</th>
<th>Fixed</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurses' salaries</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meals for patients</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning activities</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Medicine</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating room</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Usage</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab test charges</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic monitoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Parking maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2-77. For supply item # 839, Stonewall Company has been ordering 125 units based on the recommendation of the telemarketer who calls on the company monthly. A new purchasing agent has been hired by the company who wants to start using the economic order quantity method and its supporting decision elements. She has gathered the following information:

- Annual demand in units: 250 = D
- Days used per year: 250
- Lead time in days: 10
- Ordering costs: $100 = P
- Annual unit carrying costs: $20 = C

Requirement:
Determine the EOQ, average inventory, orders per year, average daily demand, reorder point, annual ordering costs, and annual carrying costs.

1. \( \text{EOQ} = \sqrt{\frac{2DP}{C}} = \sqrt{\frac{2(250)(100)}{100}} = 50 \text{ units} \)
2. Average inventory = \( \frac{25 \text{ units}}{2} = 12.5 \text{ units} \)
3. Orders/year = \( \frac{250}{50} = 5 \text{ orders/yr} \)
4. Average daily demand = \( \frac{250}{365} = 0.68 \text{ units} \)
5. Reorder point = \( \text{Average daily demand} \times \text{Lead time} = \frac{0.68}{10} \times 10 = 6.8 \text{ units} \)
6. Annual ordering costs = 100(5) = $500/yr
7. Annual carrying costs = 25 \times 20 = $500/yr
4. [AICPA Adapted] Worley Company has underallocated manufacturing overhead of $45,000 for the year ended December 31, 19\text{,}2. Before disposition of the underallocated manufacturing overhead, selected December 31, 19\text{,}2, balances from Worley's accounting records are as follows:

<table>
<thead>
<tr>
<th>Inventory</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>35,000</td>
</tr>
<tr>
<td>Work in process</td>
<td>54,000</td>
</tr>
<tr>
<td>Finished goods</td>
<td>90,000</td>
</tr>
</tbody>
</table>

Under Worley's cost accounting system, over/underallocated manufacturing overhead is allocated to appropriate inventories and cost of goods sold based on year-end balances. In its 19\text{,}2 income statement, Worley should report cost of goods sold of:

\[
\begin{align*}
\text{WIP} &= 54,000 \times 10.42\% \times 45,000 = 2812.50 \\
\text{F.G.} &= 90,000 \times 6.35\% \times 45,000 = 4689 \\
\text{CGS} &= 75,000 \times 83.33\% \times 45,000 = 37498.50 \\
\text{Balance in CGS} &= 8864,000 \times 100\% = 45,000 \\
\end{align*}
\]

5. Given the following data:

<table>
<thead>
<tr>
<th>Units produced</th>
<th>Product M</th>
<th>Product N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Units sold</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Unit selling price at split-off</td>
<td>$120</td>
<td>$60</td>
</tr>
<tr>
<td>Total separable costs if processed further</td>
<td>$4,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Unit selling price if processed further</td>
<td>$195</td>
<td>$80</td>
</tr>
<tr>
<td>Joint costs $10,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Compute the joint costs allocated to each product using the physical measure method.
(b) Compute the joint costs allocated to each product using the sales value at split-off method.
(c) Compute the joint costs allocated to each product using the estimated net realizable value method.
(d) Determine whether it is profitable to further process either or both products. Show supporting computations.
Garrison Corporation is considering the replacement of an old machine that is currently being used. The old machine is fully depreciated but can be used by the corporation through 19.4. If Garrison decides to replace the old machine, Fiero Company has offered to purchase it for $60,000 on the replacement date. The old machine would have no salvage value in 19.4.

If the replacement occurs, a new machine would be acquired from Dillent Industries on January 3, 19.4. The purchase price of $1,000,000 for the new machine would be paid in cash at the time of replacement. Due to the increased efficiency of the new machine, estimated annual cash savings of $300,000 would be generated through 19.4, the end of its expected useful life. The new machine is not expected to have any salvage value at the end of 19.4.

All operating cash receipts, operating cash expenditures, and applicable tax payouts and credits are assumed to occur at the end of the year. Garrison employs the calendar year for reporting purposes.

Discount tables for several different interest rates that are to be used in any discounting calculations are given below. Assume that Garrison is not subject to income taxes.

<table>
<thead>
<tr>
<th>Present Value of $1.00 Received at the End of Period</th>
<th>Present Value of an Annuity of $1.00 Received at the End of Each Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
<td>19%</td>
</tr>
<tr>
<td>--------</td>
<td>-----</td>
</tr>
<tr>
<td>1</td>
<td>.99</td>
</tr>
<tr>
<td>2</td>
<td>.92</td>
</tr>
<tr>
<td>3</td>
<td>.77</td>
</tr>
<tr>
<td>4</td>
<td>.66</td>
</tr>
<tr>
<td>5</td>
<td>.57</td>
</tr>
</tbody>
</table>

A. (CMA Adapted) If Garrison requires investments to earn a 12 percent return, the net present value for replacing the old machine with the new machine is:

\[
NPV_{\text{new}} = \left( \frac{3000000(3.61)}{12} \right) - \left( \frac{6000000(5.45)}{12} \right) = $485000\text{ advantage}
\]

B. (CMA Adapted) The internal rate of return, to the nearest percent, to replace the old machine is:

\[
IRR = \frac{1000000}{(PV \times 3000000)} = 3.33\%\text{ PVF}
\]

C. (CMA Adapted) The payback period to replace the old machine with the new machine is:

\[
\text{Payback period} = \frac{1000000}{300000} = 3.33\text{ yrs}
\]
6. The accrual accounting rate of return on the initial investment, to the nearest percent, is:

\[
\text{ARR} = \frac{\text{Increase in OI}}{\text{Net investment}} = \frac{300,000 - 200,000}{100,000} = 30\%
\]

6.4. Modality Corporation incurs the following estimated annual costs in making a subassembly for one of its products:

<table>
<thead>
<tr>
<th>Year</th>
<th>Factory Overhead:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Cost</td>
</tr>
<tr>
<td></td>
<td>for 20,000 Units</td>
</tr>
<tr>
<td>1</td>
<td>$300,000</td>
</tr>
<tr>
<td>2</td>
<td>900,000</td>
</tr>
<tr>
<td>3</td>
<td>600,000</td>
</tr>
</tbody>
</table>

Another manufacturer offers to sell Modality the same subassembly for $95 per unit for 20,000 units a year. Determine whether Modality should make or buy the subassembly, assuming that the plant capacity now used to make the subassembly would become idle if they were purchased and that $180,000 of the fixed factory overhead could be avoided by not making the subassembly.
7. The operation of Zink Corporation's Process One for the month of September is summarized below:

- Units started in process: 5,000
- Units completed and transferred out: 4,200
- Units in ending inventory of work in process: 800
- Work done on ending inventory:
  - Materials: 100 units
  - Conversion costs: 30 units
- Costs charged during the month:
  - Materials: $22,500
  - Conversion costs: $9,524

Compute:
(a) Total cost of the work in process inventory at September 30.
(b) Total cost of the work completed and transferred out of the process during September.

\[
\begin{align*}
800 \times 100\% &= 800 \text{ M} \\
300 \times 30\% &= 90 \text{ C} \\
2800 \times 100\% &= 2800 \text{ M} \\
240 \times 30\% &= 72 \text{ C} \\
\end{align*}
\]

\[
\begin{align*}
4800 &\quad 1200 \\
\frac{9600}{240} &= 40 \\
\frac{32000}{800} &= 40 \\
\frac{4400}{800} &= 5.5 \\
\frac{210}{420} &= 0.5 \\
\frac{18000}{500} &= 8 \\
\frac{1200}{300} &= 4 \\
\end{align*}
\]

\[
\begin{align*}
4800 \times 0.60 &= 2880 \\
2880 + 4104 &= 7084 \\
\end{align*}
\]

8. Puget Sound Fisheries processes many of its seafood items to the demands of its largest customers, most of which are large retail distributors. To keep the accounting system simple it has always assigned cost by the weight of the finished product. However, with increased competition it has had to watch its prices closely and in recent years several items have incurred zero profit margins. After several weeks of investigation, your consulting firm has found that while weight is important in processing of seafood, numerous items have very distinct processing steps and some items are processed through more steps than others.

Requirements:
Based on the findings of your consulting firm, what changes might you recommend to the company in the way of cost allocation among its products?

We would recommend allocating joint costs by unit unrealizable value rather than physical measures. The weight of the seafood is really unrelated to how much cost it has incurred. When using unit unrealizable value, on the other hand, costs are assigned based on the expected final sales value less unSellable costs. So if some items are processed further than others, a deduction of unSellable costs may be
SECTION II — GONG FOR THE SILVER/GOLD

9. 24-80. High Technology desires to implement a daily inventory receiving system with one of its suppliers. Daily demand for the material varies from 200 to 400 units with the following probability of demand:

<table>
<thead>
<tr>
<th>Demand (units)</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>0.25</td>
</tr>
<tr>
<td>350</td>
<td>0.30</td>
</tr>
<tr>
<td>400</td>
<td>0.25</td>
</tr>
<tr>
<td>300</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The EOQ model provides an optimal order quantity of 250 units. The opportunity costs of being out of stock are $2 per unit per day with a carrying cost of $0.50 per unit per day.

EOQ = \( \sqrt{\frac{2DS}{C}} \) = \( \sqrt{\frac{2 \times 250 \times 2}{0.5}} \) = 250 units of stock.

**Requirements:**

a. Prepare a table showing stockouts, stockout costs, and related carrying costs at each level of demand if the selected safety stocks are: 0, 50, 100, and 150.

<table>
<thead>
<tr>
<th>Safety Stock (units)</th>
<th>Stockout Costs</th>
<th>Carrying Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>25</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>100</td>
<td>25</td>
<td>100</td>
<td>125</td>
</tr>
<tr>
<td>150</td>
<td>25</td>
<td>150</td>
<td>175</td>
</tr>
</tbody>
</table>

b. What is the best level of safety stock to carry?

b) Should carry 150 units of safety stock.

10. 25-83. The Assembly Division of United Motors has offered to purchase 180,000 batteries from the Electrical Division for $52 per unit. At a normal volume of 300,000 batteries per year, production costs per battery are as follows:

- Direct materials: $20
- Direct manufacturing labor: $10
- Variable factory overhead: $6
- Fixed factory overhead: $20

Total: $56

The Electrical Division has been selling 500,000 batteries per year to outside buyers at $65 each. Capacity is 700,000 batteries per year. The Assembly Division has been buying batteries from outside sources for $55 each.

**Requirements:**

a. Should the Electrical Division manager accept the offer? Explain.

b. From the company’s perspective, will the internal sales be of any benefit? Explain.

- **a) **Bene. Rev: 9,260,000
  Bene. Cost: 6,490,000
  Net: 2,770,000

- **b) **11,700,000
  6,490,000
  Net: 5,210,000

The Assembly Dept. was paying $65 and now will save $13/unit by buying internally plus the Electrical Dept. will gain $4/unit thus a total company advantage of $8/unit or $5,210,000.