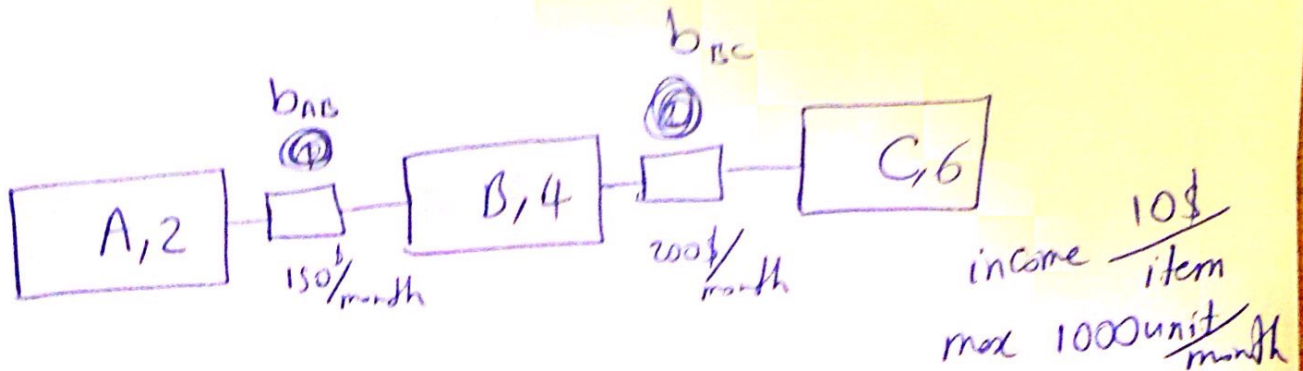


Supply Chain

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HW3

(P1)



$$b_{AB} = 0, b_{BC} = 0$$

$$\Rightarrow \text{income} = 10 \times 1000 \times (1 - 0.02) \times (1 - 0.04) \times (1 - 0.06) = 8843.5 \$$$

$$b_{AB} = 0, b_{BC} = \infty$$



best model
best

$$\text{income} = 10 \times 1000 \times (1 - 0.06) - 200 = 9200 \$$$

$$b_{AB} = \infty, b_{BC} = 0$$

$$\text{income} = 10 \times 1000 \times (1 - 0.04) \times (1 - 0.06) - 150 = 8874 \$$$

$$b_{AB} = \infty, b_{BC} = \infty$$

$$\text{income} = 10 \times 1000 \times (1 - 0.06) - 150 - 200 = 9050$$

(P2):

- storage charged 9 \$/unit/month = W
- no share
- purchase order cost 100 \$ = P
- interest rate 20 \$/year = I
- Capital Cost of the part = 450 \$ = C
- demand = 2000 units/year = D

$$\begin{aligned} \lambda &= 0.2 \\ W &= 9 \times 12 = 108 \text{ \$ / year} \\ P &= 100 \\ I &= C \times 0.2 = 450 \times 0.2 = 90 \text{ \$ / year} \\ C &= 450 \\ D &= 2000 \end{aligned}$$

Optimum Q for single product:

$$Q_s = \sqrt{\frac{2DP}{I+2W}} = \sqrt{\frac{2 \times 2000 \times 100}{90 + 2(108)}} = 36.16$$

$$H_s = \frac{I+2W}{2D} = \frac{90 + 2 \times 108}{2 \times 2000} = 0.0765$$

(P3)

$$TC = C + \frac{P}{Q} + (H)(Q) = 450 + \frac{100}{36.16} + 0.0765 \times 36.16 = 455.53 \$$$

(P4)

$$\Rightarrow T = \frac{Q}{D} = \frac{36.16}{2000} = 0.018 \text{ years}$$

(P5)

$$W = 108 \text{ \$/year}$$

$$P = 100$$

$$I = 90$$

$$C = 450$$

$$D = 2000$$

$$Q_M = \sqrt{\frac{2DP}{I+W}} = \sqrt{\frac{2 \times 2000 \times 100}{90+108}} =$$

$$H_M = \frac{I+W}{2D} = \frac{90+108}{2 \times 2000} =$$

$$TC = C + \frac{P}{Q} + (H)(Q) = 450 + \frac{100}{Q} +$$

$$T = \frac{Q_M}{D} =$$

P6

Number	Annual	Cumulative	Value	class
45%	100	0	4.3%	C items
	130	100		
	600	230		
	1200	830		
	1300	2030		
	1500	3330		
	1600	4830		
	1800	6430		
	3500	8230		
	6000	11730		
30%	9000	17730	32.2% 28%	B items
	9200	26730		
	11000	35930		
	15000	46930		
	18000	61930		
	22000	79930		
	28000	101930		
25%	30000	126930	77%	A items
	35000	156930		
	50000	191930		

(P8)

Consumption rate = 750 parts/month

Production rate = 2000 parts/month

Storage costs = 10\$ per unit-year W

Interest charges = \$5 per unit-year I

Setup charges per batch = 200\$

$$Q_s = \sqrt{\frac{2PD}{(I+2W)(1-\frac{P}{A})}}$$

$$T_{CM} = C + \frac{P}{Q} + \frac{(I+W)(\text{Average Inventory})}{D}$$

$$D = \frac{Q_M}{T - T_A}$$

$$\therefore T_{CM} = C + \frac{P}{Q} + \frac{(I+W)(\text{Average Inventory})}{D}$$