

OIL SUPPLY COMPANY**VAM:**

		K1=	K2=	K3=	K4=	K5=	
	Source	Destination					
		D1	D2	D3	D4	D5	SUPPLY
R1=	S1	13	8	6	9		160
R2=	S2	9	10	12	17		100
R3=	S3	15	11	7	8		240
R4=	S4						
	DEMAND	180	140	80	100		
O/L		13-9=4 15-13=2	10-8=2 11-8=3	7-6=1	9-8=1		

Solution from VAM:

S1 --> D2	140 @ \$8	1120
S1 --> D3	20 @ \$6	120
S2 --> D1	100 @ \$9	900
S3 --> D1	80 @ \$15	1200
S3 --> D3	60 @ \$7	420
S3 --> D4	100 @ \$8	800
		4560

MODI: 1st Iteration

		K1=	K2=	K3=	K4=	K5=	
	Source	Destination					
		D1	D2	D3	D4	D5	SUPPLY
R1=	S1	13	8	6	9		160
R2=	S2	9	10	12	17		100
R3=	S3	15	11	7	8		240
R4=	S4						
	DEMAND	180	140	80	100		

MODI: 2nd Iteration

		K1=	K2=	K3=	K4=	K5=	
	Source	Destination					
		D1	D2	D3	D4	D5	SUPPLY
R1=	S1	13	8	6	9		160
R2=	S2	9	10	12	17		100
R3=	S3	15	11	7	8		240
R4=	S4						
	DEMAND	180	140	80	100		

STOP - no more negative values
--> optimal solution**Solution from MODI:**

S1 --> D1	20 @ \$13	260
S1 --> D2	140 @ \$8	1120
S2 --> D1	100 @ \$9	900
S3 --> D1	60 @ \$15	900
S3 --> D3	80 @ \$7	560
S3 --> D4	100 @ \$8	800
		4540

(d) **Formulation:**

$$\text{MIN: } 13D_1X_1 + 8D_1X_2 + 6D_1X_3 + 9D_1X_4 + 9D_2X_1 + 10D_2X_2 + 12D_2X_3 + 17D_2X_4 + 15D_3X_1 + 11D_3X_2 + 7D_3X_3 + 8D_3X_4$$

$$\text{s.t.: } \begin{aligned} D_1X_1 + D_1X_2 + D_1X_3 + D_1X_4 &= 160 \\ D_2X_1 + D_2X_2 + D_2X_3 + D_2X_4 &= 100 \\ D_3X_1 + D_3X_2 + D_3X_3 + D_3X_4 &= 240 \end{aligned}$$

$$\begin{aligned} D_1X_1 + D_2X_1 + D_3X_1 &= 180 \\ D_1X_2 + D_2X_2 + D_3X_2 &= 140 \\ D_1X_3 + D_2X_3 + D_3X_3 &= 80 \\ D_1X_4 + D_2X_4 + D_3X_4 &= 100 \end{aligned}$$

$$D_iX_j \geq 0$$

(c) **Network Model**