1)

A	B	C	D	E
~~1~~	~~3~~	~~5~~	~~4~~	~~2~~
3	5	4	4	2
~~3~~	4	~~4~~	~~5~~	~~2~~
~~3~~	~~4~~	~~4~~	~~5~~	5
~~3~~	~~4~~	~~4~~	~~5~~	~~2~~

1	2	3	4	5
A	E	A	B	B
~~A~~	~~E~~	B	D	E
~~A~~	~~E~~	~~B~~	~~D~~	C
~~A~~	~~C~~	~~B~~	~~D~~	~~C~~
~~A~~	~~C~~	~~B~~	C	~~C~~

2) Distance of House allocation:

Case 1: Right to left

phase 1: A_1 : H_4 H_5 H_2 H_1 $\boxed{H_3}$

A_2 : H_2 H_5 H_4 H_3 $\boxed{H_1}$

A_3 : H_1 H_4 H_2 H_3 $\boxed{H_5}$

A_4 : H_4 $\boxed{H_2}$ H_1 H_5 H_3

A_5 : H_3 H_2 $\boxed{H_4}$ H_1 H_5

After phase 2 - no changes

Final result:

A_1 : $\boxed{H_3}$

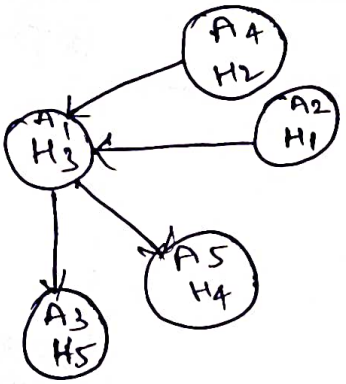
A_2 : $\boxed{H_1}$

A_3 : $\boxed{H_5}$

A_4 : $\boxed{H_2}$

A_5 : $\boxed{H_4}$

phase 3 graph :



Case 2 : left to Right

After phase 1 :

A1 : [H4] H5 H2 H1 H3

A2 : [H2] H5 H4 H3 H1

A3 : [H1] H4 H2 H3 H5

A4 : H4 H2 H1 [H5] H3

A5 : [H3] H2 H4 H1 H5

No changes after phase 2

Final result :

A1 : [H4]

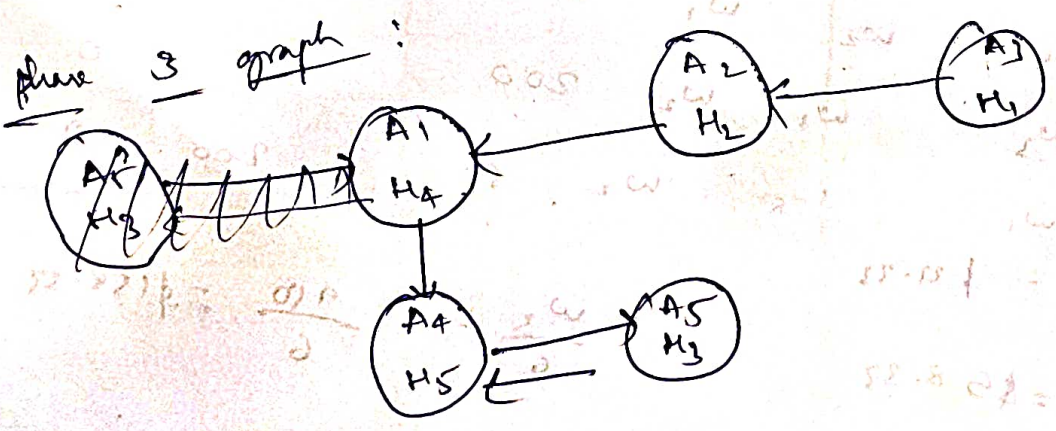
A2 : [H2]

A3 : [H1]

A4 : [H5]

A5 : [H3]

phase 3 graph :



3. The estate is worth $600

The decrease has 3 widows

widow 1 claims $150 ($w_1$)

widow 2 claims $200 ($w_2$)

widow 3 claims $350 ($w_3$)

Each widow gets (according to rule of linked vareis)

widow 1 : $\frac{w_1}{w_1 + w_2 + w_3} \times E$

$= \frac{150}{150 + 200 + 350} \times 600$

$= \frac{1}{5} \times 600$

$= 120$

widow 2 : $\frac{w_2}{w_1 + w_2 + w_3} \times E$

$= \frac{200}{600} \times 600$

$= 200$

widow 3 : $\frac{w_3}{w_1 + w_2 + w_3} \times E$

$= \frac{350}{600} \times 600$

$= 280$

widow 1, 2, 3 gets $120, $200, $280 respectively.

4. Estate's cost = $ 600

Window 1	$ 150
Window 2	$ 250
window 3	$ 350

Different combinations possible are

W_1	W_2	W_3			
$ 150	$ 250	$ 350			
W_1	W_2	W_3	→ 150	250	200
W_2	W_1	W_3	→ 250	150	200
W_2	W_3	W_1	→ 250	350	0
W_3	W_2	W_1	→ 350	250	0
W_3	W_1	W_2	→ 350	150	100
W_1	W_3	W_2	→ 150	350	100

$\Sigma W_1 = 150 + 150 + 150 + 150 = 600$

$\Sigma W_2 = 250 + 250 + 250 + 250 + 100 + 100 = 1200$

$\Sigma W_3 = 200 + 200 + 350 + 350 + 350 + 350 = 180$

wife 1 gets $\frac{600}{6} = 100$ USD

wife 2 gets $\frac{1200}{6} = 200$ USD

wife 3 gets $\frac{1800}{6} = 300$ USD

5) The worth of estate is $250

widow 1 claims $50 ($w_1$)

widow 2 claims $100 ($w_2$)

widow 3 claims $200 ($w_3$)

According to rule of linked vessels each wife gets

$$w_1 = \frac{w_1}{w_1+w_2+w_3} \times E = \frac{50}{350} \times 250 = 35.714$$

$$w_2 = \frac{w_2}{w_1+w_2+w_3} \times E = \frac{100}{350} \times 250 = 71.423$$

$$w_3 = \frac{w_3}{w_1+w_2+w_3} \times E = \frac{200}{350} \times 250 = 142.857$$

6. Given estate is lost

w_1 claims $50

$w_2 \rightarrow$ $100

$w_3 \rightarrow$ $200

Different combinations possible are

w_1	w_2	w_3
50	100	100
	50	100
	100	0
	0	0
100	50	0
	0	0
200	0	0

$$\frac{w_1}{3} = \frac{w_1}{6} = \frac{200}{6} = \$33.33$$

$$\frac{w_2}{6} = \frac{350}{6} = \$58.33$$

$$\frac{w_3}{6} = \frac{950}{6} = \$158.33$$