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CSE 5319-001

SPEC TOPICS THEORY / ALGORITHMS

1.)

A	B	C	D	E
~~6~~	~~6~~	~~6~~	~~6~~	~~6~~
[1]	[3]	[5]	~~6~~	~~6~~
3	5	4	[4]	[2]
4	4	1	5	4
2	1	2	1	5

1	2	3	4	5
[A]	[E]	A	B	B
D	~~6~~	[B]	[D]	E
C	A	~~6~~	A	[C]
B	C	~~6~~	E	~~6~~
~~6~~	~~6~~	~~6~~	C	D

So the pairs matchings are

A1 B3 C5 D4 E2
this is the stable matchings

2.) To find the max-cardinality, pareto-optimal solutions

A1 : H4 [H5] H2 ~~H1~~ ~~H3~~
A2 : [H2] H5 ~~H4~~ ~~H3~~ ~~H1~~
A3 : [H1] H4 H2 H3 ~~H5~~
A4 : [H4] ~~H5~~ H1 ~~H2~~ ~~H3~~
A5 : [H3] H2 ~~H4~~ H1 H5

So the Allocations are

A1: H5, A2: H2, A3: H1, A4: H4, A5: H3

These are the pareto-optimal solutions

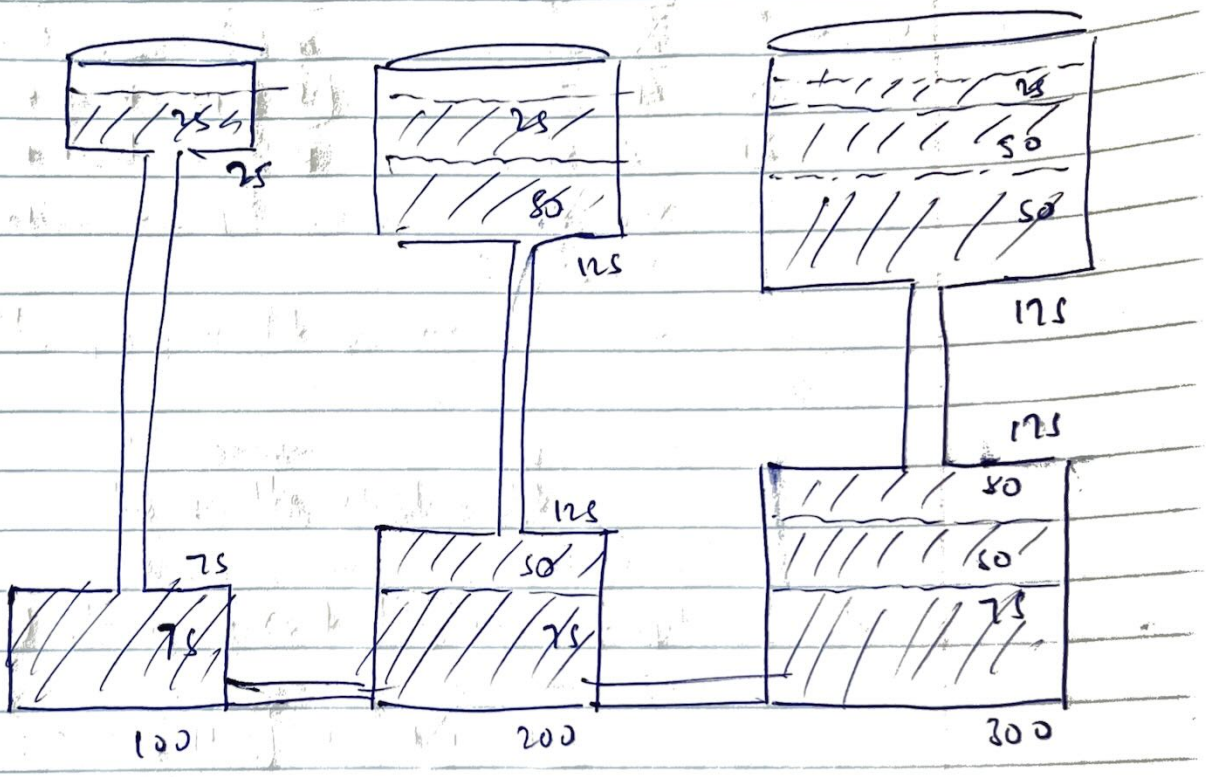
3). Estate value = $600

Widow 1 = $150

Widow 2 = $250

Widow 3 $350

Dividing the estate to the widows with the Rule of Linked vessels



With the help of the Rule of Linked Vessels, the Estate is divided among the widows in such a way which resulted in

Widow 1 → 100 $

Widow 2 → 200 $

Widow 3 → 300 $

4). With the use of O'Neils law/ rule to the bank method also known as (Shapley Value)

The widow who gets first is the one that gets full marriage contract, and the second one gets a part or full that depends on the Estate.

So Estate = $600
Contract 1 = $150
Contract 2 = $250
Contract 3 = $350

order of arrival	1	2	3
1 2 3	150	250	200
1 3 2	150	100	350
2 1 3	150	250	200
2 3 1	0	250	350
3 2 1	0	250	350
3 1 2	150	100	350
	600	1200	1800

~~Widow~~

Average = Widow 1 → $\frac{600}{6}$ → 100

Widow 2 → $\frac{1200}{6}$ → 200

Widow 3 → $\frac{1800}{6}$ → 300

So the widows get the average amount which are 100$, 200$ and 300$ for the first, second and third widow, these are also the shapley values.

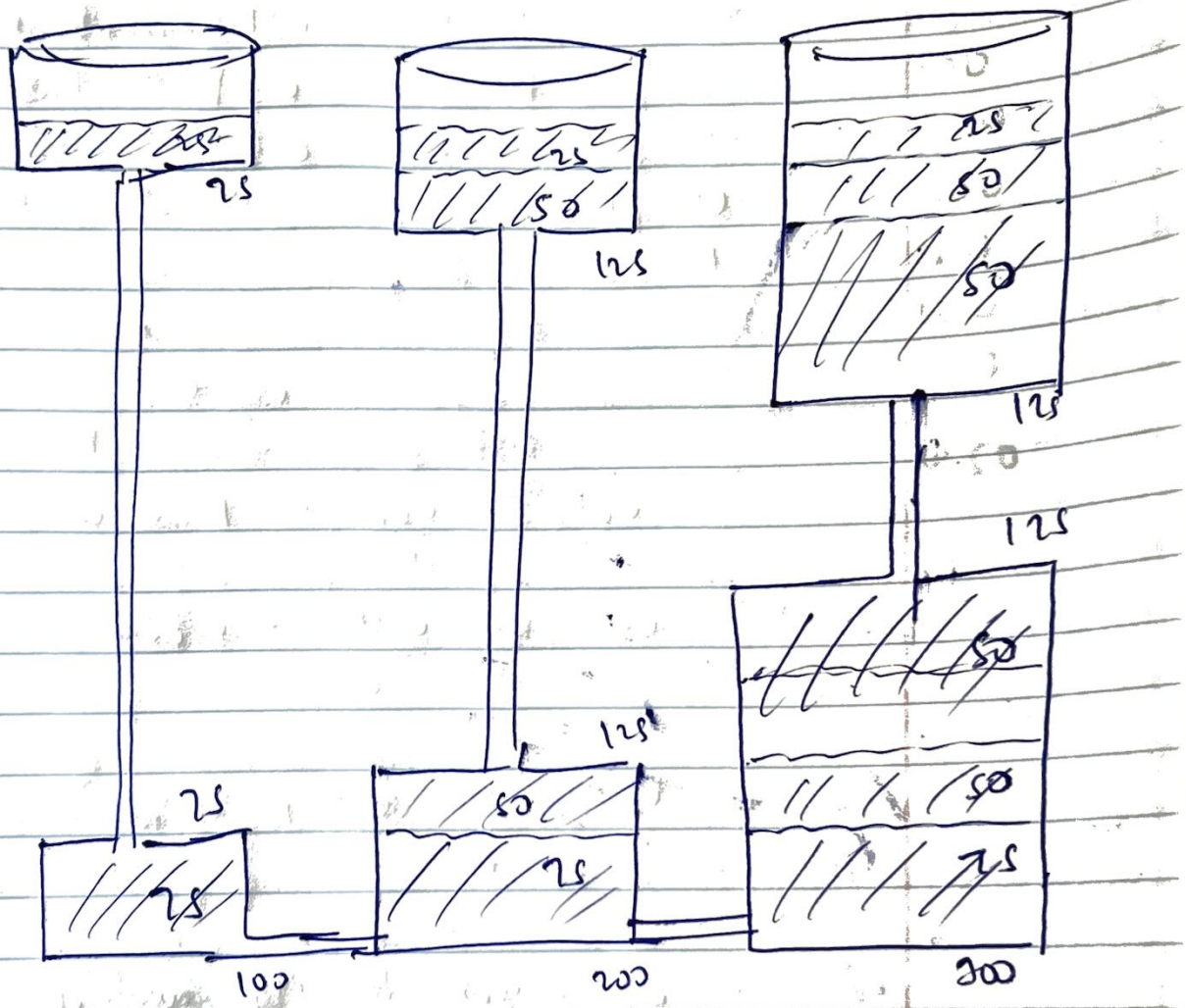
5). Estate Value = $250

Widow 1 = $50

Widow 2 = $100

Widow 3 = $200

Dividing the estate among widows using the Rule of Linked Vessels



With the help of the linked vessels Rule we divided the estate among them as 100 $, 200 $, 300 $ ...

6) With the use of O'Neil's law / are to the bard method. also to find the Shapley values.

The widow who gets first is the one that gets full marriage contract, and the second one gets a part'd amount of full that depends on the estate.

Ex.

Order of Arrival			Widows		
			1	2	3
1	2	3	50	100	100
1	3	2	50	0	200
2	1	3	50	100	100
2	3	1	0	100	150
3	1	2	50	0	200
3	2	1	0	50	200
			200	350	950

Average → Widow 1 → $\frac{200}{6}$ → 33.33

Widow 2 → $\frac{350}{6}$ → 58.33

Widow 3 → $\frac{950}{6}$ → 158.33

So the widows 1, 2, 3 gets and average amount of 33.33 $, 58.33 $, 158.33 $ respectively these are shapley values.