HW2

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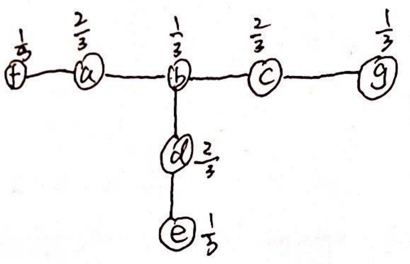
1.



2.

(a) The third person will determine this chain. There are two cases:

① If ~~two~~ first two persons choose R, then the third people will choose R. Probability is:

$$Pr[(R,R)|good] = (\frac{1}{3})^2 = \frac{1}{9}$$

② If the first person choose R, but the second person observe high. In this case, the first person indicates that ~~$P(G)=\frac{2}{3}$ and~~ he has observed low, and the second person need to make a choice. He should choose from low or high. Assume the probability is $\frac{1}{2}$ for each. So:

$$Pr[(R,R)|good] = \frac{2}{3}\times\frac{1}{2}\times\frac{1}{3} = \frac{1}{9}$$

Therefore: $$P(Good/two\ R) = \frac{P(two\ R|good)\cdot P(Good)}{P(two\ R)} = \frac{\frac{2}{9}\times\frac{1}{2}}{\frac{1}{2}\times\frac{2}{9}+\frac{1}{2}\times\frac{4}{9}+\frac{1}{2}\times\frac{1}{9}} = \frac{2}{7}$$

(b)

$P[(high,high)|G] = \frac{2}{3}\times\frac{2}{3} = \frac{4}{9}$ $\quad P[(high,low)|G] = \frac{2}{9}$ $\quad P[(high,low)|B] = \frac{2}{9}$ $\quad P[(high,high)|B] = \frac{1}{9}$

$$P[G|(high,high)] = \frac{\frac{4}{9}\times\frac{1}{2}}{\frac{4}{9}\times\frac{1}{2}+\frac{1}{9}\times\frac{1}{2}} = \frac{4}{5} \qquad P[G|(high,low)] = \frac{\frac{2}{9}\times\frac{1}{2}}{\frac{1}{2}\times\frac{2}{9}+\frac{1}{2}\times\frac{2}{9}} = \frac{1}{2}$$

So, if I receive high, I will choose A. If I receive low, I will randomly choose one.

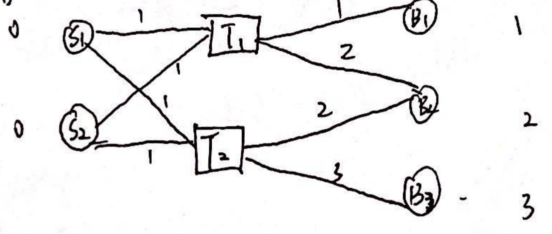
(c)

If I choose R, then all people choose R, so 11th person should also choose R.

If I choose A, then if he receive high, he should choose A. If he receive low, he should choose R.

11.3.

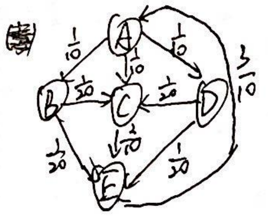
(a)



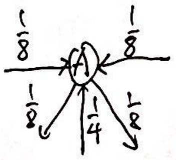
(b).
No. Since T_2 will profit a lot from selling, he could rise the price of S_1, so that he can get an additional profit.

14.4

(a) Yes, it wouldn't change. So it is Nash-Equilibrium.



(b) No. A will change its value: $\frac{1}{4}+\frac{1}{8}+\frac{1}{8} \neq \frac{1}{4}$



So it is not a NE.

15.4

(a)

Slot		Advertisers	
4	a	x	4
		y	3
3	b	z	1

$P_{xi} = V^{S}_{ij} - V^{S-0}_{S-j}$

$\Rightarrow P_{ax} = (12+3)-(3\times3) = 6$

$P_{by} = (4\times4+3\times1)-(4\times4) = 3$

$\Rightarrow P_x = 6,\ P_y = 3,\ P_z = 0$

(b)

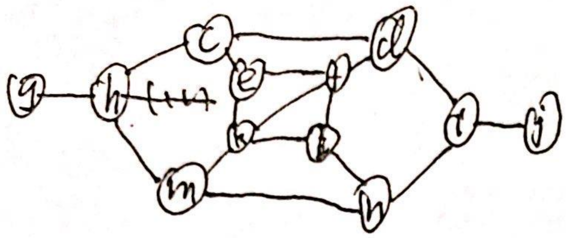
4	a	x	16	12	8
3	b	y	12	9	6
2	c	z	4	3	2

$P_x = 4$,

$P_y = 1$

$P_z = 0$

19.3



(a) k, l

(b) {g, h, c, d, i, j, h, m}

(c) h or i