Supplemental Problem Set
HONR259L

1) Preferences for 6 students over dorm rooms are given below. The first row in bold is the room that each student is randomly assigned. The students are then allowed to use the Top Trading Cycle algorithm to reallocate the rooms. Determine the final outcome.

S1	S2	S3	S4	S5	S6
r1	**r2**	**r3**	**r4**	**r5**	**r6**
r6	r1	r4	r6	r2	r2
r5	r5	r2	r5	r6	r3
r3	r3	r5	r3	r4	r5
r2	r6	r3	r2	r2	r6
r4	r2	r6	r4	r1	r4
r1	r4	r1	r1	r5	r1

Start with Student 1.
S1 → S6 → S2 → S1. A cycle, so ((S1,r6),(S6,r2),(S2,r1)) are assigned.
Now start with Student 3.
S3 → S4→S5 →S4. A cycle so ((S4,r5),(S5,r4)) are assigned. S3 remains with r3.

2) The table below gives student preferences (S) and fraternity preferences (F).
   i) Determine the outcome if the student optimal DAA is used
   ii) Determine the outcome if the fraternity optimal DAA is used.

S1	S2	S3	S4	F1	F2	F3	F4
F3	F2	F1	F2	S1	S1	S3	S3
F2	F3	F2	F3	S2	S3	S2	S2
F1	F1	F4	F4	S3	S4	S4	S4
F4	F4	F3	F1	S4	S2	S1	S1

i)
Round 1: S1 selects F3, S2 and S4 select F2,(F2 keeps only S4) S3 selects F1. S2 is unmatched
Round 2: S2 selects F3. (F3 keeps only S2). S1 is unmatched.
Round 3: S1 selects F2. (F2 keeps only S1) S4 is unmatched.
Round 4: S4 selects F3. (F3 keeps only S2). S4 is unmatched.
Round 5: S4 selects F4. All are matched.
Process ends with the following matches: (S1,F2), (S2,F3), (S3,F1), (S4,F4).

ii)
Round 1: F1 and F2 select S1 (S1 keeps only F2) F3 and F4 select S3. (S3 keeps only F4) F3 and F1 are unmatched.
Round 2: F1 and F3 select S2. (S2 keeps only F3). F1 is unmatched.
Round 3: F1 selects S3. (S3 keeps only F1) F4 is unmatched.
Round 4: F4 selects S2. (S2 keeps only F3). F4 is unmatched.
Round 5: F4 selects S4. All are matched.
Process ends with the following matches: (S1,F2), (S2,F3), (S3,F1), (S4,F4).
In this case, both algorithms yield the same match!

3) You are a bidder in a Simultaneous Multi-round Auction. There are four licenses, A,B,C,D. Each license is worth 200 activity points and the activity rule is 1 (your eligibility points in any new round is equal to the

activity points you bid on in the previous round including any PWBs that you had in that round). You are currently the provisional winning bidder (PWB) on A at a bid of $1000. Your budget is $1M. Including your PWB on A, your total eligibility is 500 points. Your maximum value for a single license is $5000 and for two licenses is $8000 in total. You do not care which license(s) you acquire. For the next round, the minimum acceptable bids for the licenses are: A--$1100, B--$4000, C--$2000, D -- $5000.

a) Provide the full list all of the licenses you are able to bid on in the next round given your situation (for example {A, D} and {A} each are examples feasible you could bid on. Describe whether you are raising your own bid or not in your list.
You could submit bids on any of the following licenses {B} {C},{D},{A,B },{A,C},{A,D},{A} where the bids on A are interpreted as raising your own PWB on A. You cannot bid on more because you do not have enough eligibility points. Recall that 200 points are tied up on A no matter what you bid. (PWBs are considered as commitments that must be honored if there are no higher bids on a license.)

b) Suppose you end up not bidding in this round and another bidders becomes the PWB on license A. What licenses can you bid on in the following round? *If you did not submit any bids, then your only eligibility from the previous round comes from your PWB on A. That gives you 200 points which you could use on any single license.*

c) What licenses should you not bid on given your values? *This question was a follow on from the initial set up not a follow on from b). Given that, note that you have a license in hand for the time being. The incremental value to you of any further license is $3000 (8000-5000). If you bid on B or D you would be paying more for a second license than it is worth to you.*

d) Suppose the minimum acceptable bids are, instead A--$1100, B--$4000, C--$3100, D -- $5000. Now what license(s) should you bid on? *Similar to c) but now you do not want to bid on any other license.*