CSCI 570

Homework

1. True

2. Yes.

There are 4 students and 2 possibilities.

① There are no 2 students prefer each other.

Therefore, it cannot be 2 separated students prefer each other to their current roommates. Thus, it is a stable matching.

② There are 2 students prefer each other.

It will be a stable matching if these two students (S1, S2) are roommates. Because there cannot be two separated students prefer each other to their current roommates. Assume another student S3 prefer S1 or S2 than S3's current roommate S4. S1 or S2 cannot prefer S3 than their current roommate, because S1, S2 prefer each other.

All in all, it always exists a stable matching.

3:

While there is a hospital h which is not filled and hasn't proposed to every student.

Choose such hospital h.

Let s be the highest-ranked student in h's preference list to which h has not proposed.

If s is assigned to no hospital then

(s,h) s is assigned to h and h's available position minus one

If h has no more available position then

h is filled

Endif

Else s is assigned to h'

If s prefer h' to h then

h is still not filled

Else s prefer h to h' then

(s,h) s is assigned to h and h's available position minus one and h''s available position plus one

if h has no more available position then

his filled

Else if h' has more availble position then
h' is not filled
Endif
Endif
Endif
Endwhile
Return the set S

4. Let Almazo Wilder and Nelly Oleson be free. Other men and women are engaged just like the results from previous matching. Then runs the Gale-Shapley algorithm.