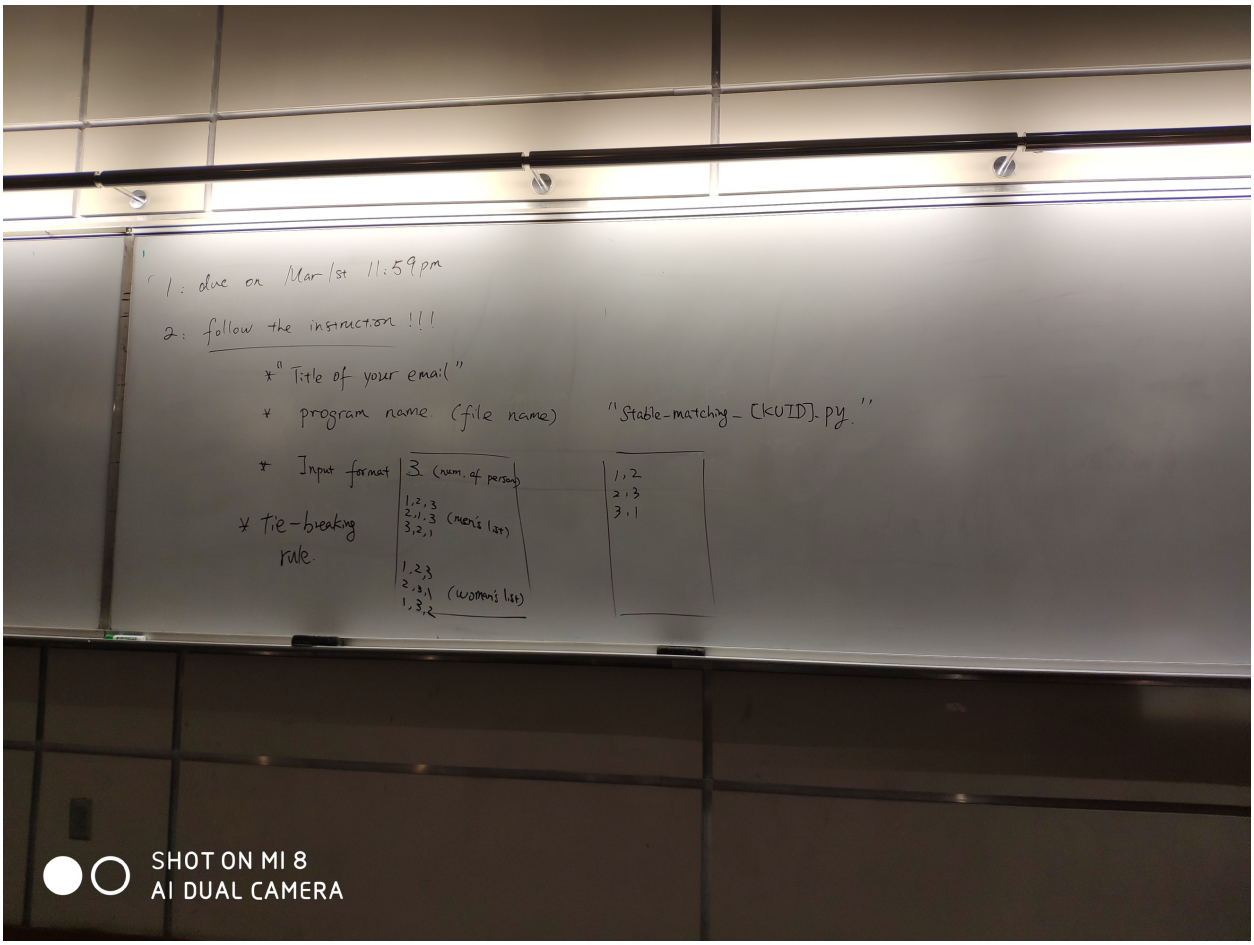
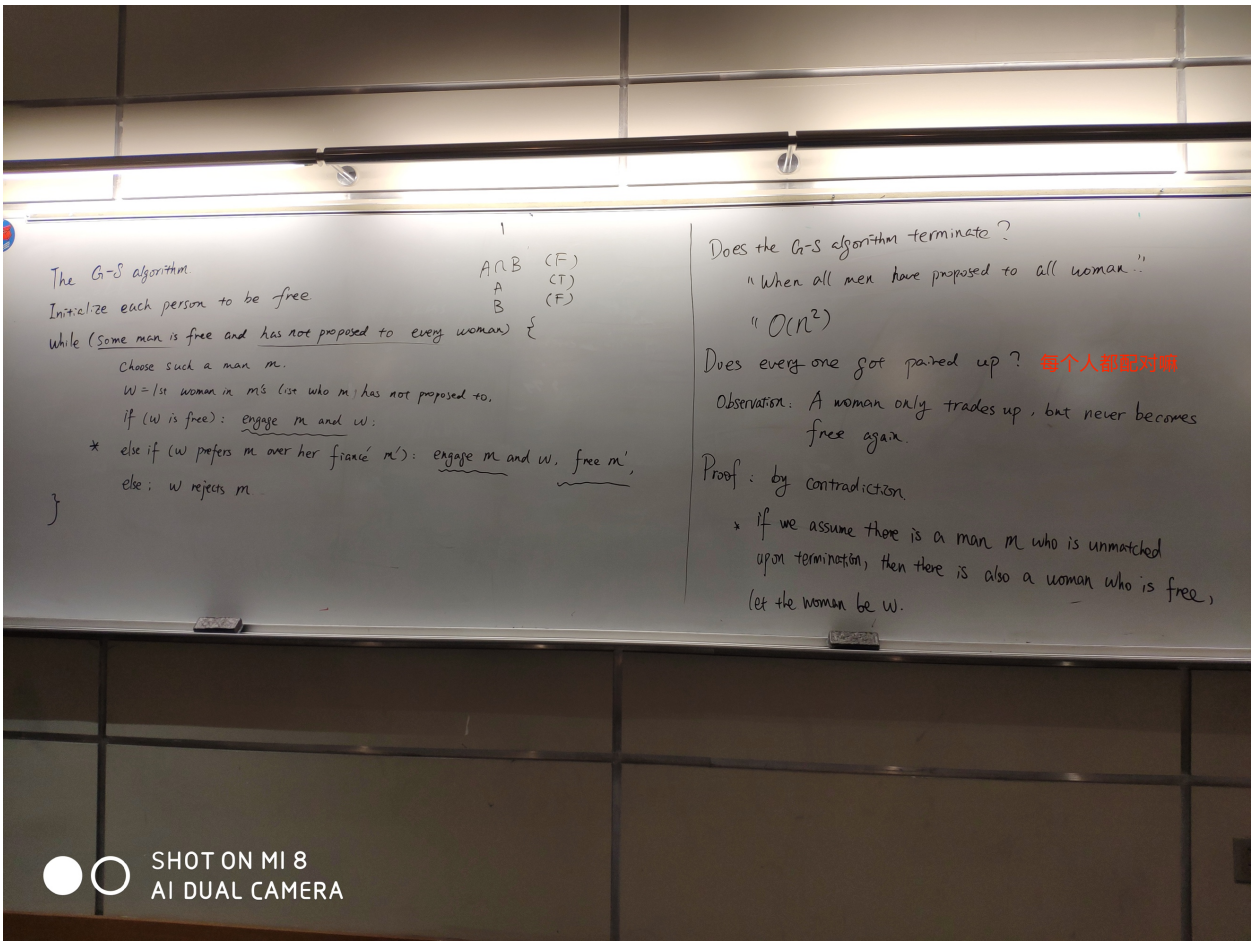
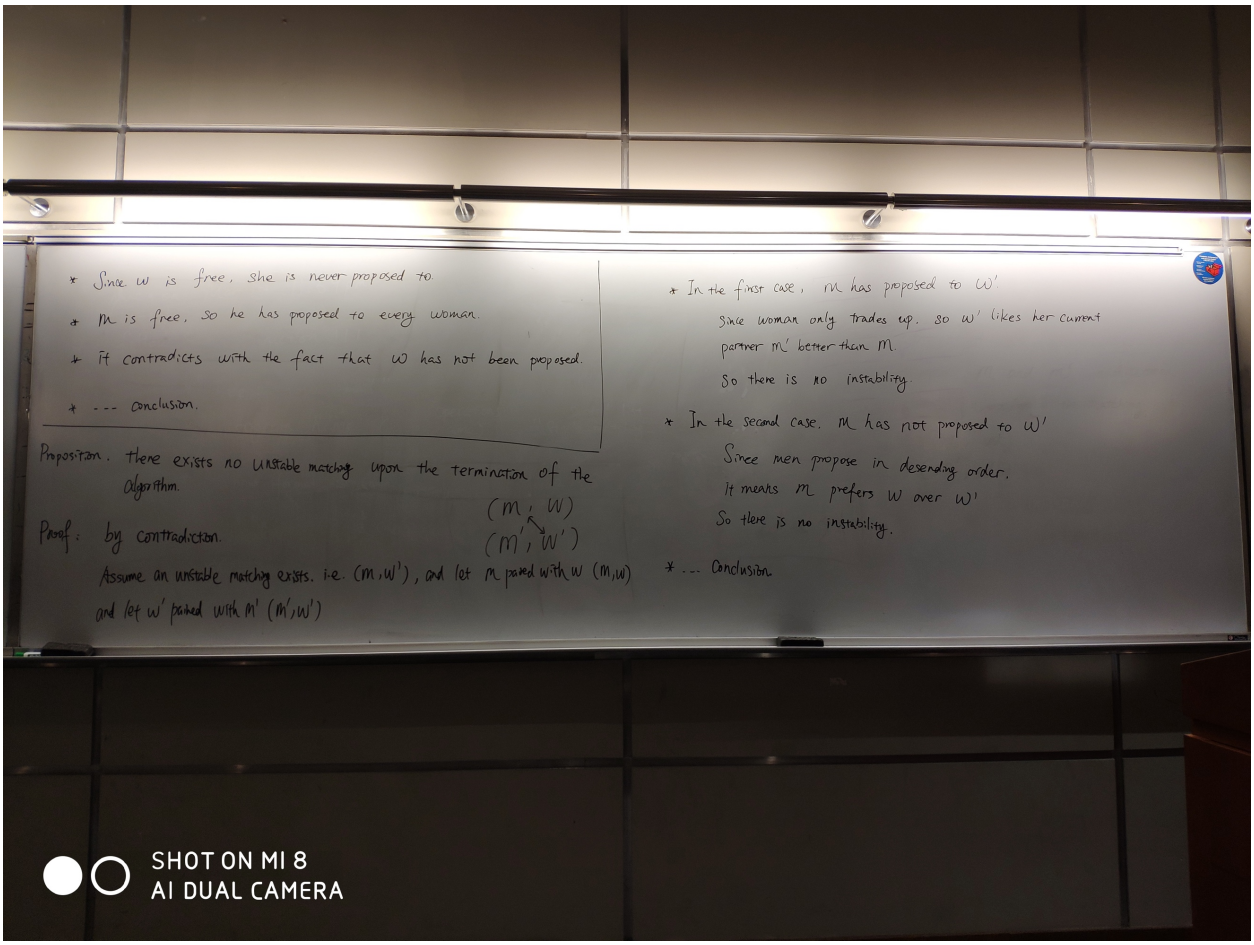
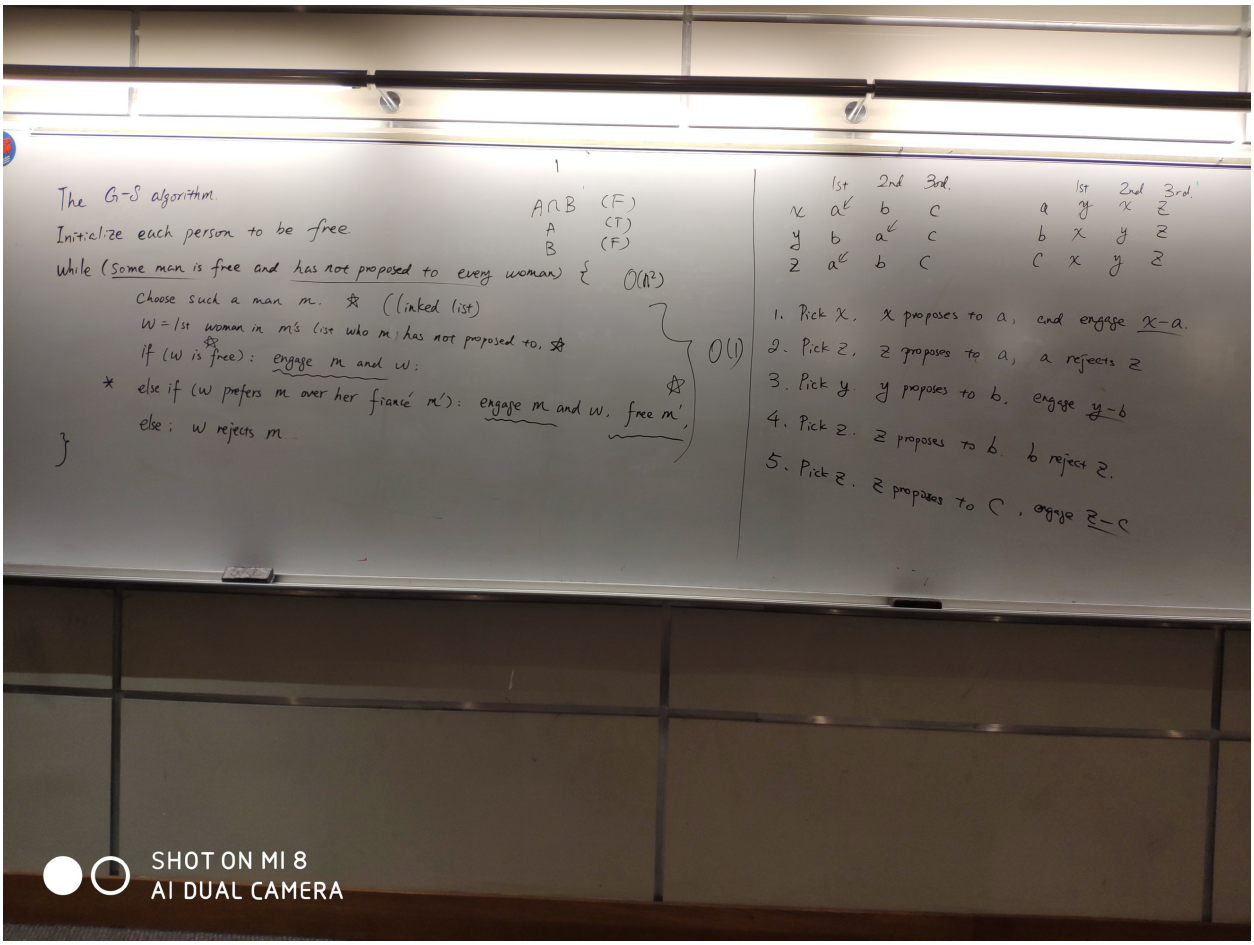
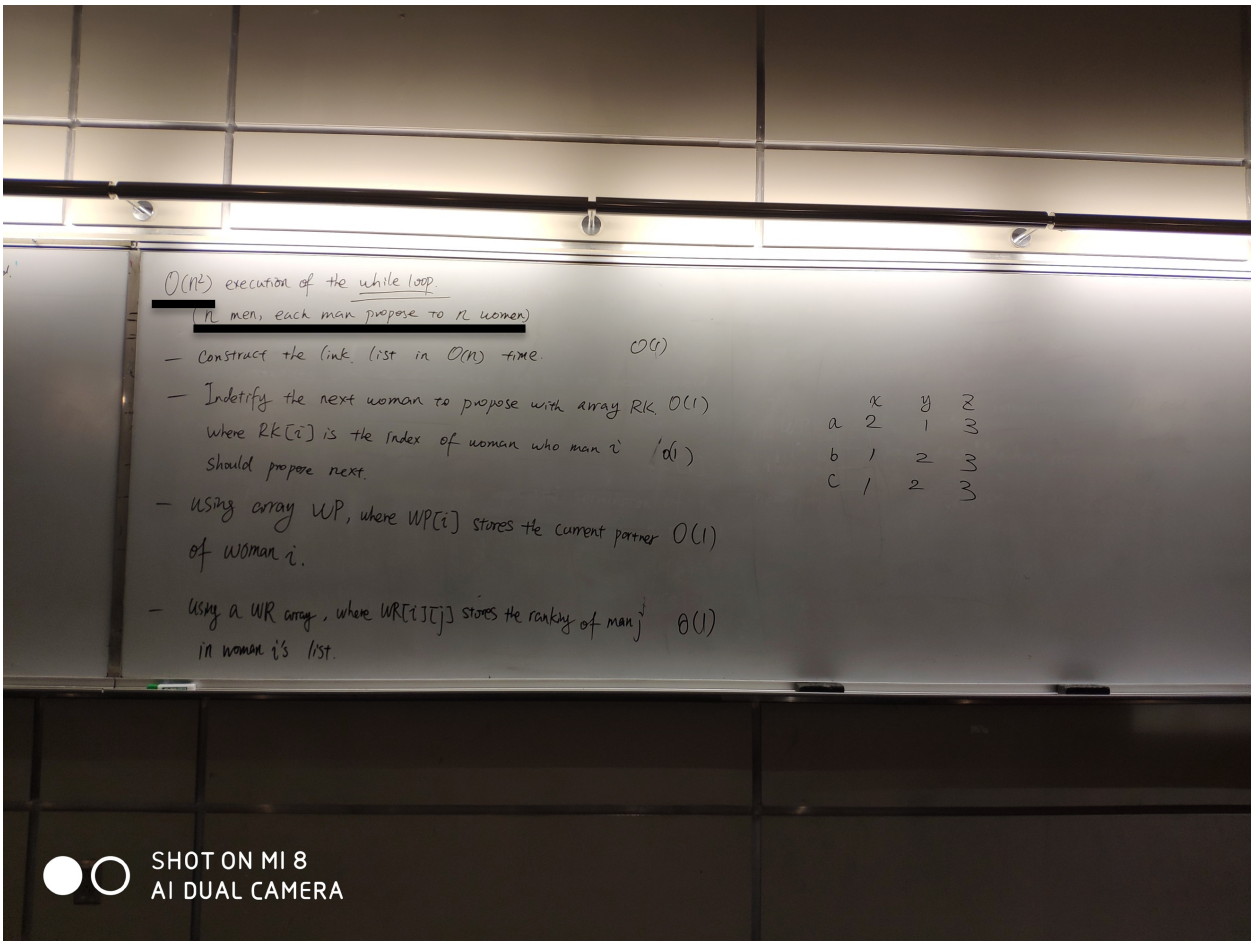

1: due on Mar 1st 11:59pm
2: follow the instruction !!!
* "Title of your email"
* program name (file name) "Stable-matching_[kUID].py"
* Input format
3 (num. of person)
1,2,3
2,1,3
3,2,1 (men's list)
1,2,3
2,3,1
1,3,2 (women's list)
1,2
2,3
3,1
* tie-breaking rule
SHOT ON MI 8
AI DUAL CAMERA


The G-S algorithm
Initialize each person to be free
while (some man is free and has not proposed to every woman) {
Choose such a man m.
w = 1st woman in m's list who m has not proposed to.
if (w is free): engage m and w;
* else if (w prefers m over her fiancé m'): engage m and w, free m',
else: w rejects m
}
A∩B (F)
A (T)
B (F)
Does the G-S algorithm terminate?
"When all men have proposed to all woman."
"O(n²)
Does every one got paired up? 每个人都配对啊
Observation: A woman only trades up, but never becomes free again.
Proof: by contradiction
* If we assume there is a man m who is unmatched upon termination, then there is also a woman who is free, let the woman be w.
SHOT ON MI 8
AI DUAL CAMERA


* Since w is free, she is never proposed to.
* m is free, so he has proposed to every woman.
* It contradicts with the fact that w has not been proposed.
* ... conclusion.
Proposition. there exists no unstable matching upon the termination of the algorithm.
Proof: by contradiction.
Assume an unstable matching exists. i.e. (m,w'), and let m paired with w (m,w) and let w' paired with m' (m',w')
(m, w)
(m', w')
* In the first case, m has proposed to w'
since woman only trades up. so w' likes her current partner m' better than m.
So there is no instability.
* In the second case. m has not proposed to w'
Since men propose in descending order.
It means m prefers w over w'
So there is no instability.
* ... Conclusion.
SHOT ON MI 8
AI DUAL CAMERA




O(n²) execution of the while loop.
(n men, each man propose to n women)
– Construct the link list in O(n) time. O(1)
– Indetify the next woman to propose with array Rk. O(1)
where Rk[i] is the index of woman who man i should propose next. O(1)
– using array WP, where WP[i] stores the current partner of woman i. O(1)
– Using a WR array, where WR[i][j] stores the ranking of man j in woman i's list. O(1)
x y z
a 2 1 3
b 1 2 3
c 1 2 3
SHOT ON MI 8
AI DUAL CAMERA