1. Stable matching

Stable matching - n jobs, n applicants, ranked list of preferences of jobs of applicants.

Def: Stable matching - a perfect matching w/ no rogue couples.

Thm: There exists a stable matching between jobs & applicants.

(Gale-Shapley algorithm)

Post. 1. Each applicant interviews at their favorite job.
2. If a job has multiple applicants, reject all but favorite.
3. Applicant gets rejected, leaves job off list.
4. Repeat 1-3 until every job has at most one applicant.

Day 1 - Shewas interviews at Facebook
Day 2 - Andrews also interviews at Facebook
(Crossed off Day 1), Facebook picks Andrews, rejects Shewas.

1. Procedure ends.
2. Everyone gets matched.
3. No rogue couples.

1. Everyone has a list of n jobs. Each time we reach to repeat 1-4, someone crosses a job off list. Jobs are never added.
2. There抯 no jobs on all lists.

\[ P \] for each job j and applicant a, if j is crossed off a抯 list, j prefers another applicant b to a, a j is his favorite job that抯 not crossed off.

2. Use contradiction, assume a didn抰 get matched, there must be a job j w/o no match & must be crossed off as list, and has an interested applicant by P, which is a contradiction.

3. Use contradiction, assume a, j are rogue.

Either j is crossed off a抯 list, or not.

Case 1

Case 2

2. Shewas, 1. Facebook
1. Andrews, 2. Microsoft
Day 1 - Shewas & Andrews interview at Facebook
Facebook rejects Shewas
Day 2 - Shewas interviews at Microsoft
Andrews interviews at Facebook

Case 1 - By P, j prefers another interested applicant to a, j a can抰 be rogue.

Case 2 - a prefers their job to j, a j can抰 be rogue.