

01. Stable matching

Both sides rank each other and goal is to pair each up **Constraints** No **rogue couples** - matched partner likes someone more than current partner that also likes them back

Gale-Shapley Algo

```
Initialize each person to be free.
while (some man is free and hasn't proposed to every woman) {
    Choose such a man m
    w = 1st woman on m's list to whom m has not yet proposed
    if (w is free)
        assign m and w to be engaged
    else if (w prefers m to her fiancé m')
        assign m and w to be engaged, and m' to be free
    else
        w rejects m
}
```

Invariant

- If woman not on boy list, she has a better current fav
- Boy choice is strictly worsening
- Girl choice cannot worsen (weakly increasing)