



Deferred Acceptance Algorithm 101



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(a.k.a. DAA, Stable Marriage problem)



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CDL Global - Leadership share
A lesson in team culture



Deferred Acceptance Algorithm 101

Alvin Roth and Lloyd Shapley

were awarded the **Nobel Memorial Prize** in Economic Science in 2012.
(proved in 1962)

Stable Marriage



1 to 1 Scenario

DAA can be used for

- 1 to many (site-ventures)
- Many to many (super session: mentors-ventures)
- 1 to 1



xkcd.com/770

Stable Marriage



1 to 1 Scenario

Given n men and n women, where each person has ranked all members of the opposite sex in order of preference, marry the men and women together such that there are no two people of opposite sex who would both rather have each other than their current partners.

When there are no such pairs of people, the set of marriages is deemed stable.

Friends



An example

- Suitors (e.g. Men)*
 - Ranked preference List
- Suited (e.g. Women)*
 - Ranked preference List

* Illustrative purposes only

Friends



An example

- **Suitors (e.g. Men)***
 - Ranked preference List
 - Suitors are Ross, Chandler, Joey.
 - Ross prefers Rachel, then Phoebe, then Monica.

- **Suited (e.g. Women)***
 - Ranked preference List



* Illustrative purposes only

Algorithm

1. Each unengaged man proposes to the woman he prefers most
2. Each woman says "maybe" to the suitor she most prefers and "no" to all other suitors
3. Continue while there are still unengaged men



ask()



accept()

Results



1. Chandler asks Rachel
2. Rachel accepts
3. Joey asks Phoebe
4. Phoebe accepts
5. Ross asks Rachel
6. Rachel accepts
7. Rachel dumps Chandler
8. Chandler asks Monica
9. Monica accepts

Everyone is matched.

Results



Is it stable?

Ross is paired with Rachel (1)

Chandler is paired with Monica (2)

Joey is paired with Phoebe (1)

Rachel is paired with Ross (2)

Phoebe is paired with Joey (3)

Monica is paired with Chandler (2)

Therefore, the matching is stable.

What if women choose 1st?



What if women choose 1st?



Scenario 1

Ross is paired with Rachel (1)

Chandler is paired with Monica (2)

Joey is paired with Phoebe (1)

Rachel is paired with Ross (2)

Phoebe is paired with Joey (3)

Monica is paired with Chandler (2)

Scenario 2

Rachel is paired with Joey (1)

Phoebe is paired with Ross (1)

Monica is paired with Chandler (2)

Ross is paired with Phoebe (2)

Chandler is paired with Monica (2)

Joey is paired with Rachel (2)

Moral of the story

If you want something. Go Get it.

"If you are not willing to risk the unusual,
you will have to settle for the ordinary."