Lecture 4

CSE 331

Sep 4, 2019

Please do keep on asking Qs!

The only bad question is the one that is not asked!

Not just technical Qs but also on how the class is run

We’re not mind readers

If you need it, ask for help

Read the syllabus CAREFULLY!

No graded material will be handed back till you pass the syllabus quiz!

Separate Proof idea/proof details

TA office hours finalized

note

stop following | 112 views

TA office hours finalized

The TA office hours are finalized:

http://www-student.cse.buffalo.edu/~atri/cse331/fall19/policies/syllabus.html

You can also see the office hours in the course calendar (which in case you did not notice) is on the 331 landing page (http://www-student.cse.buffalo.edu/~atri/cse331/fall19/index.html)

The OH will start from Tuesday.

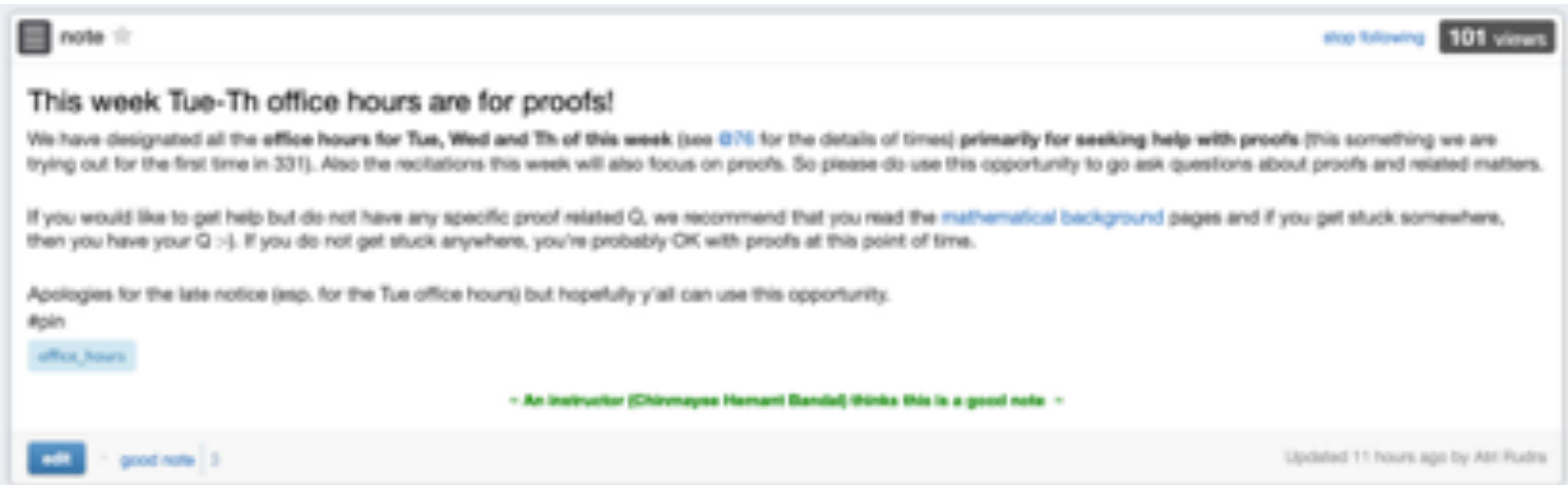
The 1on1 appointments have not been setup yet. We'll post again once those are ready for bookings.

office_hours

edit · good note | 0

Updated 6 hours ago by Atri Rudra

Office hours for proofs



note

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This week Tue-Th office hours are for proofs!

We have designated all the **office hours for Tue, Wed and Th of this week** (see @76 for the details of times) **primarily for seeking help with proofs** (this something we are trying out for the first time in 331). Also the recitations this week will also focus on proofs. So please do use this opportunity to go ask questions about proofs and related matters.

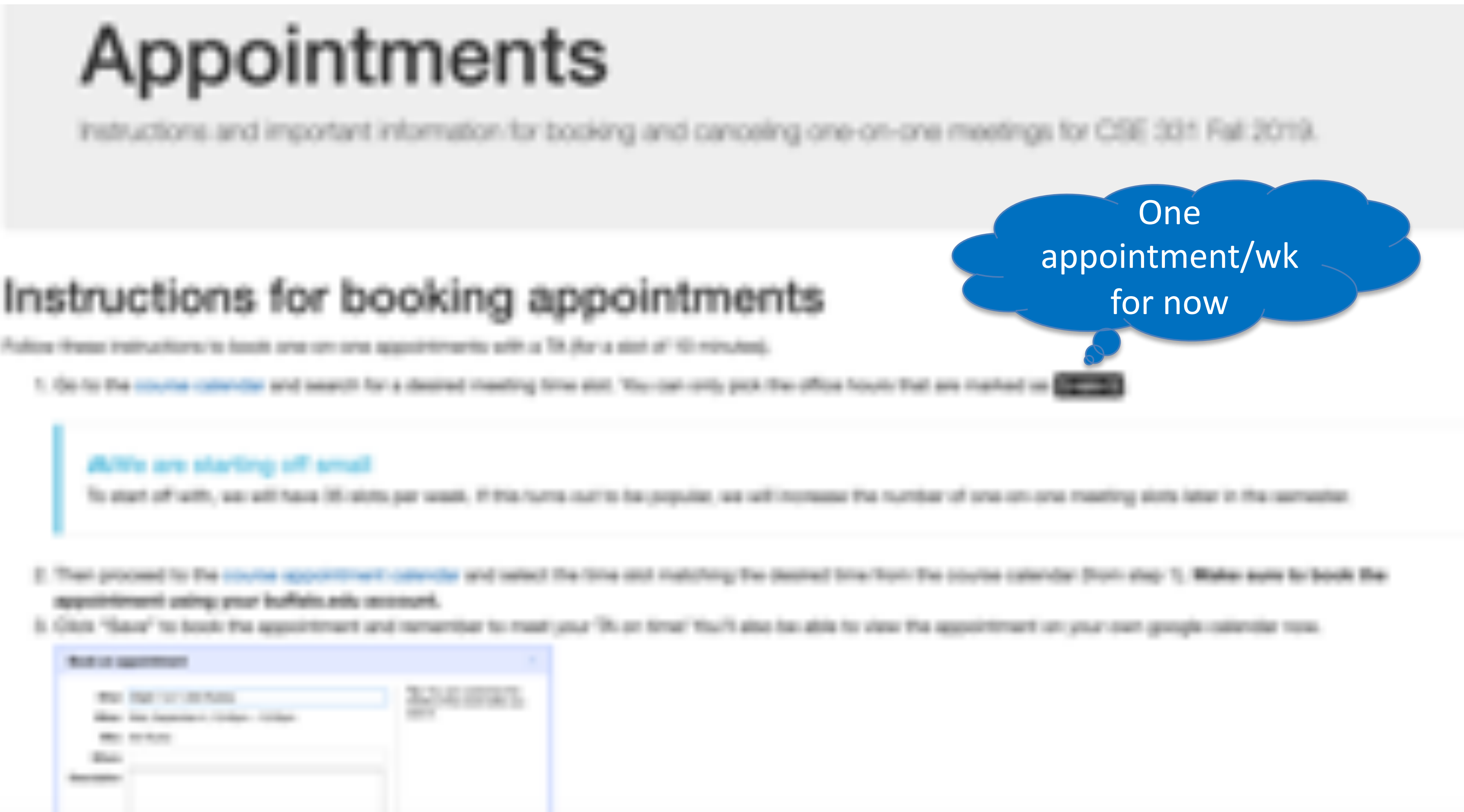
If you would like to get help but do not have any specific proof related Q, we recommend that you read the mathematical background pages and if you get stuck somewhere, then you have your Q :-). If you do not get stuck anywhere, you're probably OK with proofs at this point of time.

Apologies for the late notice (esp. for the Tue office hours) but hopefully y'all can use this opportunity.
#pin

office_hours

edit | good note | 3

1-on-1 appointments


Appointments

Instructions and important information for booking and canceling one-on-one meetings for CSE 331 Fall 2019.

Instructions for booking appointments

One appointment/wk for now

Makeup recitations

~~TODAY, 12-12:50pm in Davis 113A~~

TOMORROW, 11-11:50am in Davis 113A

Sign-up for mini projects

Deadline: Monday, Sep 23, 11:00am

Questions/Comments?

Peer notetaker request


Peer notetaker request

Hi all,

Thanks!

Incorrect Proof Details: Q1(b) on HW0

Argument does not use ANYTHING about the problem statement!

Follows from part (a)

…of perfect matchings with n men and n wo…n

This assumes number of perfect matchings only depends on n

Base case: $P(1) = 1! = 1$

Inductive hypothesis: Assume that $P(n-1) = (n-1)!$

Inductive step: Note that $P(n) = n*P(n-1) = n*(n-1)! = n!$

What are the issues with the above “proof”?

Incorrect Proof Details: Q1(b) on HW0

Needs justification

Claim 1: Number of perfect matchings is = number of permutations of 1…n

Claim 2: Number of permutations of 1…n is n!

Needs justification

Follow from 191 (?)

Claims 1 + 2 prove the result

What are the issues with the above proof?

Proof by contradiction for Q1(a)

Assume for contradiction there is an example where number of perfect matchings depends on the identities of the men and women.

You can only assume things about the example directly implied by it being a counter-example

Let $n = 1$ and consider two cases

(1) M = {BP} and W = {JA}

(2) M = {BBT} and W = {AJ}

In both cases the number of perfect matchings is $1 = 1!$

Hence contradiction.

There is NO contradiction

What are the issues with the above proof?

Questions/Comments?

On matchings

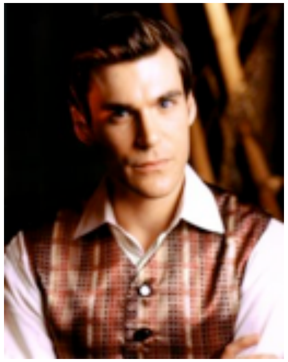
Mal

Inara

Wash

Zoe

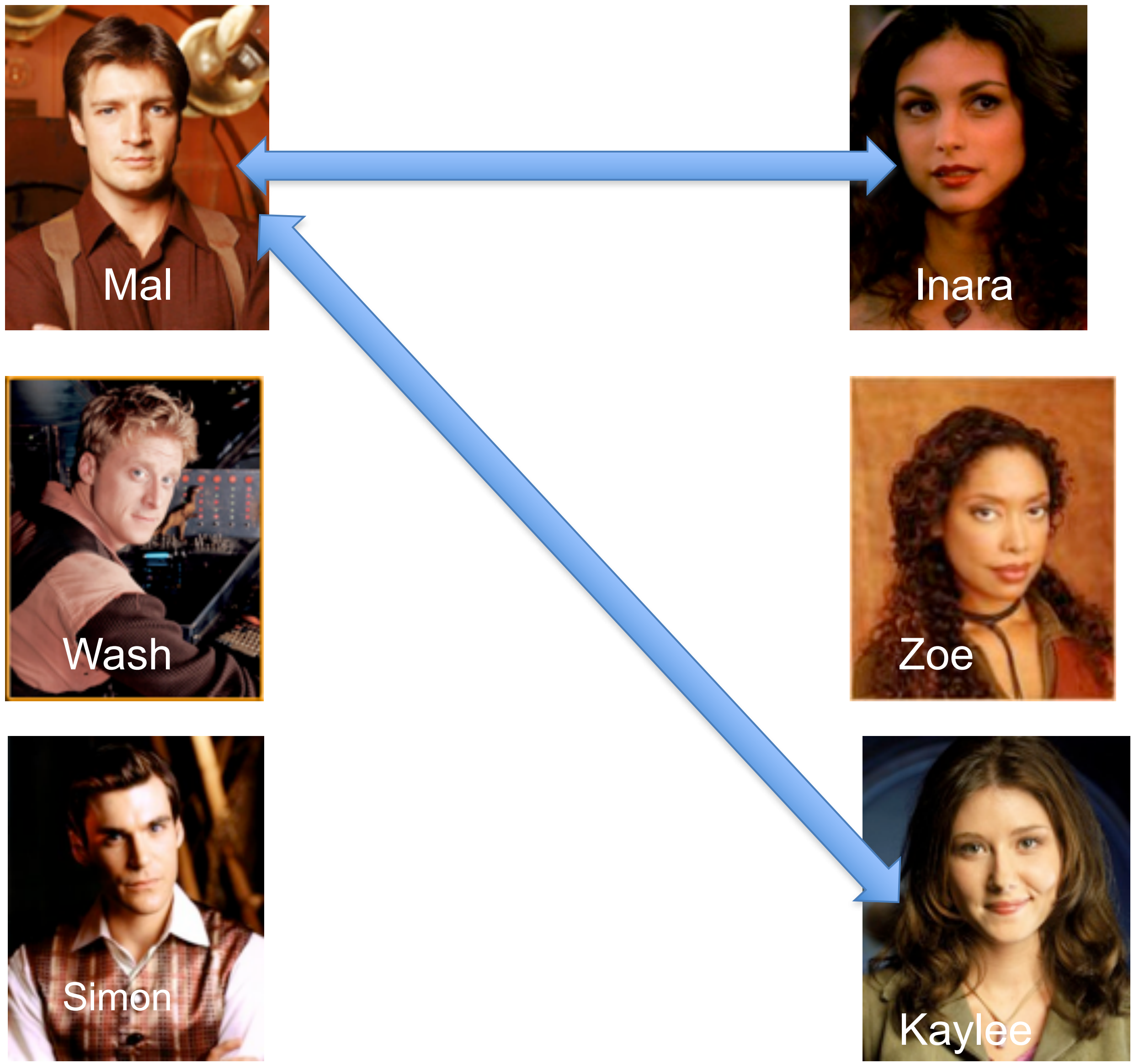
Simon



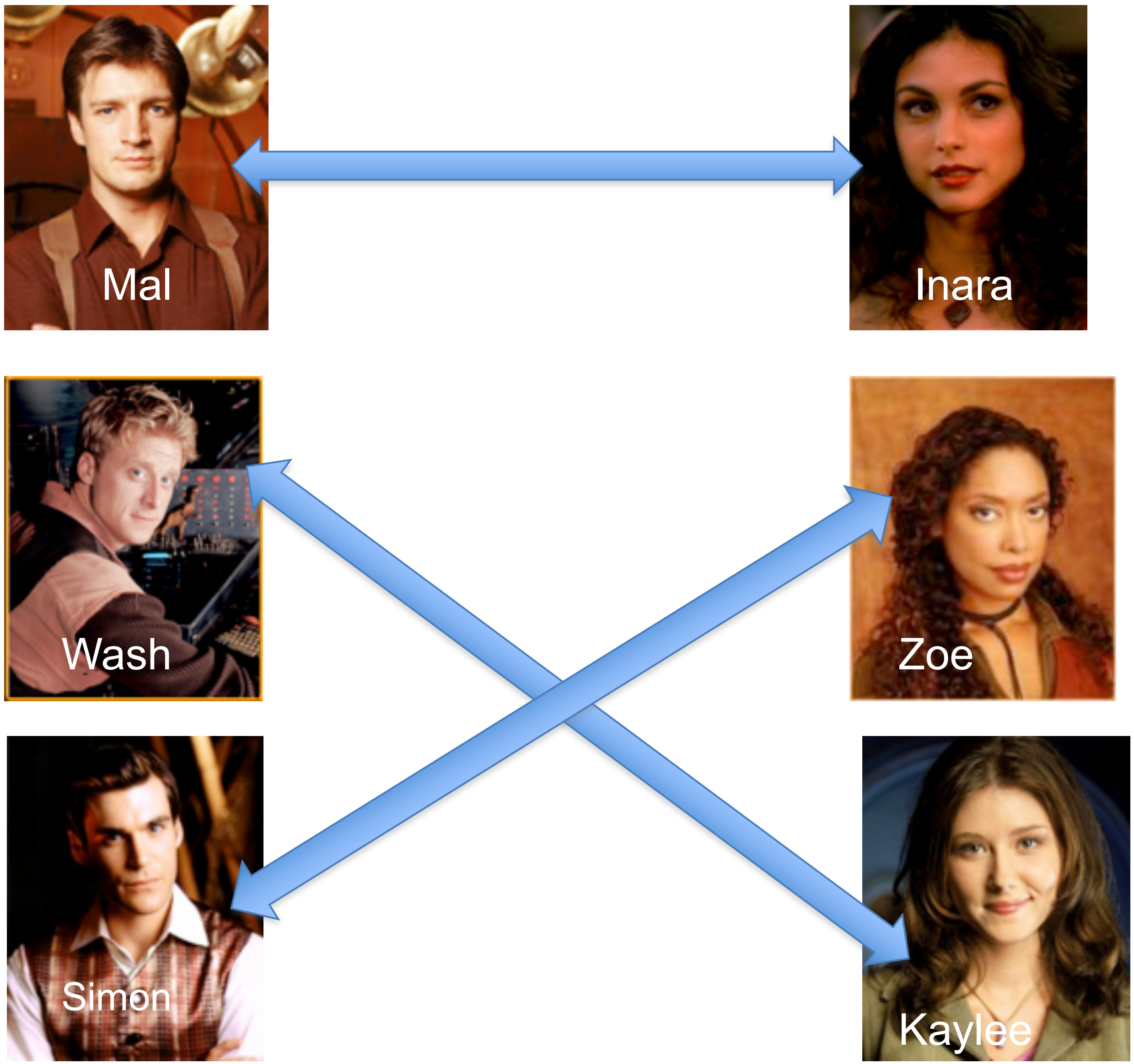
Kaylee

A valid matching

Not a matching

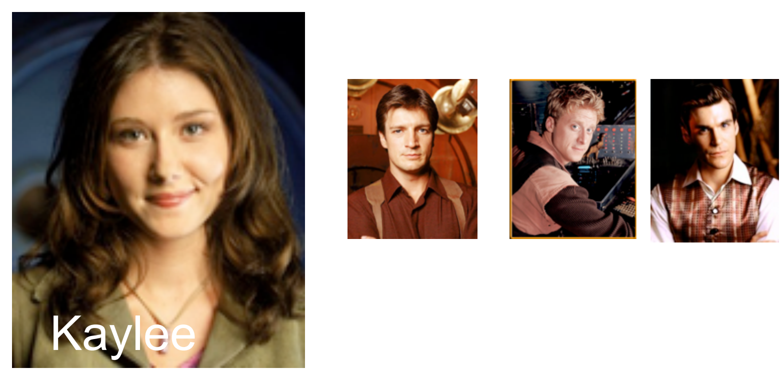


Perfect Matching

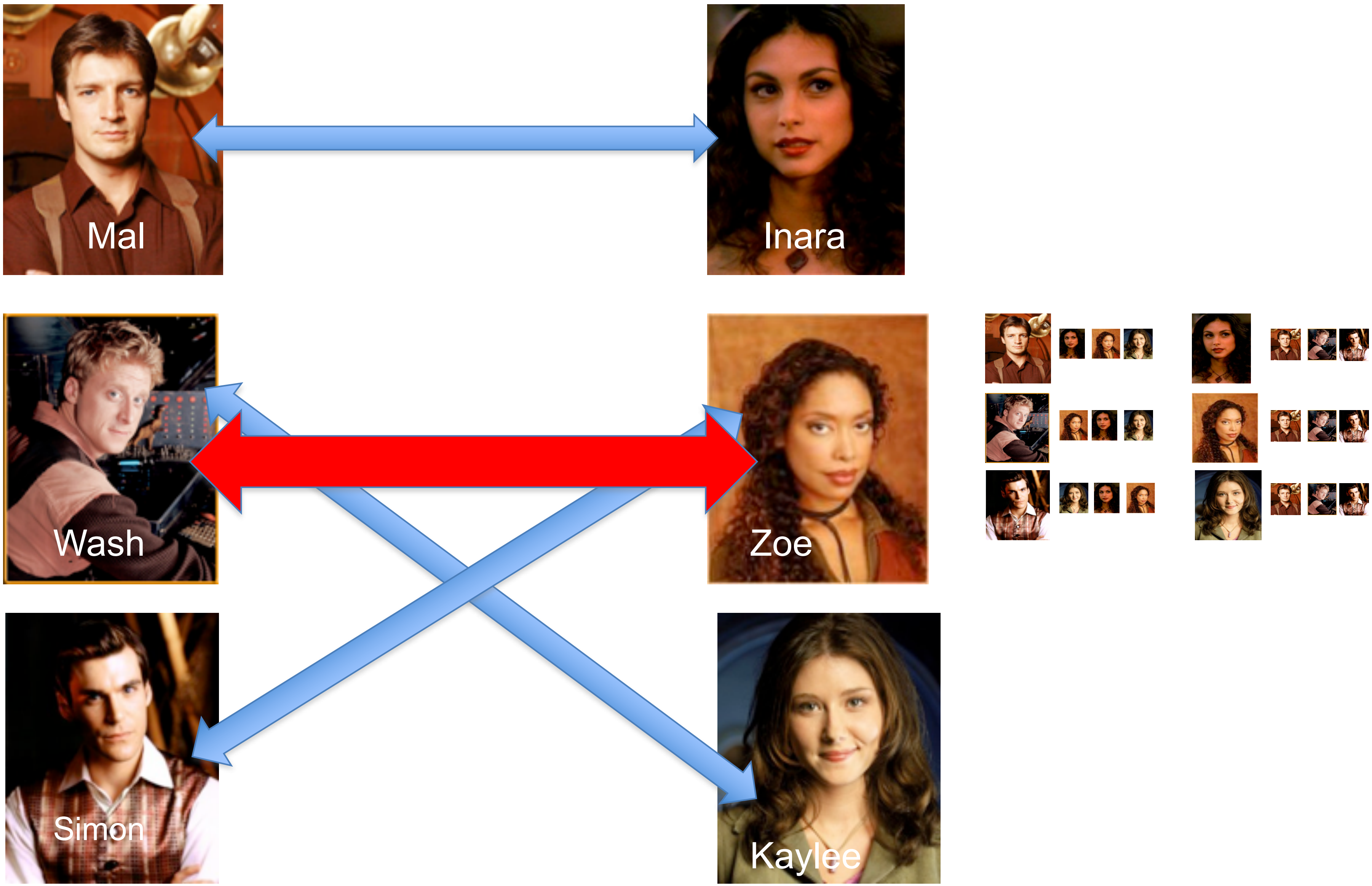


Back to couple more definitions

Preferences

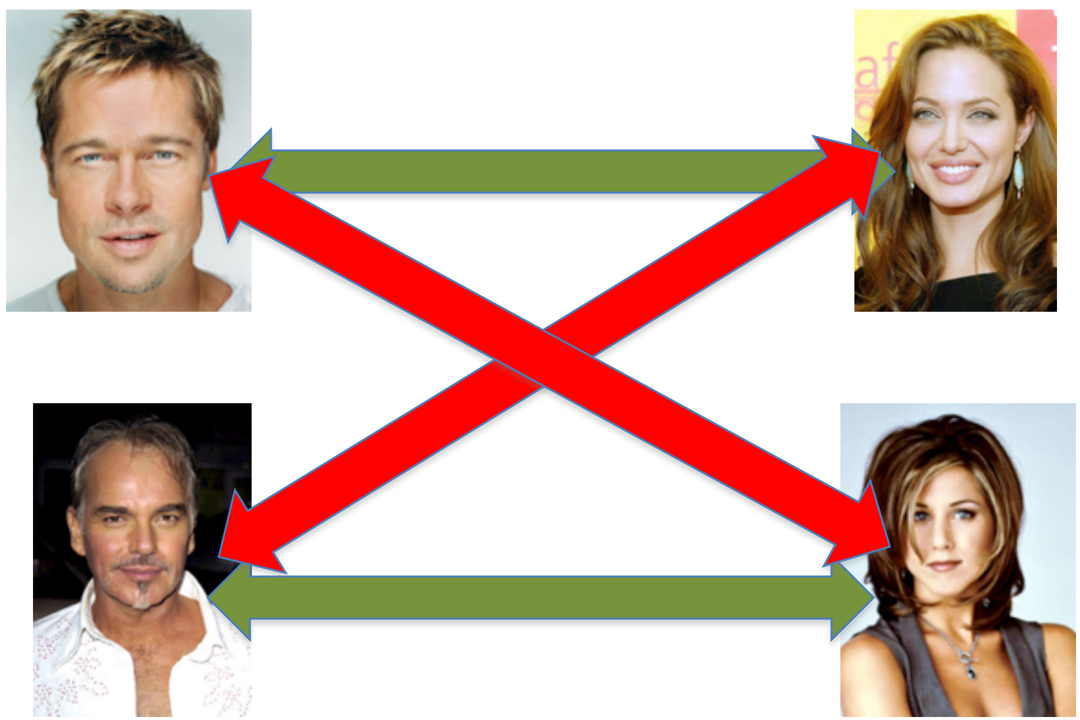


Instability

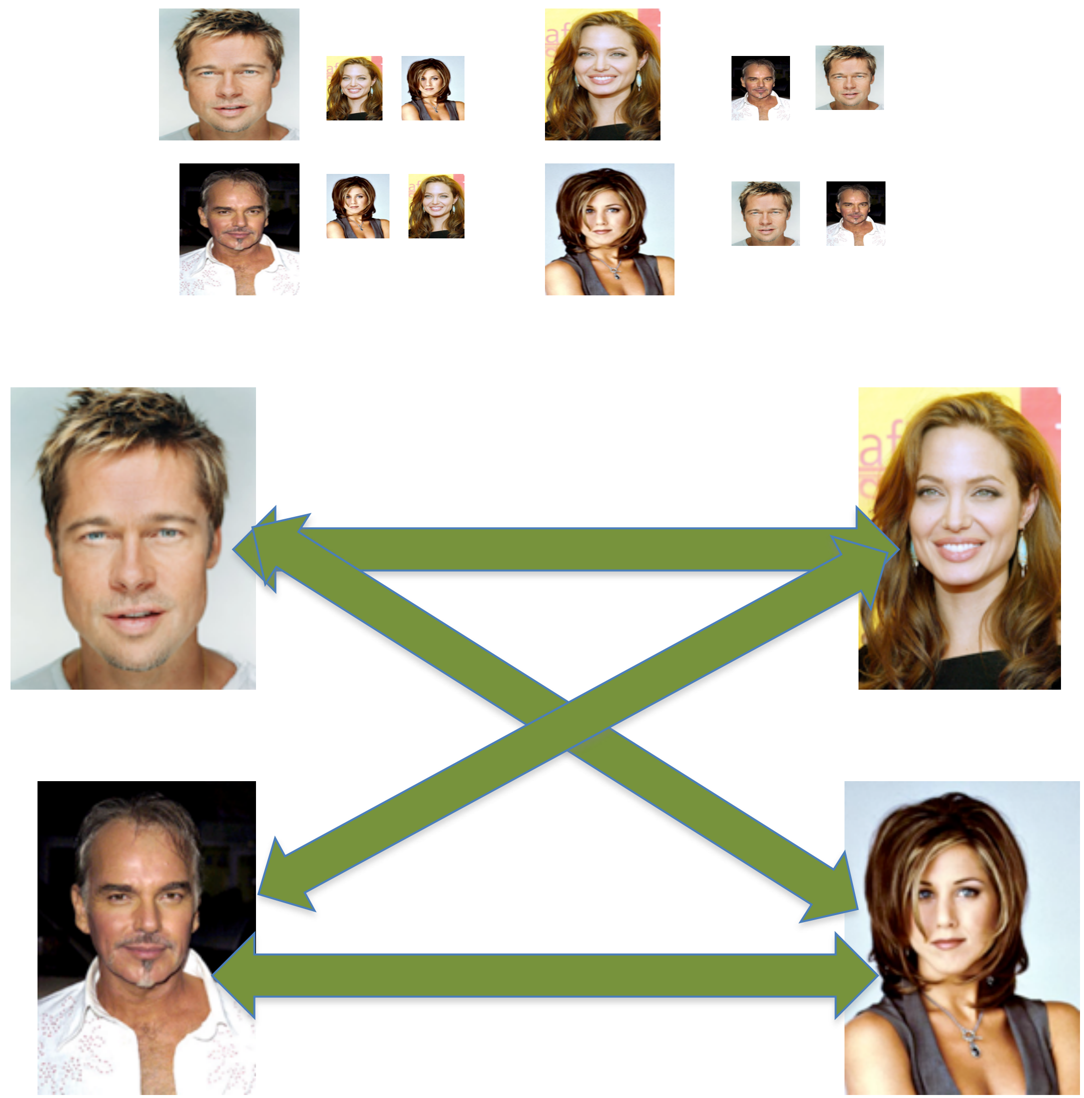


A stable marriage

Even though BBT and JA are not very happy



Two stable marriages



Stable Marriage problem

Set of men M and women W

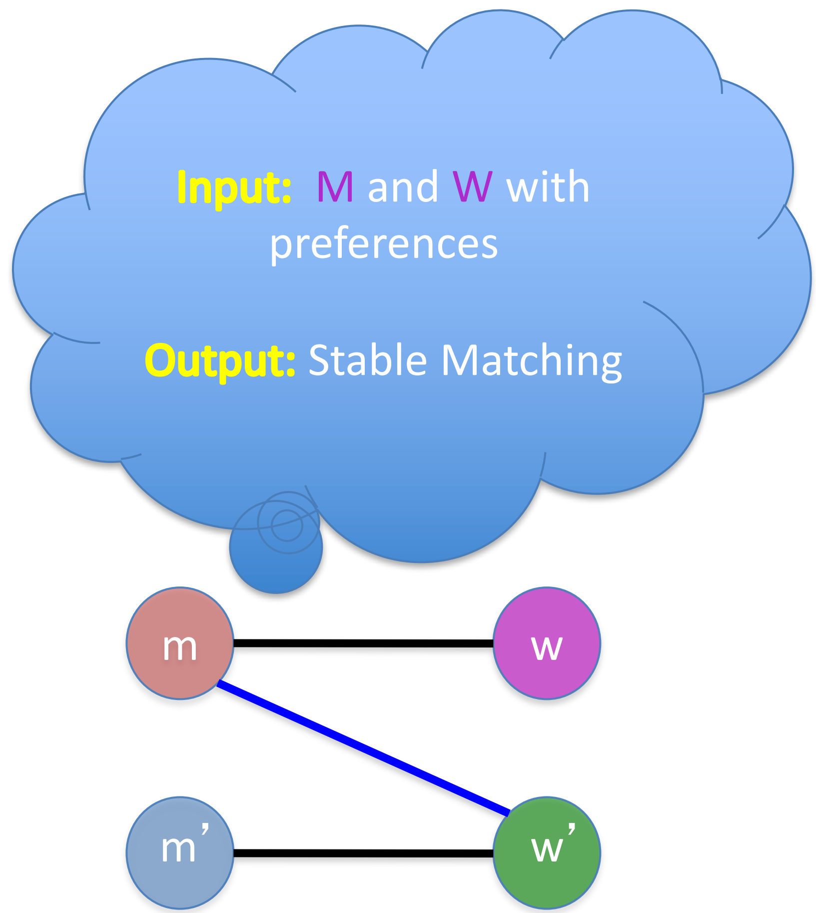
Preferences (ranking of potential spouses)

Matching (no polyandry/gamy in M X W)

Perfect Matching (everyone gets married)

Instablity

Stable matching = perfect matching+ no instablity



Questions/Comments?

Two Questions

Does a stable marriage always exist?

If one exists, how quickly can we compute one?

Today’s lecture

Naïve algorithm

Gale-Shapley algorithm for Stable Marriage problem

Discuss: Naïve algorithm!

The naïve algorithm

Incremental algorithm to produce all n! prefect matchings?

Go through all possible perfect matchings S

If S is a stable matching

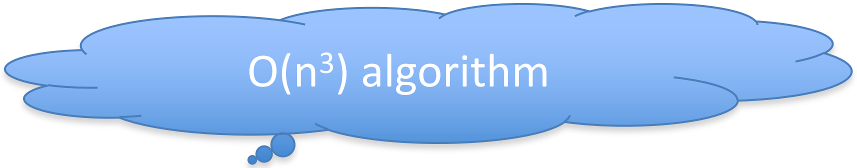
then Stop

Else move to the next perfect matching

Gale-Shapley Algorithm

David Gale

Lloyd Shapley



Moral of the story…

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Questions/Comments?