

CSE 312 Section 1

Combinatorics

Administrivia & Introductions



Announcements & Reminders

- Section Materials
 - Handouts will be provided in at each section
 - Worksheets and sample solutions will be available on the course calendar later this evening
- Office Hours
 - We start holding office hours today!
 - Times posted on the calendar on the course website
- HW1
 - Due Wednesday 4/3 @ 11:59pm

Homework

- Submissions
 - LaTeX (highly encouraged)
 - overleaf.com
 - template and LaTeX guide posted on course website!
 - Word Editor that supports mathematical equations
 - Handwritten neatly and scanned
- Homework will typically be due on Wednesdays at 11:59pm on Gradescope
- Each assignment can be submitted a max of 72 hours late
- You have **8 late days total** to use throughout the quarter
 - Anything beyond that will result in a 15% deduction per day

Icebreaker

- Small groups of 4-6ish
- Please share with your group
 - Your name
 - Number of years in department/ at UW
 - What was something fun you did over Spring break?
 - What are you concerned about for 312 / what are you excited about?
- Then, share how you like to eat your potatoes (baked, fried, chips, etc)
- We'll go around and see what style of potato is most popular!



Review

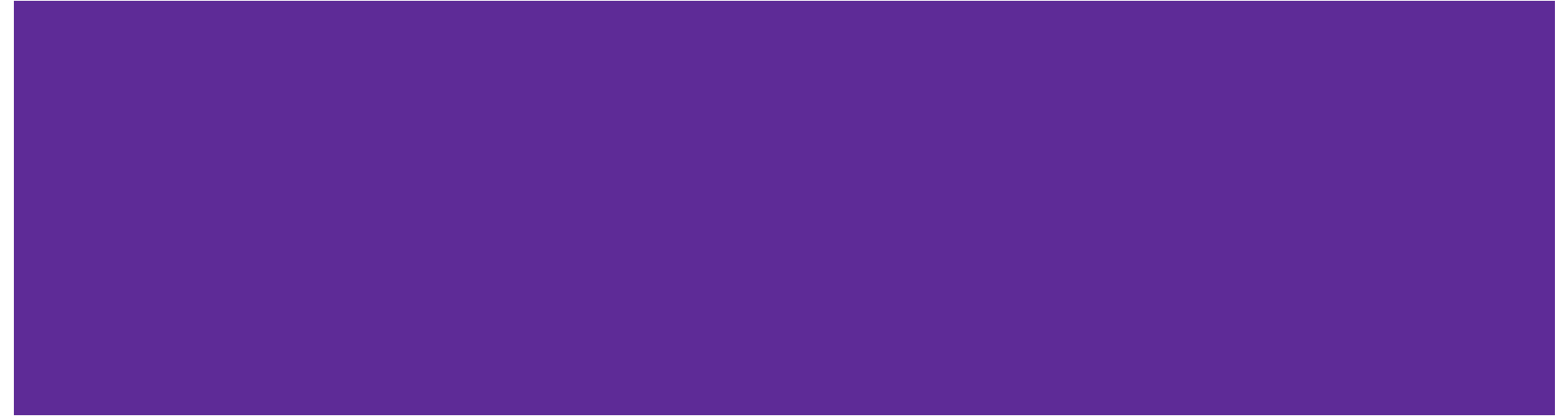


Any lingering questions from this last week?

Each week in section, we'll be reviewing the main concepts from this week by going through some practice problems together. But before that, we'll try to start off each section with some time for you to ask questions.

Was anything particularly confusing this week? Is there anything we can clarify before we dive into the review? This is your chance to clear things up!

Problem 1 - Seating



1 – Seating

How many ways are there to seat 10 people, consisting of 5 couples, in a row of 10 seats if ...

- a) ... all couples are to get adjacent seats?
- b) ... anyone can sit anywhere, except that one couple insists on not sitting in adjacent seats?

Work on this problem with the people around you, and then we'll go over it together!

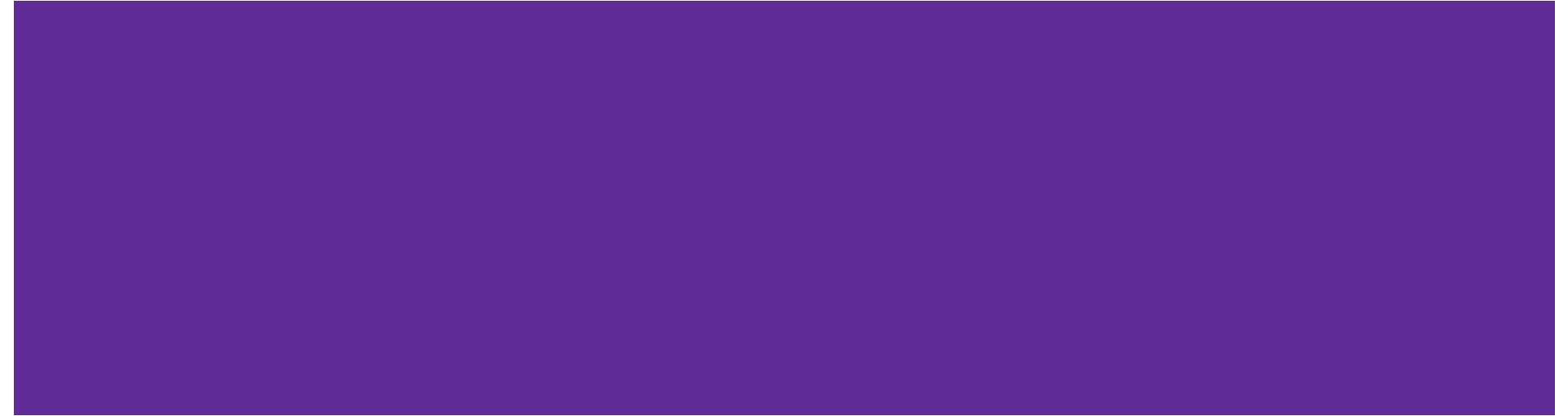
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- b) How many ways are there to seat 10 people, consisting of 5 couples, in a row of 10 seats if anyone can sit anywhere, except that one couple insists on not sitting in adjacent seats?

Problem 5 – Birthday Cake



5 – Birthday Cake

A chef is preparing desserts for the week, starting on a Sunday. On each day, only one of five desserts (apple pie, cherry pie, strawberry pie, pineapple pie, and cake) may be served. On Thursday there is a birthday, so cake must be served that day. On no two consecutive days can the chef serve the same dessert. How many dessert menus are there for the week?

Work on this problem with the people around you, and then we'll go over it together!

5 – Birthday Cake

A chef is preparing desserts for the week, starting on a Sunday. On each day, only one of five desserts (apple pie, cherry pie, strawberry pie, pineapple pie, and cake) may be served. On Thursday there is a birthday, so cake must be served that day. On no two consecutive days can the chef serve the same dessert. How many dessert menus are there for the week?

Problem 10 – Extended Family Portrait



10 – Extended Family Portrait

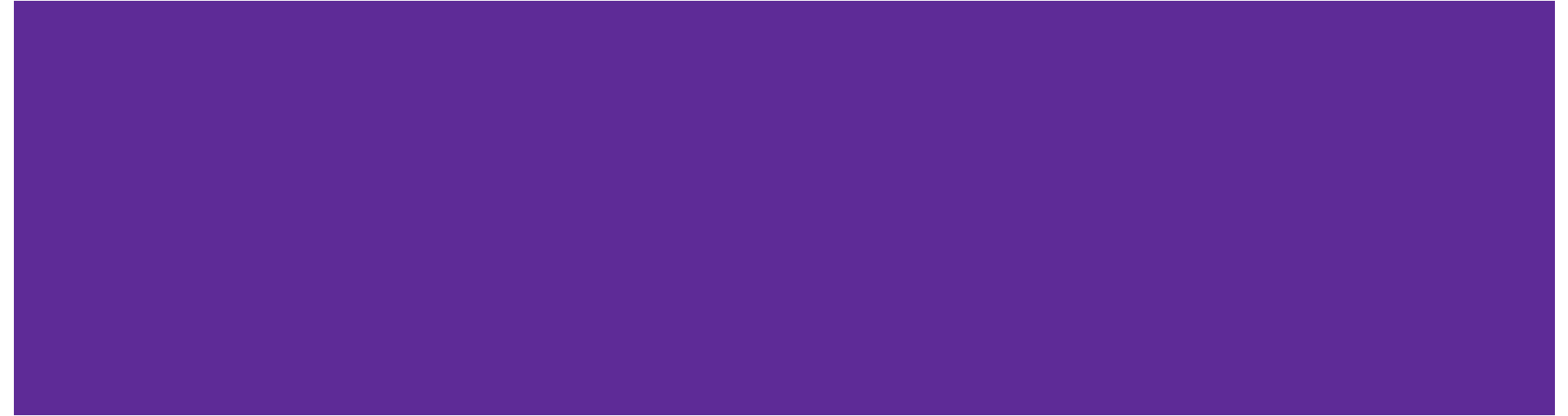
A group of n families, each with m members, are to be lined up for a photograph. In how many ways can the nm people be arranged if members of a family must stay together?

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A group of n families, each with m members, are to be lined up for a photograph. In how many ways can the nm people be arranged if members of a family must stay together?

Problem 9 – Rabbits!



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Rabbits Peter and Pauline have three offspring: Flopsie, Mopsie, and Cotton-tail. These five rabbits are to be distributed to four different pet stores so that no store gets both a parent and a child. It is not required that every store gets a rabbit. In how many different ways can this be done?

Work on this problem with the people around you, and then we'll go over it together!

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Problem 4 – Escape the Professor



4 – Escape the Professor

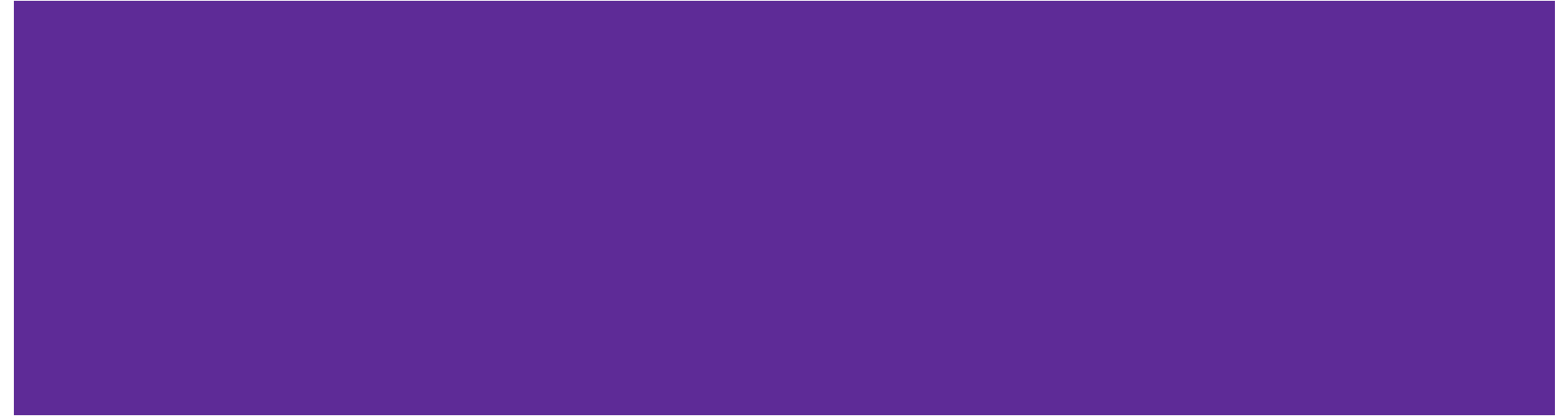
There are 6 security professors and 7 theory professors taking part in an escape room. If 4 security professors and 4 theory professors are chosen and paired off, how many pairings are possible?

Work on this problem with the people around you, and then we'll go over it together!

4 – Escape the Professor

There are 6 security professors and 7 theory professors taking part in an escape room. If 4 security professors and 4 theory professors are chosen and paired off, how many pairings are possible?

Problem 11 - Subsubset



11 – Subsubset

Let $[n] = \{1, 2, \dots, n\}$ denote the first n natural numbers. How many (ordered) pairs of subsets (A, B) are there such that $A \subseteq B \subseteq [n]$?

Work on this problem with the people around you, and then we'll go over it together!

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That's All, Folks!

Thanks for coming to section this week!
Any questions?