CS1800
Fall 2025
Recitation 6 - Practice Questions for Homework 4
October 15 & 16, 2025

Recitations

CS1802 Recitations are dedicated time set aside to work on practice problems that specifically prepare you for the current homework or upcoming quiz.

Recitations are in-person and attendance is expected.

The solutions are published at the same time as the problems, so you can check your work. There is no need to submit anything.

Approaching the Problems

These practice problems are labelled according to which Homework or Quiz topic they will help you prepare for. You do not need to complete every practice question; we encourage you to do at least one per topic, and to prioritize the topics you would like to practice.

Instructors & Teaching Assistants

Your recitation is led by a Khoury College professor, assisted by a knowledgeable and wonderful Teaching Assistant. Professors and TAs are fantastic resources, and you have the opportunity in recitation to work with them in a smaller group -- I strongly recommend you take advantage of the time to review your solutions to these practice problems, ask for help on the homework, or review material from lecture.

Practice Problems for Counting (Focus on Permutations, Combinations) (HW4, Q1)

A There are 100 people in your graduating class, and the Class Clown, Best Dressed, and Nicest Human are given out. How many ways are there to select these winners, assuming a person cannot win more than one honor?

B Now your graduation committee has decided it's OK for someone to win more than one honor. How many ways are there now?

C You can order a meal-deal at Veggie Galaxy with a vegan sandwich, fries, and a drink. There are three options for the sandwich, three for the fries, and three for the drink.

How many different orders can be created?

A *bit string* is a sequence of 0s and 1s that is treated as string/word rather than a numerical value (e.g., **001** is not the same as **01**).

D How many bit strings exist of length 8?

E How many bit strings of length 10 start AND end with 0?

F How many bit strings of length 10 start OR end with 0, but not both?

G How many bit strings of length 10 have exactly one 1?

H How many bit strings of length 10 have at most one 1?

Practice Problems for Counting (Focus on Stars and Bars) (HW4, Question 2)

A How many ways are there to select 5 bills from a cash box containing $1 bills, $2 bills, $5 bills, $10 bills, $20 bills, $50 bills, and $100 bills? Assume that the order in which the bills are chosen does not matter, bills of the same denomination are indistinguishable, and there are at least 5 of each type.

B Rush and Laney are flipping a fair coin, and Rush has called Heads -- each time it comes up Heads, Rush gets a point, and each time it comes up Tails Laney gets a point. They flip the coin 10 times.

We consider an "outcome" the number of points each person has at the end of 10 flips; order doesn't matter. How many possible outcomes are there?

C How many ways are there to distribute 7 identical Cooper photos among 5 students so that no student receives more than 5 photos?

D We have 15 snickers bars. How many ways can we distribute them to 4 kids, if we insist that every kid gets at least one snickers?

Practice Problems for Counting (Focus on: Permutations, Combinations, Overcounting) (HW4, Question 3)

A How many ways to permute the letters in *LANEY?*

B How many ways to permute the letters in *LENNY?*

C Laney is waiting for the northbound Redline at JFK station. Both Ashmont and Braintree trains come through, at unpredictable intervals. If Laney takes 10 trips where 6 are Ashmont and 4 are Briantree, how many ways can we order the trips as a sequence of Ashmont (A) and Braintree (B) trains? For example, AABBAAABAB is one possibility.

D How many ways are there to split 10 basketball players into two teams?

Practice Problems for Counting (General) (HW4, Question 4)

A Lucy, Sally, Charlie Brown, and Linus are standing in a line to take a picture. In how many ways can they be arranged?

B How many ways to arrange this same group if Linus always wants to be in the leftmost position?

C How many ways to arrange this same group if the leftmost position must always be occupied by someone whose name starts with “L”?

D How many ways to arrange this same group if there always needs to be an “L” person on the leftmost side OR the rightmost side (or both)?

E How many ways to arrange this same group if there always needs to be an “L” person on the leftmost side OR the rightmost side (but not both)?

Practice Problems for Counting (Focus on: Counting Cards) (HW4, Question 5)

A Suppose I roll two fair six-sided dice. In how many ways can I roll a 4 and 5? For this question, it doesn't matter which die has the 4 and which has the 5.

B Suppose I roll two fair six-sided dice, one after the other. In how many ways can I roll a 4 and then a 5?

C Suppose I roll two fair six-sided dice. In how many ways can I roll two numbers whose product is 6?

D Recall that there are 52 playing cards in a standard deck. Every card has one suit (clubs, diamonds, hearts, or spades) and one value (2, 3, ..., 10, Jack, Queen, King, Ace). When you are dealt a hand of cards, you can rearrange them to your liking; so *in general* for these questions order doesn't matter.

How many 5-card hands exist?

E How many 5-card hands exist that contain no Aces?

F In Poker, a *flush* is a hand consisting of five cards of the same suit, regardless of value (ex: 10♥, 4♥, 6♥, *J*♥, 7♥). How many hands constitute a flush in a standard 5-card draw of poker?

(For those familiar with poker, your answer here should include straight flushes and royal flushes. If those terms aren't familiar to you, just stick with the description above and count all possible flushes!)