CS 230 : Discrete Computational Structures
Spring Semester, 2021
HOMEWORK ASSIGNMENT #9
Due Date: Monday, Apr 19

Suggested Reading: Rosen Sections 6.1 - 6.3.

For the problems below, explain your answers and show your reasoning.

1. [**4 Pts**] An ISU Computer Science shirt is sold in 6 colors, 5 sizes, striped or solid, and long sleeve or short sleeve. (a) How many different shirts are being sold? (b) What if the black and yellow shirts only come in short-sleeve and solid?

2. [**6 Pts**] How many integers between 10000 and 99999, inclusive, are divisible by 3 or 5 or 7?

3. [**10 Pts**] Let A and B be sets of 7 elements and 10 elements, respectively. (a) How many different functions possible from A to B? from B to A? (b) How many different relations possible from A to B? (c) How many of the functions from A to B are one-to-one? (d) How many of the functions from B to A are onto?

4. [**6 Pts**] In how many ways can a photographer arrange 7 people in a row from a family of 10 people, if (a) Mom and Dad are in the photo, (b) Mom and Dad are next to each other in the photo, (c) either Mom or Dad is in the photo, not both.

5. [**6 Pts**] A sack contains 40 movie tickets, 5 for each of 8 different movies. Five friends want to go to a movie. How many tickets would you have to remove from the sack to guarantee that everyone will be able to watch the same movie? What principle did you use? What if everyone wants to go to 'Godzilla vs Kong'? How many tickets would you have to remove from the sack in that case?

6. [**6 Pts**] How many bit strings of length 7 contain (a) exactly three 1s? (b) at most three 1's? (c) at least three 1's?

7. [**6 Pts**] A coin is flipped nine times where each flip comes up either head or tails. How many possible outcomes contain at least five heads? Can you come up with two different ways to do this problem? How about three?

8. [**6 Pts**] 10 women and 8 men are on the faculty. How many ways are there to pick a committee of 6 if (a) Claire and Jane will not serve together, (b) at least one woman must be chosen, (c) at least one man and one woman must be chosen. Are there multiple ways to solve these problems? Explain.

For more practice, work on the problems from Rosen Sections 6.1 - 6.3.