

CSE 312: Foundations of Computing II

QuickCheck: Permutations and Combinations Solutions (due Thursday, September 28)

0. Sad sugar

You bought four **different** candies for your four kids. You decided that you will give one candy to each kid.

- (a) In how many different ways can you distribute the candies?

Solution:

Choose a candy for a kid, repeat for times. Each time the number of candies available decreases by one.

$$\binom{4}{1} \binom{3}{1} \binom{2}{1} \binom{1}{1}$$

- (b) On the way home, you get bit by a magical spider, and you become evil. Now, you have no problem with a child getting more than one candy or a child getting no candy. However, you make sure that **each candy goes to some child**. In how many different ways can you distribute the candies?

Solution:

Each candy has four possible options,

$$4^4$$

- (c) After distributing the original candy, you buy 8 more **different** candies. Because you are still evil, your favorite child is Sharpnel. You have decided to give Sharpnel 5 candies, and one candy to each of the remaining three. In how many different ways can you distribute the candies?

Solution:

Choose five out of eight candies for Sharpnel, then choose one candy for each of the remaining kids.

$$\binom{8}{5} \binom{3}{1} \binom{2}{1} \binom{1}{1}$$

Another alternative: choose one candy for each kid other than Sharpnel, then choose five out of five for Sharpnel.

$$\binom{8}{1} \binom{7}{1} \binom{6}{1} \binom{5}{5}$$