We are going to solve some problems together in class - nothing to submit :)

**Problem 1: stars and bars**

As a warm-up, try to count the number of ways you can distribute the four candies I have given each group to three group members. Assume the candies are identical and each of the three group members can have 0, 1, 2, 3 or 4 candies. Also assume that all four candies must be given away.

Now, let’s extend the candy distribution problem. In how many ways can 100 identical candies be distributed to 20 students? Assume that every student must get at least one candy and all 100 candies must be given away.

*Hint: first give every student a candy and then think about how many non-negative integer solutions there are to the equation \( x_1 + x_2 + \cdots + x_{20} = 80 \) (solving for the 20 \( x_i \)'s). Extra hint: see this section in Levin’s DMOI.*

**Problem 2**

(a) How many 5-card hands have a single pair and no 3-of-a-kind or 4-of-a-kind?

(b) In how many ways can you arrange 6 red balls, 5 green balls, 3 blue balls, 1 white ball and 1 black ball in a row? Assume the balls are identical other than color.

(c) How many bit strings of lengths 10 have (i) exactly three 0s? (ii) at least seven 1s? (iii) exactly three 0s or start with a 1?