

Section 2.7: Solving Counting Problems

Remember:

Permutation

└─→ order matters (selection of objects)

Examples:

- password or code
- selecting a group to be president, vice-president, treasurer
- awarding medals to 1st place, 2nd place, 3rd place

Combination

└─→ order does not matter (selection of objects)

Examples:

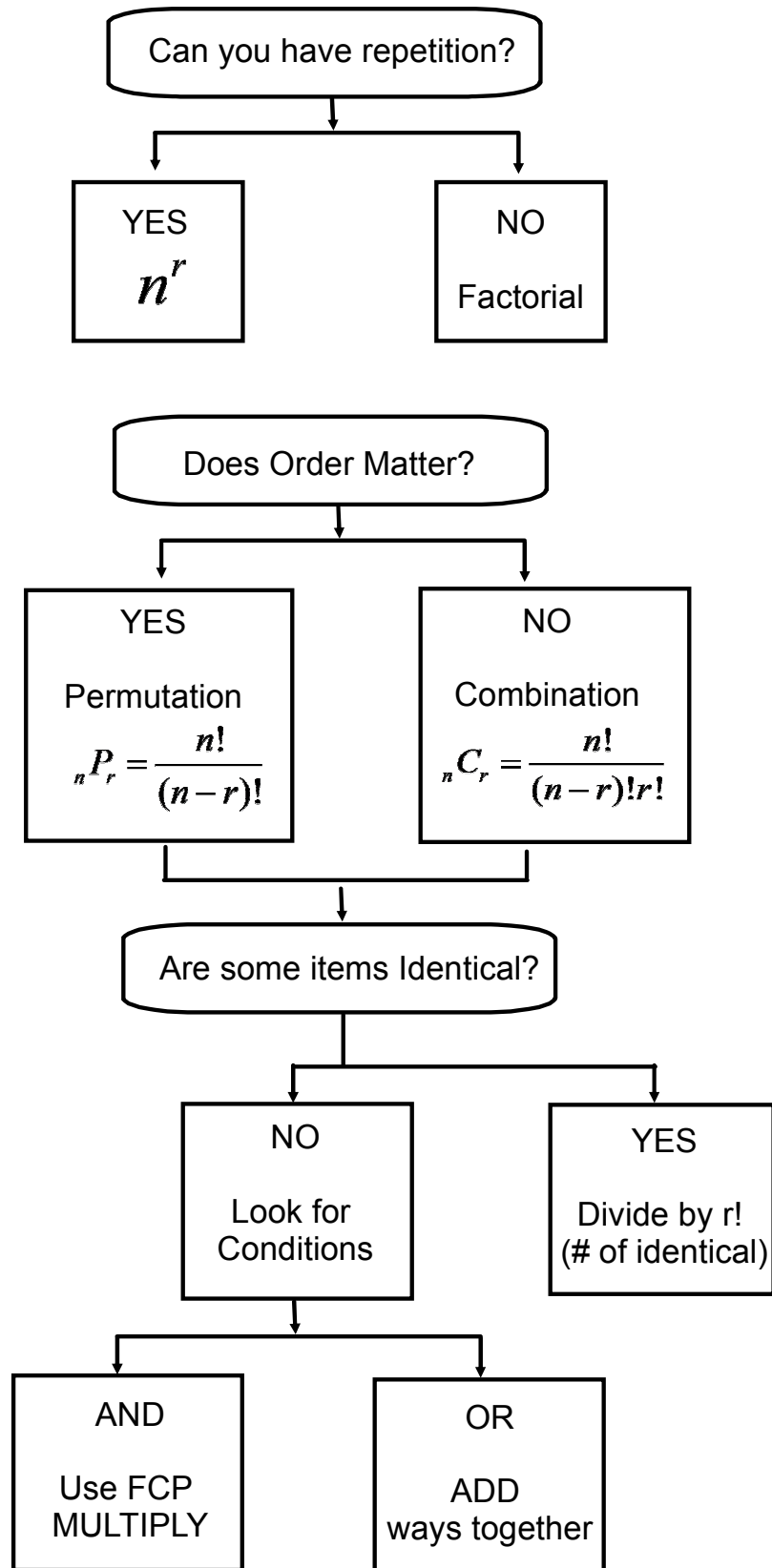
- lottery
- pick a team of 5 people from a group of 10
- taking three dogs for a walk
- choose 3 desserts from a menu

The first question you should ask yourself when solving counting problems is:

DOES ORDER MATTER??

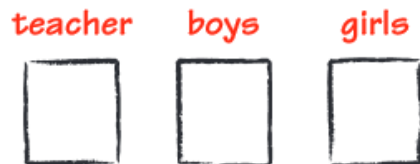


Flow Chart to help answer questions!



Example 1: (ex. 1, p. 122)

A piano teacher and her students are having a group photograph taken. There are three boys and five girls. The photographer wants the boys to sit together and the girls to sit together for one of the poses. How many ways can the students and teacher sit in a row of nine chairs for this pose?



Example 2: (ex. 2, p. 123)

Combination problems are common in computer science. Suppose there is a set of 10 different data items represented by $\{a, b, c, d, e, f, g, h, i, j\}$ to be placed into four different memory cells in a computer. Only 3 data items are to be placed in the first cell, 4 data items in the second cell, 2 data items in the third cell, and 1 data item in the last cell. How many ways can the 10 data items be placed in the four memory cells?



Example 3: (ex. 3, p. 124)

How many different five-card hands that contain at most one black card can be dealt to one person from a standard deck of playing cards?



Practice Questions:

p.126-127, #1abc,3ab,4,5ab,6,10,11ab,13,14