

ACOL1002: Discrete Mathematical Structures

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Counting

Counting

Generalized Permutations and Combinations

Theorem (Permutation with indistinguishable objects)

The number of different permutations of n objects, where there are n_1 indistinguishable objects of type 1, n_2 indistinguishable objects of type 2, ..., and n_k indistinguishable objects of type k , is

$$\frac{n!}{n_1!n_2!\dots n_k!}.$$

- Example: How many different strings can be made by reordering the letters of the word SUCCESS?

Counting

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Theorem (Distinguishable objects into distinguishable boxes)

The number of ways to distribute n distinguishable objects into k distinguishable boxes so that n_i objects are placed into box i , $i = 1, 2, \dots, k$, equals

$$\frac{n!}{n_1!n_2!\dots n_k!}$$

- In how many ways can you place n indistinguishable objects into k distinguishable boxes?

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End