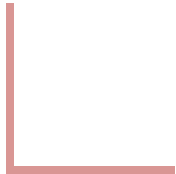


Mathematical Foundations for Computer Applications

Permutation with multisets

Dr. Premalatha H M

Department of Computer Applications



Mathematical Foundations for Computer Applications

Permutation with multisets

The number of permutations of a multi set (a set with same of the objects are alike) is : $P(n:n_1, n_2 \dots n_r)$ is the number of permutation of n objects, in which n_1 is alike, n_2 is alike etc Then

$$P(n:n_1, n_2 \dots n_r) = \frac{n!}{n_1! * n_2! * \dots * n_r!}$$

Mathematical Foundations for Computer Applications

Problems

1. In how many ways can the letters of the word 'LEADER' be arranged ?

The word 'LEADER' has 6 letters.

But in these 6 letters, 'E' occurs 2 times and rest of the letters are different.

Hence, number of ways to arrange these letters
 $= 6! / 2! = 6 \times 5 \times 4 \times 3 \times 2 \times 1 / 2 \times 1 = 360$

Mathematical Foundations for Computer Applications

Problems

2. How many arrangements can be made out of the letters of the word 'ENGINEERING' ?

- The word 'ENGINEERING' has 11 letters.
'E' occurs 3 times, 'N' occurs 3 times, 'G' occurs 2 times, 'I' occurs 2 times and rest of the letters are different.
Hence, number of ways to arrange these letters

$$= 11! / (3!)(3!)(2!)(2!)$$

$$= 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 / (3 \times 2)(3 \times 2)(2)(2)$$

$$= 277200$$

Mathematical Foundations for Computer Applications

Problems

3. In how many different ways can the letters of the word 'RUMOUR' be arranged?

Hence, number of ways to arrange these letters

$$= 6! / (2!)(2!)$$

$$= 6 \times 5 \times 4 \times 3 \times 2 / 2 \times 2$$

$$= 180$$

Mathematical Foundations for Computer Applications

Problems

4. In how many different ways can the letters of the word 'CORPORATION' be arranged so that the vowels always come together?

The 5 vowels can be grouped and considered as a single letter. that is, CRPRTN(OOAIO).

Hence we can assume total letters as 7. But in these 7 letters, 'R' occurs 2 times and rest of the letters are different.

Mathematical Foundations for Computer Applications

Problems

Number of ways to arrange these letters

$$= 7! / 2! = 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 / 2 \times 1 = \mathbf{2520}$$

In the 5 vowels (OOAIO), 'O' occurs 3 and rest of the vowels are different.

Number of ways to arrange these vowels among

$$\text{themselves} = 5! / 3! = 5 \times 4 \times 3 \times 2 \times 1 / 3 \times 2 \times 1 = \mathbf{20}$$

Hence, required number of ways = $2520 \times 20 = \mathbf{50400}$



THANK YOU

Dr. Premalatha H M

Department of Computer Applications

Premalatha.hm@pes.edu

+91 80 26721983 Extn 224