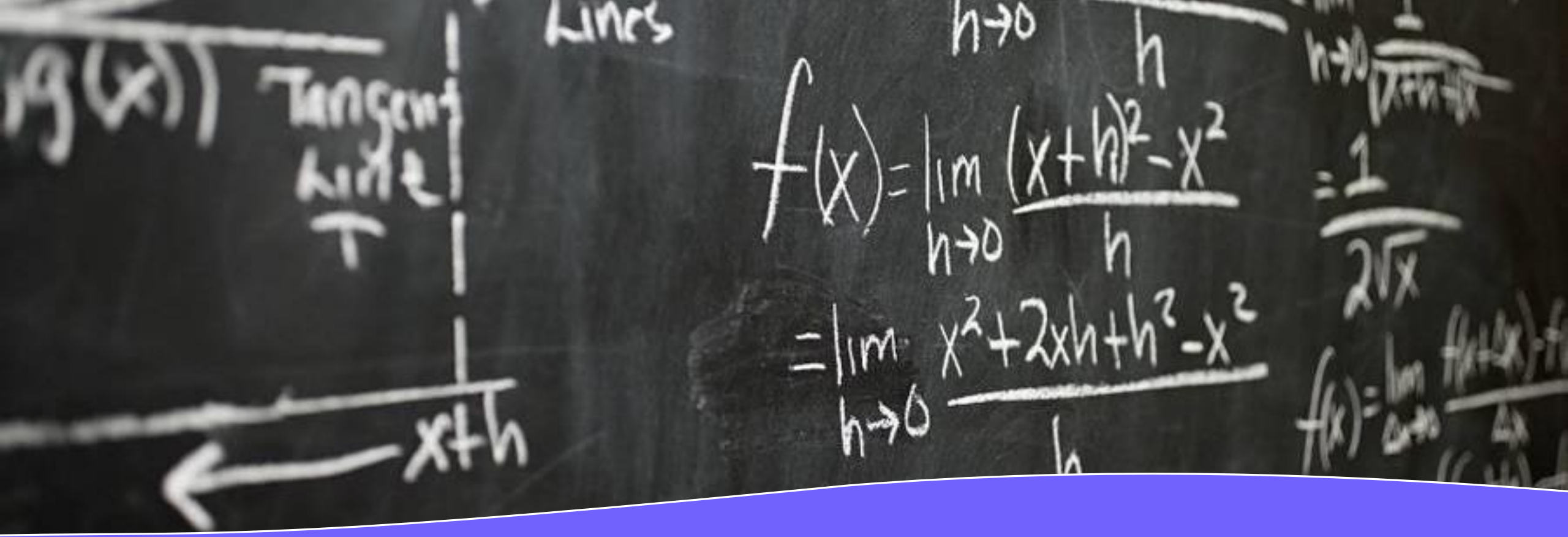


➢ Permutations And Combination

- **Promod Chandra Das**
- **Id: 231002005**
- **Presented For Monirul Islam Sir.**

Contents

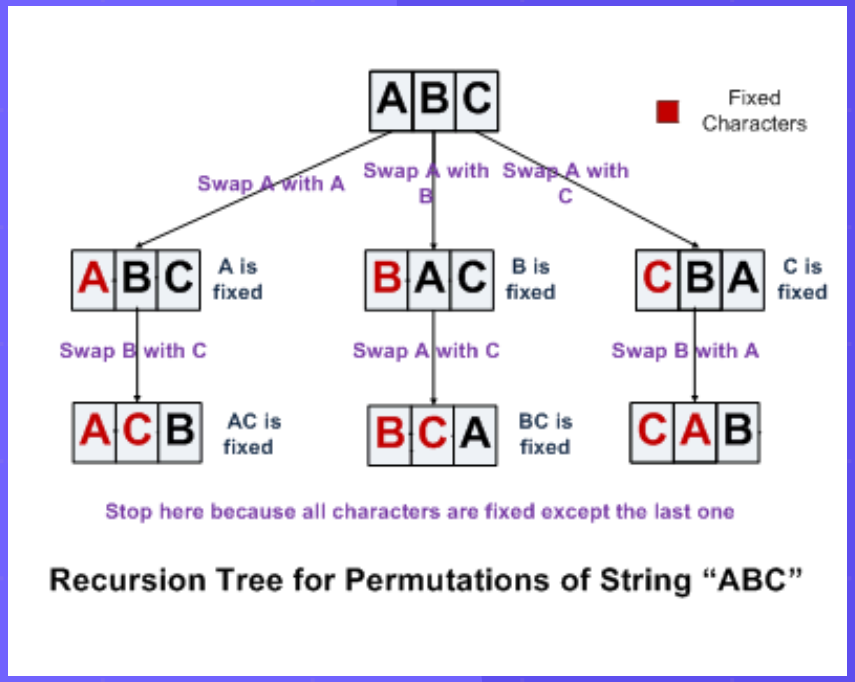
❑ What is Permutations?

" A permutation is a specific arrangement of elements from a given set. The order of the elements is important in permutations "

❑ **Example:-** let's consider the set {A, B, C}. The permutations of this set would be:

1. ABC 2. ACB 3. BAC 4. BCA 5.CAB 6. CBA

As you can see, the order of the elements (A, B, C) is different in each permutation, resulting in different arrangements.



Recursion Tree for Permutations of String "ABC"

How many different permutations are there?

The number of permutations for a set of n elements
So, the number of permutations of a set with n elements are given by n!

1. **Example:**

if we have a set of 4 elements, the number of permutations would be 4! = 4 x 3 x 2 x 1 = 24.

2. **Example:**

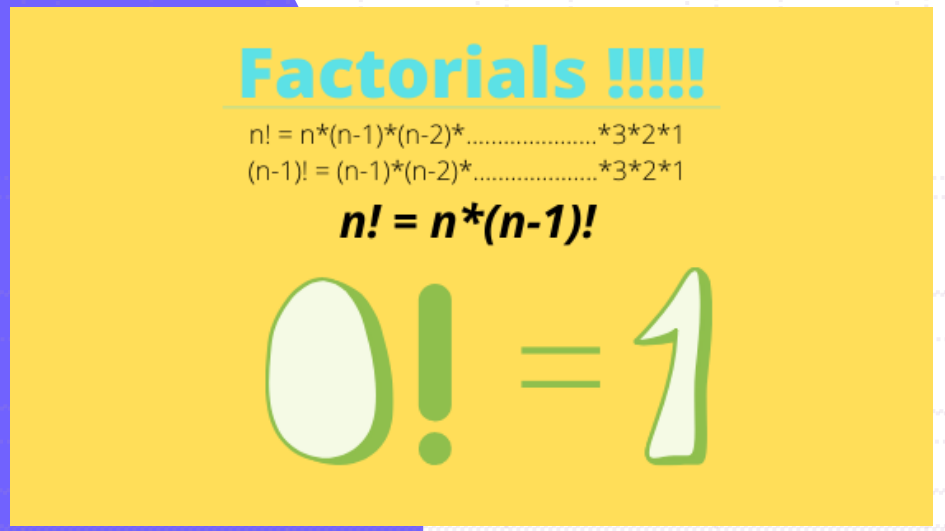
How many permutations of letters {a,b,c} are there?

A number of permutations are:

P(n,n) =P(3,3) =3! = 6

Proof:

abc acb bac bca cab cba



➢ What are K-Permutations?

Example: let's consider the set **{A, B, C}** and **assume we want to select 2 elements** from this set to form K-permutations. The K-permutations without repetition would be:

1. AB 2. AC 3. BA 4. BC 5. CA 6. CB

So, **"AB" and "BA"** are considered different K-permutations.

The number of K-permutations **without repetition** from a set of n elements can be calculated using **the formula**:

$$P(n, k) = n! / (n - k)!$$

Where **P(n, k) denotes the number of K-permutations without repetition, n is the total number of elements in the set, k is the number of elements selected for each permutation**

What is Combination?

A combination is a **selection of k items** from a **set of n items**, where the order of selection **is not considered**. represent combinations is

"nCk" or "C(n, k)".

The formula is:

$$nCk = n! / (k! * (n - k)!)$$

Where: **n is the total number of items in the set.**
k is the number of items you want to select.
"!" represents the factorial function, which means multiplying a series of descending positive integer

Combination

Example: 1

2-combinations of the set **{a,b,c}**

a b a c b c

a b covers **2-permutations**: **a b** and **b a**

Example: 2

Choosing a committee:

Let's say you have a **group of 10 people** and want to form a committee **of 3 members**. The number of possible combinations for the committee can be calculated as

10C3 = 10! / (3! * (10-3)!) = 120.

Difference Permutations And Combination.

Permutation

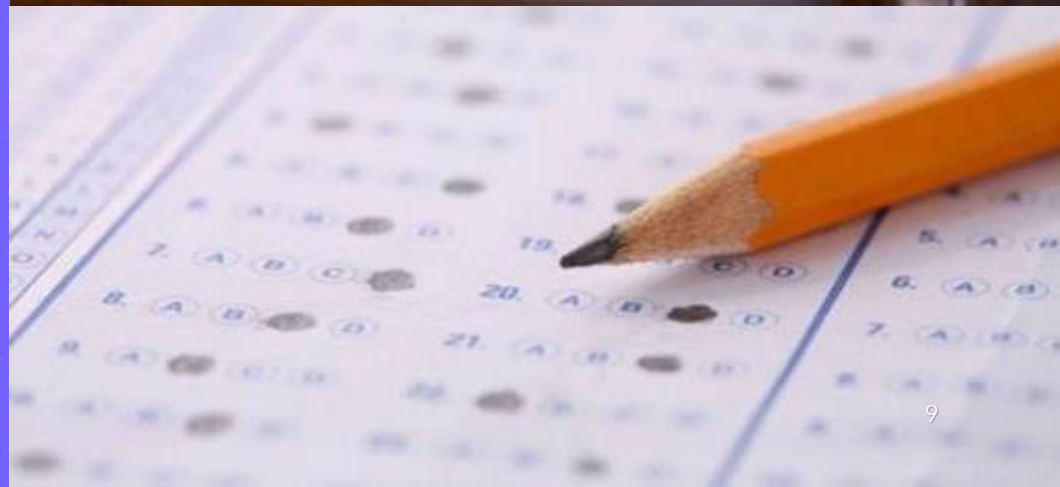
1. In permutations, **the order of elements matters.**
2. Permutations can have **repetition or not**.
3. permutations using the formula: **P(n, k) = n! / (n - k)!**

Combination

1. In combinations, **the order does not matter.**
2. Combination can have **repetition or not**.
3. combinations using the formula: **C(n, k) = n! / (k! * (n - k)!)**

Summary

permutations consider the order and **can have repetition or not,** while combinations disregard the order and **can also have repetition or not.** The formulas used to calculate them differ, reflecting their **distinct characteristics** and **counting requirements**.



Thank you

Promod Chandra Das

Email: Promodd23@gmail.com

Website:
https://sites.google.com/view/promoddas23/home