CS pathshala
Bringing computational thinking to schools

Introduction:

Permutation and Combination are two methods of selecting a few (or all) items from a set of different items.

If the order of selection does not matter or does not affect the result, the selection is called COMBINATION.

If the order of selection is important, or does affect the result, the selection (or arrangement) is called PERMUTATION.

The number of permutations of r items selected from n items is denoted by rnP . It is given by:

$$rnP = \frac{n!}{(n-r)!}$$

As a special case of the above, the number of permutations of all n items is

$$rnP = \frac{n!}{(n-n)!} = \frac{n!}{0!} = n!$$

1. State whether the selection in each of the following is combination or permutation. Remember: If order of selection does not matter, it is combination, otherwise it is permutation.
   a. There are 5 girls who are good at badminton. Teacher wants to select 2 for the doubles team. Will order of selection matter?
   b. Gagan has 4 types of fruits in the fridge. He wants to take any 2 types in his lunch box. Will order of selection matter?
   c. Mary has red, blue, white and grey material (cloth). She wants to choose 1 colour for a shirt and 1 colour for a pant. Will order of selection affect the outfit?
   d. Teacher wants to select a class monitor and a class sports-in-charge from a list of 7 children. Will order of selection matter?
   e. Sheela wants to carry a purse and a scarf today. She has 3 purses and 3 scarves to choose from. Does order of selection matter?
   f. There are 10 folk dancers. Master wants to select 1 dancer for garba and 1 for kolata. Does order of selection matter?

2. I have a lawn in my garden. I want to plant 1 type of flower on the outer border of the lawn and another type on the inner border. I have daisies, pansies and buttercups.
   In how many ways can I do this?

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3. Team A and Team B must choose their team colour. The available colours are white, purple, green and orange. What are the possible team colour pairs?

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4. I have melon, orange, guava and banana in the fridge. I want to make juice with any 2 different fruits. How many options do I have?

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5. There is melon, orange, guava and banana in the fridge. Mother wants to pack 1 fruit for Tara and a different one for Mina. How many options does Mother have?

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6. I have 3 vases – pink, white and green. I have 3 bunches of flowers – daisies, roses and lilies, each for 1 vase. How many options of flower display do I have?

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7. There are 5 rooms in the hostel with 5 different views, and there are 5 boys. Each boy must be given a room. How many allocations are possible?

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