

Class name:

We are implementing a class called Permutations that generates the different permutations using vectors

Class Functions;

The class Permutations will have the following functions:

1. GeneratePermutations()
2. PrintPermutations()
3. getFactorial(int n)
4. FindMobileElement(int& mobileIndex)
5. Swap(int index1, int index2)
6. ReverseDirections(int k)
7. InitializeSet()

Description of the functions:

1. GeneratePermutations(): It generates and prints all permutations of the set.
2. PrintPermutations(): It prints the current permutations stored in the vector.
3. getFactorial(int n): It calculates the factorial of a given integer.
4. FindMobileElement(int& mobileIndex): It finds the next mobile element in the permutation.
5. Swap(int index1, int index2): It swaps the position of two elements.
6. ReverseDirections(int k): It reverses the directions of elements in the “direction” vector.
7. InitializeSet(): This function initializes the “permutation” vector.

Test cases for functions:

1. GeneratePermutations() has **two** possible test case(s):
 - a. All permutations of the set will be printed.
 - b. All permutations of the set will not be printed.
2. PrintPermutations() has **two** possible test case(s):
 - a. The current permutations stored in the vector will be printed.
 - b. The current permutations stored in the vector will not be printed.
3. getFactorial(int n) has **two** possible test case(s):
 - a. The factorial of n will be returned.
 - b. The factorial of n will not be returned.
4. FindMobileElement(int& mobileIndex) has **two** possible test case(s):
 - a. The mobile element will be found in the permutation.
 - b. The mobile element will not be found in the permutation.
5. Swap(int index1, int index2) has **two** possible test case(s):
 - a. index1 and index2 will be swapped.
 - b. index1 and index2 will not be swapped.

6. ReverseDirections(int k) has **two** possible test case(s):
 - a. The direction of the element will be reversed in the direction vector.
 - b. The direction of the element will not be reversed in the direction vector.
7. InitializeSet() has **two** possible test case(s):
 - a. The permutation will be initialized.
 - b. The permutation will not be initialized.

Program Test Cases:

1. Permutation Test Case 1: Finding permutations for a set of size 3.
2. Permutation Test Case 2: Finding permutations for a set of size 4.
3. Permutation Test Case 3: Finding permutations for a set of size 5.
4. Permutation Test Case 4: Finding permutations for a set of size 6.
5. Permutation Test Case 5: Finding permutations for a set of size 7.