

Section 4: Permutations and Combinations

Directions: Copy the following program. Complete the questions and challenge.

Permutations Source Code using sort and next_permutations command line

```
1 #include <iostream> // input and output
2 #include <algorithm> // next_permutation, sort command
3 using namespace std;
4
5 int main () {
6     int myints[] = {1,2,3}; // declares the array and its elements without input
7
8     sort (myints,myints+3); //sort command is an internal code that sorts the array
9                               //sort command stores the various permutations of the data set {1,2,3}
10    cout << "The 3! possible permutations with 3 elements:\n";
11
12    while ( next_permutation(myints,myints+3) ) //While loop uses next_permutation command from the algorithm library to output the permutations
13    {
14        cout << myints[0] << ' ' << myints[1];
15        cout << ' ' << myints[2] << '\n';
16    }
17
18    cout << "After loop: " << myints[0] << " " << myints[1] << " " << myints[2] << '\n'; //Outputs the full sorted listed in ascending order
19
20    return 0;
21 }
```

Questions/Challenge

1. Challenge: Modify the program to do the following
 - a. Adjust the Array Size to 5
 - b. Allow the User to input random positive numbers.(Note: May have repeating numbers)
 - c. Check for invalid entries
 - d. Output
 - i. Total Number of Combinations
 - ii. Output all possible combinations

