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Subject:- DSA

//Question no.1

```
#include <iostream>

using namespace std;

void swap(int &a, int &b) {

    int temp = a;

    a = b;

    b = temp;

}

int partitionArray(int arr[], int start, int end) {

    int pivot = arr[start];

    int i = start + 1;

    int j = end;

    while (i <= j) {

        while (i <= end && arr[i] > pivot) {

            i++;

        }

        while (j >= start && arr[j] < pivot) {

            j--;

        }

        if (i < j) {

            swap(arr[i], arr[j]);

        }

    }

}
```

```

        swap(arr[start], arr[j]);
        return j;
    }
    void quickSortArray(int arr[], int start, int end) {
        if (start < end) {
            int partitionIndex = partitionArray(arr, start, end);
            quickSortArray(arr, start, partitionIndex - 1);
            quickSortArray(arr, partitionIndex + 1, end);
        }
    }
}

```

```

int main() {
    const int size = 7;
    int arr[size] = {10, 80, 30, 90, 40, 50, 70};

    cout << "Original Array: ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }
    cout << endl;

    quickSortArray(arr, 0, size - 1);

    cout << "Sorted Array (Descending Order): ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }
    cout << endl;
}

```

```

return 0;

}

```

The screenshot shows the Programiz C++ Online Compiler interface. The browser address bar displays 'programiz.com/cpp-programming/online-compiler/'. A banner at the top promotes a 'BLACK FRIDAY SALE' for Programiz PRO. The main area is divided into a code editor on the left and an output panel on the right. The code editor shows a C++ program for quicksort, and the output panel displays the results of the program execution.

```

main.cpp
43  int arr[size] = {10, 80, 30, 90, 40, 50, 70};
44
45  cout << "Original Array: ";
46+  for (int i = 0; i < size; i++) {
47      cout << arr[i] << " ";
48  }
49  cout << endl;
50
51  quickSortArray(arr, 0, size - 1);
52
53  cout << "Sorted Array (Descending Order): ";
54+  for (int i = 0; i < size; i++) {
55      cout << arr[i] << " ";
56  }
57  cout << endl;
58
59  return 0;

```

Output

```

Original Array: 10 80 30 90 40 50 70
Sorted Array (Descending Order): 90 80 70 50 40 30 10

=== Code Execution Successful ===

```

//Question no.2

```
#include <iostream>
```

```
using namespace std;
```

```
void sortDescending(int arr[], int n) {
```

```
    for (int i = 0; i < n - 1; i++) {
```

```
        int maxIndex = i;
```

```
        for (int j = i + 1; j < n; j++) {
```

```
            if (arr[j] > arr[maxIndex]) {
```

```
                maxIndex = j;
```

```
            }
```

```
        }
```

```
        int temp = arr[maxIndex];
```

```

        arr[maxIndex] = arr[i];
        arr[i] = temp;

        cout << "After iteration " << i + 1 << ": ";

        for (int k = 0; k < n; k++) {
            cout << arr[k] << " ";
        }

        cout << endl;
    }
}

int main() {
    int arr[5] = {12, 45, 23, 8, 19};
    int size = 5;

    cout << "Original Array: ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }

    cout << endl;

    sortDescending(arr, size);

    cout << "Sorted Array (Descending Order): ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }

    cout << endl;
}

```

```
return 0;

}
```

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main.cpp Run Output Clear

```
1 #include <iostream>
2 using namespace std;
3
4 void sortDescending(int arr[], int n) {
5     for (int i = 0; i < n - 1; i++) {
6         int maxIndex = i;
7         for (int j = i + 1; j < n; j++) {
8             if (arr[j] > arr[maxIndex]) {
9                 maxIndex = j;
10            }
11        }
12
13        int temp = arr[maxIndex];
14        arr[maxIndex] = arr[i];
15        arr[i] = temp;
16
17        cout << "After iteration " << i + 1 << " : ";
```

Original Array: 12 45 23 8 19
After iteration 1: 45 12 23 8 19
After iteration 2: 45 23 12 8 19
After iteration 3: 45 23 19 8 12
After iteration 4: 45 23 19 12 8
Sorted Array (Descending Order): 45 23 19 12 8

=== Code Execution Successful ===