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*******Q#1*******

```
#include <iostream>

using namespace std;

int partition(int arr[], int first, int last) {

    int pivot = arr[first];

    int bottom = first + 1, top = last;

    int temp;

    while (true) {

        while (arr[top] < pivot && top > bottom) {

            top--;

        }

        while (arr[bottom] > pivot && bottom < top) {

            bottom++;

        }

        // If `bottom` and `top` cross, exit loop

        if (bottom >= top) {

            break;

        } else {

            // Swap elements at `bottom` and `top`
```

```

temp = arr[bottom];
arr[bottom] = arr[top];
arr[top] = temp;
}
}

temp = arr[first];
arr[first] = arr[top];
arr[top] = temp;
return top; // Return the partition index
}

```

```

void quickSort(int arr[], int first, int last) {
    if (first < last) {
        int pivotIndex = partition(arr, first, last);
        quickSort(arr, first, pivotIndex - 1);
        quickSort(arr, pivotIndex + 1, last);
    }
}

```

```

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;

quickSort(arr, 0, size - 1);

cout << "Sorted Array (Descending Order): ";

for (int i = 0; i < size; i++) {

cout << arr[i] << " ";

}

cout << endl;

return 0;

}

```



```

main.cpp
34 int pivotIndex = partition(arr, first, last);
35 quickSort(arr, first, pivotIndex - 1);
36 quickSort(arr, pivotIndex + 1, last);
37 }
38 }
39 int main() {
40     const int size = 7;
41     int arr[size] = {10, 80, 30, 90, 40, 50, 70};
42     cout << "Original Array: ";
43     for (int i = 0; i < size; i++) {
44         cout << arr[i] << " ";
45     }
46     cout << endl;
47     quickSort(arr, 0, size - 1);
48     cout << "Sorted Array (Descending Order): ";
49     for (int i = 0; i < size; i++) {
50         cout << arr[i] << " ";
51     }
52     cout << endl;
53     return 0;
54 }

```

input

```

Original Array: 10 80 30 90 40 50 70
Sorted Array (Descending Order): 80 90 70 40 50 30 10
...Program finished with exit code 0
Press ENTER to exit console.

```

*****Q#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;

}

```

The screenshot shows an online C++ compiler interface. The code editor displays the following C++ code:

```

main.cpp
26 int arr[s] = {12, 45, 23, 8, 19};
27 int size = 5;
28
29 cout << "Original Array: ";
30 for (int i = 0; i < size; i++) {
31     cout << arr[i] << " ";
32 }
33 cout << endl;
34
35 sortDescending(arr, size);
36
37 cout << "Sorted Array (Descending Order): ";
38 for (int i = 0; i < size; i++) {
39     cout << arr[i] << " ";
40 }
41 cout << endl;
42
43 return 0;
44 }
45

```

The output console shows the following results:

```

input
After iteration 4: 45 23 19 12 8
Sorted Array (Descending Order): 45 23 19 12 8
...Program finished with exit code 0
Press ENTER to exit console.

```

The taskbar at the bottom of the screen shows various application icons and the system clock indicating 8:53 PM on 11/17/2024.

