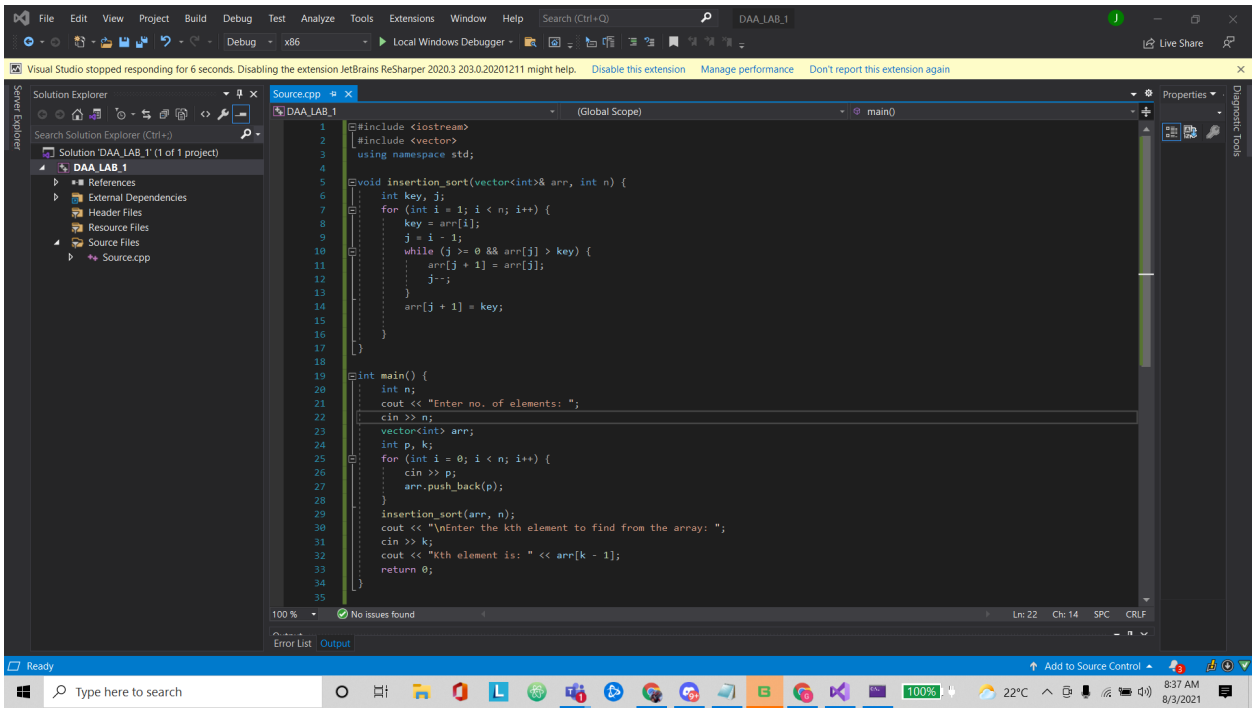
Question 1:

To find the kth smallest no. from a given array

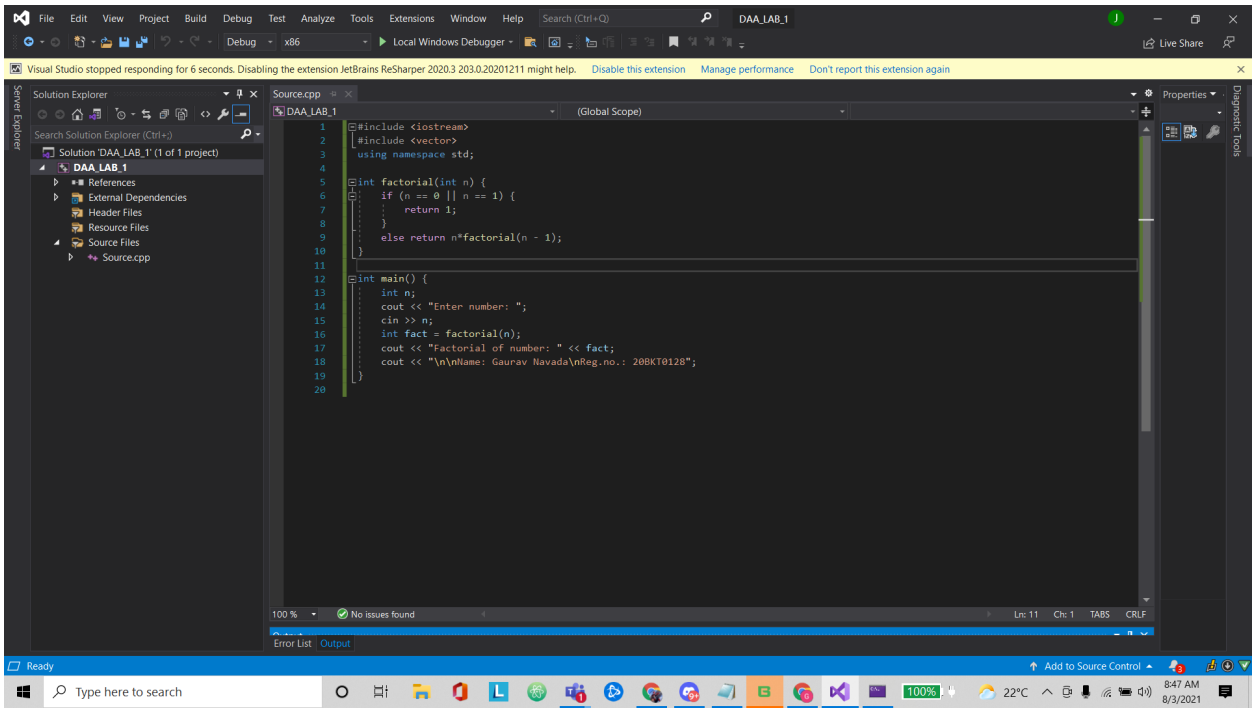


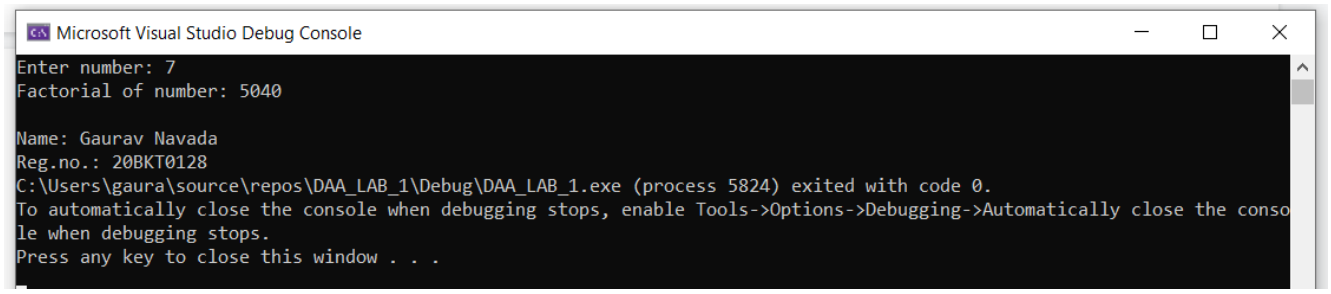
```
#include <iostream>
#include <vector>
using namespace std;

void insertion_sort(vector<int>& arr, int n) {
    int key, j;
    for (int i = 1; i < n; i++) {
        key = arr[i];
        j = i - 1;
        while (j >= 0 && arr[j] > key) {
            arr[j + 1] = arr[j];
            j--;
        }
        arr[j + 1] = key;

    }
}

int main() {
    int n;
    cout << "Enter no. of elements: ";
    cin >> n;
    vector<int> arr;
    int p, k;
    for (int i = 0; i < n; i++) {
        cin >> p;
        arr.push_back(p);
    }
    insertion_sort(arr, n);
    cout << "\nEnter the kth element to find from the array: ";
    cin >> k;
    cout << "Kth element is: " << arr[k - 1];
    return 0;
}
```

```
Microsoft Visual Studio Debug Console
Enter no. of elements: 6
30
20
10
60
50
40

Enter the kth element to find from the array: 4
Kth element is: 40

Name: Gaurav Navada
Reg.no.: 20BKT0128
C:\Users\gaura\source\repos\DAA_LAB_1\Debug\DAA_LAB_1.exe (process 19744) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .
```

Question 2:

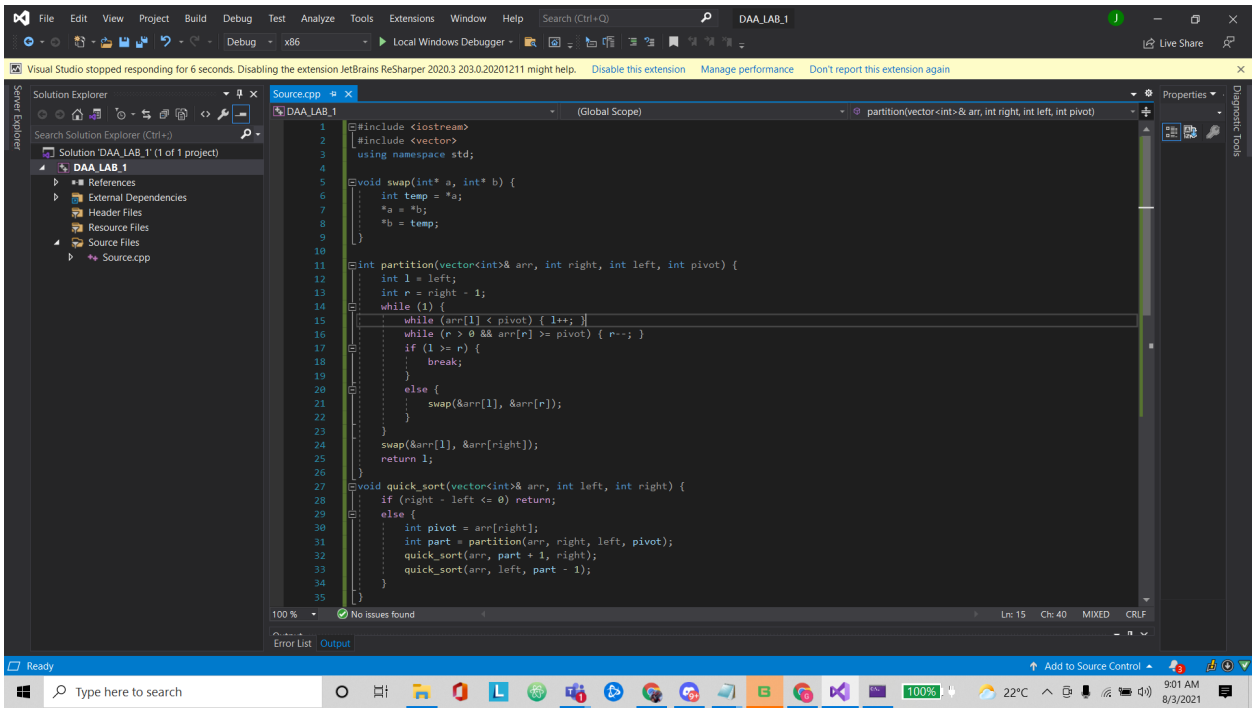
To find factorial of a number using recursion



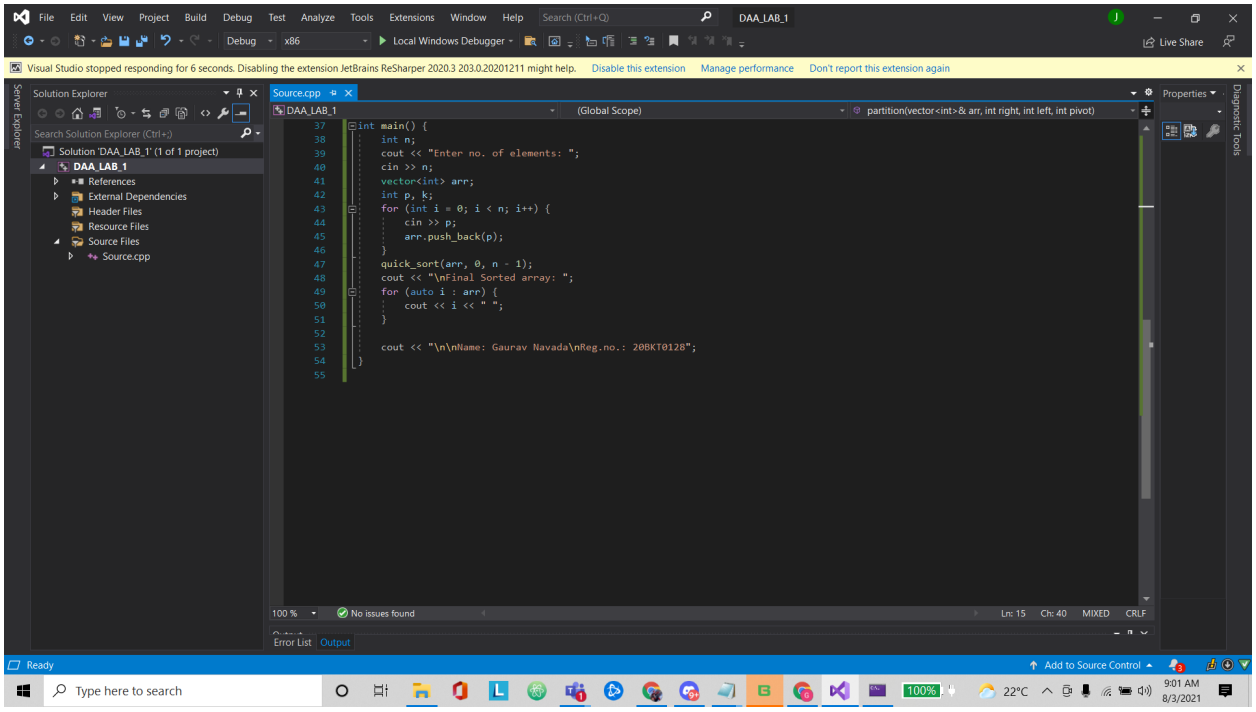


Question 3:

To write a code for Quick Sort



```
#include <iostream>
#include <vector>
using namespace std;

void swap(int* a, int* b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

int partition(vector<int>& arr, int right, int left, int pivot) {
    int l = left;
    int r = right - 1;
    while (1) {
        while (arr[l] < pivot) { l++; }
        while (r > 0 && arr[r] >= pivot) { r--; }
        if (l >= r) {
            break;
        }
        else {
            swap(&arr[l], &arr[r]);
        }
    }
    swap(&arr[l], &arr[right]);
    return l;
}
void quick_sort(vector<int>& arr, int left, int right) {
    if (right - left <= 0) return;
    else {
        int pivot = arr[right];
        int part = partition(arr, right, left, pivot);
        quick_sort(arr, part + 1, right);
        quick_sort(arr, left, part - 1);
    }
}
```



```
int main() {
    int n;
    cout << "Enter no. of elements: ";
    cin >> n;
    vector<int> arr;
    int p, k;
    for (int i = 0; i < n; i++) {
        cin >> p;
        arr.push_back(p);
    }
    quick_sort(arr, 0, n - 1);
    cout << "\nFinal Sorted array: ";
    for (auto i : arr) {
        cout << i << " ";
    }

    cout << "\n\nName: Gaurav Navada\nReg.no.: 20BKT0128";
}
```

```
Microsoft Visual Studio Debug Console
Enter no. of elements: 10
5
3
6
4
8
7
9
1
4
3

Final Sorted array: 1 3 3 4 4 5 6 7 8 9

Name: Gaurav Navada
Reg.no.: 20BKT0128
C:\Users\gaura\source\repos\DAA_LAB_1\Debug\DAA_LAB_1.exe (process 22712) exited with code 0.
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le when debugging stops.
Press any key to close this window . . .
```
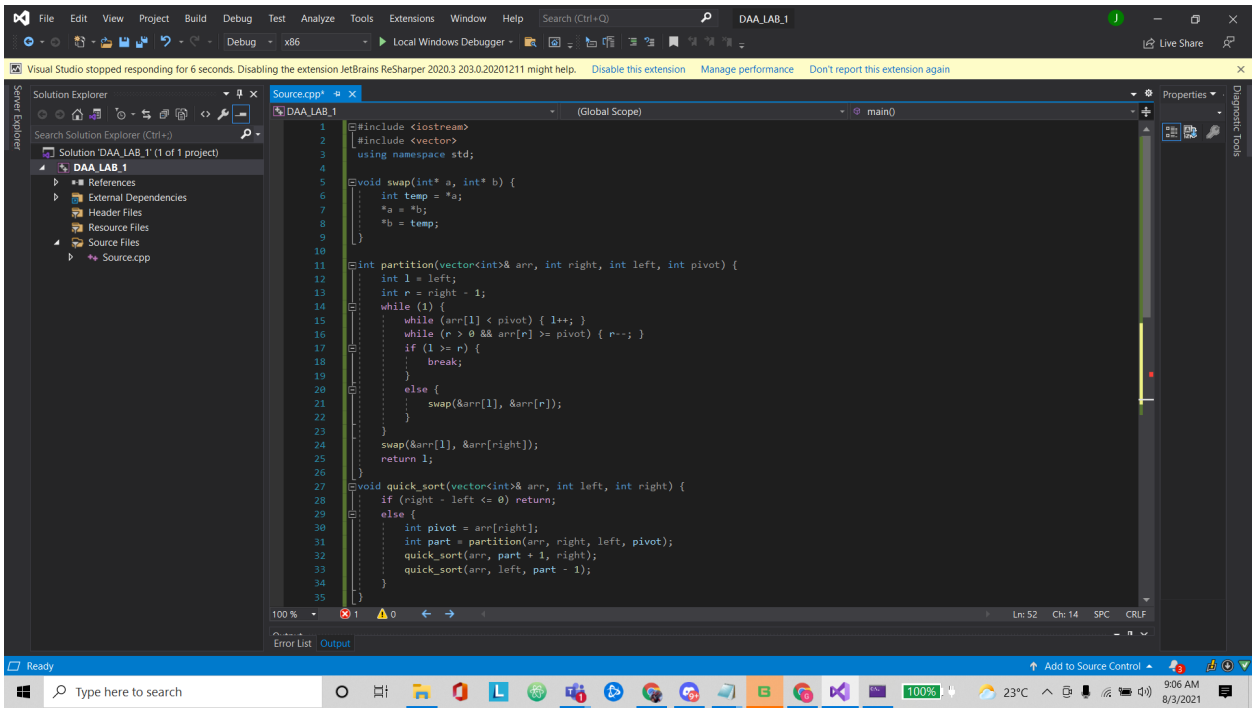
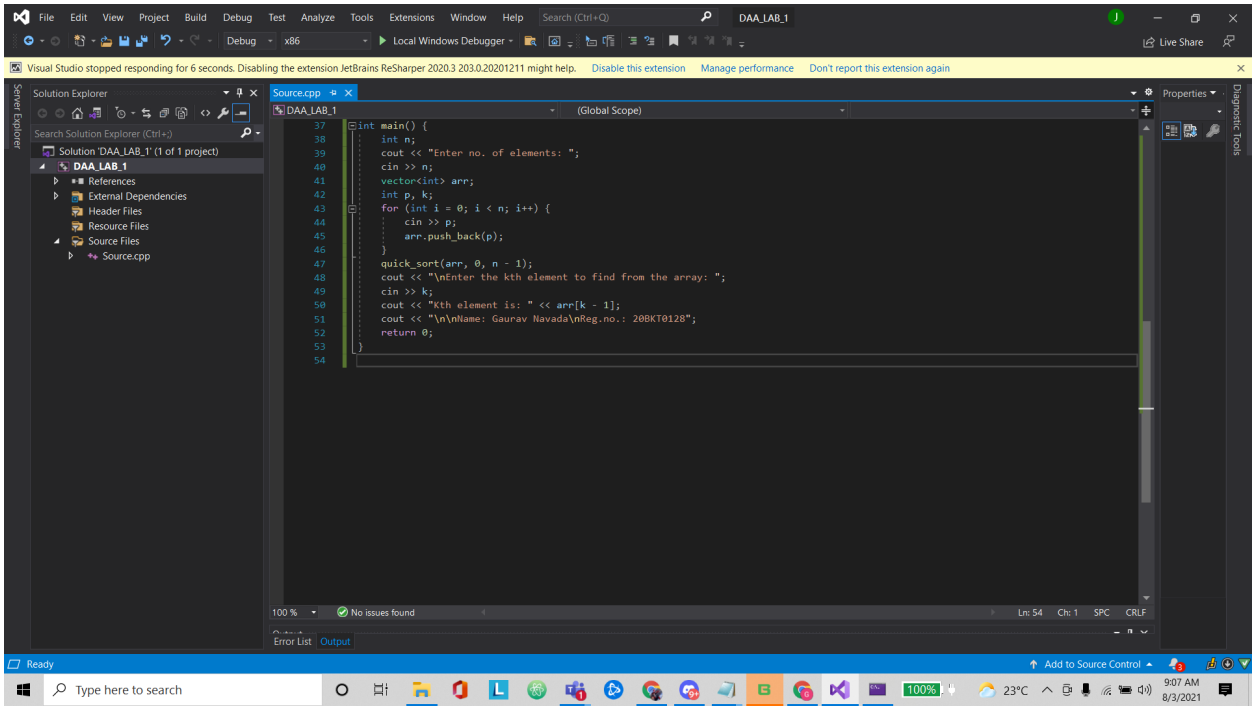

Question 4:

To find the kth smallest no. from a given array (optimized solution) - using quick sort




File Edit View Project Build Debug Test Analyze Tools Extensions Window Help
DAA_LAB_1
Debug x86 Local Windows Debugger
Live Share
Visual Studio stopped responding for 6 seconds. Disabling the extension JetBrains ReSharper 2020.3 203.0.20201211 might help. Disable this extension Manage performance Don't report this extension again
Solution Explorer
Search Solution Explorer (Ctrl+;)
Solution 'DAA_LAB_1' (1 of 1 project)
DAA_LAB_1
References
External Dependencies
Header Files
Resource Files
Source Files
Source.cpp
Source.cpp
DAA_LAB_1
(Global Scope)
Properties
Diagnostic Tools
int main() {
int n;
cout << "Enter no. of elements: ";
cin >> n;
vector<int> arr;
int p, k;
for (int i = 0; i < n; i++) {
cin >> p;
arr.push_back(p);
}
quick_sort(arr, 0, n - 1);
cout << "\nEnter the kth element to find from the array: ";
cin >> k;
cout << "Kth element is: " << arr[k - 1];
cout << "\n\nName: Gaurav Navada\nReg.no.: 20BKT0128";
return 0;
}
100 %
No issues found
Ln: 54 Ch: 1 SPC CRLF
Error List Output
Ready
Add to Source Control
Type here to search
100%
23°C
9:07 AM
8/3/2021


Microsoft Visual Studio Debug Console
Enter no. of elements: 6
30
20
10
60
50
40
Enter the kth element to find from the array: 3
Kth element is: 30
Name: Gaurav Navada
Reg.no.: 20BKT0128
C:\Users\gaura\source\repos\DAA_LAB_1\Debug\DAA_LAB_1.exe (process 17812) exited with code 0.
To automatically close the console when debugging stops, enable Tools->Options->Debugging->Automatically close the conso
le when debugging stops.
Press any key to close this window . . .