Heaven's Light is Our Guide

Rajshahi University of Engineering and Technology

Department of Computer Science and Engineering

Course No: CSE.2202

Course Title: Sessional based on CSE.2201 (Computer Algorithm)

Report On: Lab Final Problem 1

Submitted To

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Problem 1:

Algorithm:

(i) QuickSort (left, right) {

```
if (left < right) {
    j = Partition (left, right+1);
    QuickSort (left, j-1);
    QuickSort (j+1, right);
}
```

}

(ii) Partition (m, p) {

```
v := a[m]; i = m; j = p;
repeat {
    repeat { i := i+1; } untill (a[i] ≥ v);
    repeat { j := j-1; } untill (a[j] ≤ v);
    if (i < j) then t := a[i]; a[i] = a[j]; a[j] = t;
} untill (i ≥ j);
a[m] := a[j]; a[j] = v;
return j;
```

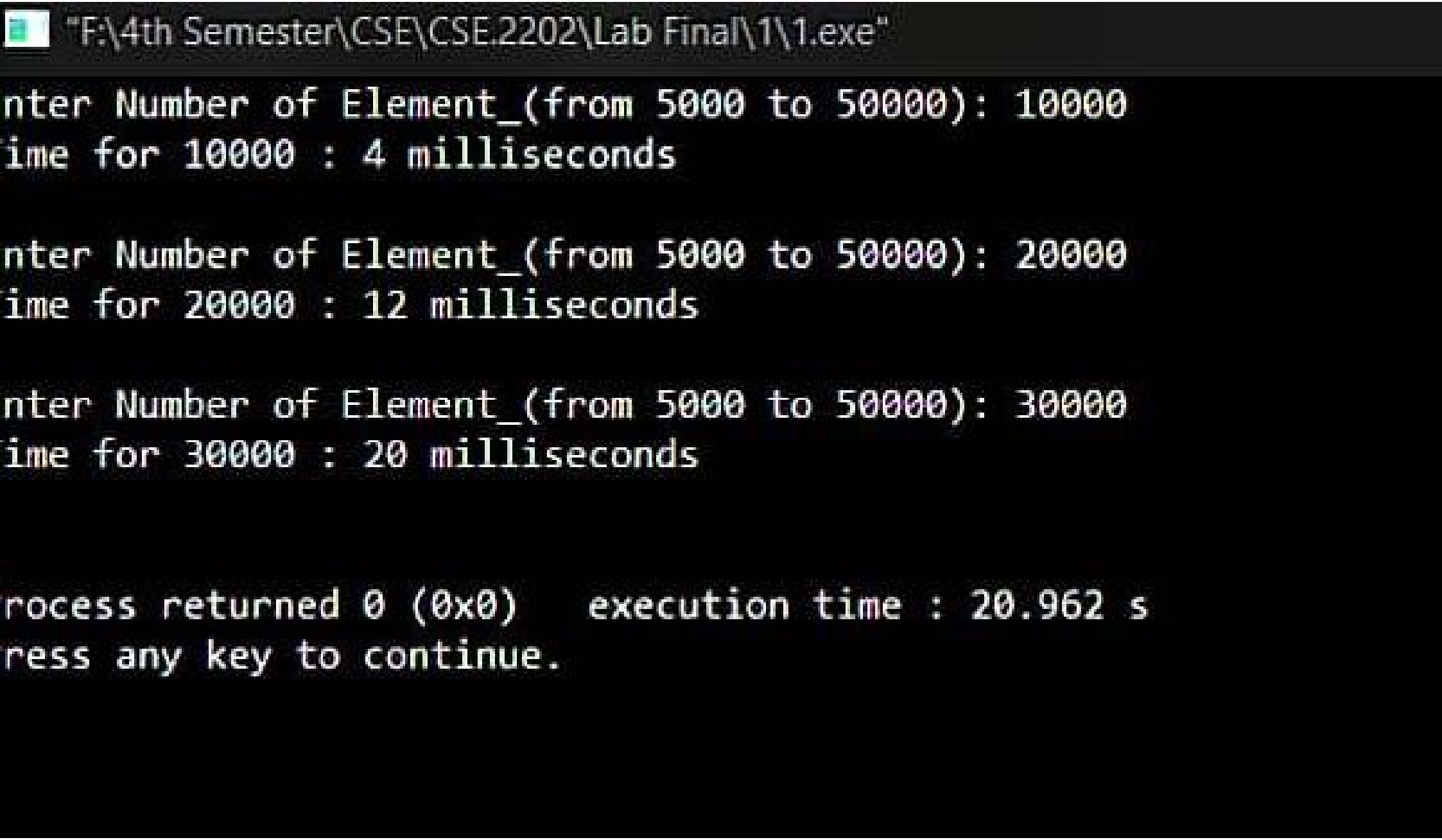
}

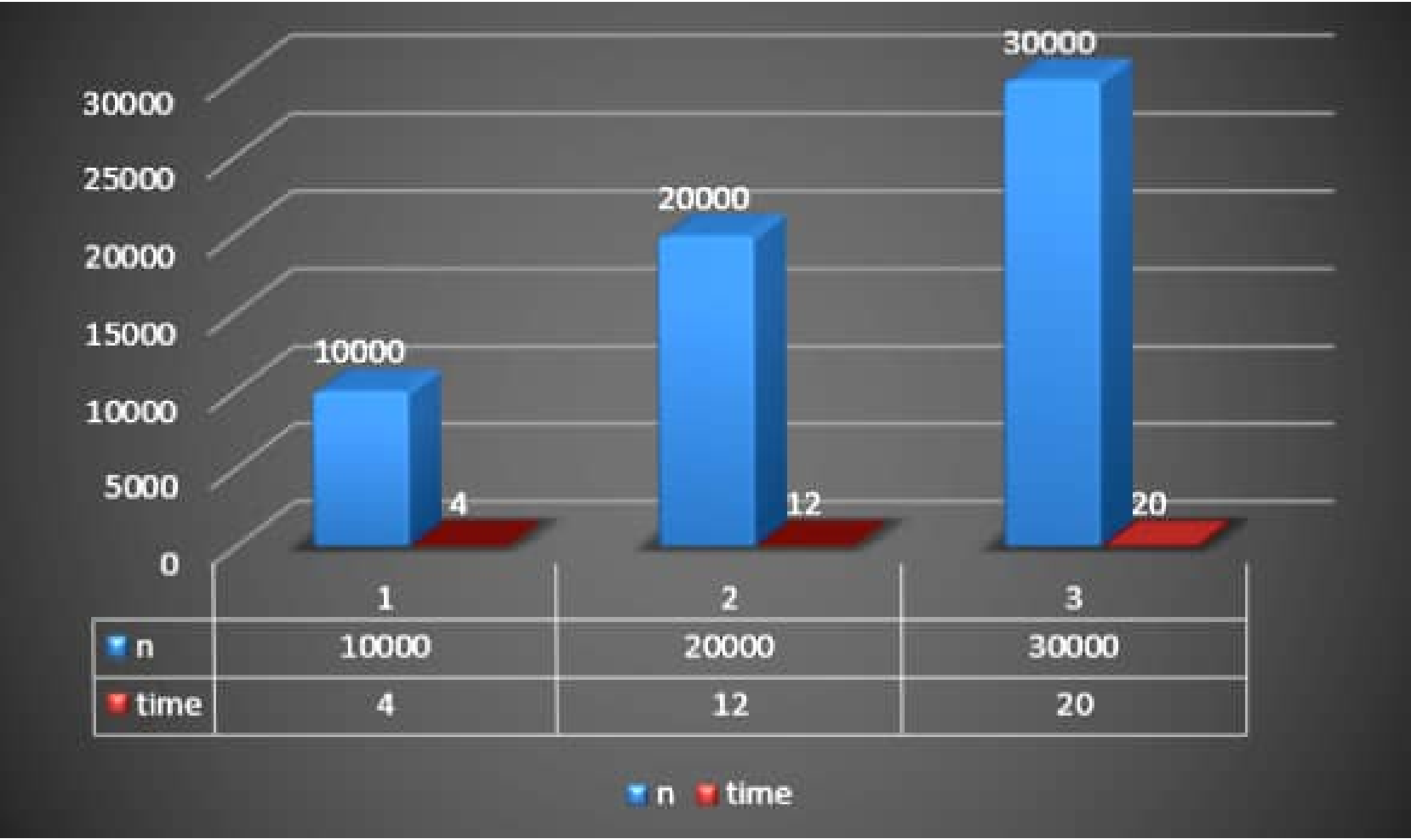
Code :

```
#include <bits/stdc++.h>
using namespace std;
using namespace std::chrono;
typedef long long ll;
#define Max 1e17

vector <ll> arr;
ll n;
void input (ll x, ll i){
    string a,b="quick";
    b = b + to_string(i) + ".txt";
    ifstream f1;
    f1.open(b);
    arr.clear();

    while (arr.size() < n){
        f1 >> a;
        arr.push_back (stoll(a));

    }
    arr.push_back (Max);

    f1.close();

}
```

```
ll Partition (ll m, ll p){
    ll v= arr[m] ; i=m; j=p;
    while (i<j){
        do { i+=1;} while (arr[i]<v);
        do { j-=1;} while (arr[j]>v);
        if (i<j) { swap (arr[i], arr[j]);}
    }
    arr[m]=arr[j]; arr[j]=v;
    return j;
}

void quick_sort (ll left, ll right){
    if (left<right){
        ll j;
        j= Partition (left, right+1);
        quick_sort (left, j-1);
        quick_sort (j+1, right);
    }
}
```

```
int main() {
    ll i;

    for (i = 1 ; i<4; i++){
        cout<<" Enter N: "; cin >>n;
        input (n, i);
        auto start = high_resolution_clock :: now();
        quick_sort (0, n-1);
        auto stop = high_resolution_clock :: now();
        auto duration = duration_cast <milliseconds >(stop-start);
        cout <<" Time for "<<n<<" : "<<duration <<endl;

    }

    return 0;

}
```


"F:\4th Semester\CSE\CSE.2202\Lab Final\1\1.exe"
nter Number of Element_(from 5000 to 50000): 10000
ime for 10000 : 4 milliseconds
nter Number of Element_(from 5000 to 50000): 20000
ime for 20000 : 12 milliseconds
nter Number of Element_(from 5000 to 50000): 30000
ime for 30000 : 20 milliseconds
rocess returned 0 (0x0)   execution time : 20.962 s
ress any key to continue.


30000
25000
20000
15000
10000
5000
0
10000
4
20000
12
30000
20
1
2
3
n
10000
20000
30000
time
4
12
20
n
time