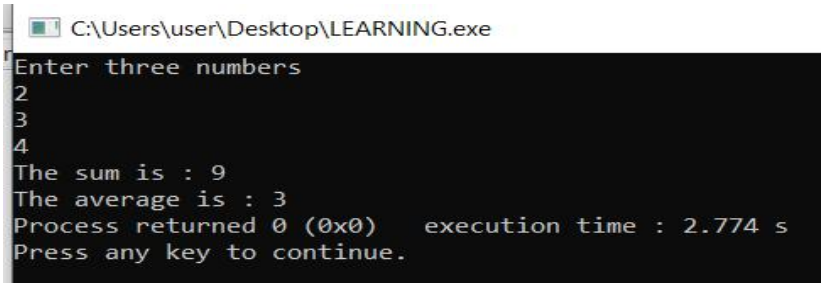
Software Development Lab – II [15B17CI271]

Assignment Sheet

Week 1

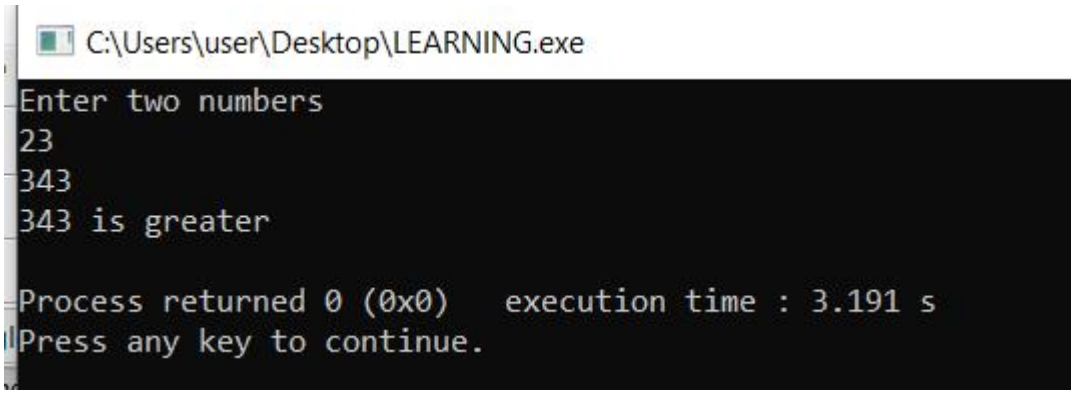
Q.1 WAP using C++ to read three numbers from user and display their sum and average on output screen.

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

int main()
{
   int x,y,z;
   cout<<"Enter three numbers\n";
   cin>>x>>y>>z;
   cout<<"The sum is : "<<x+y+z;
   cout<<"\nThe average is : "<<(x+y+z)/3;

   return 0;
}
```



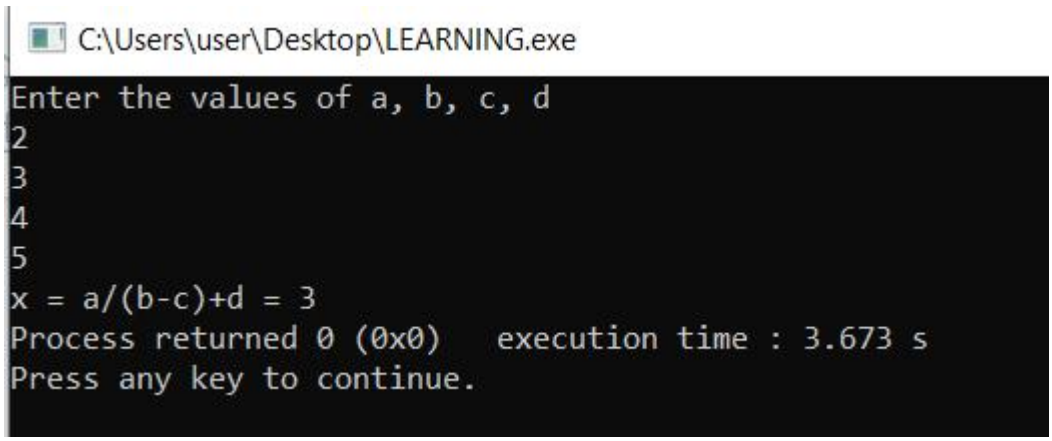
Q.2 Write a C++ program to read two numbers from the user and display the larger value on the output screen.

```
#include <iostream>
using namespace std;
int main()
{
   int x, y;
   cout << "Enter two numbers\n";
   cin >> x >> y;
   if (x > y)
   {
      cout << x << " is greater\n";
   }
   else
   {
      cout << y << " is greater\n";
   }
   return 0;
}
```



Q.3 Write a C++ program to read the values of variables: a, b c and d from user and display
the value of x on output screen, where
x = a / (b -c) + d

```
#include<iostream>
using namespace std;
int main()
{
   float a,b,c,d;
   float x;
   cout<<"Enter the values of a, b, c, d\n";
   cin>>a>>b>>c>>d;
   x=a/(b-c)+d;

   if(b==c)
   {
      cout<<"x= cannot be divided by zero error. Please retry with other input\n";
   }
   else
   {
      cout<<"x = a/(b-c)+d = "<<x;
   }
   return 0;
}
```



Q4. Given an unsorted array with both positive and negative elements. Find the smallest positive number missing from the array in O(n) time using constant extra space. It is allowed to modify the original array.

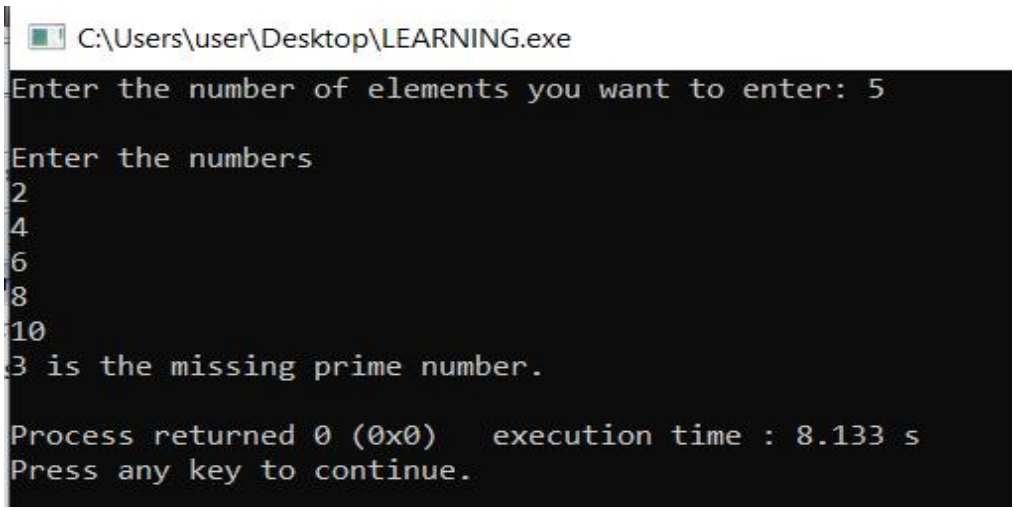
```
#include<iostream>
using namespace std;

int main()
{
   int n,ans;
   cout<<"ENTER HOW MANY ELEMENTS DO YOU WANT TO ENTER IN
ARRAY :";
   cin>>n;
   int a[n];
   cout<<"ENTER ARRAY ELEMENTS :";
   for(int i=0;i<n;i++)
      cin>>a[i];

    int i=1;
   int count;
   while(true)
   {
      count=0;
      for(int j=0;j<n;j++)
      {
         if(a[j]==i)
         {
            count++;
         }}
      if(count==0)
      {
         cout<<i;
         break;
      }
      else
         i++;
      }}}
```

```
ENTER HOW MANY ELEMENTS DO YOU WANT TO ENTER IN ARRAY :5
ENTER ARRAY ELEMENTS :1
3
4
5
7
2
Process returned 0 (0x0)   execution time : 7.276 s
Press any key to continue.
```

Q5. Smallest prime number missing in an array: Given an array containing n distinct numbers. The task is to find the smallest prime which is not present in the array.
Note: If there is no prime number missing up to the maximum element of the array then print "No prime number missing".

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

int prime(int n)
{
   for(int i=2; i<n; i++)
   {
      if(n%i == 0)
      return 0;
   }
   return 1;
}
void Sort(int arr[], int n)
{
   int i, j;
   for (i = 0; i < n-1; i++)
   {
      for (j = 0; j < n-i-1; j++)
      {
         if (arr[j] > arr[j+1])
         {
            int temp = arr[j];
            arr[j] = arr[j+1];
            arr[j+1] = temp;
         }}}}
int main()
{
   cout << "Enter the number of elements you want to enter: ";
   int n;
   cin >> n;
   cout << endl;
   cout << "Enter the numbers " << endl;
   int arr[n];
   for(int i=0; i<n; i++)
   {
      cin >> arr[i];
   }
   int missing = 0;
   bool flag = true;
```

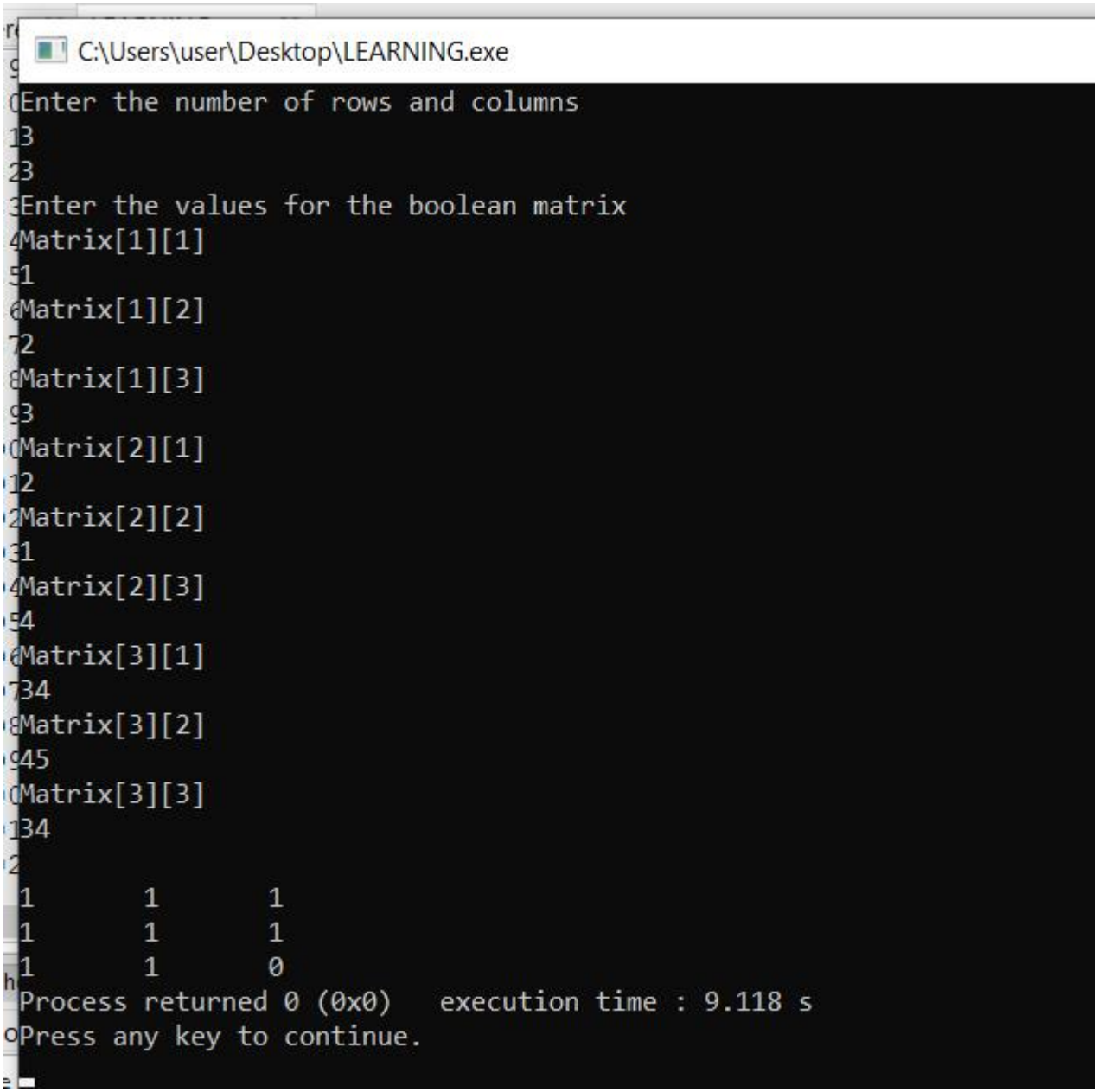
```
    Sort(arr, n);
    for(int i=2; i<arr[n-1]; i++)
    {
       int check = prime(i);
       if(check == 1)
       {
       for(int j = 0 ; j<n; j++)
       {
          if(arr[j]!=i)
          flag = false;
          if(arr[j]==i)
          {
             flag = true;
             break;
          }}}

       if(flag == false)
       {
          missing = i;
          break;
       }}
    if(missing != 0)
    cout << missing << " is the missing prime number." << endl;
    else
    cout << "No prime number missing " << endl;
    return 0;
}
```



Q6. Given a boolean matrix mat[M][N] of size M X N, modify it such that if a matrix cell mat[i][j] is 1 (or true) then make all the cells of ith row and jth column as 1.

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

int main()
{
   int m,n;
   cout<<"Enter the number of rows and columns\n";
   cin>>m>>n;
   int mat[m][n],mod[m][n];
   for (int i = 0; i < m; i++)
   {
      for (int j = 0; j < n; j++)
      {
        mod[i][j]=0;
      }}
   cout<<"Enter the values for the boolean matrix\n";
   for (int i = 0; i < m; i++)
   {
      for (int j = 0; j < n; j++)
      {
         cout<<"Matrix"<<"["<<i+1<<"]"<<"["<<j+1<<"]\n";
         cin>>mat[i][j];
      }}
   for (int i = 0; i < m; i++)
   {
      for (int j = 0; j < n; j++)
      {
         if(mat[i][j]==1)
         {
            for(int k=0;k<m;k++)
            {
               mod[i][k]=1;
            }
            for(int l= 0; l < n; l++)
            {
               mod[l][j]=1;
            }}}}
   for (int i = 0; i < m; i++)
   {
      cout<<"\n";
      for (int j = 0; j < n; j++)
```

```
    {
      cout<<mod[i][j]<<"\t";
    }}
  return 0;
}
```



Q7: C++ Program to assign data to members of a structure variable and display it.

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

struct employee
{
   char name[20];
   int age , salary;

}s1;
int main()
{
   cout<<"Enter The Name\n";
   cin>>s1.name;
   cout<<"Enter the Age\n";
   cin>>s1.age;
   cout<<"Enter the Salary\n";
   cin>>s1.salary;

   cout<<"\nName : "<<s1.name;
   cout<<"\nAge : "<<s1.age;
   cout<<"\nSalary : "<<s1.salary;
   return 0;
}
```

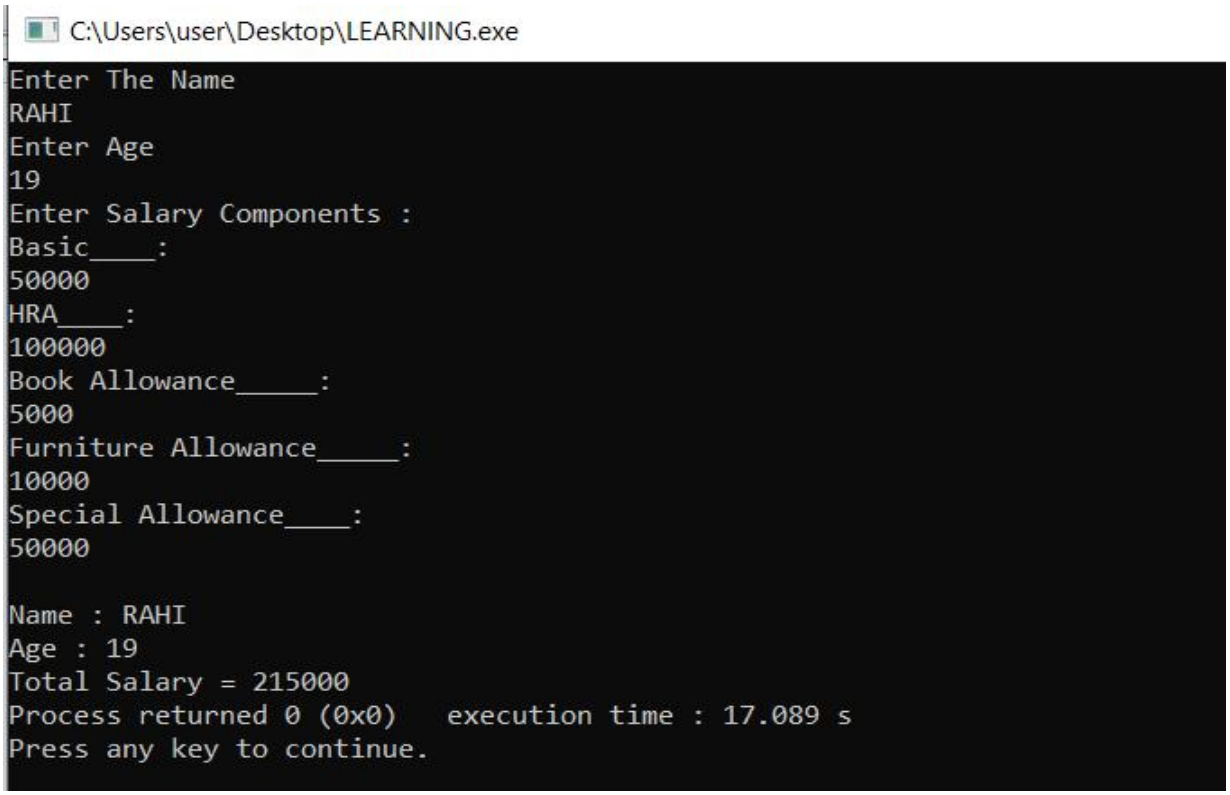
```
C:\Users\user\Desktop\LEARNING.exe
Enter The Name
RAHI
Enter the Age
18
Enter the Salary
50000000

Name : RAHI
Age : 18
Salary : 50000000
Process returned 0 (0x0)   execution time : 9.986 s
Press any key to continue.
```

Q7.1 Modify the program in the following way

Enter salary components
Basic:____
HRA:_____
BOOK Allowance:_____
Furniture Allowance: _____
Special allowance:_____
Total salary = sum(basic+HRA+BOOK Allowance+Furniture Allowance+Special allowance)

```
#include<iostream>
using namespace std ;
struct income
{
   int basic, HRA, book_all, furn_all, special_all;
};
struct employee
{
   char name[20];
    int age ;
   struct income emp;

}s1;
int main()
{
   int total;
   cout<<"Enter The Name\n";
   cin>>s1.name;
   cout<<"Enter Age\n";
   cin>>s1.age;
   cout<<"Enter Salary Components :\n";
   cout<<"Basic____:\n";
   cin>>s1.emp.basic;
   cout<<"HRA____:\n";
   cin>>s1.emp.HRA;
   cout<<"Book Allowance_____:\n";
   cin>>s1.emp.book_all;
   cout<<"Furniture Allowance_____:\n";
   cin>>s1.emp.furn_all;
   cout<<"Special Allowance____:\n";
   cin>>s1.emp.special_all;
   total =
s1.emp.basic+s1.emp.book_all+s1.emp.furn_all+s1.emp.HRA+s1.emp.special_all;
```

```
   cout<<"\nName : "<<s1.name;
   cout<<"\nAge : "<<s1.age;
   cout<<"\nTotal Salary = "<<total;
   return 0;
}
```



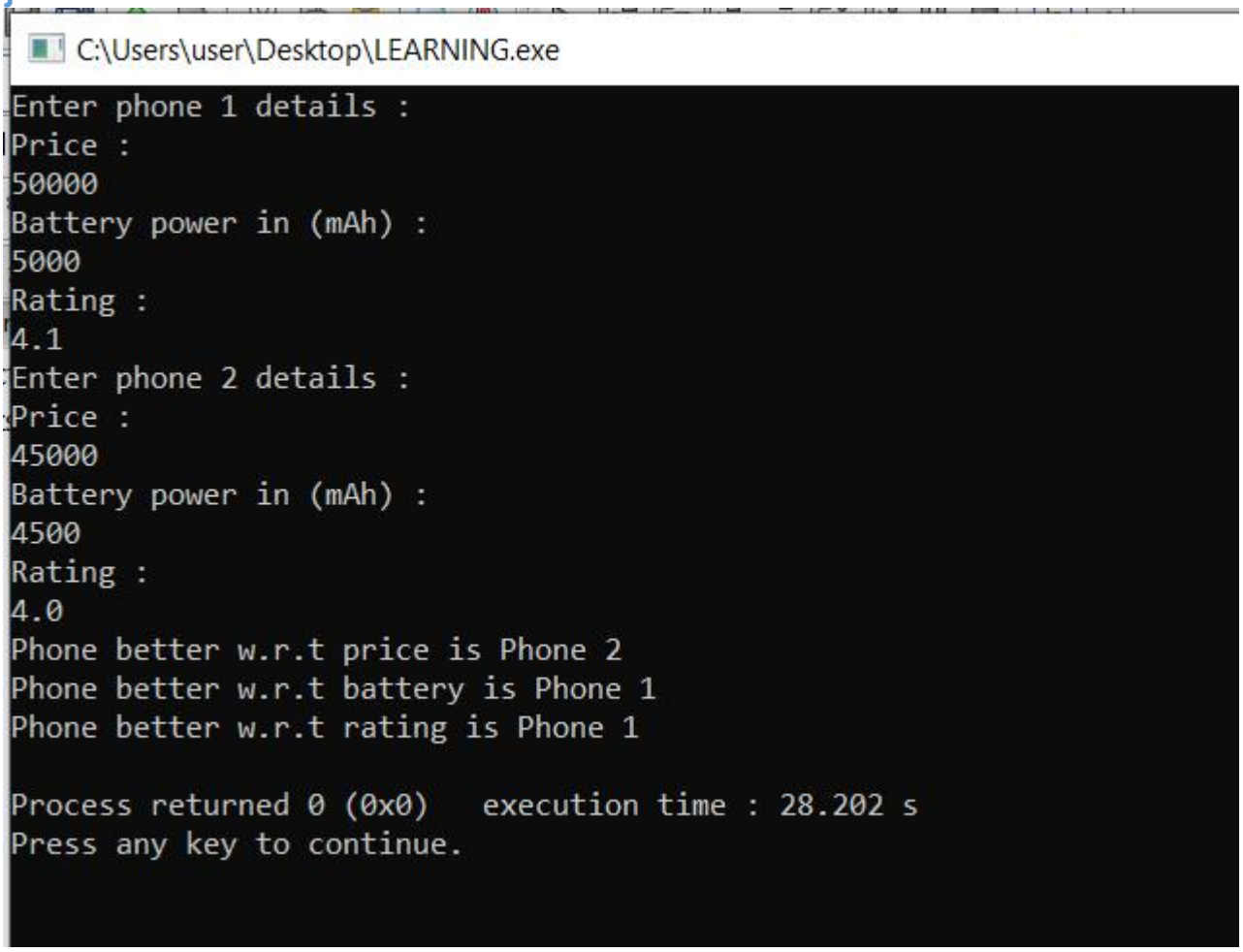
Q.8 Write a program in C++ to compare individual members of structures.
a) Create 'phone' structure with Price, Battery Power (In mAH)and Rating (between 0-5) as member variables.

b) Create two structure variables (Two phone).

c) Compare both phones and display the better phone w.r.t to each criterion (A better phone is low in price with better Battery Power and high rating).

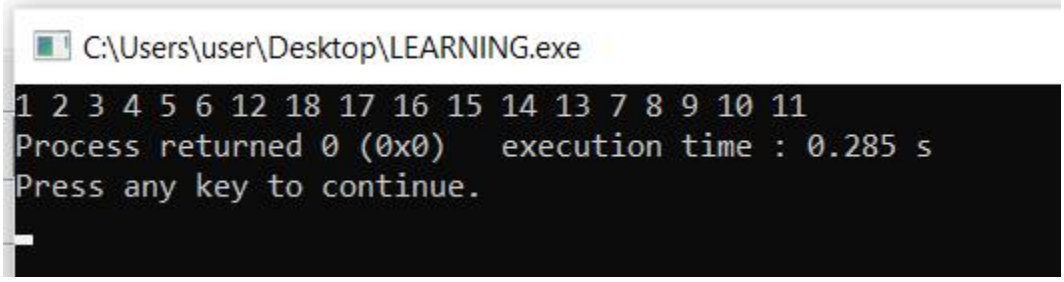
```
#include<iostream>
using namespace std;

struct phone
{
   int price, battery;
   float rating;
}p1,p2;
int main()
{
   cout<<"Enter phone 1 details :\n";
   cout<<"Price :\n";
   cin>>p1.price;
   cout<<"Battery power in (mAh) :\n";
   cin>>p1.battery;
   cout<<"Rating : \n";
   cin>>p1.rating;
   cout<<"Enter phone 2 details :\n";
   cout<<"Price :\n";
   cin>>p2.price;
   cout<<"Battery power in (mAh) :\n";
   cin>>p2.battery;
   cout<<"Rating : \n";
   cin>>p2.rating;

   if(p1.price<p2.price)
   {
      cout<<"Phone better w.r.t price is Phone 1\n";
   }
   else
   {
    cout<<"Phone better w.r.t price is Phone 2\n";
   }
   if(p1.battery>p2.battery)
   {
```

```
    cout<<"Phone better w.r.t battery is Phone 1\n";
  }
  else
  {
   cout<<"Phone better w.r.t battery is Phone 2\n";
  }
  if(p1.rating>p2.rating)
  {

    cout<<"Phone better w.r.t rating is Phone 1\n";
  }
  else
  {
   cout<<"Phone better w.r.t rating is Phone 2\n";
  }
  return 0;
}
```



Q.9 Write a C++ program to read a 2-D matrix from the user and display it in spiral form.

```
#include <iostream>
using namespace std;
#define R 3
#define C 6

void spiralPrint (int m, int n, int a[R][C])
{
   int i, k = 0, l = 0;
   while (k < m && l < n) {

      for (i = l; i < n; ++i) {
         cout << a[k][i] << " ";
      }
      k++;
      for (i = k; i < m; ++i) {
         cout << a[i][n - 1] << " ";
      }
      n--;
      if (k < m) {
         for (i = n - 1; i >= l; --i) {
            cout << a[m - 1][i] << " ";
         }
         m--;
      }
      if (l < n) {
         for (i = m - 1; i >= k; --i) {
            cout << a[i][l] << " ";
         }
         l++;
      }}}
int main()
{
   int a[R][C] = { { 1, 2, 3, 4, 5, 6 },
                   { 7, 8, 9, 10, 11, 12 },
                   { 13, 14, 15, 16, 17, 18 } };

   spiralPrint(R, C, a);
   return 0;
}
```



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