S.No: 6	Exp. Name: ***Write a C program to Sort the elements using Insertion Sort Technique***	Date: 2022-06-27

Aim:

Write a program to **sort** the given elements using `insertion sort technique`.

At the time of execution, the program should print the message on the console as:

```
Enter value of n :
```

For example, if the user gives the **input** as:

```
Enter value of n : 3
```

Next, the program should print the messages one by one on the console as:

```
Enter element for a[0] :
Enter element for a[1] :
Enter element for a[2] :
```

if the user gives the **input** as:

```
Enter element for a[0] : 22
Enter element for a[1] : 33
Enter element for a[2] : 12
```

then the program should **print** the result as:

```
Before sorting the elements in the array are
Value of a[0] = 22
Value of a[1] = 33
Value of a[2] = 12
After sorting the elements in the array are
Value of a[0] = 12
Value of a[1] = 22
Value of a[2] = 33
```

Fill in the missing code so that it produces the desired result.

Source Code:

InsertionSortDemo3.c

```
#include<stdio.h>
void main() {
   int a[20], i, n, j, temp;
   printf("Enter value of n : ");
   scanf("%d", &n);
   // Write the for loop to read array elements
   for(i=0;i<n;i++)
   { printf("Enter element for a[%d] : ",i);
     scanf("%d",&a[i]);
   }
   printf("Before sorting the elements in the array are\n");
   // Write the for loop to display array elements before sorting
   for(i=0;i<n;i++)
   printf("Value of a[%d] = %d\n",i,a[i]);
```

```
   //Write the code to sort elements
   for(i=1;i<n;i++)
   {  temp=a[i];
      for(j=i-1;temp<a[j]&&j>=0;j--)
      a[j+1]=a[j];
      a[j+1]=temp;
   }


   printf("After sorting the elements in the array are\n");
   // Write the for loop to display array elements after sorting
   for(i=0;i<n;i++)
   printf("Value of a[%d] = %d\n",i,a[i]);

}
```


Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter value of n : 5
Enter element for a[0] : 6
Enter element for a[1] : 9
Enter element for a[2] : 2
Enter element for a[3] : 5
Enter element for a[4] : 1
Before sorting the elements in the array are
Value of a[0] = 6
Value of a[1] = 9
Value of a[2] = 2
Value of a[3] = 5
Value of a[4] = 1
After sorting the elements in the array are
Value of a[0] = 1
Value of a[1] = 2
Value of a[2] = 5
Value of a[3] = 6
Value of a[4] = 9

Test Case - 2
User Output
Enter value of n : 3
Enter element for a[0] : 5
Enter element for a[1] : 9
Enter element for a[2] : 2
Before sorting the elements in the array are
Value of a[0] = 5
Value of a[1] = 9

Test Case - 2
Value of a[2] = 2
After sorting the elements in the array are
Value of a[0] = 2
Value of a[1] = 5
Value of a[2] = 9

Test Case - 3
User Output
Enter value of n : 6
Enter element for a[0] : 5
Enter element for a[1] : 4
Enter element for a[2] : 6
Enter element for a[3] : 2
Enter element for a[4] : 3
Enter element for a[5] : 41
Before sorting the elements in the array are
Value of a[0] = 5
Value of a[1] = 4
Value of a[2] = 6
Value of a[3] = 2
Value of a[4] = 3
Value of a[5] = 41
After sorting the elements in the array are
Value of a[0] = 2
Value of a[1] = 3
Value of a[2] = 4
Value of a[3] = 5
Value of a[4] = 6
Value of a[5] = 41