K. J. Somaiya College of Engineering, Mumbai-77

A Constituent College of Somaiya Vidyavihar University

Batch: P5-2	**Roll No.: 16010422185**
Experiment / assignment / tutorial No. 5	
Grade: AA / AB / BB / BC / CC / CD /DD	
Signature of the Staff In-charge with date	

TITLE: Program to sort array

AIM: Program to sort the 1D array in the ascending or descending order and then accept the element from user and insert in the same array at its correct place by keeping array sorted

Expected OUTCOME of Experiment:

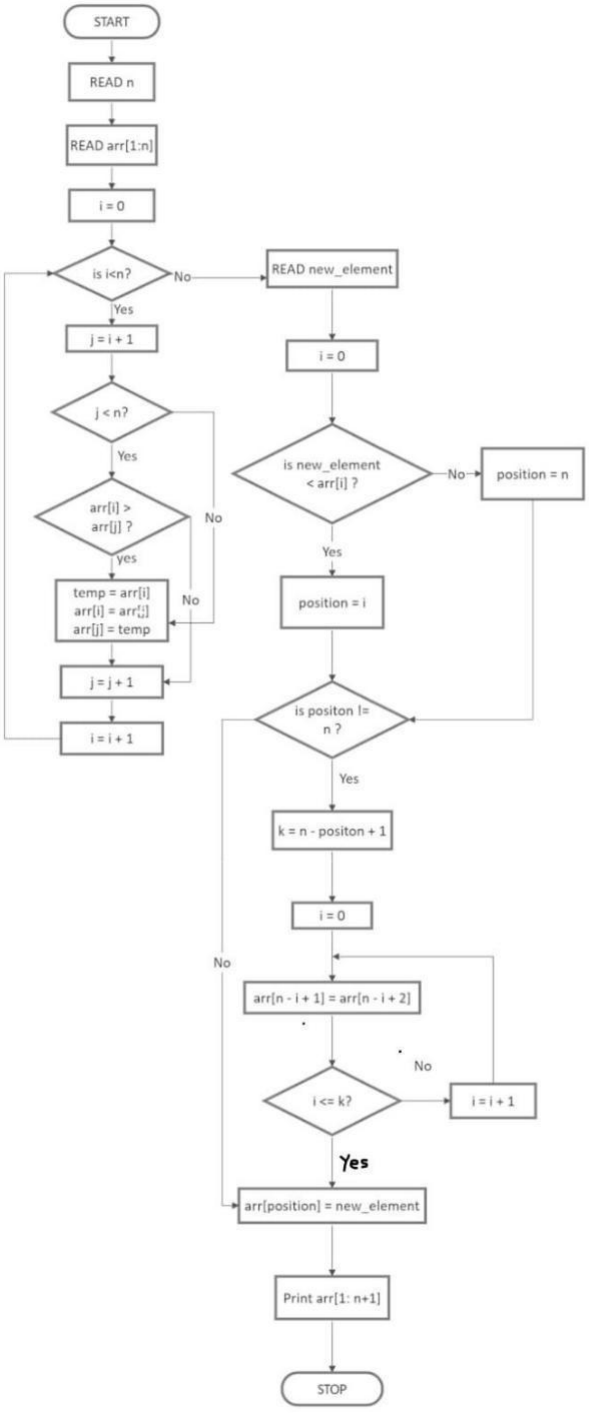
Books/ Journals/ Websites referred:

1. Programming in C, second edition, Pradeep Dey and Manas Ghosh, Oxford University Press.
2. Programming in ANSI C, fifth edition, E Balagurusamy, Tata McGraw Hill.
3. Introduction to programming and problem solving, G. Michael Schneider ,Wiley India edition.
4. http://cse.iitkgp.ac.in/~rkumar/pds-vlab/

Problem Definition:

The program takes a 1D array and sorts it in the specified manner. The user enters an element and the same has to be inserted at the correct place in the sorted array.

Flowchart:


START
READ n
READ arr[1:n]
i = 0
is i<n?
No
Yes
READ new_element
j = i + 1
i = 0
j < n?
Yes
is new_element < arr[i] ?
No
position = n
arr[i] > arr[j] ?
No
yes
Yes
temp = arr[i]
arr[i] = arr[j]
arr[j] = temp
No
position = i
j = j + 1
is positon != n ?
i = i + 1
Yes
k = n - positon + 1
i = 0
No
arr[n - i + 1] = arr[n - i + 2]
No
i <= k?
i = i + 1
Yes
arr[position] = new_element
Print arr[1: n+1]
STOP

Implementation details:

```
#include <stdio.h>

int main()
{
   int n, new_element, position;

   printf("Enter n: ");
   scanf("%d", &n);
   int arr[n];

   printf("Enter elements of array: ");
   for (int i = 0; i < n; i++)
   {
      scanf("%d", &arr[i]);
   }

   for (int i = 0; i < n; i++)
   {
      for (int j = i + 1; j < n; j++)
      {
         if (arr[i] > arr[j])
         {
            int temp = arr[i];
            arr[i] = arr[j];
            arr[j] = temp;
         }
      }
   }

   printf("Sorted array is: ");
   for (int i = 0; i < n; i++)
   {
      printf("%d ", arr[i]);
   }

   printf("\nEnter element to be inserted: ");
   scanf("%d", &new_element);

   for (int i = 0; i < n; i++)
   {
      if (new_element < arr[i])
      {

         position = i;
         break;
      }
      if (new_element > arr[n - 1])
      {
         position = n;
```

```
            break;
        }
    }

    if (position != n)
    {
        int k = n - position + 1;
        for (int i = 0; i <= k; i++)
        {
            arr[n - i + 2] = arr[n - i + 1];
        }
    }

    arr[position] = new_element;

    printf("New Sorted array is: ");
    for (int i = 0; i < n + 1; i++)
    {
        printf("%d ", arr[i]);
    }

    return 0;
}
```

Output(s):

```
Enter n: 5
Enter elements of array: 45 64 343 66 2
Sorted array is: 2 45 64 66 343
Enter element to be inserted: 65
New Sorted array is: 2 45 64 65 66 343
```

Conclusion: 1D array entered by the user is sorted and the inserted element is placed at its correct position.

Post Lab Descriptive Questions

Write a program to enter n numbers, store them in an array and rearrange the array in the reverse order.

Answer:

```
#include <stdio.h>

int main()
{
   int n, temp;
   printf("Enter n: ");
   scanf("%d", &n);
   int arr[n];

   printf("Enter elements of array: ");
   for (int i = 0; i < n; i++)
   {
      scanf("%d", &arr[i]);
   }

   printf("Array in reverse order: ");
   for (int i = n - 1; i >= 0; i--)
   {
      printf("%d ", arr[i]);
   }

   return 0;
}
```

Output:

```
Enter n: 5
Enter elements of array: 45 33 2 77 45
Array in reverse order: 45 77 2 33 45
```

Date: _____ **Signature of faculty in-charge**