

Program:

Insertion Sort

```
#include <stdio.h>

void insertionSort(int arr[], int length){
    for (int i = 1; i < length - 1; i++){
        int temp = arr[i];
        while (arr[i - 1] > temp){
            arr[i] = arr[i - 1];
            i--;
        }
        arr[i] = temp;
    }
    printf("The Sorted Values are: ");
    for (int i = 0; i < length; i++){
        printf("%d\t", arr[i]);
    }
}

int main()
{
    int arr[20],length;
    printf("Enter The Number of Values: ");
    scanf("%d", &length);
    printf("Enter The %d Values: \n", length);
    for (int i = 0; i < length; i++){
        scanf("%d", &arr[i]);
    }
    insertionSort(arr, length);
    return 0;
}
```

OUTPUT:

```
→ root@kali ~/Documents/Class/PCC-SEM-3/Data-Structures/Expt8-sort ./a.out
Enter The Number of Values: 6
Enter The 6 Values:
4 3 1 9 2 4
The Sorted Values are: 2      3      4      6      9      4
```

HeapSort

```
#include <stdio.h>

void heapSort(int arr[], int length){
    int temp, c, root;
    for (int i = 1; i < length; i++){
        c = i;
        do{
            root = (c - 1) / 2;
            if (arr[root] < arr[c]){
                temp = arr[root];
                arr[root] = arr[c];
                arr[c] = temp;
            }
            c = root;
        } while (c != 0);
    }
    printf("The MAX Values are: ");
    for (int i = 0; i < length; i++){
        printf("%d\t", arr[i]);
    }
    printf("\n");
    for (int j = length - 1; j >= 0; j--){
        temp = arr[0];
        arr[0] = arr[j];
        arr[j] = temp;
        root = 0;
        do{
            c = 2 * root + 1;
            if ((arr[c] < arr[c + 1]) && c < j - 1)
                c++;
            if (arr[root] < arr[c] && c < j){
                temp = arr[root];
                arr[root] = arr[c];
                arr[c] = temp;
            }
        } while (c < j);
    }
}
```

```

        }
        root = c;
    } while (c < j);
}
printf("The Sorted Values are: ");
for (int i = 0; i < length; i++){
    printf("%d\t", arr[i]);
}
}
int main()
{
    int arr[20],length;
    printf("Enter The Number of Values: ");
    scanf("%d", &length);
    printf("Enter The %d Values: \n", length);
    for (int i = 0; i < length; i++){
        scanf("%d", &arr[i]);
    }
    heapSort(arr, length);
    return 0;
}

```

OUTPUT:

```

→ root@kali ~/Documents/Class/PCC-SEM-3/Data-Structures/Expt8-sort ./a.out
Enter The Number of Values: 6
Enter The 6 Values:
4 3 1 8 0 2
The MAX Values are: 8    4    2    3    0    1
The Sorted Values are: 0    1    2    3    4    8

```