

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      #

```