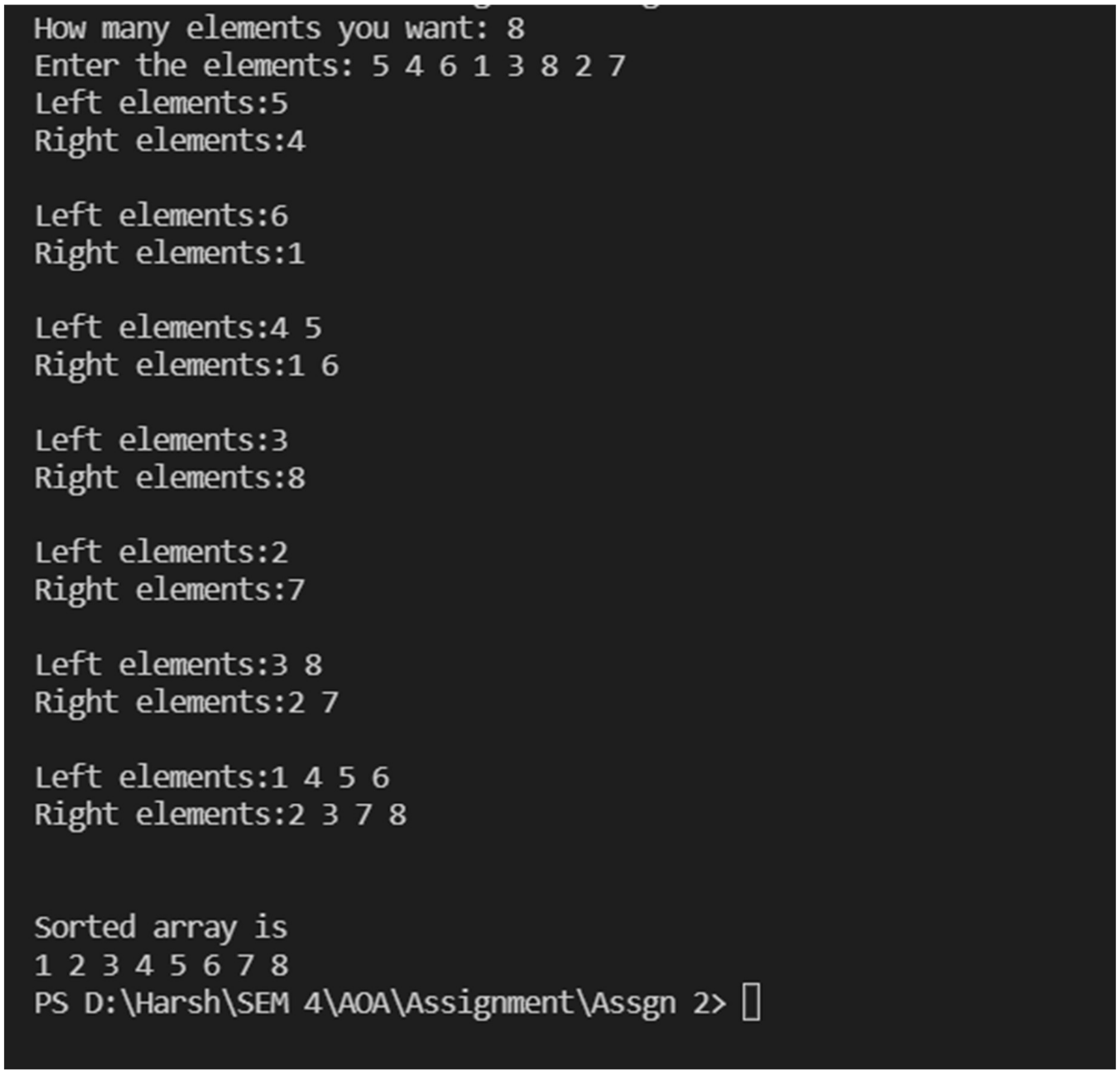
PROGRAM

Merge Sort:

```
#include <stdio.h>
#include <stdlib.h>
void Array(int A[], int size){
int i;
for (i = 0; i < size; i++)
printf("%d ", A[i]);
printf("\n");
}
void merge(int arr[], int l, int m, int h){
int i, j, k;
int n1 = m - l + 1;
int n2 = h - m;
int L[n1], R[n2];
for (i = 0; i < n1; i++)
L[i] = arr[l + i];
for (j = 0; j < n2; j++)
R[j] = arr[m + 1 + j];
i = 0;
j = 0;
k = l;
while (i < n1 && j < n2) {
if (L[i] <= R[j]) {
arr[k] = L[i];
i++;
}
else {
arr[k] = R[j];
j++;
}
k++;
}
while (i < n1) {
arr[k] = L[i];
i++;
k++;
}
while (j < n2) {
arr[k] = R[j];
j++;
k++;
}
printf("Left elements:");
Array(L, n1);
printf("Right elements:");
Array(R, n2);
printf("\n");
}

void mergeSort(int arr[], int l, int h){
if (l < h) {
int m = (l + h) / 2;
mergeSort(arr, l, m);
mergeSort(arr, m + 1, h);
merge(arr, l, m, h);
}
}
```

```
int main(){
int n;
 printf("How many elements you want: ");
 scanf("%d", &n);
 int arr[n];
 printf("Enter the elements: ");
 for(int i=0; i<n; i++){
 scanf("%d", &arr[i]);
 }
mergeSort(arr, 0, n - 1);
printf("\nSorted array is \n");
Array(arr, n);
return 0;
}
```

OUTPUT:



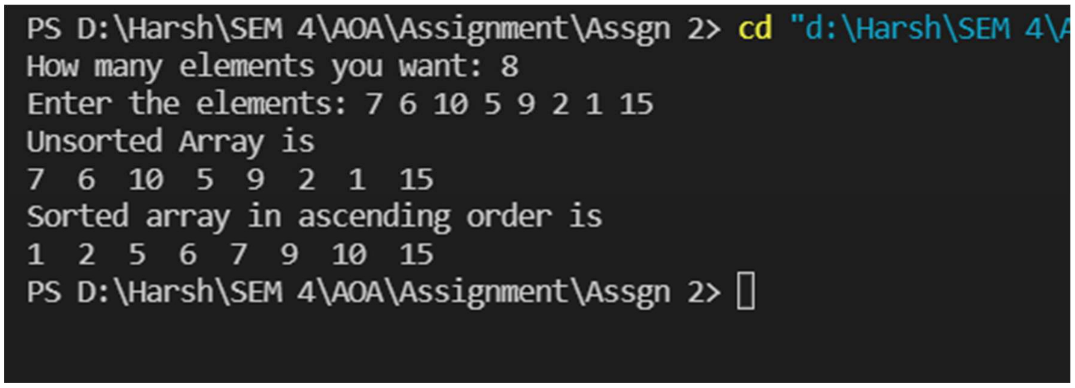
```
How many elements you want: 8
Enter the elements: 5 4 6 1 3 8 2 7
Left elements:5
Right elements:4

Left elements:6
Right elements:1

Left elements:4 5
Right elements:1 6

Left elements:3
Right elements:8

Left elements:2
Right elements:7

Left elements:3 8
Right elements:2 7

Left elements:1 4 5 6
Right elements:2 3 7 8


Sorted array is
1 2 3 4 5 6 7 8
PS D:\Harsh\SEM 4\AOA\Assignment\Assgn 2> 
```

QUICK SORT:

```
#include <stdio.h>
void swap(int *a, int *b) {
 int t = *a;
 *a = *b;
 *b = t;
}

int partition(int array[], int low, int high) {
 int pivot = array[low];
 int i = low;
 int j = high;
 while(i<j){
 do{
    i++;
 }while(array[i]<=pivot);
 do{
    j--;
 }while(array[j]>pivot);
 if(i<j)
 swap(&array[i], &array[j]);
 }
 swap(&array[low], &array[j]);
 return (j);
}

void quickSort(int array[], int low, int high){
 if (low < high) {
   int j=partition(array, low, high);
```

```
    quickSort(array, low, j);
    quickSort(array, j + 1, high);
  }
}

void Array(int array[], int size){
  for (int i = 0; i < size; ++i) {
    printf("%d  ", array[i]);
  }
  printf("\n");
}

int main(){
int n;
printf("How many elements you want: ");
scanf("%d", &n);
int arr[n];
printf("Enter the elements: ");
for(int i=0; i<n; i++){
scanf("%d", &arr[i]);
}
printf("Unsorted Array is \n");
Array(arr, n);
quickSort(arr, 0, n);
printf("Sorted array in ascending order is \n");
Array(arr, n);
}
```

OUTPUT:



```
PS D:\Harsh\SEM 4\AOA\Assignment\Assgn 2> cd "d:\Harsh\SEM 4\A
How many elements you want: 8
Enter the elements: 7 6 10 5 9 2 1 15
Unsorted Array is
7  6  10  5  9  2  1  15
Sorted array in ascending order is
1  2  5  6  7  9  10  15
PS D:\Harsh\SEM 4\AOA\Assignment\Assgn 2>
```