Name:Gaurav singh

Roll No: 70

Semester: 3 Sem.

Subject: Data structures and Algorithms.

Practical: 8 Develop the programs for the following sorting algorithms:

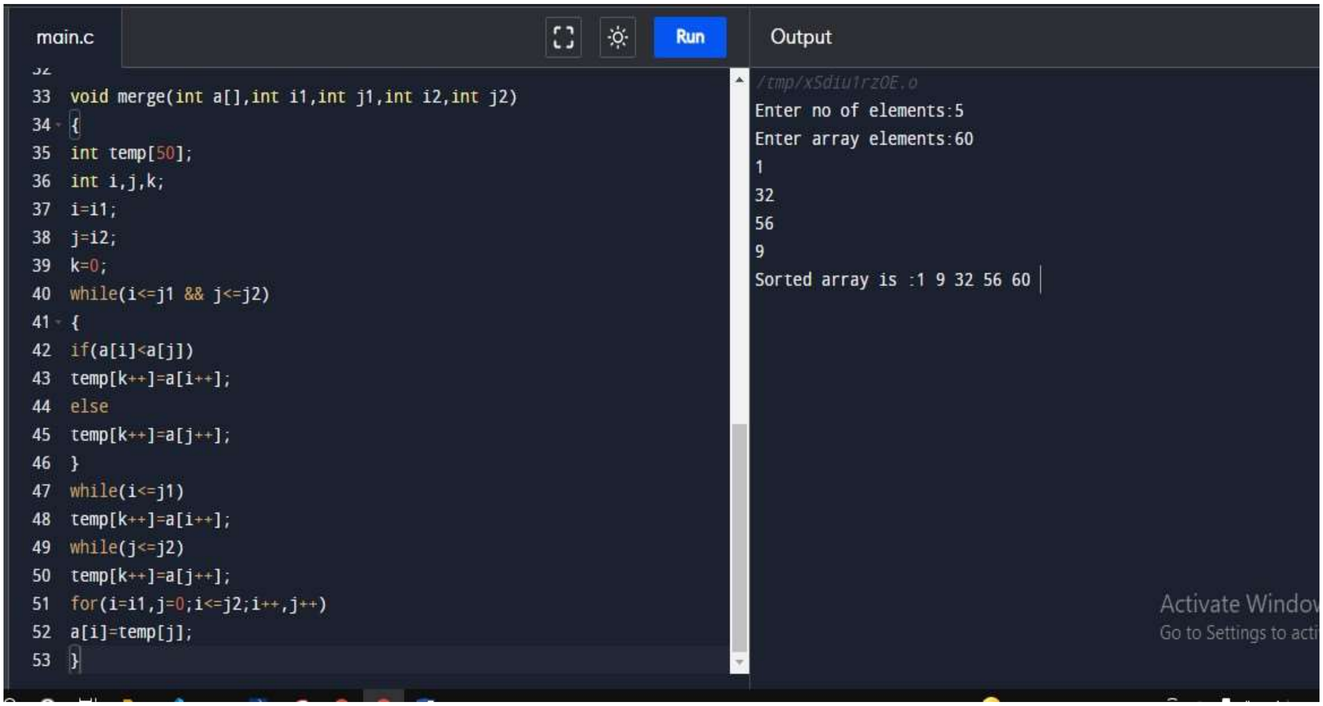
1. Merge Sort
2. Quick Sort

1. MERGE SORT:

```
#include<stdio.h>


void mergesort(int a[],int i,int j);

void merge(int a[],int i1,int j1,int i2,int j2);


int main()

{

int a[30],n,i;

printf("Enter no of elements:");

scanf("%d",&n);

printf("Enter array elements:");

for(i=0;i<n;i++)

scanf("%d",&a[i]);

mergesort(a,0,n-1);

printf("\nSorted array is :");

for(i=0;i<n;i++)

printf("%d ",a[i]);

return 0;

}
```

```
void mergesort(int a[],int i,int j)
{
int mid;
if(i<j)
{
mid=(i+j)/2;
mergesort(a,i,mid);
mergesort(a,mid+1,j);
merge(a,i,mid,mid+1,j);
}
}

void merge(int a[],int i1,int j1,int i2,int j2)
{
int temp[50];
int i,j,k;
i=i1;
j=i2;
k=0;
while(i<=j1 && j<=j2)
{
if(a[i]<a[j])
temp[k++]=a[i++];
else
temp[k++]=a[j++];
}
while(i<=j1)
temp[k++]=a[i++];
while(j<=j2)
temp[k++]=a[j++];
for(i=i1,j=0;i<=j2;i++,j++)
a[i]=temp[j];
}
```

Output Screen:



```
void merge(int a[],int i1,int j1,int i2,int j2)
{
int temp[50];
int i,j,k;
i=i1;
j=i2;
k=0;
while(i<=j1 && j<=j2)
{
if(a[i]<a[j])
temp[k++]=a[i++];
else
temp[k++]=a[j++];
}
while(i<=j1)
temp[k++]=a[i++];
while(j<=j2)
temp[k++]=a[j++];
for(i=i1,j=0;i<=j2;i++,j++)
a[i]=temp[j];
}
```

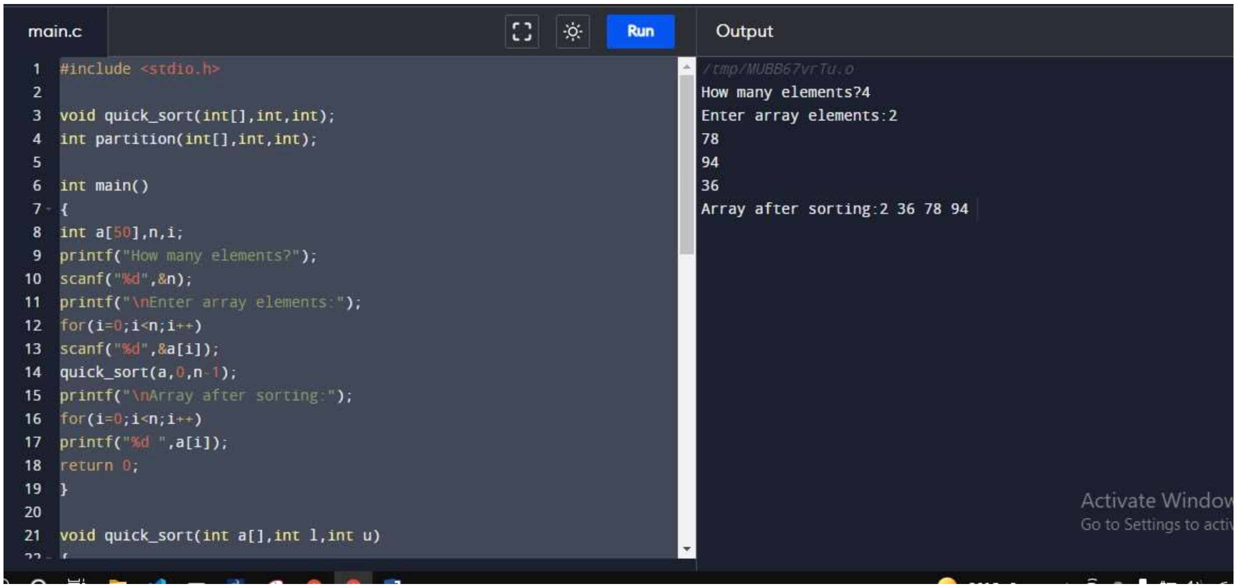
```
/tmp/xSdiu1rzOE.o
Enter no of elements:5
Enter array elements:60
1
32
56
9
Sorted array is :1 9 32 56 60
```

2. QUICK SORT:

```
#include <stdio.h>

void quick_sort(int[],int,int);
int partition(int[],int,int);

int main()
{
int a[50],n,i;
printf("How many elements?");
scanf("%d",&n);
printf("\nEnter array elements:");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
quick_sort(a,0,n-1);
printf("\nArray after sorting:");
for(i=0;i<n;i++)
printf("%d ",a[i]);
return 0;
}

void quick_sort(int a[],int l,int u)
{
int j;
if(l<u)
{
j=partition(a,l,u);
quick_sort(a,l,j-1);
quick_sort(a,j+1,u);
}
}

int partition(int a[],int l,int u)
{
int v,i,j,temp;
v=a[l];
i=l;
j=u+1;
do
{
do
i++;
while(a[i]<v&&i<=u);
do
j--;
while(v<a[j]);
if(i<j)
{
temp=a[i];
a[i]=a[j];
a[j]=temp;
}
}while(i<j);
a[l]=a[j];
a[j]=v;
return(j);
```

}

Output Screen:



```c
#include <stdio.h>

void quick_sort(int[],int,int);
int partition(int[],int,int);

int main()
{
int a[50],n,i;
printf("How many elements?");
scanf("%d",&n);
printf("\nEnter array elements:");
for(i=0;i<n;i++)
scanf("%d",&a[i]);
quick_sort(a,0,n-1);
printf("\nArray after sorting:");
for(i=0;i<n;i++)
printf("%d ",a[i]);
return 0;
}

void quick_sort(int a[],int l,int u)
{
```

```
/tmp/MUBB67vrTu.o
How many elements?4
Enter array elements:2
78
94
36
Array after sorting:2 36 78 94
```