**PROGRAM CODE**

/\* Program to implement insertion sort using C programming language \*/

#include<stdio.h>

#include<conio.h>

int main(){

int size;

printf("Enter the size of the array : ");

scanf("%d",&size);

int i, j, arr[size], small;

printf("Enter %d numbers which are to be sorted : ", size);

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

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

for(i=1; i<size; i++){

small = arr[i];

for(j=i-1; j>=0 && arr[j]>small; j--)

arr[j+1] = arr[j];

arr[j+1] =small;

}

printf("The sorted numbers are : ");

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

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

}

**OUTPUT**

1.

Enter the size of the array : 9

Enter 9 numbers which are to be sorted : 12 23 25 165 56 255 97 98 565

The sorted numbers are : 12 23 25 56 97 98 165 255 565

2.

Enter the size of the array : 10

Enter 10 numbers which are to be sorted : 584 49 514 9 966 59 65 487 458 32

The sorted numbers are : 9 32 49 59 65 458 487 514 584 966

**PROGRAM CODE**

/\* Program to implement merge sort using C programming language \*/

#include<stdio.h>

#include<conio.h>

void merge(int [], int [], int, int, int);

void msort(int [], int [], int , int);

int main(){

int size;

printf("Enter the size of the array : ");

scanf("%d", &size);

int i, j, arr[size], small, temp[size];

printf("Enter %d numbers which are to be sorted : ", size);

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

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

msort(arr, temp, 0, size-1);

printf("The sorted numbers are : ");

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

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

}

void msort(int arr[], int temp[], int left, int right){

int mid;

if(left < right){

mid = (left + right) / 2;

msort(arr, temp, left, mid);

msort(arr, temp, mid+1, right);

merge(arr, temp, left, mid+1, right);

}

}

void merge(int arr[], int temp[], int left, int mid, int right){

int i, lend, no\_element, tmpos;

lend = mid - 1;

tmpos = left;

no\_element = right - left + 1;

while ((left <= lend) && (mid <= right)){

if(arr[left] <= arr[mid]){

temp[tmpos] = arr[left];

tmpos ++;

left++;

}

else{

temp[tmpos] = arr[mid];

tmpos++;

mid ++;

}

}

while (left <= lend){

temp[tmpos] = arr[left];

left++;

tmpos++;

}

while ((mid <= right)){

temp[tmpos] = arr[mid];

mid ++;

tmpos ++;

}

for(i=0; i<=no\_element; i++){

arr[right] = temp[right];

right --;

}

}

**OUTPUT**

1.

Enter the size of the array : 10

Enter 10 numbers which are to be sorted : 65 459 64 23 52 589 2510 46 4 146

The sorted numbers are : 4 23 46 52 64 65 146 459 589 2510

2.

Enter the size of the array : 9

Enter 9 numbers which are to be sorted : 54 4518 545 12 46 236 10 320 124

The sorted numbers are : 10 12 46 54 124 236 320 545 4518

**PROGRAM CODE**

/\* Program to implement binary search in C programming language \*/

#include<stdio.h>

#include<conio.h>

void binsrch(int [], int, int, int);

int main(){

int size;

printf("Enter the size of the array : ");

scanf("%d", &size);

int i, j, item, arr[size], small;

char ch;

printf("Enter %d numbers to implement binary search : ", size);

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

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

for(i=1; i<size; i++){

small = arr[i];

for(j=i-1; j>=0 && arr[j]>small; j--)

arr[j+1] = arr[j];

arr[j+1] = small;

}

printf("The sorted numbers are : ");

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

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

printf("\n");

do{

printf("\nEnter no. to be searched : ");

scanf("%d", &item);

binsrch(arr, 0, size, item);

fseek(stdin,0,SEEK\_END);

printf("Do you want to search for another number (Y/N)? : ");

scanf("%c",&ch);

}

while ((ch == 'Y') || (ch == 'y'));

}

void binsrch(int arr[], int beg, int end, int item){

int mid, count=1;

mid = (beg+end)/2;

while(beg<=end && item != arr[mid]){

if(item < arr[mid])

end =mid-1;

else

beg=mid+1;

mid=(beg+end)/2;

count++;

}

if(item==arr[mid]){

printf("Search successful!!! \n ");

printf("It took %d iterations to find this item", count);

printf("\n The position is %d \n\n",mid+1);

}

else

printf("Search unsuccessful!!! \n\n");

}

**OUTPUT**

Enter the size of the array : 10

Enter 10 numbers to implement binary search : 210 15 164 48 494 89 97 12 1 4850

The sorted numbers are : 1 12 15 48 89 97 164 210 494 4850

Enter no. to be searched : 89

Search successful!!!

It took 4 iterations to find this item

The position is 5

Do you want to search for another number (Y/N)? : y

Enter no. to be searched : 97

Search successful!!!

It took 1 iterations to find this item

The position is 6

Do you want to search for another number (Y/N)? : y

Enter no. to be searched : 40

Search unsuccessful!!!

Do you want to search for another number (Y/N)? : y

Enter no. to be searched : 4850

Search successful!!!

It took 3 iterations to find this item

The position is 10

Do you want to search for another number (Y/N)? : n