S.No: 10	Exp. Name: ***Write a C program to sort the given elements using Heap sort***	Date:2023-05-08

Aim:

Write a program to sort (ascending order) the given elements using heap sort technique.

Note: Do use the printf() function with a newline character (\n).

Source Code:

HeapSortMain.c

```
#include<stdio.h>
void main()
{
   int arr[15],i,n;
   printf("Enter array size : ");
   scanf("%d",&n);
   printf("Enter %d elements : ",n);
   for(i=0;i<n;i++)
   {
      scanf("%d",&arr[i]);
   }
   printf("Before sorting the elements are : ");
   display(arr,n);
   heapsort(arr,n);
   printf("After sorting the elements are : ");
   display(arr,n);
}
void display(int arr[15],int n)
{
   int i;
   for(i=0;i<n;i++)
   printf("%d ",arr[i]);
   printf("\n");
}
void heapify(int arr[],int n,int i)
{
   int largest=i;
   int l=2*i+1;
   int r=2*i+2;
   int temp;
   if(l<n&&arr[l]>arr[largest])
   largest=l;
   if(r<n&&arr[r]>arr[largest])
   largest=r;
   if(largest!=i)
   {
      temp=arr[i];
      arr[i]=arr[largest];
      arr[largest]=temp;
      heapify(arr,n,largest);
   }
}
void heapsort(int arr[],int n)
{
```

```
    int i,temp;
    for(i=n/2-1;i>=0;i--)
    {
       heapify(arr,n,i);
    }
    for(i=n-1;i>=0;i--)
    {
       temp=arr[0];
       arr[0]=arr[i];
       arr[i]=temp;
       heapify(arr,i,0);
    }
 }
```


Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter array size : 5
Enter 5 elements : 23 54 22 44 12
Before sorting the elements are : 23 54 22 44 12
After sorting the elements are : 12 22 23 44 54

Test Case - 2
User Output
Enter array size : 6
Enter 6 elements : 12 65 23 98 35 98
Before sorting the elements are : 12 65 23 98 35 98
After sorting the elements are : 12 23 35 65 98 98

Test Case - 3
User Output
Enter array size : 4
Enter 4 elements : -23 -45 -12 -36
Before sorting the elements are : -23 -45 -12 -36
After sorting the elements are : -45 -36 -23 -12

Test Case - 4
User Output
Enter array size : 6
Enter 6 elements : 1 -3 8 -4 -2 5
Before sorting the elements are : 1 -3 8 -4 -2 5
After sorting the elements are : -4 -3 -2 1 5 8