**EX:12 IMPLEMENTATION OF HEAP**

#include <stdio.h>

#include<stdlib.h>

int size = 0,i=0;

void swap(int \*a, int \*b)

{

// Swap the values \*a and \*b using \*temp

int temp=\*a;

\*a=\*b;

\*b=temp;

}

// Heapify the tree

void heapify(int array[], int size, int i)

{

// Check if the size is 1. If yes, display "There is only one element in Heap"

if(size ==1 )

{

printf("There is only one element in Heap");

}

else

{

int largest = i;

int left = 2 \* i + 1;

int right = 2 \* i + 2;

if(left < size && array[left]>array[largest])

{

largest = left;

}

if(right > size && array[right] > array[largest])

{

largest = right;

}

if(largest!=i)

{

swap(&array[i],&array[largest]);

heapify(array,size,largest);

}

}

}

// Insert function

void insert(int array[], int temp)

{

// Check whether the size value is 0. If yes, assign temp to array[0] and increment the size by 1

if(size==0)

{

array[0]=temp;

size=size+1;

}

else

{

array[size]=temp;

size=size+1;

for(i=size/2-1;i>=0;i--)

{

heapify(array,size,i);

}

}

}

// Delete function

void deleteRoot(int array[], int num)

{

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

{

if(num==array[i])

{

break;

}

}

// Call swap function by passing &array[i] and &array[size-1]

swap(&array[i],&array[size-1]);

// Decrement the value of size

size--;

for(i=size/2-1;i>=0;i--)

{

heapify(array,size,i);

}

}

// Display function

void display(int array[])

{

// Generate a loop i from 0 to size and display the array values

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

{

printf("\n%d",array[i]);

}

}

// Main function

int main()

{

// Declare an array

int array[20];

int i=0;

int temp,num,element,del;

// Get the maximum number of element from the user

int size = 0;

printf("\nName:R.Sridevi");

printf("\nRoll.No:20UIT021");

printf("\nProgram Name:Implementation of heap");

printf("\nEnter the total number of elements:");

scanf("%d",&size);

// Generate a loop to get the input element and call the insert function by passing the array and element

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

{

printf("Enter the %d element:",i+1);

scanf("%d",&temp);

insert(array,temp);

}

// Call the display function by passing the array and size

display(array);

// Get the element to be deleted and call the delete function by passing array and element

printf("\n Enter the element to be deleted:\n");

scanf("%d",&num);

deleteRoot(array,num);

// Call the display function by passing the array and size

display(array);

}

**OUTPUT:**

Name:R.Sridevi

Roll.No:20UIT021

Program Name:Implementation of heap

Enter the total number of elements:5

Enter the 1 element:10

Enter the 2 element:4

Enter the 3 element:2

Enter the 4 element:18

Enter the 5 element:5

1810245

Enter the element to be deleted:

10

18524

Enter the total number of elements:5

Enter the 1 element:3

Enter the 2 element:5

Enter the 3 element:7

Enter the 4 element:9

Enter the 5 element:1

95731

Enter the element to be deleted:

5

9371