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/*C Program to implement Heap Sort Algorithm
Input  : 1. Size of the Array[n]
         2. Array elements
Output : Sorted array A[n]
*/

#include<stdio.h>
#include<conio.h>
#include<math.h>

 void heapify(int *,int);
 void build_heap(int *,int);
 void heapsort(int *,int);
 void swap(int *,int *);
 int heapsize;

int main()
{
    int *arr,n,i;
    printf("\n How many numbers do you want to sort?\n ");
    scanf("%d",&n);
    arr=(int *)malloc(sizeof(int)*n);
    printf("\n\n Enter %d numbers\n ",n);
    for(i=0;i<n;i++)
    {
       scanf("%d",&arr[i]);
    }
    //heapsize = n;
    heapsort(arr,n);
    printf("\n\n The sorted array is \n\n ");
    for(i=0;i<n;i++)
```

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    {
        printf("%d  ",arr[i]);
    }
    printf("\n\n\n ");
    return 0;
}

void heapsort(int *arr,int len)
{
   int i;
   build_heap(arr,len);
   for(i= len-1;i>=1;i--)
   {
      swap(&arr[0],&arr[i]);
      heapsize = heapsize -1;
      heapify(arr,0);
   }
}

void heapify(int *arr,int i)
{
   int l=2*i,r=2*i+1,largest;
   if(l<heapsize && arr[l]>arr[i])
      largest = l;
   else
      largest = i;
   if(r<heapsize && arr[r]>arr[largest])
      largest = r;

   if(largest != i)
   {
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        swap(&arr[i],&arr[largest]);
        heapify(arr,largest);
    }
}

void build_heap(int *arr,int len)
{
    int i;
    heapsize = len;
    for(i =len/2;i>=0;i--)
    {
        heapify(arr,i);
    }
}
void swap(int *a ,int *b)
{
    int temp = *a;
    *a= *b;
    *b= temp;
}
```

Sample Input and Output:

```
How many numbers do you want to sort?
6

Enter 6 numbers
45 36 10 8 30 24

The sorted array is

8  10  24  30  36  45

Press any key to continue...
```