

Lab 10

Algorithms

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CODE

```
/*  
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    Implement Heap Sort using MaxHeap.  
*/  
  
#include <stdio.h>  
#define MAX 100  
  
int Heap_Sort(int *a,int len){  
    build_heap(a,len);  
    int tmp;  
    int newlen=len;  
    while(newlen>1){  
        //swap head with last  
        tmp=a[0];  
        a[0]=a[newlen-1];  
        a[newlen-1]=tmp;  
        newlen--;  
        //new heap  
        MaxHeap(a,newlen,0);  
    }  
    return 0;  
}  
  
int build_heap(int *a,int len){  
    int i;  
    for (i=len-1; i>=0; i--) {  
        if(2*i+1>len-1) continue;  
        MaxHeap(a,len,i);  
    }  
    return 0;  
}  
  
int MaxHeap(int *a,int len, int index){  
    int left=2*index+1;  
    int right=2*index+2;  
    int tmp;  
    if (left>len-1) {  
        return 0;  
    }  
    else if(left==len-1){  
        if(a[index]<a[left]){  
            //swap  
            tmp=a[index];  
            a[index]=a[left];  
            a[left]=tmp;  
        }  
        return 0;  
    }
```

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}
else{
    if (a[index]<a[left]||a[index]<a[right]) {
        if (a[left]<a[right]) {
            //swap right with parent
            tmp=a[index];
            a[index]=a[right];
            a[right]=tmp;
            MaxHeap(a,len,right);
        }
        else{
            //swap left with parent
            tmp=a[index];
            a[index]=a[left];
            a[left]=tmp;
            MaxHeap(a,len,left);
        }
    }
}
}
}

int main(){

    int n_elements;
    int i;
    int a[MAX];

    printf("\n\n\t IMPLEMENTATION OF HEAP SORT (Using Max Heap)\n");
    printf("\t =====\n\n");

    printf("\t Enter the number of elements : ");
    scanf("%d",&n_elements);

    printf("\n\t Enter the elements : ");

    for (i = 0; i < n_elements; ++i)
    {
        scanf("%d",&a[i]);
    }
    Heap_Sort(a,n_elements);

    printf("\n\t =====\n");
    printf("\t After Heap Sort \n");
    printf("\t =====\n\n");
    for (i=n_elements-1; i>=0; i--) {
        printf("\t%d ", a[i]);
    }
    printf("\n");
    return 0;
}

```

SCREENSHOTS

Heapsort

