

**CS 5343 Algorithm Analysis and Data Structures**

**Assignment #3**



*Submitted by*

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## Implementation of Heap sort

Program :

```
// Naga Mutya Kumar Kumtsam(nxk210028)
```

```
#include<iostream>
using namespace std;
```

```
void percolate(int arr[],int parent)
{
    int left_child,right_child,base_value;
    base_value = parent;
    left_child  = 2 * parent;
    right_child = 2 *parent+1;

    if(left_child <= arr[0])
    {
        if(arr[base_value] > arr[left_child])
        {
            base_value = left_child;
        }
        if(right_child <= arr[0])
        {
            if(arr[base_value] > arr[right_child])
            {
                base_value = right_child;
            }
        }
        if(base_value != parent)
        {
            swap(arr[parent],arr[base_value]);
            percolate(arr,base_value);
        }
    }
    return;
}
```

```
void heapsort(int arr[])
{
    while (arr[0] > 1)
    {
        swap(arr[1], arr[arr[0]]);
        arr[0]--;
        percolate(arr, 1);
    }
}
```

```

        return;
    }

void display(int arr[],int n)
{
    for (int i = 1; i <= n; i++)
    {
        cout << arr[i] << " ";
    }
    cout << endl ;
}

int main()
{
    int arr[]={15,30,20,40,60,10,50,11,29,32,17,16,100,6,13,41};
    int n = (sizeof(arr)/sizeof(arr[0]))-1;
    cout << "Initial Array is :";
    display(arr,n);

    // Implementing Flyod Algorithm
    int last_parent;
    last_parent = arr[0]/2;

    while(last_parent > 0)
    {
        percolate(arr, last_parent);
        last_parent--;
    }

    cout << "After sorting Array is :";
    display(arr,n);

    heapsort(arr);
    cout << "After Heap sorting Array is :";
    display(arr,n);
}

```

## Executions

### Display of Initial Array

```

Select F:\UTD Academics\F21-1st Semester\5343\Assignment3\Assignment3.exe
Initial Array is :30 20 40 60 10 50 11 29 32 17 16 100 6 13 41
-----
Process exited after 0.5322 seconds with return value 0
Press any key to continue . . .
```

### After Min sorting using Floyd algorithm

```

F:\UTD Academics\F21-1st Semester\5343\Assignment3\Assignment3.exe
Initial Array is :30 20 40 60 10 50 11 29 32 17 16 100 6 13 41
After sorting Array is :6 10 11 29 16 40 13 60 32 17 20 100 50 30 41
-----
Process exited after 0.6492 seconds with return value 0
Press any key to continue . . .
```

## After Heap sorting

```
Select F:\UTD Academics\F21-1st Semester\5343\Assignment3\Assignment3.exe
Initial Array is :30 20 40 60 10 50 11 29 32 17 16 100 6 13 41
After sorting Array is :6 10 11 29 16 40 13 60 32 17 20 100 50 30 41
After Heap sorting Array is :100 60 50 41 40 32 30 29 20 17 16 13 11 10 6

-----
Process exited after 0.7344 seconds with return value 0
Press any key to continue . . .
```