TOPIC NO.: 12

TITLE: Heap Sort

Program Code:

#include <stdio.h>

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

int temp = \*a;

\*a = \*b;

\*b = temp;

}

void heapify(int arr[], int N, int i) {

int largest = i;

int left = 2 \* i + 1;

int right = 2 \* i + 2;

if (left < N && arr[left] > arr[largest])

largest = left;

if (right < N && arr[right] > arr[largest])

largest = right;

if (largest != i) {

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

heapify(arr, N, largest);

}

}

void heapSort(int arr[], int N) {

for (int i = N / 2 - 1; i >= 0; i--) {

heapify(arr, N, i);

}

Output:

Enter the size of the array : 7

Element at [0] : 6

Element at [1] : 4

Element at [2] : 9

Element at [3] : 1

Element at [4] : 3

Element at [5] : 2

Element at [6] : 7

Sorted array is

1 2 3 4 6 7 9

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for (int i = N - 1; i >= 0; i--) {

swap(&arr[0], &arr[i]);

heapify(arr, i, 0);

}

}

void printArray(int arr[], int N) {

for (int i = 0; i < N; i++)

printf(" %d", arr[i]);

printf("\n");

}

int main() {

int i, size;

printf("Enter the size of the array : ");

scanf("%d", &size);

int arr[size];

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

printf("Element at [%d] : ", i);

scanf("%d", &arr[i]);

}

int N = sizeof(arr) / sizeof(arr[0]);

heapSort(arr, N);

printf("Sorted array is \n");

printArray(arr, N);

return 0;

}