**Program No.8**

**Aim: Write programs for tree-based comparison sorting method Heap Sort.**

**Algorithm : //ANJALI MALVIYA**

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| **Program: 8**  **//ANJALI MALVIYA**  **#include <iostream>**  **using namespace std;**  **void heapify(int arr[], int n, int i)**  **{**  **int largest = i;**  **int l = 2 \* i + 1;**  **int r = 2 \* i + 2;**  **if (l < n && arr[l] > arr[largest])**  **largest = l;**  **if (r < n && arr[r] > arr[largest])**  **largest = r;**  **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);**  **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)**  **cout << arr[i] << " ";**  **cout << "\n";**  **}**  **int main(){**  **int n;**  **cout<<"ANJALI MALVIYA:\n";**  **cout<<"Enter size of array\n";**  **cin>>n;**  **int arr[n];**  **cout<<"Enter elements of array\n";**  **for(int i=0;i<n;i++){**  **cin>>arr[i];**  **}**  **heapSort(arr, n);**  **cout << "Sorted array is \n";**  **printArray(arr, n);**  **}** |

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| **Output 1: ANJALI MALVIYA** | | | | |
| **Output 2: ANJALI MALVIYA** | | | | |
| **Output 3: ANJALI MALVIYA** | | | | |
|  | **Time complexity** | | |
| **Best** | **Case** | **Worst Case** | |
| **Type of Input**  **(sorted/unsorted/**  **Random)** | **Time complexity** | **Type of Input**  **(sorted/unsorted/**  **Random)** | **Time complexity** |
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