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Class: SY B2

Assignment 3

Aim: Read the marks obtained by students of second year in an online examination of particular subject. Find out maximum and minimum marks obtained in that subject. Use heap data structure. Analyse the algorithm

Code:

```
import java.util.Scanner;

class MaxHeap{
    int[] heap =new int[15] ;
    int size=0;

    void insert(int val){
        int current=size;
        heap[current]=val;
        while(heap[current]>heap[(current-1)/2]){
            swap(current,(current-1)/2);
            current=(current-1)/2;
        }
        size++;
    }
    private void swap(int pos, int p_pos) {
        int k;
        k=heap[pos];
        heap[pos]=heap[p_pos];
        heap[p_pos]=k;
    }
    void print(){
        System.out.println("Element of Heap are ");
        for (int i = 0; i < size; i++) {
            System.out.println(heap[i]);
        }
    }
    void maxVal(){
        System.out.println("Maximum value is "+heap[0]);
    }
}

class MinHeap{
    int[] heap =new int[15] ;
    int size=0;
```

```

void insert(int val){
    int current=size;
    heap[current]=val;
    while(heap[current]<heap[(current-1)/2]){
        swap(current,(current-1)/2);
        current=(current-1)/2;
    }
    size++;
}

private void swap(int pos, int p_pos) {
    int k;
    k=heap[pos];
    heap[pos]=heap[p_pos];
    heap[p_pos]=k;
}

void print(){
    for (int i = 0; i < size; i++) {
        System.out.println(heap[i]);
    }
}

void minVal(){
    System.out.println("Minimum value is "+heap[0]);
}
}

public class Main {
    public static void main(String[] args) {
        MaxHeap maxHeap=new MaxHeap();
        MinHeap minHeap=new MinHeap();
        Scanner sc=new Scanner(System.in);
        boolean t=true;
        while (t) {
            System.out.println("\t\tOption Menu ");
            System.out.println("1. Insert Marks");
            System.out.println("2. Max marks ");
            System.out.println("3. Min marks ");
            System.out.println("4. Display Marks ");
            System.out.println("5. Exit ");
            System.out.println("Enter the choice ");
            int ch=sc.nextInt();
            switch (ch) {
                case 1:
                    System.out.println("Enter the mark to insert ");
                    int val= sc.nextInt();
                    maxHeap.insert(val);
                    minHeap.insert(val);
                    break;
                case 2:

```

```
        maxHeap.maxVal();
        break;
    case 3:
        minHeap.minVal();
        break;
    case 4:
        maxHeap.print();
        break;
    case 5:
        t=false;
        break;
    default:
        break;
    }
}
}
```

Output:

Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 1 Enter the mark to insert: 58 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 1 Enter the mark to insert: 96 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 140 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 16	Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 2 Maximum value is 96 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 3 Minimum value is 58 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 4 Element of Heap are 96 58 Enter the choice 1. Insert 2. Max marks 3. Min marks 4. Display 5. Exit 5
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Conclusion: Thus, we successfully found the minimum and maximum marks obtained in that subject.