



**Write a program for Min-Max Problem implemented  
in JAVA**

**Lab Assignment-4**

**CSE3002 : Artificial Intelligence**

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**SCOPE**

**VIT-AP**

**Task:**

Write a program for Min-Max Problem

**Solution:**

I have used the DFS algorithm to solve this problem using Java to get the Optimal solution for the given problem.

Below is the source code of the same.

```
import java.util.*;

public class lab4{

    public static void main(String [] args){
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter number of elements");
        int n=sc.nextInt();
        int [] scores=new int[n];
        System.out.println("Enter "+n+" scores");
        for(int i=0;i<n;i++){
            scores[i]=sc.nextInt();
        }
        int h=log2(n);
        int result=minmax(0,0,scores,h,true);
        System.out.println("The solution is "+result);
    }

    public static int log2(int n){
        return n==1? 0 : 1 + log2(n/2);
    }

    public static int minmax(int depth,int currnode,int [] scores,int
height,boolean maxmin){

        if(depth==height){
            return scores[currnode];
        }

        if(maxmin==true){
            return Math.max(minmax(depth+1, currnode*2, scores, height,
false), minmax(depth+1, currnode*2 + 1, scores, height, false));
        }
    }
}
```

```

    }
    else{
        return Math.min(minmax(depth+1, currnode*2, scores, height,
true), minmax(depth+1, currnode*2 + 1, scores, height, true));
    }
}
}
}

```

Output below :

The screenshot displays the Visual Studio Code interface with a Java file named 'lab4.java' open. The code implements a recursive function to find the minimum number of elements required to reach a target height 'h' using a sequence of scores. The 'main' method prompts the user to enter the number of elements and the scores, then prints the solution.

```

public static void main(String[] args){
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter number of elements");
    int n=sc.nextInt();
    int [] scores=new int[n];
    System.out.println("Enter "+n+" scores");
    for(int i=0;i<n;i++){
        scores[i]=sc.nextInt();
    }
    int h=log2(n);
    int result=minmax(0,0,scores,h,true);
    System.out.println("The solution is "+result);
}

public static int log2(int n){
    return n==1? 0 : 1 + log2(n/2);
}

public static int minmax(int depth,int currnode,int [] scores,int height,boolean maxmin){
    if(depth==height){

```

The terminal output shows the execution of the program. It prompts for the number of elements (8) and the scores (3 5 2 9 12 5 23). The solution is calculated as 12.

```

PS C:\Users\VDI HEEMANITH KUMAR\Desktop\AI-Lab> & 'c:\Users\VDI HEEMANITH KUMAR\.vscode\extensions\vscjava.vscode-java-debug-0.35.0\scripts\launcher.bat' 'c:\Program Files\Java\jdk-15.0.1\bin\java.exe' -xx:+ShowCodeDetailsInExceptionMessages '-Dfile.encoding=UTF-8' -cp 'c:\Users\VDI HEEMANITH KUMAR\AppData\Roaming\Code\User\workspaceStorage\ccha8c3e56c81eb41834b582c2703fe8\redhat.java\jdk_ws\AI-Lab_a53219e9\bin' 'lab4'
Enter number of elements
8
Enter 8 scores
3 5 2 9 12 5 23
The solution is 12
PS C:\Users\VDI HEEMANITH KUMAR\Desktop\AI-Lab>

```