CS263 LAB5

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Task: Calculate maximum score in candy swapping game.

Solution Code:

```
import java.util.*;
public class cdswapmax {
    Run | Debug
    public static void main(String[] args) {
      Scanner input = new Scanner(System.in);
      System.out.println(x: "Enter number of animals:");     //input of total number of animals
      int num= input.nextInt();
      int A[]=new int[num];
      System.out.println(x: "Enter the candy numbers:");     //taking input of candy numbers
      for(int i=0;i<num;i++){
        A[i]=input.nextInt();
      }
      System.out.println(x: "andy Number which the person has:");  //candy number of user
      int m=input.nextInt();
      int i=0;
      System.out.println("Maximum Score is:"+ MXScore(A,m,i,num));  //finding the max score
      input.close();
    }
```

```java
    public static int MXScore(int A[],int m, int i, int num){
        int P,Q;
        if(i<num){
            if(A[i]==m){                    //when user and animal have same candy
                P=MXScore(A,m,i+1,num)+1;   //score increases by 1 if user swaps
                Q=MXScore(A,m,i+1,num);     //score doesnot increase if user doesnot swap
            }else{                          //when candy is not same
                P=MXScore(A,A[i],i+1,num)-1;    //score decreases by 1 if user swaps
                Q=MXScore(A,m,i+1,num);     //score doesnot decrease if user doesnot swap
            }
            if(P>Q){                        //checks which of P & Q is maximum and returns that
                return P;
            }else{
                return Q;
            }

        }
        return 0;
    }
}

//here T(n)=O(2^n)
```

OUTPUT:

```
PS D:\Java\ALCS263> cd "d:\Java\ALCS263\" ; if ($?) { javac cdswapmax.java } ; if ($?) { java cdswapmax }
Enter number of animals:
6
Enter the candy numbers:
3 2 3 1 1 2
andy Number which the person has:
3
Maximum Score is:2
```

```
PS D:\Java\ALCS263> cd "d:\Java\ALCS263\" ; if ($?) { javac cdswapmax.java } ; if ($?) { java cdswapmax }
Enter number of animals:
7
Enter the candy numbers:
2 1 2 3 3 2 2
andy Number which the person has:
2
Maximum Score is:4
```

Time complexity:

T(n)=O(2^n)

It is because in this case we have only 2 options in the game

Either we swap the candy or we do not swap the candy.

So no of choice 2

And we are traversing through n animals with choice of 2.