HOW TO REMOVE TLE ERROR ?

(TIME LIMIT EXCEEDED)

#COMMON MISTAKES IN CODECHEF.

#COMPETITIVE PROGRAMMING

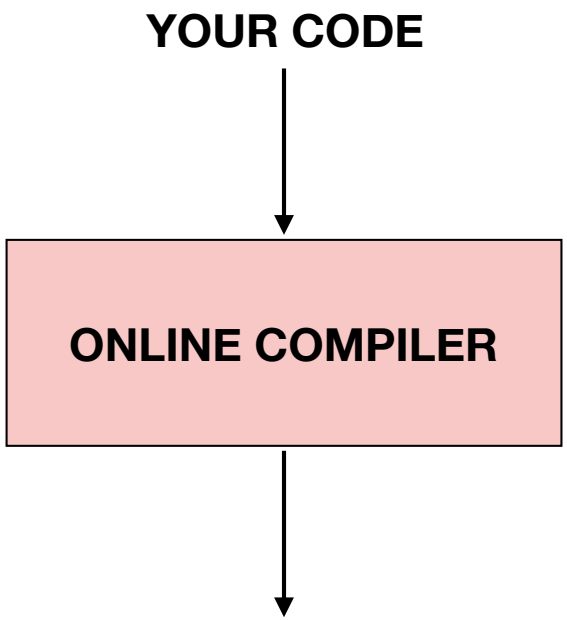
“TIME LIMIT EXCEEDED”

By Prince Agarwal

[“ Hello World ”]

TIME LIMIT EXCEEDED

How Online SYSTEM WORK :-



NOW CHECK YOUR CONSTRINTS :-

Time = 1 Sec.

It means Compiler can perform An operation upto 10^8

CHECK YOUR CODE

IF (Operation is under 10^8)

NO ERROR

ELSE

TLE

TIME LIMIT EXCEEDED

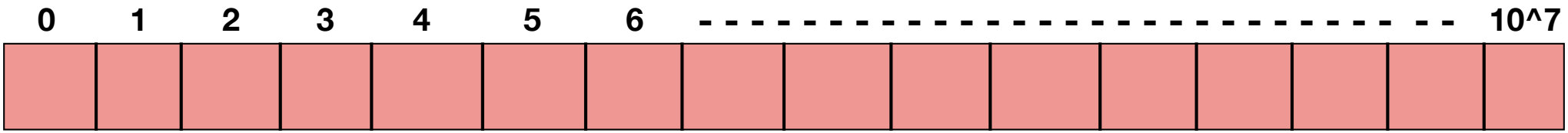
NOW POINT IS —> HOW WE UNDERSTAND

WHERE THE PROBLEM IS

NOW TAKE AN EXAMPLE :-

There is set of numbers Ranging from 0 to 1000

Total Numbers = N = 10^7



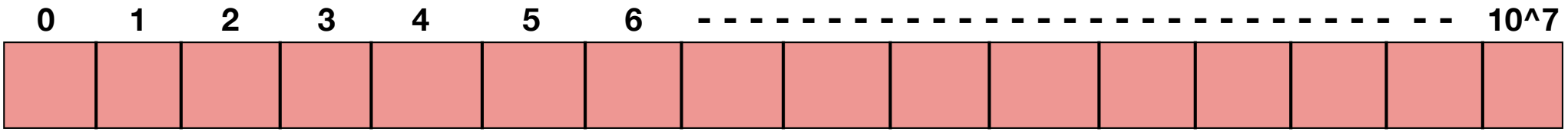
Now What we want :-

We want to update an array by +2

AND PRINT THE FINAL OUTPUT

TIME LIMIT EXCEEDED

SOLUTION :-



AGAIN We want to update an array by +2

AND PRINT THE FINAL OUTPUT

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
        A [ i ] = A [ i ] + 2
}
```

O (N) Or

10^7 Operations

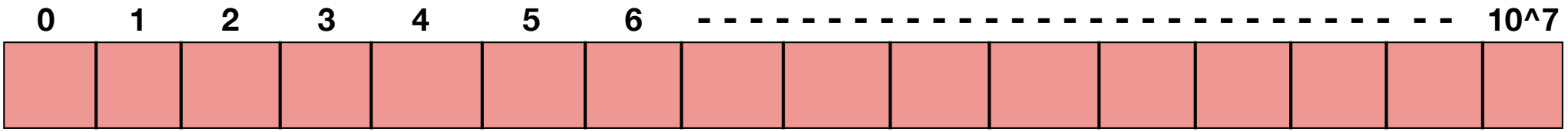
```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
        Print A [ i ] ;
}
```

10^7 Operations

TOTAL OPERATIONS = 2* 10^7 ;

TIME LIMIT EXCEEDED

SOLUTION :-



NOW, We want to update an array by +2

We want to update an array by +9

AND PRINT THE FINAL OUTPUT

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
        A [ i ] = A [ i ] + 2
}
```

O (N) Or

10^7 Operations

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
        A [ i ] = A [ i ] + 9
}
```

O (N) Or

10^7 Operations

TIME LIMIT EXCEEDED

NOW, We want to update an array by +2
We want to update an array by +9
We want to update an array by *3
We want to update an array by -4

AND PRINT THE FINAL OUTPUT

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
    A [ i ] = A [ i ] + 2
}
```

O (N) Or
10^7 Operations

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
    A [ i ] = A [ i ] + 9
}
```

O (N) Or
10^7 Operations

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
    A [ i ] = A [ i ] * 3
}
```

O (N) Or
10^7 Operations

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
    A [ i ] = A [ i ] - 4
}
```

O (N) Or
10^7 Operations

TIME LIMIT EXCEEDED

NOW, We want to update an array by +2

.
.
.

We want to update an array by -4

M time Operations

Or

M time Updation

Now, M = 10^5 Times Updations

```
For ( int i = 0 ; i  < 10^7 ; i ++ )
{
      Operations
}
```

O (N) × O (M)

10^7 × 10^5 = 10^12

NOW TLE ERROR COMES

TIME LIMIT EXCEEDED

NOW, We want to update an array by +2

.

|

.

|

We want to update an array by -4

M time Operations

Or

M time Updation

Now, M = 10^5

Times Updations

Now, For this we use RANGE UPDATE QUERY

AFTER This, the Update query works in O (1)

TOTAL UPDATE OPERATION = M = 10^5

TIME TAKEN = M * O(1) = 10^5 * O(1) = 10^5

AND TIME TAKEN FOR PRINT = 10^7

TOTAL TIME = 10^7 + 10^5 = 10^7

SUCCESS NO TLE

TIME LIMIT EXCEEDED

NOW PROCESS TO IDENTIFY TLE :-

1) Identify where Loop is running

2) Try to figure out the complexity of loop

3) Add all the loop at the end and see whether it cross the 10^8 operation

4) Focus on constraints

5) PRACTICE AND PRACTICE

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Hello World

“ If you feel any problem then comments in my video
I will reply as soon as possible “

- Prince Agarwal