WOBURN CHALLENGE

2018-19 Online Round 1

Friday, November 16th, 2018

Junior Division Problems

Automated grading is available for these problems at:
wcipeg.com

For more problems from past contests, visit:
woburnchallenge.com

Problem J1: Homework

14 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc181j1*

Alice is a student at H.S. High School. Right now, she's not the happiest student in the world, as she has a whole bunch of math homework due tomorrow!

Her homework consists of A ($1 \leq A \leq 100$) math questions, which Alice is supposed to complete one after another. Each question takes M ($1 \leq M \leq 100$) minutes to complete.

As important as Alice's homework is, she's had some more important shows to watch first, leaving her with only T ($1 \leq T \leq 100$) minutes now remaining before her strict bedtime! She'd like to figure out whether she can complete all A homework questions within at most T minutes, or if they would require a combined total of strictly more than T minutes (in which case she'll use that time to come up with an excuse instead). Output "Y" (without quotes) if she still has time to finish her homework today, or "N" if she doesn't.

Input Format

The first line of input consists of a single integer, A.
The next line consists of a single integer, M.
The next line consists of a single integer, T.

Output Format

Output a single character, either "Y" if Alice can complete all A assignments within at most T minutes, or "N" otherwise.

Sample Input 1

```
2
3
9
```

Sample Input 2

```
4
3
11
```

Sample Output 1

```
Y
```

Sample Output 2

```
N
```

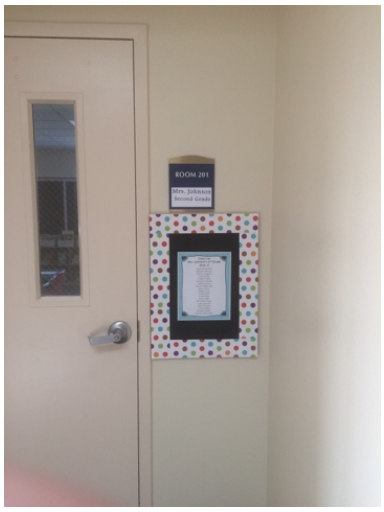
Sample Explanation

In the first case, the 2 assignments would require a total of 6 minutes, which is less than or equal to 9, meaning that Alice has time to complete them.

In the second case, the 4 assignments would require a total of 12 minutes, which is greater than 11, meaning that Alice won't have time to complete them.

Problem J2: Making the Cut

18 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc181j2*



The computer science club at H.S. High School has just posted a special list of five student names. These students have qualified to represent the school at an upcoming programming competition, hosted by Ontario's Organization for Computing Education (OOCE)! The *i*-th name on this team roster is S_i, a non-empty string consisting of at most 20 lowercase letters ("a".."z"), and all five names are distinct.

A certain student is looking at this team roster, and wants to see whether or not they made the cut and will get to compete. This student's name is *N*, which is similarly a non-empty string consisting of at most 20 lowercase letters. Unfortunately, though their programming skills are strong, their reading skills aren't so strong, so they're having trouble looking for their name on the list. Help them determine whether or not any of the five names $S_{1..5}$ on the team rosters are equal to their own name *N*. Output "Y" (without quotes) if their name is present, or "N" if it isn't.

Input Format

The first line of input consists of a single string, *N*.
Five lines follow, the *i*-th of which consists of a single string, S_i, for $i = 1..5$.

Output Format

Output a single character, either "Y" if any of the five names on the team roster are equal to *N*, or "N" otherwise.

Sample Input 1

```
bob
alice
bob
christine
david
erika
```

Sample Input 2

```
alice
frank
georgia
hans
ilia
james
```

Sample Output 1

```
Y
```

Sample Output 2

```
N
```

Sample Explanation

In the first case, "bob" is the second of the five names on the team roster.
In the second case, "alice" is not present on the team roster.

Problem J3: Comparing Grades

28 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc181j3*

As grades from the school year's first science test are being handed back, the students of H.S. High School begin to peer at their marks with dread. With the exception of two particularly competitive friends, that is: Alice and Bob are eager to compare their grades against one another, and see who did better this time around!

Alice received a percentage grade of A ($0 \le A \le 100$) on the test, while Bob received a percentage grade of B ($0 \le B \le 100$). However, they don't like to compare these exact percentage grades against one another—instead, they think it's more fun to compare their more approximate letter grades. Each percentage grade corresponds to a letter grade according to the following table:

Percentage Grade Range	Letter Grade
90..100	A
80.. 89	B
70.. 79	C
60.. 69	D
0.. 59	F

According to Alice and Bob's rules, whichever of them receives a worse letter grade than the other will have to do something embarrassing in front of the class. However, if they both receive the same letter grade, then neither of them will be subjected to this punishment.

As one of their fellow classmates, you'd like to find out if anything embarrassing is going to occur, so that you can have your phone at the ready. In other words, you'd like to determine whether or not Alice and Bob received the same letter grade as one another. Output "`Same`" (without quotes) if their letter grades are the same, or "`Different`" if they're different.

Input Format

The first and only line of input consists of two space-separated integers, A and B.

Output Format

Output a single string, either "`Same`" if Alice and Bob received the same letter grade, or "`Different`" otherwise.

Sample Input 1

```
84 89
```

Sample Output 1

```
Same
```

Sample Input 2

```
60 59
```

Sample Output 2

```
Different
```

Sample Explanation

In the first case, both Alice and Bob received a letter grade of B.

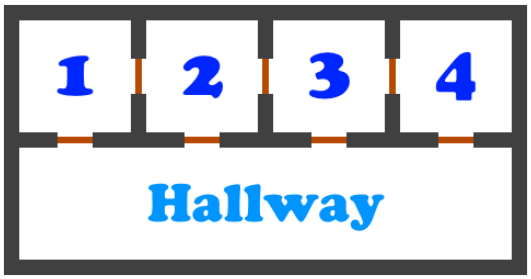
In the second case, Alice received a letter grade of D while Bob received a letter grade of F.

Problem J4: Germaphobia

40 Points / Time Limit: 2.00s / Memory Limit: 16M *Submit online: http://wcipeg.com/problem/wc181j4*

H.S. High School has N ($2 \le N \le 100$) classrooms in a row, numbered from 1 to N in order. There's a common hallway outside the classrooms with a door to each one, meaning that it's possible to move from the hallway to any classroom (or vice versa) by passing through a door. There's also a door between each pair of adjacent classrooms i and $i + 1$ (for each $1 \le i \le N - 1$), meaning that it's possible to move between them in either direction by passing through that door.

For example, if $N = 4$, the school layout looks as follows (with the 4 numbered classrooms at the top, the hallway at the bottom, and doors indicated in brown):



Today, Bob has M ($1 \le M \le 100$) classes to attend, one after another, with the i-th one held in classroom C_i ($1 \le C_i \le N$). Multiple classes throughout the day may be held in the same classroom, but no pair of consecutive classes are held in the same classroom as one another (in other words, $C_i \ne C_{i+1}$ for each $1 \le i \le M - 1$).

Upon entering the school in the morning, Bob finds himself in the hallway, and will then need to move into his M classes' classrooms in order (in other words, he'll need to visit classroom C_1, then classroom C_2, and so on). He may freely visit other classrooms or the hallway in between the classes he needs to attend. After attending the M-th class, Bob will need to move back into the hallway before heading home.

Bob is well aware of the alarming volume of germs present on school doorknobs, so he'd like to pass through as few doors as possible throughout the day. Help Bob determine the minimum number of doors he must pass through in total.

Input Format

The first line of input consists of two space-separated integers, N and M.
M lines follow, the i-th of which consists of a single integer, C_i, for $i = 1..M$.

Output Format

Output a single integer, the minimum number of doors which Bob must pass through in total.

Sample Input

```
4 5
2
3
1
4
3
```

Sample Output

```
8
```

Sample Explanation

One optimal route Bob might take is as follows:

Hallway → **Classroom 2** → **Classroom 3** → Classroom 2 → **Classroom 1** → Hallway → **Classroom 4** → **Classroom 3** → Hallway