Questions for programming contest
Week 3

Question 1: Finding patterns

Title :
You will be given a pattern of the form

```
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ddddddddddddddddddddd.
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ddddddddddddddddddddd.
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ddddddddddddddddddddd.
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ddddddddddddddddddddd.
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.....................
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ccccccccccccccccccccc.
.jjjjjjjjjjjjjjjjjjjjjjj.eeeeeeeeeeeeeee.bbbbbbbb.ccccccccccccccccccccc.
.........................eeeeeeeeeeeeeee.bbbbbbbb.ccccccccccccccccccccc.
.iiiiiiiiii.kkkkkkkkkkkkk.eeeeeeeeeeeeeee.bbbbbbbb.ccccccccccccccccccccc.
```

Input will also contain the dimension of the pattern. The top right corner of the pattern is the location (1,1). Each of the (.) represent gaps. Each pattern formed by the set of same characters is called a tile.
Your job is to print the location and the size of each tile.
Here is an example:

Input 1 = Size of the pattern in characters.

Input 2 = The pattern itself. For example use the pattern above

Output =

- Tile of character 'j' is at (2,2) and size is 7x25
- Tile of character 'i' is at (9,2) and size is 1x10
- Tile of character 'k' is at (9,13) and size 1x14
- And others ...

Question 2

Title : Lets play compiler!!!

You will be given an arithmetic expression in the form of a string. It may contain (,),+,-,*,/,% operators involved. Your task is to convert it into a prefix expression. Then print the prefix expression. Next you can use your program from the previous week's question and evaluate the prefix expression that you get.

Input = (3+4)*2+5

First Output = +*+3425

Second Output = 19

Question 3

Title : Minimum Steps

Suppose you are allowed to do the following operations:

1. Divide by 2
2. Divide by 3
3. Subtract 1

Your task is to reduce a given number to 1 using only the operations listed above. The catch here is that you must use the minimum number of operations. You are allowed to divide using 2 or 3 only if the number is properly divisible by it, ie no remainder must be left.
Here is an exmple for you.

Input = 10

Output 1 = /2 -1 /2 /2 (Intermediate numbers : 5 4 2 1)

Output 2 = -1 /3 /3 (Intermediate numbers : 9 3 1)

The second output has less number of steps so you must print it.