

# More Exercise: Data Types and Variables

Problems for exercises and homework for the ["Programming Fundamentals" course @ SoftUni](#).

You can check your solutions in [Judge](#).

## 1. Data Type Finder

You will receive input until you receive "END". Find what **data type** is the input. Possible data types are:

- Integer
- Floating point
- Characters
- Boolean
- Strings

Print the result in the following format: "{input} is {data type} type".

### Examples

Input	Output
5	5 is integer type
2.5	2.5 is floating point type
true	true is boolean type
END	
a	a is character type
asd	asd is string type
-5	-5 is integer type
END	

## 2. From Left to the Right

You will receive a number representing how many lines we will get as input. On the next N lines, you will receive a string with 2 numbers separated by a single space. You need to compare them. If the left number is greater than the right number, you need to print the sum of all digits in the left number, otherwise, print the sum of all digits in the right number.

### Examples

Input	Output
2	2
1000 2000	2
2000 1000	
4	46
123456 2147483647	5
5000000 -500000	49
97766554 97766554	90
9999999999 8888888888	

### 3. Floating Equality

Write a program that safely compares floating-point numbers (double) with precision  $\text{eps} = 0.000001$ . Note that we cannot directly compare two floating-point numbers **a** and **b** by  $a==b$  because of the nature of the floating-point arithmetic. Therefore, we assume two numbers are equal if they are closer to each other than some fixed constant  $\text{eps}$ .

You will receive two lines, each containing a floating-point number. Your task is to compare the values of the two numbers.

#### Examples

Number a	Number b	Equal (with precision $\text{eps}=0.000001$ )	Explanation
5.3	6.01	False	The difference of 0.71 is too big ( $> \text{eps}$ )
5.00000001	5.00000003	True	The difference $0.00000002 < \text{eps}$
5.00000005	5.00000001	True	The difference $0.00000004 < \text{eps}$
-0.0000007	0.00000007	True	The difference $0.00000077 < \text{eps}$
-4.999999	-4.999998	False	Border case. The difference $0.0000001 == \text{eps}$ . We consider the numbers are different.
4.999999	4.999998	False	Border case. The difference $0.0000001 == \text{eps}$ . We consider the numbers are different.

### 4. Refactoring: Prime Checker

You are given a program that checks if numbers in a given range  $[2...N]$  are prime. For each number is printed "{number} -> {true or false}". The code, however, is not very well written. Your job is to modify it in a way that is easy to read and understand.

#### Code

##### Sample Code

```
Scanner chetec = new Scanner(System.in);

int __Do__ = Integer.parseInt(chetec.nextLine());
for (int takoa = 2; takoa <= __Do__; takoa++) {
    boolean takovalie = true;
    for (int cepitel = 2; cepitel < takoa; cepitel++) {
        if (takoa % cepitel == 0) {
            takovalie = false;
            break;
        }
    }
    System.out.printf("%d -> %b\n", takoa, takovalie);
}
```

## Examples

Input	Output
5	2 -> true 3 -> true 4 -> false 5 -> true
7	2 -> true 3 -> true 4 -> false 5 -> true 6 -> false 7 -> true

## 5. Decrypting Messages

You will receive a **key** (integer) and **n** characters afterward. Add the key to each character and append them to the **message**. In the end, print the message, which you decrypted.

### Input

- On the **first line**, you will receive the **key**.
- On the **second line**, you will receive **n** – the number of **lines** that will **follow**.
- On the next **n lines** – you will receive **lower** and **uppercase** characters from the **Latin** alphabet.

### Output

Print the **decrypted message**.

### Constraints

- The **key** will be in the interval **[0...20]**.
- **n** will be in the interval **[1...20]**.
- The **characters** will always be **upper** or **lower**-case letters from the **English** alphabet.
- You will receive **one letter** per **line**.

## Examples

Input	Output	Input	Output
3 7 P l c q R k f	SoftUni	1 7 C d b q x o s	Decrypt

## 6. Balanced Brackets

You will receive **n** lines. On **those lines**, you will receive **one** of the following:

- Opening bracket – "("

- Closing bracket – ")"
- Random string

Your task is to find out if the **brackets** are **balanced**. That means after every **closing** bracket should follow an **opening** one. Nested parentheses are **not valid**, and if **two consecutive opening brackets** exist, the expression should be marked as **unbalanced**.

## Input

- On the **first line**, you will receive **n** – the number of lines that will follow.
- On the next **n** lines, you will receive "(" , ")" or **another** string.

## Output

You must print "**BALANCED**" if the parentheses are balanced and "**UNBALANCED**" otherwise.

## Constraints

- **n** will be in the interval **[1...20]**.
- The length of the strings will be between **[1...100]** characters.

## Examples

Input	Output	Input	Output
<b>8</b> ( 5 + 10 ) * 2 + ( 5 ) -12	BALANCED	<b>6</b> 12 * ) 10 + 2 - ( 5 + 10 )	UNBALANCED