Lab: Lists as Stacks and Queues

Problems for in-class lab for the Python Advanced Course @SoftUni.
Submit your solutions in the SoftUni Judge system.

1. Reverse Strings

Write a program that:

- **Reads** an **input string**
- **Reverses** it using a **stack**
- **Prints** the result back on the console

Examples

Input	Output
I Love Python	nohtyP evoL I
Stacks and Queues	seueuQ dna skcatS

2. Matching Parentheses

You are given an algebraic expression with **parentheses**. Scan through the string and extract **each set of parentheses**.

Print the result back **on the console**.

Examples

Input	Output
1 + (2 - (2 + 3) * 4 / (3 + 1)) * 5	(2 + 3) (3 + 1) (2 - (2 + 3) * 4 / (3 + 1))
(2 + 3) - (2 + 3)	(2 + 3) (2 + 3)

Hints

Scan through the expression searching for parentheses:

- If you find an **opening parenthesis**, **push** the index into the stack.
- If you find a **closing parenthesis, pop** the topmost element from the stack. This is the index of the last opening parenthesis.
- Use the current index and the popped one to **extract** a set of **parentheses.**

3. Supermarket

Tom is working at the supermarket, and he needs your help to keep track of his clients. Write a program that **reads lines of input** consisting of a customer's **name** and **adds** it to the end of a **queue** until "**End**" is received. If, in the meantime, you receive the command "**Paid**", you should **print each customer** in the order they are served (from the first to the last one) and **empty** the queue.

When you receive **"End",** you should print the **count of the remaining people** in the queue in the format: **"{count} people remaining."**.

Examples

Input	Output
George Peter William Paid Michael Oscar Olivia Linda End	George Peter William 4 people remaining.
Anna Emma Alexander End	3 people remaining.

4. Water Dispenser

Write a program that keeps track of people getting water from a dispenser and the amount of water left at the end.

On the first line, you will receive the starting **quantity** of water (integer) in a dispenser. Then, on the following lines, you will be given the **names** of some people who want to **get water** (each on a separate line) until you receive the command **"Start"**. Add those people to a **queue**. Finally, you will receive some commands until the command **"End"**:

- **"{liters}"** - litters (integer) that the current person in the **queue** wants to get. Check if there is **enough** water in the dispenser for that person.
  - If there is enough water, print **"{person_name} got water"** and remove him/her from the queue.
  - Otherwise, print **"{person_name} must wait"** and **remove the person** from the queue **without reducing** the water in the dispenser.
- **"refill {liters}"** - **add** the given litters in the dispenser.

In the end, print how many liters of water have left in the format: **"{left_liters} liters left"**.

Examples

Input	Output	Comment
2 Peter Amy Start 2 refill 1 1 End	Peter got water Amy got water 0 liters left	We create a queue with Peter and Amy. After the start command, we see that Peter wants 2 liters of water (and he gets them). The water dispenser is left with 0 liters. After refilling, there is 1 liter in the dispenser. So when Amy wants 1 liter, she gets it, and there are 0 liters left in the dispenser.
10 Peter George Amy Alice Start 2	Peter got water George got water Amy got water Alice must wait 2 liters left	

3 3 3 End		

5. Hot Potato

Hot Potato is a game in which children form a circle and toss a hot potato. The counting starts with the first kid. **Every nth toss, the child holding the potato leaves the game**. When a kid leaves the game, it **passes** the potato to the next kid. It continues **until there is only one kid left**.

Create a program that simulates the game of Hot Potato. On the **first line,** you will receive kids' names, separated by a single space. On the **second line,** you will receive the **nth** toss (integer) in which a child leaves the game.

Print every kid who is **removed** from the **circle** in the format **"Removed {kid}"**. In the end, **print** the **only kid left** in the format **"Last is {kid}"**.

Examples

Input	Output
Tracy Emily Daniel 2	Removed Emily Removed Tracy Last is Daniel
George Peter Michael William Thomas 10	Removed Thomas Removed Peter Removed Michael Removed George Last is William
George Peter Michael William Thomas 1	Removed George Removed Peter Removed Michael Removed William Last is Thomas