Lab: Stacks and Queues

Problems for exercises and homework for the "CSharp Advanced" course @ Software University.

You can check your solutions here: https://judge.softuni.bg/Contests/1445/Stacks-and-Queues-Lab

Working with Stacks Ι.

Reverse Strings 1.

Write program that:

- Reads an input string
- Reverses it using a Stack<T>
- **Prints** the result back at the terminal

Examples

Input	Output
I Love C#	#C evoL I
Stacks and Queues	seueuQ dna skcatS

Hints

- Use a **Stack<string>**
- Use the methods **Push()**, **Pop()**

2. Stack Sum

Write program that:

- Reads an input of integer numbers and adds them to a stack
- Reads commands until "end" is received
- **Prints** the **sum** of the remaining elements of the **stack**

Input

- On the first line you will receive an array of integers
- On the next lines, until the "end" command is given, you will receive commands a single command and one or two numbers after the command, depending on what command you are given
- If the command is "add", you will always receive exactly two numbers after the command which you need to add in the stack
- If the command is "remove", you will always receive exactly one number after the command which represents the count of the numbers you need to remove from the stack. If there are not enough elements skip the command.

Output

When the command "end" is received, you need to print the sum of the remaining elements in the stack



















Examples

Input	Output
1234 adD56 REmove 3 eNd	Sum: 6
3 5 8 4 1 9 add 19 32 remove 10 add 89 22 remove 4 remove 3 end	Sum: 16

Hints

- Use a Stack<int>
- Use the methods Push(), Pop()
- Commands may be given in mixed case

Simple Calculator

Create a simple calculator that can evaluate simple expressions with only addition and subtraction. There will not be any parentheses.

Solve the problem using a Stack.

Examples

Input	Output
2 + 5 + 10 - 2 - 1	14
2 - 2 + 5	5

Hints

- Use a **Stack<string>**
- You can either
 - o add the elements and then Pop() them out
 - o or **Push()** them and reverse the stack

Matching Brackets

We are given an arithmetic expression with brackets. Scan through the string and extract each sub-expression.

Print the result back at the terminal.

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 brackets
 - If you find an opening bracket, push the index into the stack
 - o If you find a closing bracket pop the topmost element from the stack. This is the index of the opening bracket.
 - Use the current and the popped index to extract the sub-expression

Working with Queues 11.

Print Even Numbers 5.

Write program that:

- Reads an array of integers and adds them to a queue
- Prints the even numbers separated by ", "

Examples

Input	Output
123456	2, 4, 6
11 13 18 95 2 112 81 46	18, 2, 112, 46

Hints

- Use a **Queue<int>**
- Use the methods **Enqueue()**, **Dequeue()**, **Peek()**

6. **Supermarket**

Reads an input consisting of a name and adds it to a queue until "End" is received. If you receive "Paid", print every customer name and empty the queue, otherwise we receive a client and we have to add him to the queue. When we receive "End" we have to print the count of the remaining people in the queue in the format: "{count} people remaining.".

Examples

Input	Output
Gosho Pesho Ivan Paid Nasko Stefan Naska Tanq End	Gosho Pesho Ivan 4 people remaining.
Ani Miro Stoyan	3 people remaining.





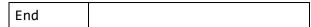












7. **Hot Potato**

Hot potato is a game in which children form a circle and start passing a hot potato. The counting starts with the fist kid. Every nth toss the child left with the potato leaves the game. When a kid leaves the game, it passes the potato along. This continues until there is only one kid left.

Create a program that simulates the game of Hot Potato. Print every kid that is removed from the circle. In the end, print the kid that is left last.

Examples

Input	Output
Mimi Pepi Toshko 2	Removed Pepi Removed Mimi Last is Toshko
Gosho Pesho Misho Stefan Krasi 10	Removed Krasi Removed Pesho Removed Misho Removed Gosho Last is Stefan
Gosho Pesho Misho Stefan Krasi 1	Removed Gosho Removed Pesho Removed Misho Removed Stefan Last is Krasi

Traffic Jam 8.

Create a program that simulates the queue that forms during a traffic jam. During a traffic jam only N cars can pass the crossroads when the light goes green. Then the program reads the vehicles that arrive one by one and adds them to the queue. When the light goes green N number of cars pass the crossroads and for each a message "{car} passed!" is displayed. When the "end" command is given, terminate the program and display a message with the total number of cars that passed the crossroads.

Input

- On the first line you will receive N the number of cars that can pass during a green light
- On the next lines, until the "end" command is given, you will receive commands a single string, either a car or "green"

Output

- Every time the "green" command is given, print out a message for every car that passes the crossroads in the format "{car} passed!"
- When the "end" command is given, print out a message in the format "{number of cars} cars passed the crossroads."

Examples

Input	Output
4	Hummer H2 passed!

















Hummer H2 Audi passed! Audi Lada passed! Lada Tesla passed! Renault passed! Tesla Trabant passed! Renault Trabant Mercedes passed! Mercedes MAN Truck passed! MAN Truck 8 cars passed the crossroads. green green Tesla Renault Trabant end 3 Pesho's car passed! Pesho's car Gosho's car passed! Gosho's car Mercedes CLS passed! Mercedes CLS Nekva troshka passed! BMW X5 passed! Nekva troshka green 5 cars passed the crossroads. BMW X5 green end













