More Exercises: Data Types and Variables

Problems for exercises and homework for the “Programming Fundamentals” course @ SoftUni.

Check your solutions here: https://judge.softuni.bg/Contests/570/

I. Numeral Types and Type Conversion

Problem 1. Type Boundaries

Write a program which receives a **number type** (**as a string**) and prints the **maximum** and the **minimum value** of that type. You can receive one of the following types: “**int**”, “**uint**”, “**long**”, “**byte**” and “**sbyte**”.

*Note: For this example, the Java’s **byte** corresponds to the C#’s **sbyte**.*

Examples

Input	Output
int	2147483647 -2147483648

Input	Output
byte	255 0

Problem 2. Number Checker

Write a program, which checks if a **number** is an **integer** or a **floating-point** number and **prints** either “**floating-point**” or “**integer**”, depending on the case. You will **only** receive **numbers**.

Constraints

- **Integer numbers** will be in the interval **[-9223372036854775808…9223372036854775807]**

Examples

Input	Output
3	integer

Input	Output
2.31	floating-point

Problem 3. Water Overflow

You have a **water tank** with capacity of **255 liters**. On the next **n** lines, you will receive **liters of water**, which you have to **pour** in your **tank**. If the **capacity** is **not enough**, print “**Insufficient capacity!**” and **continue reading** the next line. On the last line, print the **liters** in the **tank**.

Input

The **input** will be on two lines:

- On the **first line**, you will receive **n** – the number of **lines**, which will **follow**
- On the next **n lines** – you receive **quantities** of water, which you have to **pour** in the **tank**

Output

Every time you do not have **enough capacity** in the tank to pour the given liters, **print**:

```
Insufficient capacity!
```

On the last line, **print** only the **liters** in the **tank**.

Constraints

- **n** will be in the interval **[1…20]**
- **liters** will be in the interval **[1…1000]**

Examples

Input	Output
5 20 100 100 100 20	Insufficient capacity! 240

Input	Output
1 1000	Insufficient capacity! 0

Input	Output
7 10 20 30 10 5 10 20	105

Input	Output
4 250 10 20 40	Insufficient capacity! Insufficient capacity! Insufficient capacity! 250

Problem 4. Tourist Information

Write a program, which helps tourists **convert imperial units** of measurement to **metric units**. Your program needs to support the **following conversions**: **miles** to **kilometers**, **inches** to **centimeters**, **feet** to **centimeters**, **yards** to **meters** and **gallons** to **liters**. The **conversion table** looks like this:

If you receive:	Multiply by:	To get:
miles	1.6	kilometers
inches	2.54	centimeters
feet	30	centimeters
yards	0.91	meters
gallons	3.8	liters

Input

The **input** will be on **two lines**:

- On the **first line**, you will receive the **imperial unit**, which you need to convert
- On the **second line**, you will receive the **value**, which you need to **convert**

Output

Print the answer in the following format:

```
{initial value} {initial imperial unit} = {converted value} {metric unit}
```

Format the **converted value** to the **2nd decimal place**.

Print the **initial value** as it is **given**.

Constraints

- The **value**, which needs to be **converted** will be in the interval **[±1.5×10-45… ±3.4×1038].**

Examples

Input	Output
miles 12.313	12.313 miles = 19.70 kilometers

Input	Output
gallons 12	12 gallons = 45.60 liters

Problem 5. Weather Forecast

You invented a new groundbreaking technology to **predict the weather**, using **numerology**. You will be given a **number** from the **console** and with it, you can predict **tomorrow's weather**. Your system works in the following way:

- If the number can fit in **sbyte** (for C#) or **byte** (for Java) – the weather will be **"Sunny**"
- If the numbers can fit in **int** – the weather will be "**Cloudy**"
- If the number fits in **long** – the weather will be "**Windy**"
- If it is **floating point** number – the weather will be "**Rainy**"

Always print the **smallest possible** option.

Input

- On the first line, you will receive a **number**.

Output

Print your prediction for the **weather**.

Constraints

- Any whole **numbers** will be in the interval **[-9223372036854775808…9223372036854775807]**.

Examples

Input	Output
120	Sunny

Input	Output
-1.31	Rainy

Problem 6. Catch the Thief

In the future, a very dangerous thief has escaped. Your mission is to catch him, but the only thing you know is the **numeral type**, which is his **id**.

On the **first line,** you will receive the **numeral type** of **thief's id**. On the **second line,** you will receive **n** – the number of ids you will receive. The person who has an id **closest** to the **maximum value** of the given numeral type **without overflowing it** is the **thief's id**.

Input

- On the first line, you will receive the thief's id **numeral type**. The type will **always** be one of the following: "**sbyte**", "**int**" or "**long**".
- On the second line, you will receive **n** – the **count** of **ids** you are going to receive. **Each** will be on a **new line**.

Output

Print the **id** of the **thief**.

Constraints

- The type will **always** be one of the following: "**sbyte**", "**int**" or "**long**"
- The **sbyte** interval will be **[-128…127]**
- The number **n** will be in the interval **[1…20]**.
- The **ids** will be integers in the interval **[-9223372036854775808…9223372036854775807]**

Examples

Input	Output
sbyte 5 1 126 128 1000 1241	126

Input	Output
long 4 1 6 3 2	6

Problem 7. * Sentence the Thief

In the last task, you caught the thief, but in the future, everyone is multitasking and you need to **calculate** his **sentence** as well.

His sentence equals to the **times** his **id overflows** the numerical type **sbyte**. Round the years to the **nearest larger integer value** (5.01 ➔ 6).

Example: If the thief's id is **5251**, that means the sentence will equal: **5251 / 127 = 41.35** years. Rounded to the **next integer value**, the final sentence would be **42 years**.

Notice that the **id** might be **negative** and can **overflow** the **negative** boundary of **sbyte**.

Input

- On the first line, you will receive the thief's id **numeral type**. The type will **always** be one of the following: "**sbyte**", "**int**" or "**long**".
- On the second line, you will receive **n** – the **count** of **ids** you are going to receive. **Each** will be on a **new line**.

Output

If the **years** of the sentence are more than **1** print them in the following format:

```
Prisoner with id {id of the thief} is sentenced to {duration of the sentence} years
```

Otherwise use this format:

```
Prisoner with id {id of the thief} is sentenced to {duration of the sentence} year
```

Constraints

- The type will **always** be one of the following: “**sbyte**”, “**int**” or “**long**”
- We will use for **sbyte** the interval **[-128…127]**
- **n** will be in the interval **[1…20]**
- The **ids** will be integers in the interval **[-9223372036854775808…9223372036854775807]**
- The **id** will **never** be **0**.

Examples

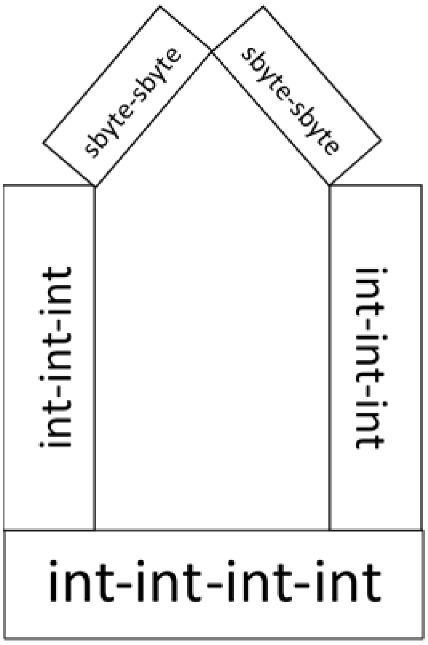
Input	Output	Comments
int **4** -2561 -3412 -5999 -2641	`Prisoner with id -2561 is sentenced to 21 years`	The biggest int, which is the **closest** to **long’s** max value is **-2561**, and this is the thief’s id. Their sentence will equal to: **-2561 / -128 = 20.01**. After rounding that equals **21 years**.

Input	Output
sbyte **5** 1 126 128 1000 1241	`Prisoner with id 126 is sentenced to 1 year`

Input	Output
long **5** 1 56 100 -42 -2411	`Prisoner with id 100 is sentenced to 1 year`

Problem 8. House Builder

You are a house builder and you need to buy the materials for one of your clients. This is quite a special house and it needs special materials. The house needs **4** **`sbyte`** variables and **10** **`int`** variables. A rough design of the house can be seen below:



You will receive **two** numbers from the console, which will be the prices of the **materials**. **One** will be an **integer** and the **other** will be **sbyte**, but you do not know the order in which they will be given. The **int** number will be the **price** of the **int materials** and the **sbyte** number will be the **price** of the **sbyte materials**.

Calculate the **total price of the materials** and print them on the console.

Input

- You will receive **two lines** of input, containing different **numbers** from **different numeral types**.

Output

Print the **total** price for the **materials**.

Constraints

- The **sbyte price** will be integers in the interval **[0…127]**
- The **int price** will be integer in the interval **[128…2147483647]**

Examples

Input	Output
100 2000	20400

Input	Output
2147483647 127	21474836978

II. Text and Other Types

Problem 9. Make a Word

Write a program, which combines **n** characters and prints on a single line the **combinations** of these characters.

Input

- On the **first line**, you will receive **n** – the number of **lines**, which will **follow**
- On the next **n lines** – you will receive **lower** and **uppercase** characters from the **English** alphabet

Output

Print the **word** in the format:

The word is: {word}

Constraints

- **n** will be in the interval **[1…20]**.
- The **characters** will always be either **uppercase** or **lowercase** letters from the **English alphabet**
- You will receive **one letter** per **line**, **without empty** spaces.

Examples

Input	Output
5 A b	The word is: AbCdE

Input	Output
12 S o	The word is: SoftUniRulzz

C d E	

f t U n i R u l z z	

Problem 10. Sum of Chars

Write a program, which sums the ASCII codes of **n** characters and prints the **sum** on the console.

Input

- On the **first line**, you will receive **n** – the number of **lines**, which will **follow**
- On the next **n lines** – you will receive letters from the **Latin** alphabet

Output

Print the **total sum** in the following format:

```
The sum equals: {totalSum}
```

Constraints

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

Examples

Input	Output
5 A b C d E	The sum equals: 399

Input	Output
12 S o f t U n i R u l z z	The sum equals: 1263

Problem 11. String Concatenation

Write a program, which reads **three** lines from the console. On the **first** line, there will be **delimiter** (**char**) – you have to **separate** the **strings** by this delimiter. The **second** line will be either "**even**" or "**odd**". If you receive "**odd**", you have to take every odd string and vice versa if you receive "**even**". The last line will be the number of lines – **n** which you will receive. The **first** iteration of the **loop** starts from **1**.

Print the newly created string on a **new line**.

Constraints

- **n** will be in the interval **[1…20]**.
- The strings will be at most **30** characters long

Examples

Input	Output
- **even** **5** One Two Three Four Five	Two-Four

Input	Output
& **odd** **4** Pesho Stefan Maria Gergana	Pesho&Maria

Hints

- In C#, you can use `String.Remove(…)` to remove the last delimiter.
- In Java, you can use `String.substring(…)` for the same operation.

Problem 12. Beer Kegs

Write a program, which calculates the volume of **n** beer kegs. You will receive in total **3 * n** lines. **Each three lines** will hold **information** for a **single** keg. First up is the **model** of the keg, after that is the **radius** of the keg, and lastly is the **height** of the keg.

Calculate the volume using the following formula: **`π * r^2 * h`**.

At the end, print the **model** of the **biggest** keg.

Input

You will receive **3 * n** lines. Each group of lines will be on a new line:

- First – **model** – **string**.
- Second –**radius** – **floating-point** number
- Third – **height** – **integer** number

Output

Print the **model** of the **biggest** keg.

Constraints

- **n** will be in the interval **[1…10]**
- The **radius** will be a **floating-point number** in the interval **[1…3.402823E+38]**
- The **height** will be an **integer** in the interval **[1…2147483647]**

Examples

Input	Output

Input	Output

3 Keg 1 10 10 Keg 2 20 20 Keg 3 10 30	Keg 2

2 Smaller Keg 2.41 10 Bigger Keg 5.12 20	Bigger Keg

Problem 13. Decrypting Messages

You will receive a **key** (**integer**) and **n** characters afterward. Add the key to each of the characters and append them to **message**. At 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**, which 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
3 **7** P l c q R k f	SoftUni

Input	Output
1 **7** C d b q x o s	Decrypt

Problem 14. * Boat Simulator

You have the task to write a simulator of a boat race. You will receive **two** characters, which will **represent** the two **boats**.

After that you will receive **n** random strings. Each string on an **odd** line represents the **speed** of the **first boat** and on an **even** line – the **speed** of the **second boat**. The boat **moves** with the count of the tiles, equal to the **length** of the given **string**. The **first boat**, which reaches **50 tiles** is the **winner**.

Our boats can be **upgradable**, which means when we receive the string "**UPGRADE**" we **add 3** to the **ASCII** codes of **both** of the boats characters and after that, we use those **characters** to represent the boats. If you receive "**UPGRADE**", you should **not move** the boats.

If one of the boats **reaches 50** moves – print the character of the **winner** and **stop** taking any **input**. If **neither** of the boats reach **50** moves – print the boat, which reached the **most moves**.

Input

- On the **first line**, you will receive the **character** of the **first** boat
- On the **second line**, you will receive the **character** of the **second** boat
- On the **third line,** you will receive **n** – the number of lines, which will follow

Output

Print only the **character representation** of the **winning boat**.

Constraints

- **n** will be in the interval **[1…20]**
- The length of the stings will be between **[1…100]** characters
- At the **end,** the boats will not have **equal moves**

Examples

Input	Output	Comments
! **(** **7** move need for speed go fast and furious UPGRADE stopTheBoat UPGRADE	.	First boat ➔ '**!**', second boat ➔ '**(**' "**move**" ➔ **4 letters long** ➔ **first boat (odd row)** moves **4 tiles** "**need for speed**" ➔ 14 letters long ➔ **second boat (even row)** moves **14** tiles. "**go**" ➔ 2 letters long ➔ **first boat (odd row)** moves **2** tiles. "**fast and furious**" ➔ 16 letters long ➔ **second boat** moves **16** tiles. "**UPGRADE**" ➔ add 3 to'**!**' ➔ upgrades to **'$'**, add 3 to **'(**' ➔ upgrades to **'+'**. "**stopTheBoat**" ➔ 11 letters long ➔ **second boat** moves **11** tiles. "**UPGRADE**"➔ add 3 to '**$**' ➔ upgrades to '**'**', add 3 to **'+'** ➔ upgrades to '**.**'. **Winner – second boat ➔ 41 moves > 6 moves ➔ second boat wins**

Input	Output	Comments
E **A** **10** UPGRADE start driveWithTheSpeedOfLight go driveWithTheSpeedOfLightOrFaster Should not be read a Should not be read b	H	We start with an **UPGRADE** and the first boat is represented by '**H**' and the second by '**D**' After the **5th** line of input the **first** boat has made **50** moves and you should **not** take as an input the **other lines**.

`Should not be read`		

Problem 15. * Balanced Brackets

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

- Opening bracket – “**(**“,
- Closing bracket – “**)**” or
- **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, which will follow
- On the next **n** lines, you will receive “**(**”, “**)**” or **another** string

Output

You have to print “**BALANCED**”, if the parentheses are balanced and “**UNBALANCED**” otherwise.

Constraints

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

Examples

Input	Output
8 (5 + 10) * 2 + (5) -12	BALANCED

Input	Output
6 12 *) 10 + 2 - (5 + 10)	UNBALANCED