**Exercise: For-Loop**

Problems for in-class and homework exercises for the course ["Programming Basics" @ SoftUni](https://softuni.org/).

Test your solutions in the **Judge** system: <https://judge.softuni.org/Contests/3494/For-Loop-Exercise-PS>

## Numbers Ending in 7

Write a function that prints the numbers in the range **1 to 1000** that **end with 7.**

|  |  |
| --- | --- |
| **Input** | **Output** |
| (no input) | 7  17  27  …  997 |

### Hints and Guidelines

1. Make a **for-loop** from 7 to 997 and check each number to see if it ends with 7. A number ends with 7 when the result of the **modular division of the number and 10 equals 7**.



### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#0>

## Multiplication Table

Write a function that receives a number argument from 1 to 10 and prints the multiplication table to the console.

### Sample Input and Output

|  |  |
| --- | --- |
| **Input** | **Output** |
| solve(5) | 1 \* 5 = 5  2 \* 5 = 10  3 \* 5 = 15  4 \* 5 = 20  5 \* 5 = 25  6 \* 5 = 30  7 \* 5 = 35  8 \* 5 = 40  9 \* 5 = 45  10 \* 5 = 50 |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#1>

# Sample Exam Problems

## Histogram

There are **n integers** in the range [1...1000]. Of these, some percent **p1** are below 200, another percent **p2** are from 200 to 399, another percent **p3** are from 400 to 599, another percent **p4** are from 600 to 799 and the remaining **p5** percent are from 800 upwards. Write a function that calculates and prints the percentages **p1, p2, p3, p4,** and **p5**.

**Example**: we have n = **20** numbers: 53, 7, 56, 180, 450, 920, 12, 7, 150, 250, 680, 2, 600, 200, 800, 799, 199, 46, 128, 65. We get the following distribution and visualization:

|  |  |  |  |
| --- | --- | --- | --- |
| **Range** | **Numbers in the range** | **Numbers count** | **Percent** |
| < 200 | 53, 7, 56, 180, 12, 7, 150, 2, 199, 46, 128, 65 | 12 | p1 = 12 / 20 \* 100 = **60.00**% |
| 200 … 399 | 250, 200 | 2 | p2 = 2 / 20 \* 100 = **10.00**% |
| 400 … 599 | 450 | 1 | p3 = 1 / 20 \* 100 = **5.00**% |
| 600 … 799 | 680, 600, 799 | 3 | p4 = 3 / 20 \* 100 = **15.00**% |
| ≥ 800 | 920, 800 | 2 | p5 = 2 / 20 \* 100 = **10.00**% |

### Input Data

The first received argument is the integer **n** (1 ≤ n ≤ 1000) - numbers count. On the next **n arguments**, there is **one integer** in the range [**1...1000**] - the numbers on which the histogram is to be calculated.

### Output Data

Print the **histogram** on the console in **5 lines**, each containing a number between 0% and 100%, formatted to **two digits after the decimal point**, e.g. 25.00%, 66.67%, 57.14%.

### Sample Input and Output

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| solve([3,1,2,999]) | 66.67%  0.00%  0.00%  0.00%  33.33% | solve([7,800,8001,250,199,399,599,799]) | 14.29%  28.57%  14.29%  14.29%  28.57% | solve([9,367,99,200,799,999,333,555,111,9]) | 33.33%  33.33%  11.11%  11.11%  11.11% | solve([14,53,7,56,180,450,920,12,7,150,250,680,2,600,200]) | 57.14%  14.29%  7.14%  14.29%  7.14% |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#2>

## Clever Lily

Lily is now **N years old**. For every **birthday** she receives a present.

* For the **odd** birthdays (**1, 3, 5...n**) she receives **toys.**
* For the **even** birthdays (**2, 4, 6...n**) she receives **money**.

For the **second birthday,** she receives **10.00 USD**, and the **amount increases by 10.00 USD for each following even birthday** (**2 -> 10, 4 -> 20, 6 -> 30**...etc.). Over the years, Lily has been secretly saving this money. Lily's **brother**, in **the years** that she **receives money, takes 1.00 USD** of it. Lily **sold the toys**, she received over the years, **for P USD each** and **added** the amount **to the saved money**. With the money, she wanted to **buy a washing machine for X USD**. Write a function to calculate **how much money she has collected** and whether **she has enough to buy a washing machine**.

### Input Data

The function receives **3 arguments** entered by the user.

* **Lily's age** – **an integer** in the range **[1...77]**
* **Price of the washing machine** – **a floating-point number** in the range **[1.00...10 000.00]**
* **Unit price of a toy** – **an integer** in the range **[0...40]**

### Output Data

Print on the console on a single line:

* If Lily's money is enough:
  + **"**Yes! {N}**"** - where **N** is the remaining money after the purchase
* If the money is not enough:
  + **"No! {М}"** - where **M** is the needed amount

The numbers **N** and **M** must be **formatted to 2 digits after the decimal point.**

### Sample Input and Output

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| solve([10,170.00,6]) | Yes! 5.00 | **On her first birthday, she** receives a **toy**  **On her second birthday, she** receives **money (10 USD)**  **On her third birthday,** **she** receives a **toy**  **On her fourth birthday,** **she** receives **money (20 USD)**  **On her fifth birthday,** **she** receives a **toy**  **On her sixth birthday,** **she** receives **money (30 USD)**  **On her seventh birthday,** **she** receives a **toy**  **On her eighth birthday,** **she** receives **money (40 USD)**  **On her ninth birthday,** **she** receives a **toy**  **On her tenth birthday,** **she** receives **money (50 USD)**  **Savings**: 10 + 20 + 30 + 40 + 50 = **150 USD**  She sold **5 toys \* 6 USD** = **30 USD**  **Her brother took 5 times \* 1 USD** = **5 USD**  **Total saved money:** (**150** + **30**) – **5** = **175 USD**  **175 >= 170** (the price of the washing machine)  => she **managed** to buy a washing machine  **Left:** **175** - **170** = **5 USD** |
| solve([21,1570.98,3]) | No! 997.98 | **Savings: 550 USD**  She sold **11 toys** \* **3 USD** = **33 USD**  **Her brother took 10 times** \* **1 USD** = **10 USD**  **Total saved money:** (**550** + **33**) – **10** = **573 USD**  **573 < 1570.98** – she **didn't manage** to buy a washing machine  **Needed money:** **1570.98** – **573** = **997.98 USD** |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#3>

## Salary

**A company boss notices that more and more employees are spending time on sites that distract them.**

**To prevent this, he introduces surprise checks on his employees' open browser tabs.**

**According to the open tab site, the following fines are applied:**

* **"Facebook" -> 150 USD**
* **"Instagram" -> 100 USD**
* **"Reddit" -> 50 USD**

The function receives **2 arguments:**

* **The number of tabs** opened in the browser **n –** **an integer in the range [1...10]**
* **Salary –** **an integer in the range [500...1500]**

Then **n - number of times the website name** is read **– string.**

### Input Data

* **If during the check the salary becomes less than or equal to 0 USD, the console displays "You have lost your salary." and the program ends.**
* **Otherwise, after the check, the console displays the remainder of the salary (to be displayed as an integer).**

### Sample Input and Output

|  |  |  |  |
| --- | --- | --- | --- |
| **Input** | **Output** | **Comments** | |
| solve([10,750, 'Facebook', 'Stackoverflow.com', 'Instagram', 'Facebook', 'Reddit', 'Facebook', 'Facebook']) | You have lost your salary. | There are **10** tabs open in the browser.  Initial salary: **750**  For the first tab -> Facebook -> fine **150** USD (salary: **750** - **150** = **600**)  For the second tab -> Stackoverflow.com -> no fine  For the third tab -> Instagram -> fine **100** USD (salary: **600** - **100** = **500**)  For the fourth tab -> Facebook -> fine **150** USD (salary: **500** - **150** = **350**)  For the fifth tab -> Reddit -> fine **50** USD (salary: **350** - **50** = **300**)  For the sixth tab -> Facebook -> fine **150** USD (salary: **300** - **150** = **150**)  For the seventh tab -> Facebook -> fine **150** USD (salary: **150** - **150** = **0**)  Salary equals **0** => prints the corresponding output and the program ends. | |
| **Input** | **Output** | **Input** | **Output** |
| solve([3,500, 'Github.com', 'Stackoverflow.com', 'Softuni.bg']) | 500 | solve([3,500, 'Facebook', 'Stackoverflow.com', 'Softuni.bg']) | 350 |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#4>

## Oscars

You have been invited by the academy to write software that calculates the points for an actor/actress. The academy will give you initial **points for the actor**. **Each assessor** will then give **their score**. The points **an actor gets** are formed by: **the length** of the **assessor's name** **multiplied** by the **points** they **give divided** by **two**.

**If the score at any point exceeds 1250.5 the program must break and print that the given actor has received a nomination.**

### Input Data

Firstly, the function receives **3 arguments**:

* Actor's name - **string**
* Academy points – **a floating-point number in the range [2.0... 450.5]**
* Number of assessors **n** – **an integer in the range [1… 20]**

The next **n-number of arguments**:

* Assessor's name - **string**
* Assessor's score – **a floating-point number in the range [1.0... 50.0]**

### Output Data

Print on the console on a single line:

* If the points are above **1250.5**:

**"Congratulations, {actor's name} got a nominee for leading role with {points}!"**

* If the points **are not** enough:

**"Sorry, {actor's name} you need {needed points} more!"**

**Format the result to the first digit after the decimal point!**

### Sample Input and Output

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| solve(['Tom Hanks', 205, 4, 'Johhny Depp', 45, 'Will Smith', 29, 'Jet Lee', 10, 'Matthew McConaughey', 39]) | Sorry, Tom Hanks you need 247.5 more! | Tom Hanks starts with **205** points and **4** people will score him.  First is Johnny Depp  => **205** + ((11 \* **45**) / 2) = **452.5**  Second is Will Smith  => **452.5** + ((10 \* **29**) / 2) = **597.5**  Third is Jet Lee  => **597.5** + ((7 \***10**) / 2) = **632.5**  Fourth is Matthew McConaughey  => **632.5** + ((19 \* **39**) / 2) = **1003.0**  **1003.0** < **1250.5**  => The points are not enough.  Needed points: **1250.5** - **1003.0** = 247.5 |
| solve(['Sandra Bullock', 340, 5, 'Robert De Niro', 50, 'Julia Roberts', 40.5', 'Daniel Day-Lewis', 39.4, 'Nicolas Cage', 29.9, 'Sophia Loren', 33]) | Congratulations, Sandra Bullock got a nominee for leading role with 1268.5! |  |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#5>

## Trekking Mania

Climbers from all over the world gather in groups and mark the next peaks to climb. Depending on **the size of the group**, climbers will climb **different peaks**.

* Group **up to 5 people** - climb **Makalu**
* Group **of 6 to 12 people** - climb **Mont Blanc**
* Group **of 13 to 25 people** - climb **Kilimanjaro**
* Group **of 26 to 40 people** - climb **K2**
* Group **of 41 or more people** - climb **Everest**

**Write a function** that **calculates the percentage of climbers climbing each peak**.

### Input Data

A **sequence of arguments** is received by the function:

* **The first argument** – **the number of groups** of climbers– **an integer in the range [1...1000]**
* **A separate argument** for each group– **the number of people in the group - an integer in the range [1...1000]**

### Output Data

Print **5 lines** on the console, each containing a **percentage between 0.00% and 100.00% formatted to two digits after the decimal point:**

* **First line - the percentage** of people climbing **Makalu**
* **Second line - the percentage** of people climbing **Mont Blanc**
* **Third line - the percentage** of people climbing **Kilimanjaro**
* **Fourth line - the percentage** of people climbing **K2**
* **Fifth line - the percentage** of people climbing **Everest**

### Sample Input and Output

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| solve([10, 10, 5, 1, 100, 12, 26, 17, 37, 40, 78]) | 1.84%  6.75%  5.21%  31.60%  54.60% | Total number of people: 10 + 5 + 1 + 100 + 12 + 26 + 17 + 37 + 40 + 78 = 326  Makalu climbers: 6 / 326 \* 100 = 1.84%  Mont Blanc climbers: 22/326\*100 = 6.75%  Kilimanjaro climbers: 17/326\*100 = 5.21%  K2 climbers: 103/326\*100 = 31.60%  Everest climbers: 178/326\*100 = 54.60% |
| **Input** | **Output** | **Comments** |
| solve([5, 25, 41, 31, 250, 6]) | 0.00%  1.70%  7.08%  8.78%  82.44% | Total number of people: 25 + 41 + 31 + 250 + 6 = 353  Makalu climbers: 0 / 353 \* 100 = 0.00%  Mont Blanc climbers: 6 / 353 \* 100 = 1.70%  Kilimanjaro climbers: 25 / 353 \* 100 = 7.08%  K2 climbers: 31 / 353 \* 100 = 8.78%  Everest climbers: 291 / 353 \* 100 = 82.44% |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#6>

## Tennis Ranklist

Rafael Nadal is a tennis player whose next goal is to climb the world rankings in men's tennis.

During the year, Rafael participates in **a certain number of tournaments**, and for each tournament, he receives points that depend on **the position he finished in the tournament**. There are **three options** for finishing a tournament:

* **W - if he is the winner, he receives 2000 points**
* **F - if he is a finalist, he receives 1200 points**
* **SF - if he is a semi-finalist, he receives 720 points**

Write a function that **calculates how many points Rafael will have after playing all the tournaments**, knowing **how many points he started the season with**. Also, calculate **how many points he earns on average** from all tournaments played and **what percentage** of tournaments he has won.

### Input Data

The function receives **2 arguments**:

* **Number of tournaments he has participated in – an integer in the range [1…20]**
* **Initial number of points in the ranking – an integer in the range [1...4000]**

**A separate argument is received for each tournament:**

* **Tournament stage reached – string –** "**W**"**,** "**F**" **or** "**SF**"

### Output Data

Print **three lines** in the following format:

* "**Final points: {number of points after the tournaments are played}**"
* "**Average points: {average points earned per tournament}**"
* "**{percentage of won tournaments}%**"

**Average points should be rounded down to the nearest integer number and percentages to be formatted to the second digit after the decimal point.**

### Sample Input and Output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** | **Comments** | | |
| solve([5, 1400, 'F', 'SF', 'W', 'W', 'SF']) | Final points: 8040  Average points: 1328  40.00% | **5 tournaments and starting points: 1400**  **1st tournament -> final (F) -> points = 1400 + 1200 = 2600**  **2nd tournament -> semi-final (SF) -> points = 2600 + 720 = 3320**  **3rd tournament -> winner (W) -> points = 3320 + 2000 = 5320**  **4th tournament -> winner (W) -> points = 5320 + 2000 = 7320**  **5th tournament -> semi-final (SF) -> points = 7320 + 720 = 8040**  **Points after the tournaments are played: 8040**  **Average points earned per tournament:**  **(1200 + 720 + 2000 + 2000 + 720) / 5 = 6640 / 5 = 1328**  **Number of won tournaments: 2**  **Percentage of won tournaments: (2 / 5) \* 100 = 40 %** | | |
| **Input** | **Output** | **Input** | **Output** |
| solve([4, 750, 'SF', 'W', 'SF', 'W']) | Final points: 6190  Average points: 1360  50.00% | solve([7, 1200, 'SF', 'F', 'W', 'F', 'W', 'SF', 'W']) | Final points: 11040  Average points: 1405  42.86% |

### Testing in the Judge System

Test the solution to this problem here: <https://judge.softuni.org/Contests/Compete/Index/3494#7>