# Confirmation of qualifications

**To get started on the working tasks, demonstrate your knowledge level .**

**Prove that you are ready for the brainstorm!**

Confirmation of qualifications

# What is a loop?
# Which loop operator do you know?

Confirmation of qualifications

# Loop

**– a command that executes actions given as long as a certain logical expression (condition) remains true.**

```
while Expression is true :
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

*An action block starts with a colon*

*4 spaces*

Confirmation of qualifications

# What is a counter ?
# What is it used for?

Confirmation of qualifications

# Counter

**– a variable storing the number of steps of a certain loop.**

The counter can store:

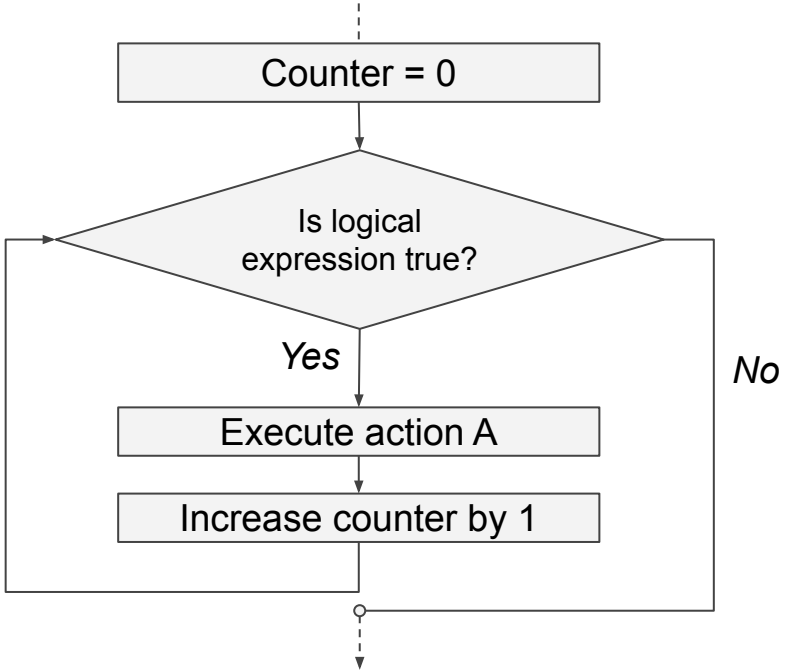
- All the steps of a loop.
- Loop steps for which a certain condition is met.

Confirmation of qualifications

# Counter

**– a variable storing the number of steps of a certain loop.**

*Example 1:*
Counter storing all the loop steps.

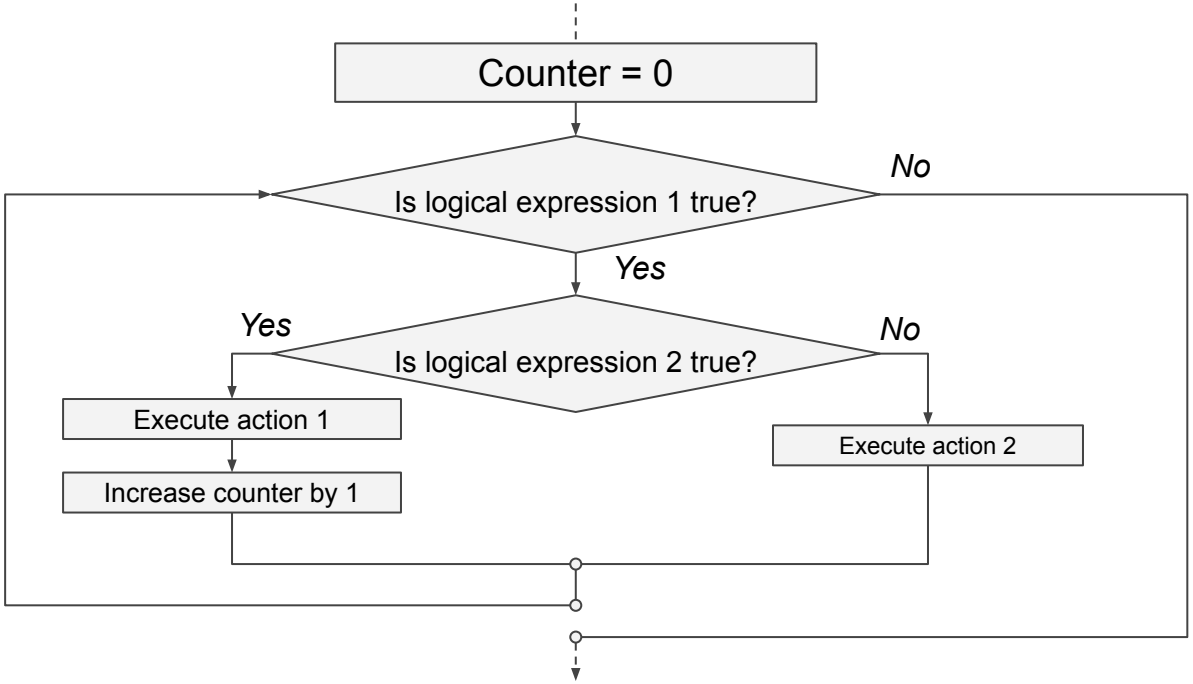



Confirmation of qualifications

# Counter

**– a variable storing the number of steps of a certain loop.**

*Example 2:*
Counter storing all the loop steps where the condition is true.




Confirmation of qualifications

# Complete the task

Write a program that prompts you to enter three user preferences. After every preference has been entered, the program prints: “Preference taken into account!”. After all the preferences have been entered, the program prints: “Recommendation system is set up!”.

```
Enter your wish:
>>> tik tokers
Preference taken into account
Enter your wish:
>>> Marvel comics
Preference taken into account
Enter your wish:
>>> games
Preference taken into account
Recommendation system is set up!
```

Confirmation of qualifications

# Complete the task

Write a program that prompts you to enter three user preferences. After every preference has been entered, the program prints: “Preference taken into account!”. After all the preferences have been entered, the program prints: “Recommendation system is set up!”

```
i = 0
while i != 3:
  wish = input('Enter your wish:')
  print('Preference taken into account')
  i += 1
print('Recommendation system is set up!')
```

```
Enter your wish:
>>> tik tokers
Preference taken into account
Enter your wish:
>>> Marvel comics
Preference taken into account
Enter your wish:
>>> games
Preference taken into account
Recommendation system is set up!
```

Confirmation of qualifications

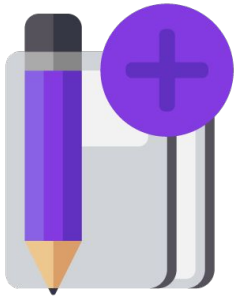
# Qualifications confirmed!

Great! You are ready to brainstorm and complete your work task!

Confirmation of qualifications

## Brainstorm:

# The for loop



# Where is the for loop used?

The **for** loop

Iteration over the sequence elements

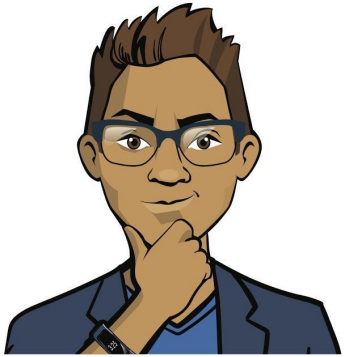
*Important tool:*

The **in** operator

Repeating actions in the loop body n times

*Important tool:*

The **range()** function



Brainstorm

# Where is the for loop used?

The **for** loop

Iteration over the sequence elements

*Important tool:*

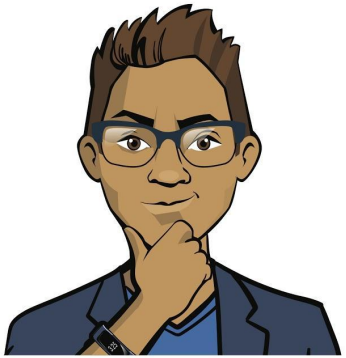
The **in** operator

Repeating actions in the loop body n times

*Important tool:*

The **range()** function

In fact, the second case comes down to the first one!
Let's figure out how the loop works inside.



Brainstorm

# The for loop

## — a loop iterating over the elements of a finite sequence.

A sequence is an ordered set of elements.

```
for element in sequence :
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

*An action block starts with a colon*

*4 spaces*

Brainstorm

# The `for` loop

## — a loop iterating over the elements of a finite sequence.

A sequence is an ordered set of elements.

```
for element in sequence :
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

*The interpreter <u>itself</u> determines the **beginning** of the sequence, its **end**, and the **order** of the elements.*

*<u>No counter needed</u>!*

| | | | | | | |
|---|---|---|---|---|---|---|
| a | n | n | y | 1 | 2 | 3 |

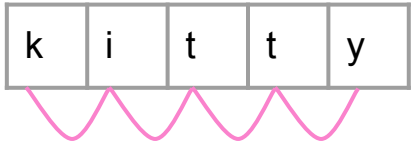
Brainstorm

# The for loop

## — a loop iterating over the elements of a finite sequence.

Encrypting the password by letter number in the alphabet:

```
password = 'kitty'
alphabet = 'abcdefghijklmnopqrstuvwxyz'
for symbol in password:
    print(alphabet.find(symbol) + 1)
```


Brainstorm

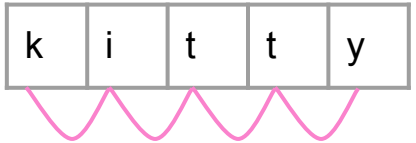
# The for loop

## — a loop iterating over the elements of a finite sequence.

Encrypting the password by letter number in the alphabet:

```
password = 'kitty'
alphabet = 'abcdefghijklmnopqrstuvwxyz'
for symbol in password:
    print(alphabet.find(symbol) + 1)
```


*How many times will the loop work?*
*Why exactly this many?*




Brainstorm

# Let’s go back to the task

**Task 1.** Only letters of the Latin alphabet and numbers can be used in logins. The following symbols are forbidden: **=?*^$№@_,;:#%^&()**. The program must ask for the login and print the forbidden symbols, if any.

```
Enter your login:
>>> kate_@smith
Forbidden symbol: _
Forbidden symbol: @
```

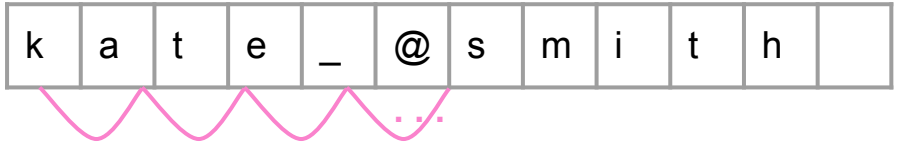
Brainstorm

# Let’s go back to the task

**Task 1.** Only letters of the Latin alphabet and numbers can be used in logins. The following symbols are forbidden: **=?*^$№@_,;:#%^&()**. The program must ask for the login and print the forbidden symbols, if any.

```
login = input('Enter your login:')
wrong = '=?*^$№@_'
for symbol in login:
    if symbol in wrong:
        print('Forbidden symbol:', symbol)
```

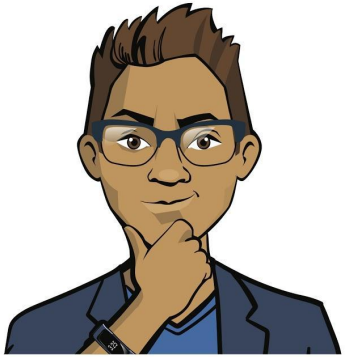
```
Enter your login:
>>> kate_@smith
Forbidden symbol: _
Forbidden symbol: @
```




Brainstorm

# Before we continue:

1. How many steps will the loop take if you enter the login: “ag.sidorov”? Why?
2. What will the program print if you enter the login: “$tep@n555”?
3. Suppose we enter a login that has no forbidden characters. How many times will the loop work?



Brainstorm

# The for loop

## can be programmed as a counter loop.

Since for iterates over the elements of a sequence, the for loop must iterate over numbers in the range from 0 to n-1 to repeat the actions n times.

```
for element in range from 0 to 4 :
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

Repeating actions of the loop body 5 times.

Brainstorm

# The for loop

## can be programmed as a counter loop.

Since for iterates over the elements of a sequence, the for loop must iterate over numbers in the range from 0 to n-1 to repeat the actions n times.

```
for element in range from 0 to 4 :
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

Repeating actions of the loop body 5 times.

To create a time range for the for loop, the range() function is used.

Brainstorm

# The range() function

**creates a sequence of numbers within the specified range.**

`range(n)` — creates the sequence of numbers 0, 1, 2... n-1.

`range(a, b)` — creates the sequence of numbers a, a+1, a+2... b-1.

```
for element in range( range ):
    Execute action 1
    Execute action 2
    Execute action 3
Execute action 4
```

Brainstorm

# The range() function

**creates a sequence of numbers within the specified range.**

`range(n)` — creates the sequence of numbers 0, 1, 2... n-1.

`range(a, b)` — creates the sequence of numbers a, a+1, a+2... b-1.

Prompting the user to enter three preferences:

```
for i in range(3):
    wish = input('Enter your wish:')
    print('Preference taken into account')
print('Recommendation system is set up!')
```

```
Enter your wish:
>>> tik tokers
Preference taken into account
Enter your wish:
>>> Marvel comics
Preference taken into account
Enter your wish:
>>> games
Preference taken into account
Recommendation system is set up!
```

Brainstorm

# Let’s go over a task

**Task 2.** Write a program to create a group chat. The number of people is entered from the keyboard. Then, one by one, the names of the users to be added to the chat are entered. In response to each name, the program prints: "Welcome, <name>!" After all the names have been entered, a message is displayed: "Group chat created!"

```
Number of participants:
>>> 3
Enter name:
>>> Kate
Welcome, Kate
Enter name:
>>> John
Welcome, John
Enter name:
>>> Bess
Welcome, Bess
Group chat created!
```

Brainstorm

# Let’s go over a task

**Task 2.** Write a program to create a group chat. The number of people is entered from the keyboard. Then, one by one, the names of the users to be added to the chat are entered. In response to each name, the program prints: "Welcome, <name>!" After all the names have been entered, a message is displayed: "Group chat created!"

```
amount = int(input('Number of
participants:'))
for i in range(amount):
    name = input('Enter name:')
    print('Welcome,', name)
print('Group chat created!')
```

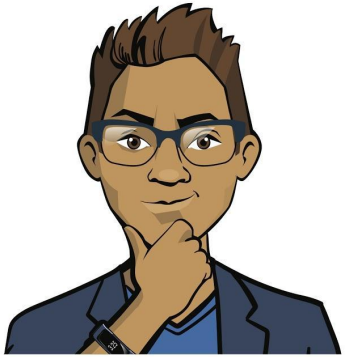
| 0 | 1 | 2 | 3 |
|---|---|---|---|

```
Number of participants:
>>> 3
Enter name:
>>> Kate
Welcome, Kate
Enter name:
>>> John
Welcome, John
Enter name:
>>> Bess
Welcome, Bess
Group chat created!
```

Brainstorm

# Before we continue:

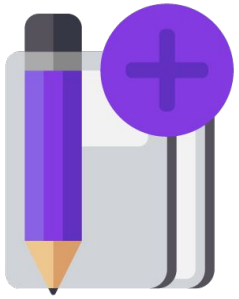
1. How many steps will the loop take if you enter 5 participants? 10? 7? Why?
2. How does the solution change if you specify a range of values as `range(0, amount)`? `range(0, 3)`? `range(amount-1)`?



Brainstorm

## Brainstorm:

# Nested constructs



# Let’s go over a task

**Task 1**. Create a program to authorize the social network administrator by login and password. There are **three attempts** to enter. If the data is entered correctly (login: admin, password: kjf3g), the program prints: “Authorization at attempt <number>”.

```
Login:
>>> admin
Password:
>>> ksjdk
Login:
>>> admin
Password:
>>> kjf3g
Authorization at attempt 2
```

*How do we complete this task?*

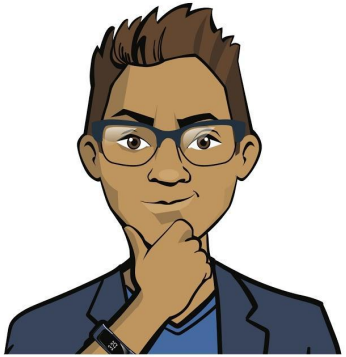
Brainstorm

# Let’s go over a task

**Task 1**. Create a program to authorize the social network administrator by login and password. There are **three attempts** to enter. If the data is entered correctly (login: admin, password: kjf3g), the program prints: “Authorization at attempt <number>”.

```
for i in range(3):
  login = input('Login:')
  password = input('Password:')
  if login == 'admin' and password == 'kjf3g':
      print('Authorization at attempt', i+1)
```

*Let’s go over a solution that uses for. Is it correct?*



Brainstorm

# Let’s go over a task

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```
for i in range(3):
  login = input('Login:')
  password = input('Password:')
  if login == 'admin' and password == 'kjf3g':
      print('Authorization at attempt', i+1)
```

```
Login:
>>> admin
Password:
>>> hhasd
Login:
>>> admin
Password:
>>> kjf3g
Authorization at attempt 2
Login:
>>> admin
Password:
>>> kjf3g
Authorization at attempt 3
```

*No! The loop will run 3 times even if correct data is received.*

*Describe a tool that could remedy the situation.*

Brainstorm

# Let’s go over a task

**Task 1**. Create a program to authorize the social network administrator by login and password. There are **three attempts** to enter. If the data is entered correctly (login: admin, password: kjf3g), the program prints: “Authorization at attempt <number>”.

`break` — operator that terminates the loop ahead of schedule.

```
Login:
>>> admin
Password:
>>> hhasd
Login:
>>> admin
Password:
>>> kjf3g
Authorization at attempt 2
Login:
>>> admin
Password:
>>> kjf3g
Authorization at attempt 3
```

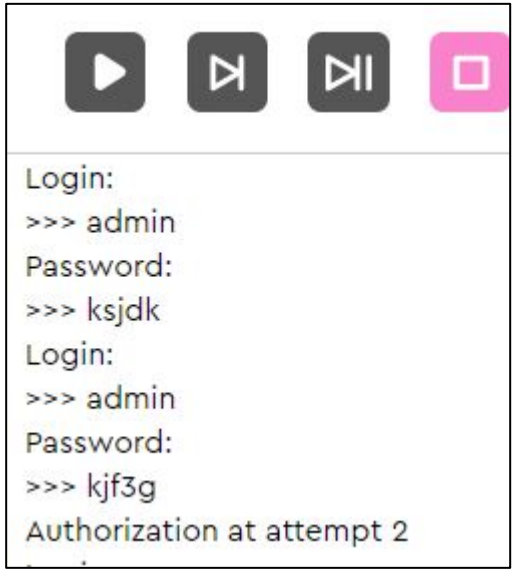
*How can we fix the previous solution using the break operator?*

Brainstorm

# Let’s go over a task

**Task 1**. Create a program to authorize the social network administrator by login and password. There are **three attempts** to enter. If the data is entered correctly (login: admin, password: kjf3g), the program prints: “Authorization at attempt <number>”.

```
for i in range(3):
  login = input('Login:')
  password = input('Password:')
  if login == 'admin' and password == 'kjf3g':
      print('Authorization at attempt', i+1)
      break
```




Brainstorm

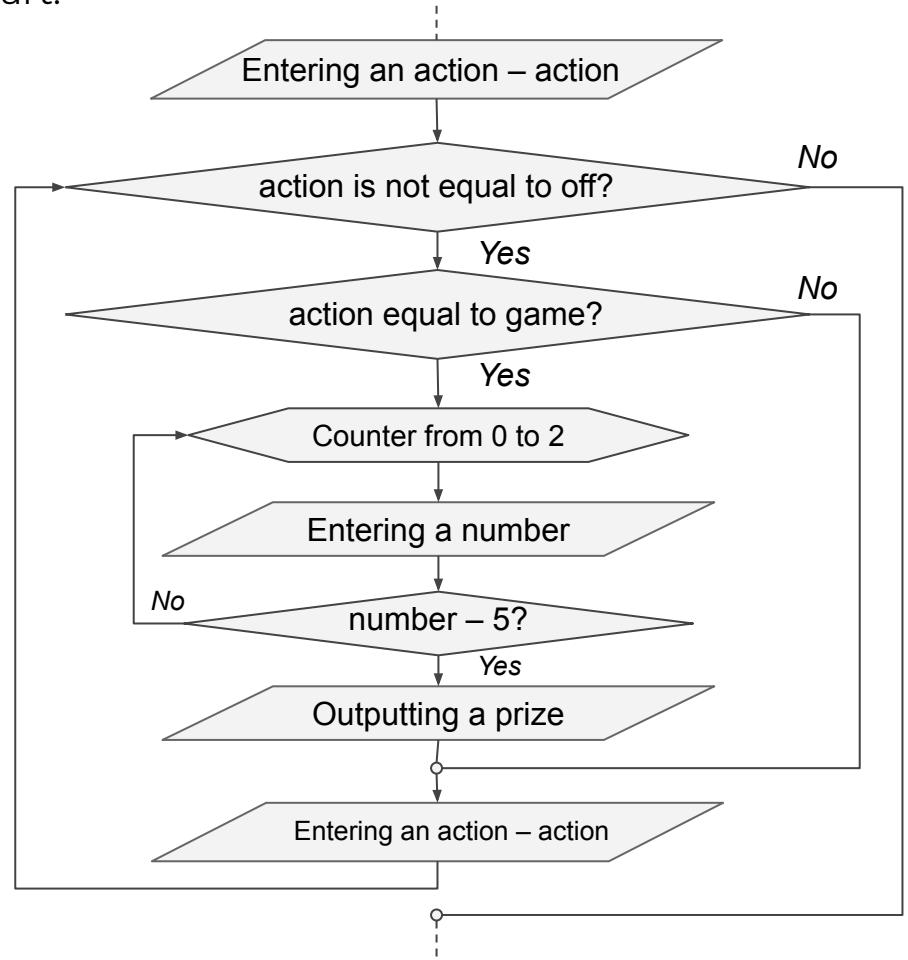
# Let’s go over a task

**Task 2**. Write a program for the entertainment section. When you enter “game”, the game “Guess the Number” must start (the correct answer is 5). There are three attempts to answer. If the answer is correct, the program prints: “You have won a concert ticket!”. The game can be played any number of times. When you enter “off”, the program must exit.

```
Enter game – "Guess the Number" game, off – exit
>>> 3
Enter game – "Guess the Number" game, off – exit
>>> 1
Enter game – "Guess the Number" game, off – exit
>>> 2
Enter game – "Guess the Number" game, off – exit
>>> game
Enter number
>>> 5
You have won a concert ticket!
Enter game – "Guess the Number" game, off – exit
>>> off
```

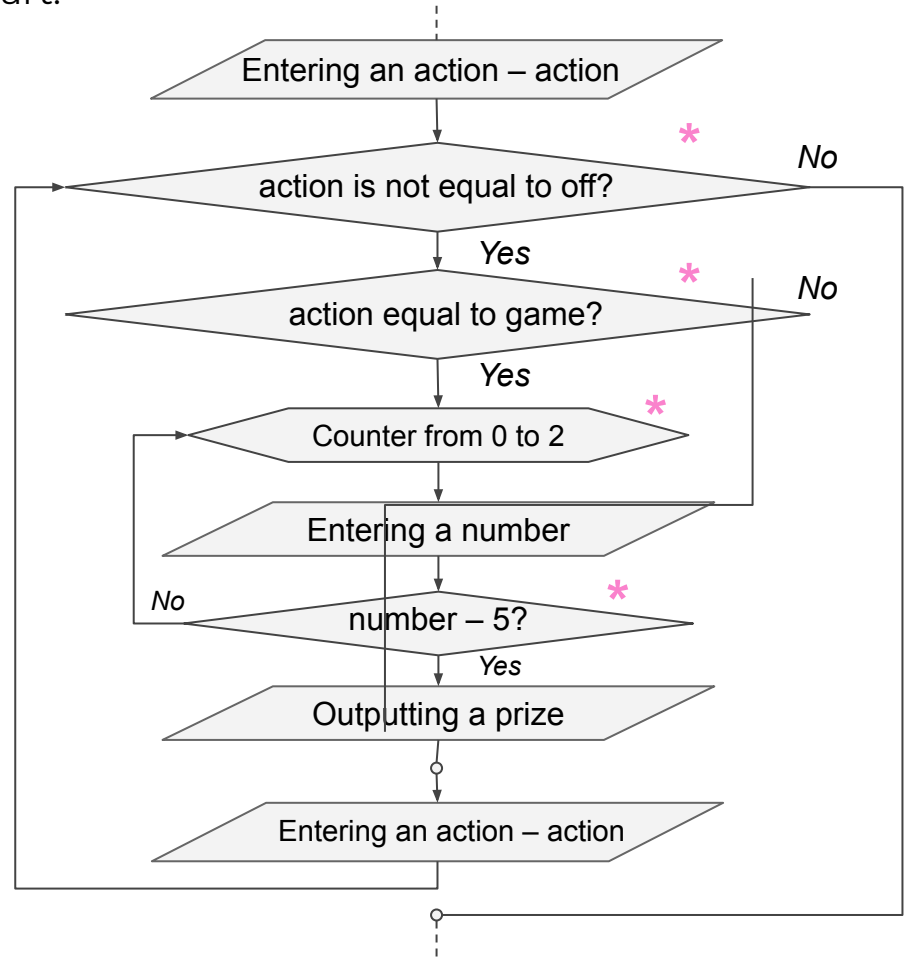
Brainstorm

Sample flowchart:




Brainstorm

Sample flowchart:




Name the operators that can be used in the marked blocks.

Brainstorm

# Sample solution

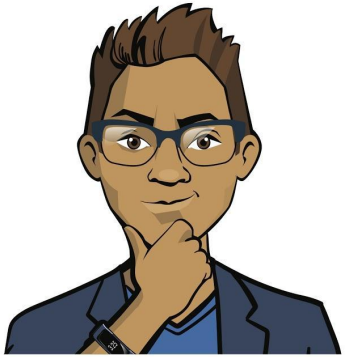
**Task 2**. Write a program for the entertainment section. When you enter “game”, the game “Guess the Number” must start (the correct answer is 5). There are three attempts to answer. If the answer is correct, the program prints: “You have won a concert ticket!”. The game can be played any number of times. When you enter “off”, the program must exit.

```
action = input('Enter game - “Guess the Number” game, off - exit')
while action != 'off':
  if action == 'game':
       for i in range(3):
          if input('Enter number') == '5':
              print('You have won a concert ticket!')
              break
  action = input('Enter game - “Guess the Number” game, off - exit')
```

Brainstorm

# Before we continue:

1. How many steps will the while loop take if you sequentially enter “jokes”, “game”, “3”, “5”, “off”?
2. How many steps will the for loop take if you sequentially enter “game”, “5”, “off”?
3. How will the program work if you run out of all attempts in the “Guess the Number” game?



Brainstorm