Confirmation of qualifications

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

Prove that you are ready for the brainstorm and training!

Confirmation of qualifications

What is a conditional statement ?
What types of conditional statement s do you know?

Confirmation of qualifications

Conditional statement

– a command that executes or does not execute an action depending on the value of the logical expression.

```
if Expression is true :
    Execute action 1
    Execute action 2
    Execute action 3
```

An action block starts with a colon

4 spaces

```
if Expression_1 is true :
    Execute action 1
elif Expression_2 is true :
    Execute action 2
else :
    Execute action 3
```

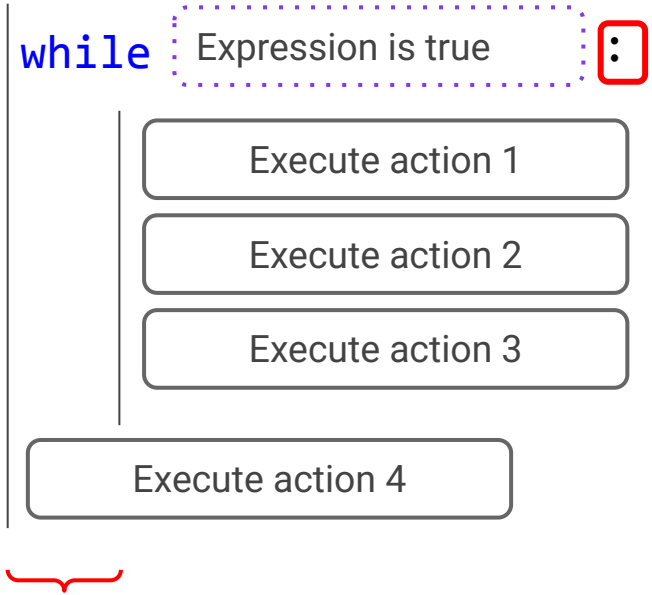
Confirmation of qualifications

What is a loop?
Which loop operators do you know?

Confirmation of qualifications

Loop

– a command that executes actions given as long as a certain logical expression remains true.



While the logical expression is true.

Execute...

Confirmation of qualifications

Loop

– a command that executes actions given as long as a certain logical expression remains true.

A sequence is an ordered set of elements.

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

For every element in the sequence.

Execute...

Confirmation of qualifications

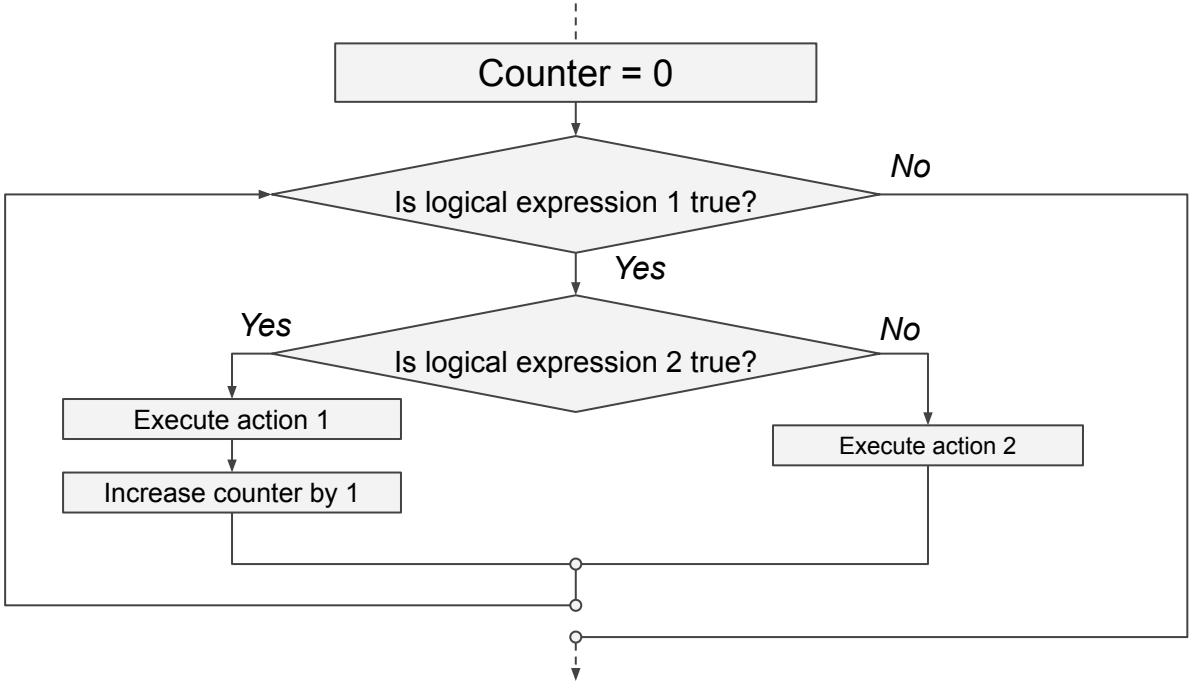
What is a counter ?
What data can it store?

Confirmation of qualifications

Counter

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

Example:
Counter storing all the loop steps where the condition was true.



Confirmation of qualifications

How do we program
a while loop with a counter ?
A for loop with a counter ?

Confirmation of qualifications

while with counter

Counter to repeat the loop body n times.

```
i = 0

while i < n:
    Execute action 1
    Execute action 2
    i = i + 1
Execute action 3
```

Counter to count only the steps where the additional condition was true.

```
i = 0

while Expression_1 is true :
    if Expression_2 is true :
        Execute action 1
        i = i + 1
Execute action 2
```

Confirmation of qualifications

for with counter

`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.

Counter to repeat the loop body n times.

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

Repeat the loop body n times and count the number of times the additional condition was true.

```
k = 0
for i in range(n):
    If the condition is true
        k = k + 1
Execute action 2
```

Confirmation of qualifications

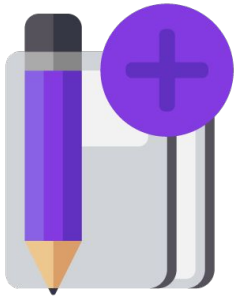
Qualifications confirmed!

Great! You are ready for the brainstorm and training!

Confirmation of qualifications

Brainstorm:

Training

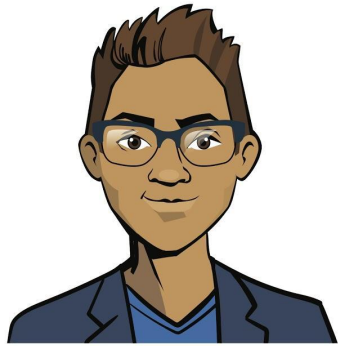


Nested control constructs

The training on nested data structures will consist of two parts: theory and practice.

Key question:

- What types of conditional statements and loops do we need to use in this particular task?



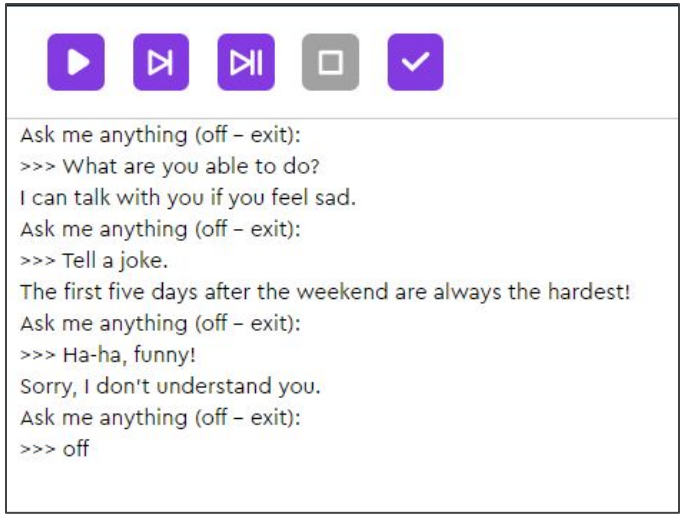
Brainstorm

Let’s go over a task

Task 1. Program a textual bot that can keep up a conversation. The bot must reply to these questions:

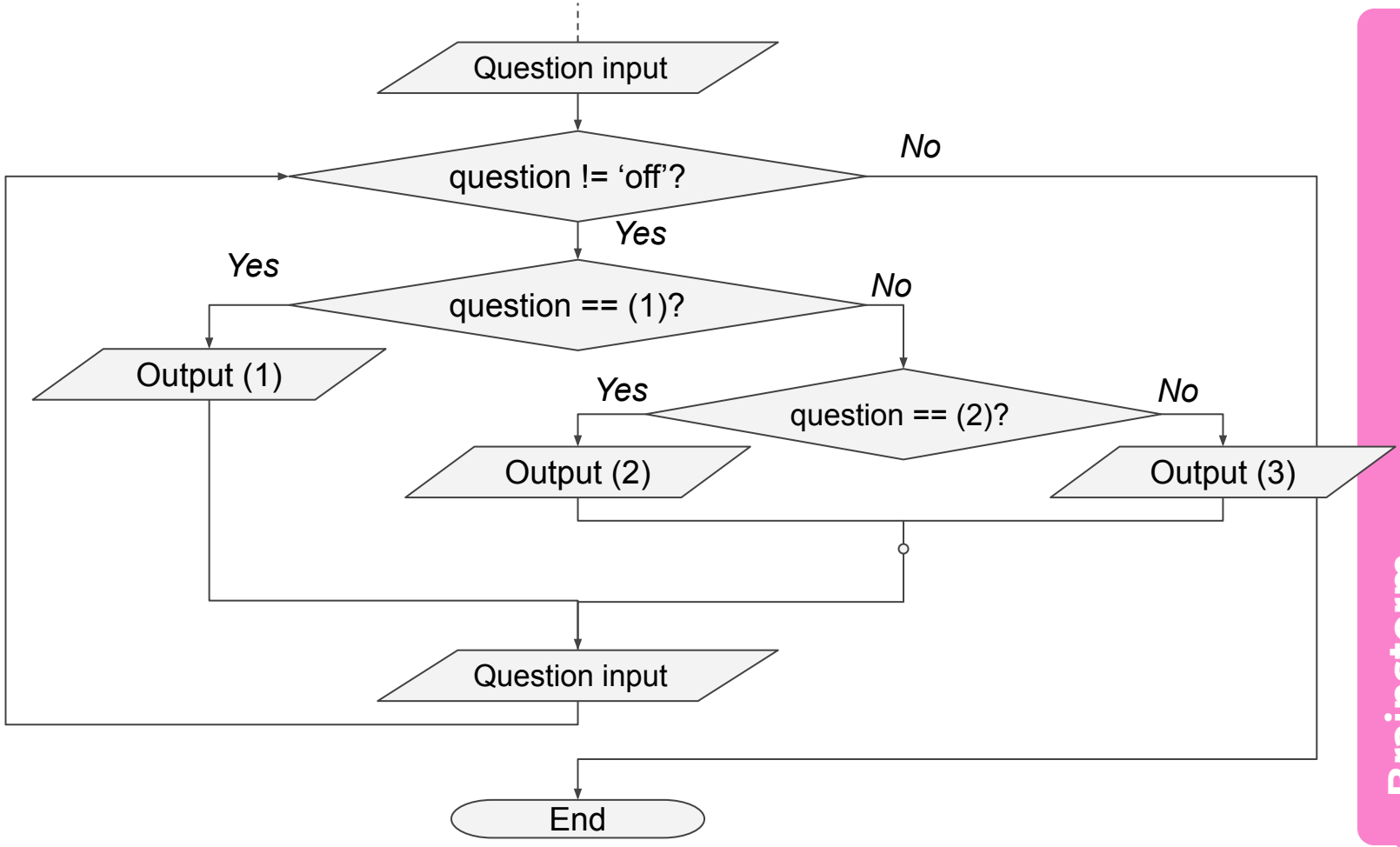
- Q: “What are you able to do?” A: “I can talk with you if you feel sad.”
- Q: “Tell a joke.” A: “The first five days after the weekend are always the hardest!”

In all the other cases: “Sorry, I don’t understand you.” When the input is “off”, the bot ends operation.



Which control constructs will we need?

Brainstorm


Question input
question != 'off'?
No
Yes
Yes
question == (1)?
No
Output (1)
Yes
question == (2)?
No
Output (2)
Output (3)
Question input
End

Brainstorm

Sample solution

Task 1. Program a textual bot that can keep up a conversation. The bot must reply to these questions:

- Q: “What are you able to do?” A: “I can talk with you if you feel sad.”
- Q: “Tell a joke.” A: “The first five days after the weekend are always the hardest!”

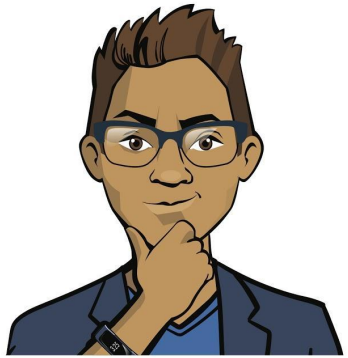
In all the other cases: “Sorry, I don’t understand you.” When the input is “off”, the bot ends operation.

```
question = input('Ask me anything (off - exit):')
while question != 'off':
    if question == 'What are you able to do?':
        print('I can talk with you if you feel sad.')
    elif question == 'Tell a joke.':
        print('The first five days after the weekend are always
the hardest!')
    else:
        print('Sorry, I don't understand you.')
    question = input('Ask me anything (off - exit):')
```

Brainstorm

Before we continue:

1. How will the program respond if the user inputs the following question: “What music is worth listening to?”
2. What addition do we need to make to the program so that, when asked, “What is your hobby?” the bot replies, “I love computer games”?
3. Trying to exit the program, users may enter “Off”, “OFF”, etc. instead of “off”.
   How do we recognize these, too?

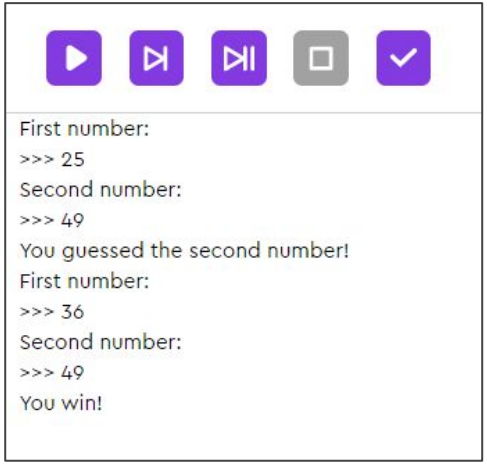


Brainstorm

Let’s go over a task

Task 2. The bot chooses two numbers a day. Those who guess both of them **in 3 tries** get a free music subscription for one year. Users enter these two numbers one after another.

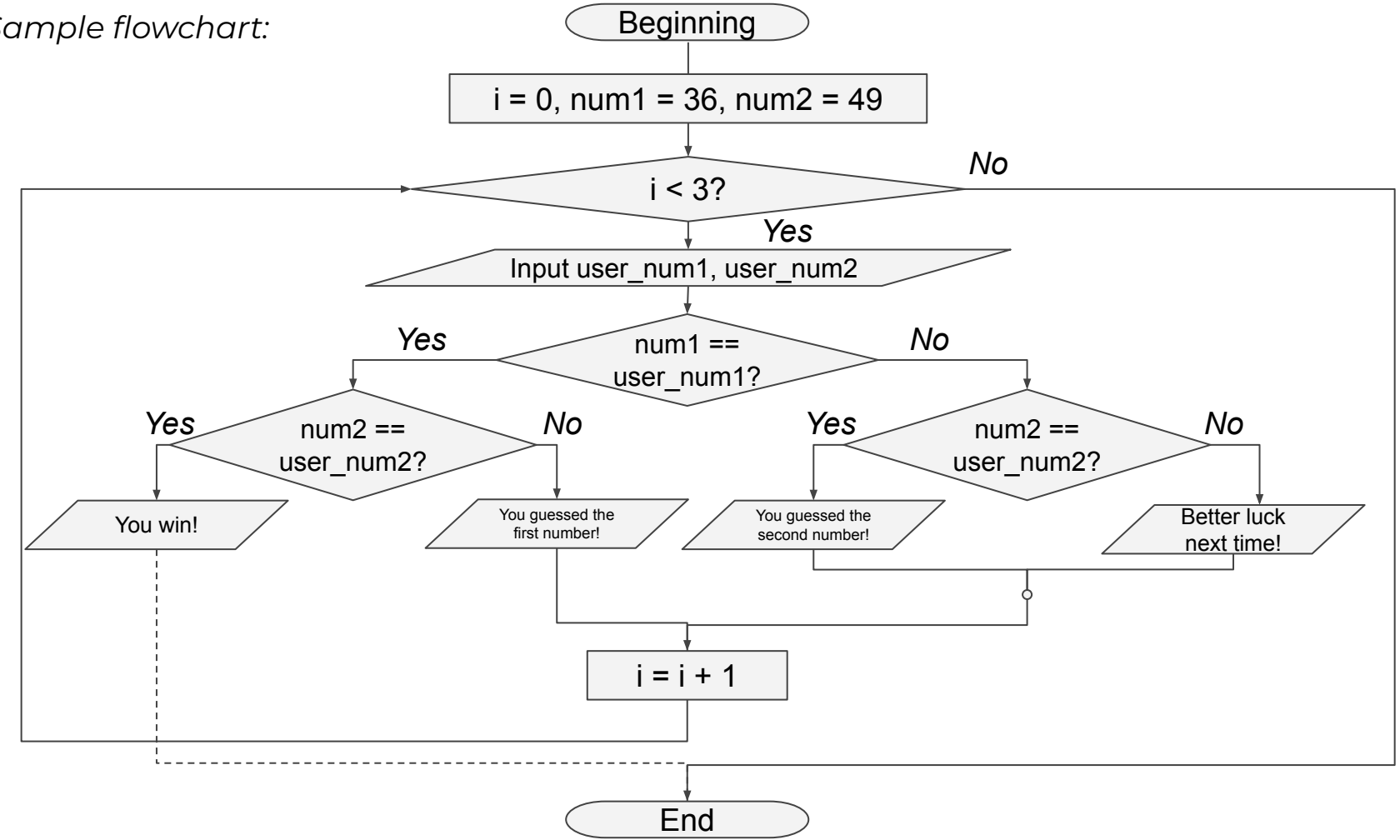
- ❏ If both of them are guessed correctly, the output is “You win!”
- ❏ If only the first one is guessed correctly, the output is “You guessed the first number!”
- ❏ If only the second one is guessed correctly, the output is “You guessed the second number!”
- ❏ In all the other cases, the output is “Better luck next time!”



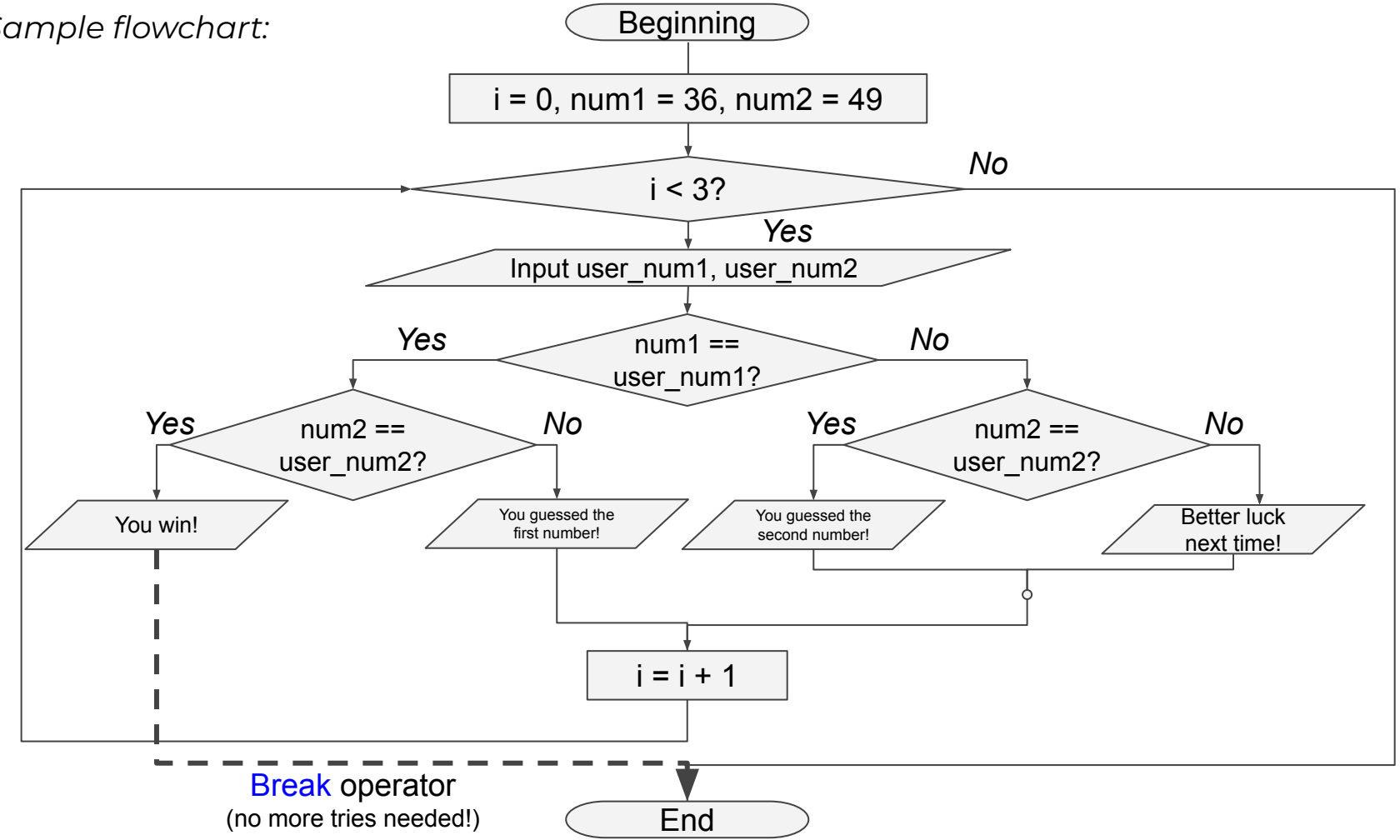
Which constructs will we need?

Brainstorm

Sample flowchart:



Sample flowchart:



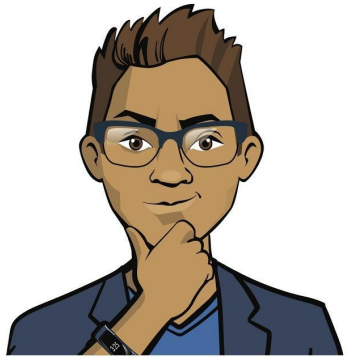
```
num1 = '36'
num2 = '49'
for i in range(3):
    user_num1 = input('First number:')
    user_num2 = input('Second number:')
    if user_num1 == num1:
        if user_num2 == num2:
            print('You win!')
            break
        else:
            print('You guessed the first
number!')
    else:
        if user_num2 == num2:
            print('You guessed the second
number!')
        else:
            print('Better luck next time!')
```

```
First number:
>>> 25
Second number:
>>> 49
You guessed the second number!
First number:
>>> 36
Second number:
>>> 49
You win!
```

Brainstorm

Before we continue:

1. How many levels of nesting are there in this program? Are there cases when the interpreter analyzes only part of the branches?
2. What will the program print if the user inputs the following sets of numbers?
    - 7, 49
    - 36, 46
    - 6, 7



Brainstorm