2.3
PLAYING WITH LOOPS

keep playing on repeat

2.3 PLAYING WITH LOOPS

- It is very common to have repetitive elements in games.
- These elements can be coded once but run many times.
- Looping structures enable us to run the same block of code over and over again.
- We will learn two types of loops: "for" and "while".

FOR LOOPS

A "for loop is made up of a loop variable and a loop body.

The loop variable keeps track of the number of repetitions that occurred.

The block of code that gets repeated n a loop is the loop body.

block

FOR LOOPS

loop variable

Keeps track of how many times the loop has run so far.

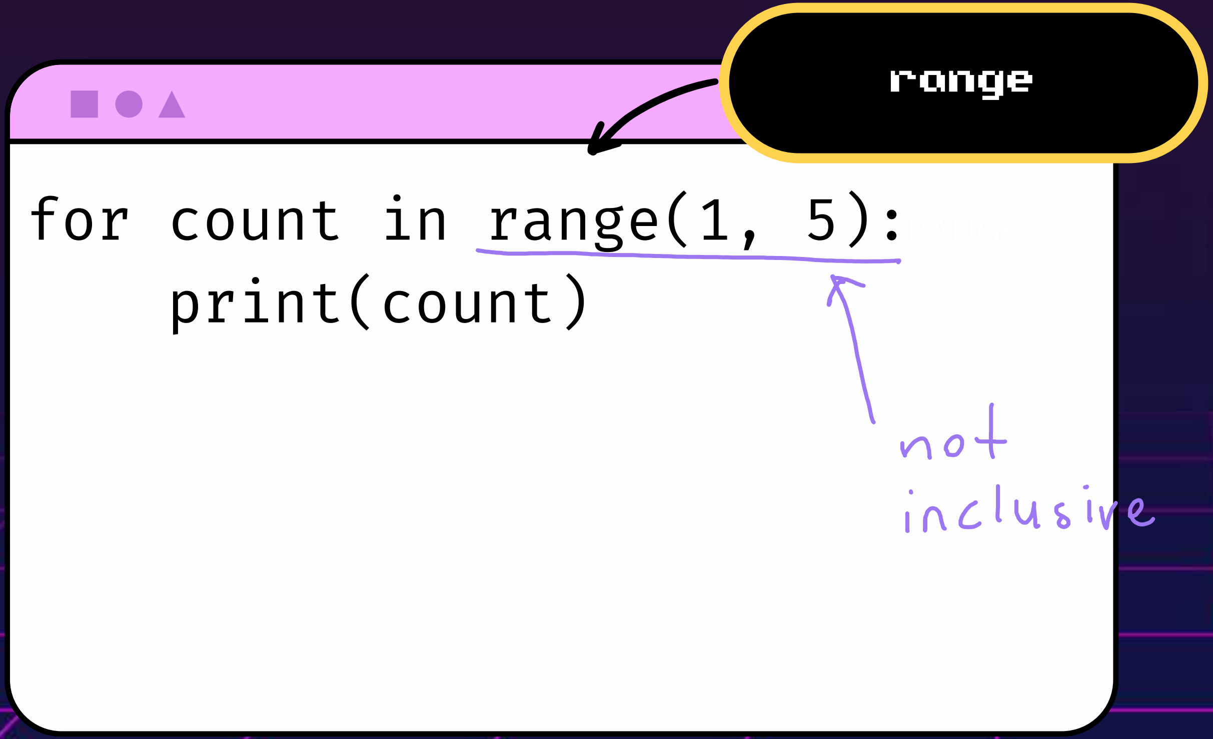
```
for count in range(1, 5):
    print(count)
```

loop body

Repeated code. Always indent commands inside a loop.

```
1
2
3
4
```

RANGE( ) FUNCTION



```
for count in range(1, 5):
    print(count)
```

The range function gives us a list of numbers from the first number up until the second-to-last number. Therefore, range(1, 5) gives us a list of [1, 2, 3, 4]. Note that 5 is not included.

WHAT DOES THIS DO?

```
guesses = []
print("Guess three numbers...")
for count in range(1, 4):
    guess = input("Enter...")
    guesses.append(guess)
```

[✓ A. Loops through numbers 1 up to 3.]

B. Conditional branch to select code.

C. Loops through numbers 1 up to 4.

[✓ D. Stores multiple user inputs in a list.]

Did you understand?

COMPLETE THE PROGRAM

Write a program that displays all the prime numbers between 2 and 10.

Fill in the Blanks

```
____________ n in ____________(2, 11):
    ____________ n == 2 or n == 3:
        print(n)
    else:
        prime = (6 * n) - 1
        print(prime)
```

range

if

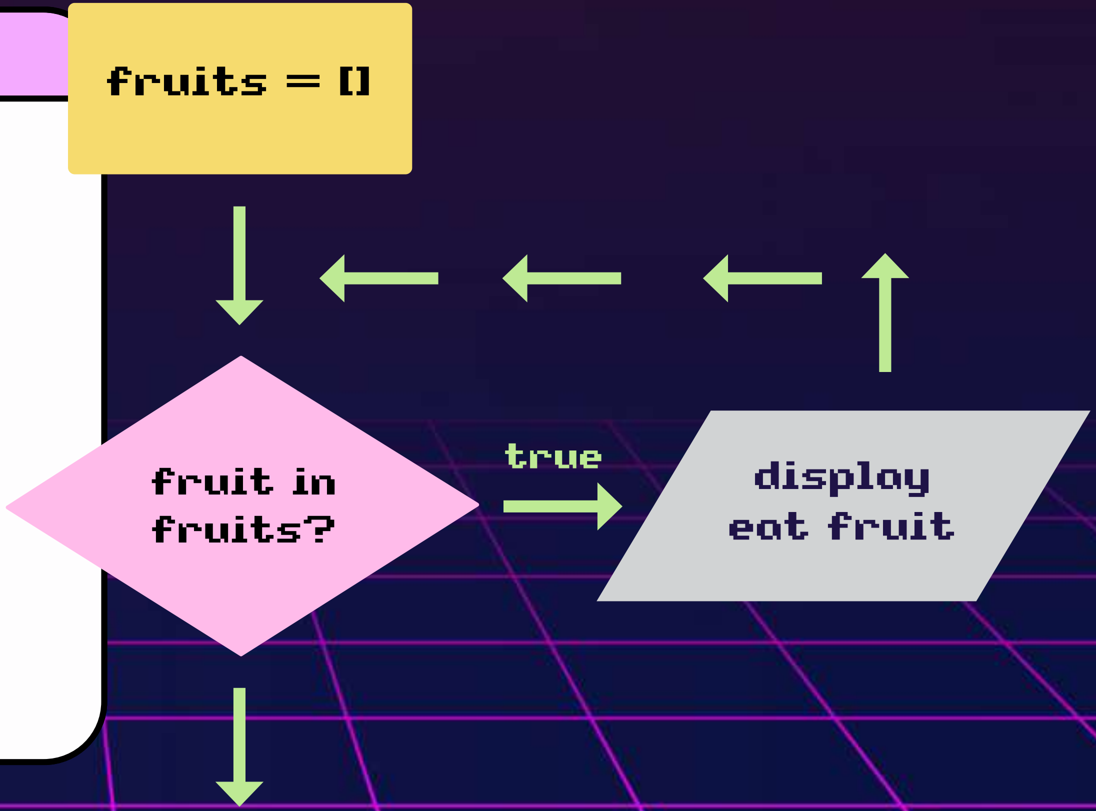
for

LOOPING OVER A LIST

```
fruits = ["apple", "banana", "cherry"]
for fruit in fruits:
    print("Eat this " + fruit)
```

fruit var

Fruit is a looping variable that moves along the list and stores the current fruit.



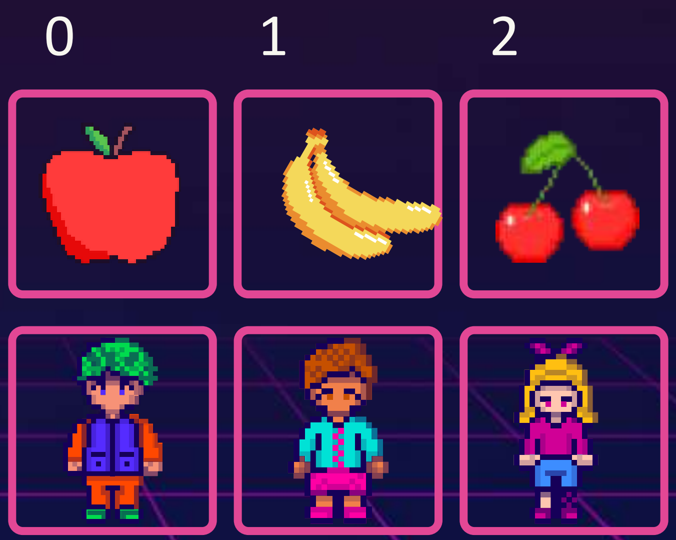
LOOPING OVER TWO LISTS

```
fruits = ["apple", "banana", "cherry"]
names = ["John", "Paul", "Amy"]
index = 0
for fruit in fruits:
    print(names[index] + " eats a " + fruit)
    index = index + 1
```

index means position

index

We created an index variable which moves through the fruit list.



TWO LIES AND A TRUTH

Can you pick out any lies?

```
fruits = ["apple", "banana", "cherry"]
names = ["John", "Paul", "Amy"]
index = 0
for fruit in fruits:
    print(names[index] + " eats a " + fruit)
    index = index + 1
```

Multiple Choice

A. Amy eats a cherry

B. John eats a banana

C. Jake eats an apple

FOR LOOP SUMMARY

Loop through consecutive numbers by making use of the **range** function.

When looping through a list the looping **variable** ____________ stores the current item.

Create a variable to track the current **index** when looping over two lists.

number

LESSON CHALLENGE

- Time to put the theory into practice.
- You will continue to build a small component of a game.
- You must use all you learned so far.
- Find your tasks!

WHILE LOOPS

A "while" loop uses a loop condition which can be True or **false**

The loop **condition** determines whether the loop body should be run.

The loop body will only run when the loop condition evaluates to **True**

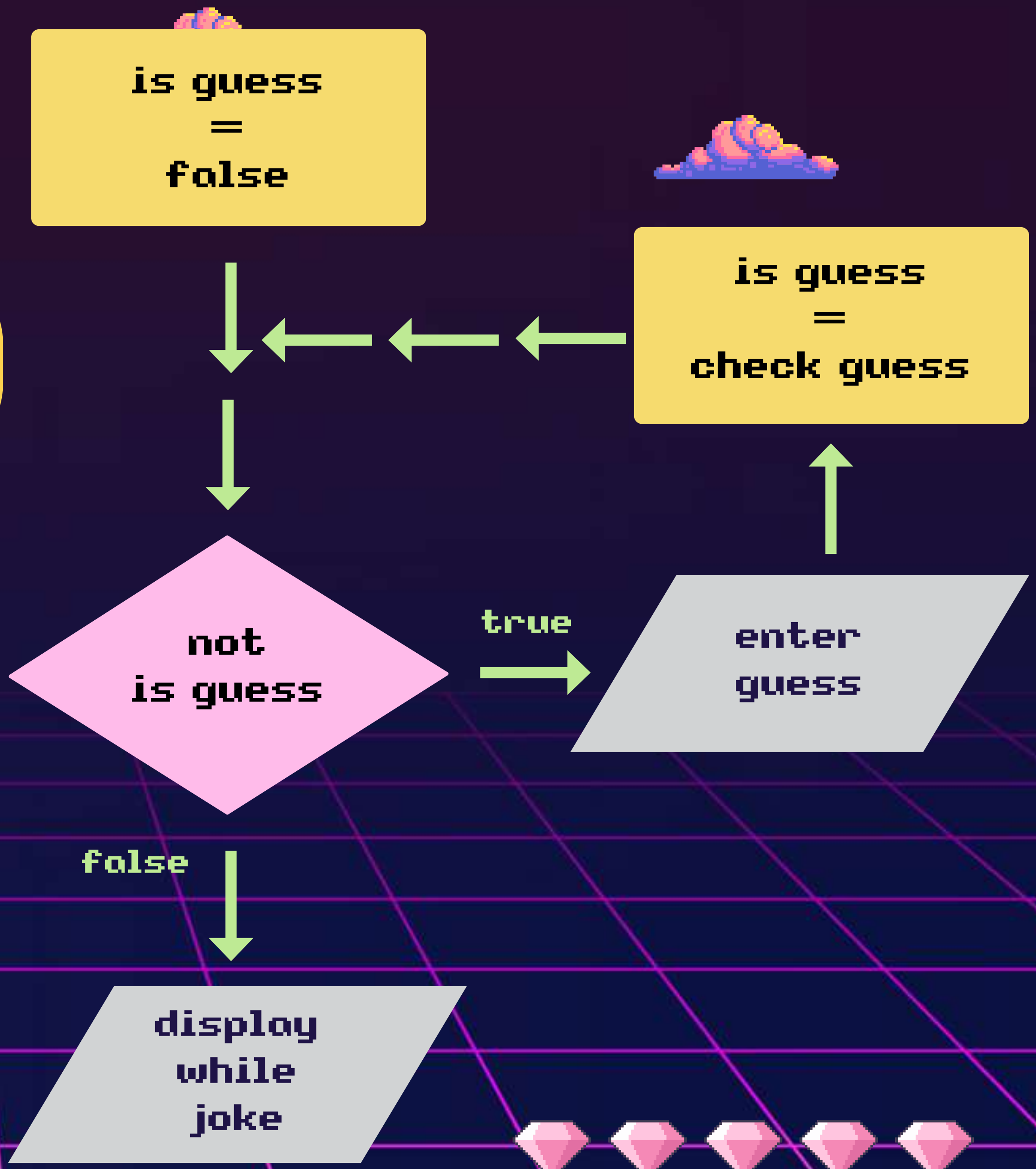
repeated

WHILE LOOP

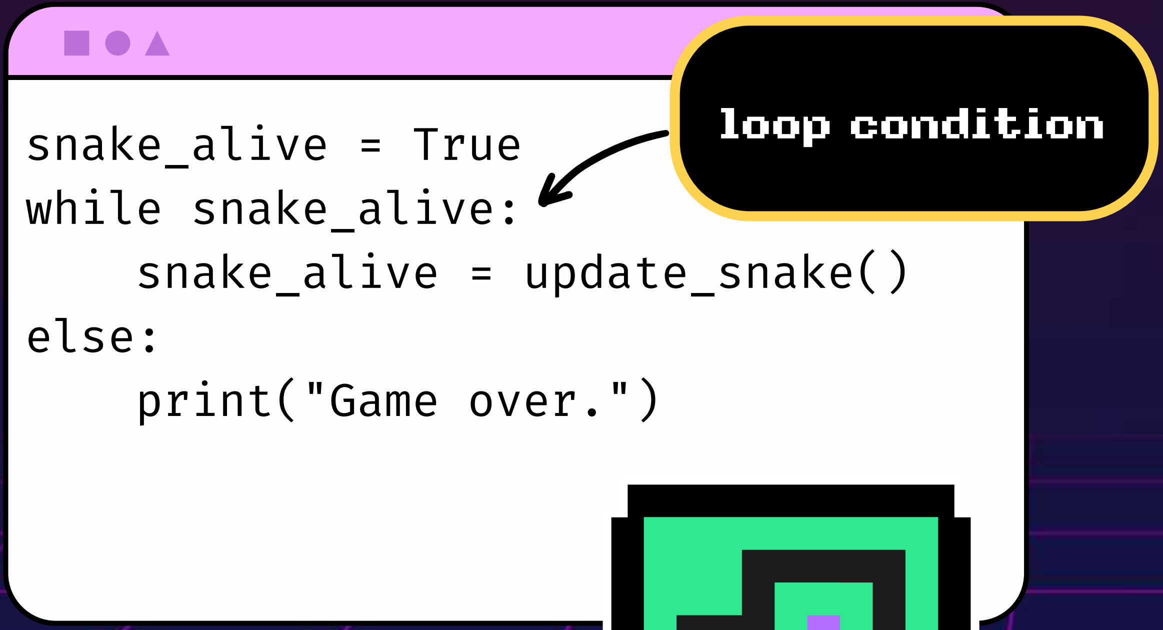
```
is_guess = False
while not is_guess:
    guess = input("Enter guess: ")
    is_guess = check(guess)
print("Took a while to guess!")
```

loop condition

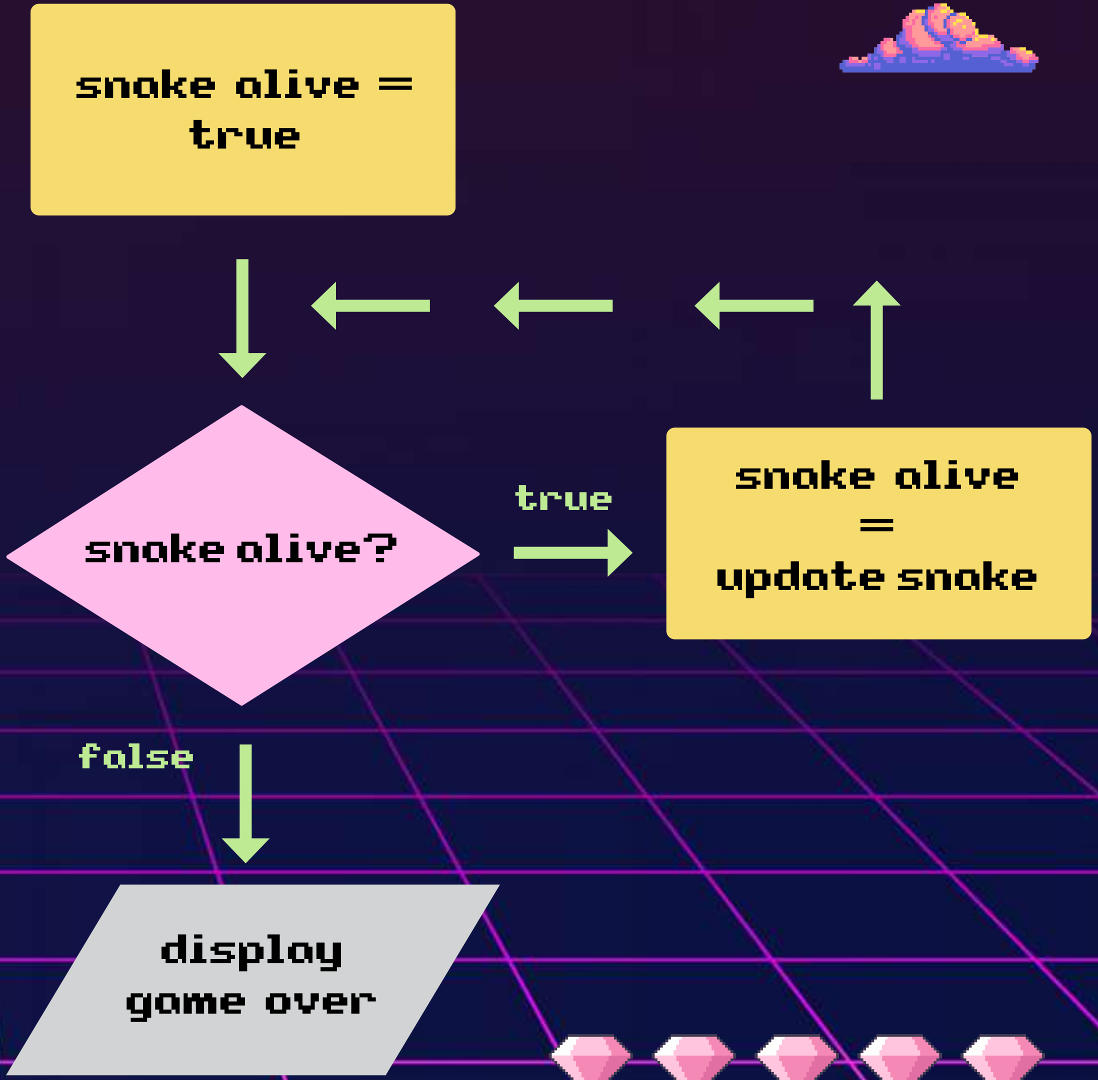
not False equates to True!



WHILE ... ELSE



```
snake_alive = True
while snake_alive:
    snake_alive = update_snake()
else:
    print("Game over.")
```



What do you think?

Can you explain the difference between a for loop and a while loop?

Give a short answer.

Short Answer

WHAT IS THE DIFFERENCE?

- When we know exactly how many times we need a loop to repeat we should use a for loop.
- At times, we might not know exactly how many times we need a loop to repeat, and so we use a while loop.
- A "for" loop has a clear start and end like a flight of stairs.
- A "while" loop will only start if the loop condition is True and will stop when the loop condition is False.

DID YOU UNDERSTAND?

COMPLETE THE PROGRAM

Complete the code snippet that will be part of a game called "Guess the number". The program keeps asking the user to guess the number when the user input is incorrect.

Fill in the Blanks

```
is_correct = False
____________ not is_correct:
    guess = input("Enter your guess")
    ____________ guess == number:
        is_correct = True
    else:
        ____________("Try again.")
```

print

if

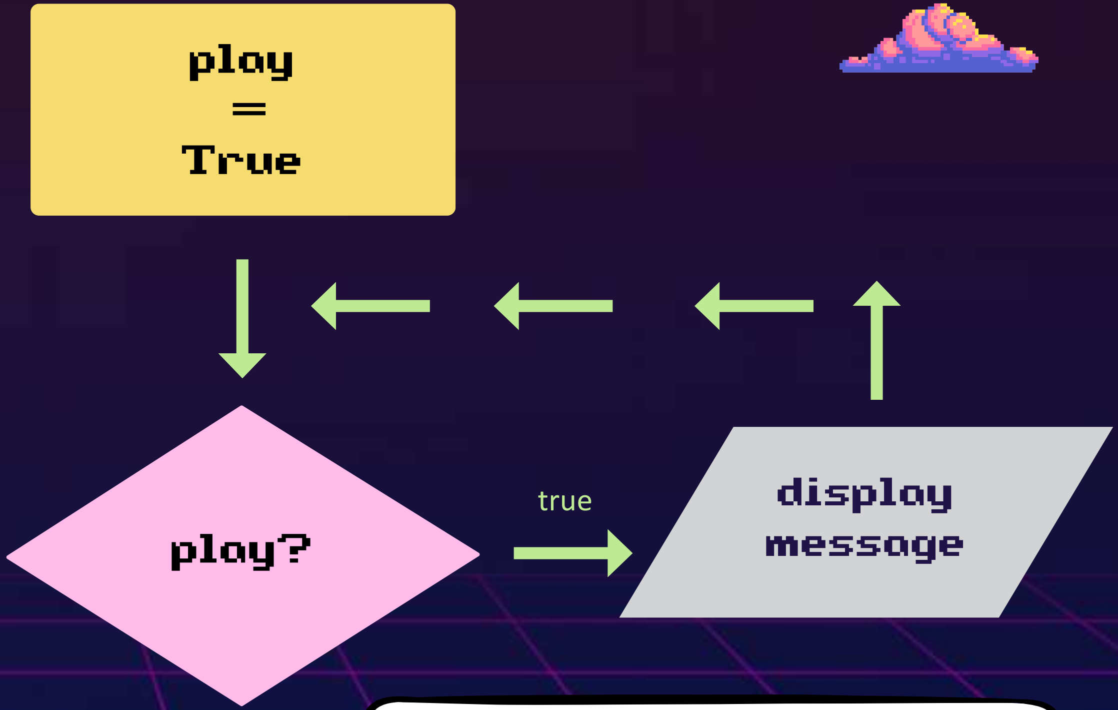
while

TO INFINITY...

infinite loop

```
play = True
while play:
    print("Will this ever end?")
```

This loop will run forever! Use with extreme caution.



You may have done this unintentionally. It happens.
When your program has an infinite loop you can press Ctrl + C to stop.

MAKE A BREAK FOR IT!

```
lives = 5
while True:
    lives_lost = game_cycle()
    lives = lives - lives_lost
    if lives == 0:
        break
```

break

A command that enables you to terminate a loop

Might seem strange, but some programmers intentionally put infinite loops. However this is dangerous and if you want to do this make sure there is a point where you "break" from it.

LESSON CHALLENGE

- Time to put the theory into practice.
- You will continue to build a small component of a game.
- You must use all you learned so far.
- Find your tasks!