



Review

Answer the following questions, if you're not sure or even don't remember, revisit our videos, refer to our book or ask your instructors or your TAs:

Remember that there isn't only one right answer, only good ones :)

- Why should we use functions at all?

We use functions to organize programs into chunks that match how we think about the problem.

- How to define/declare a function?

We declare a function with the keyword "def" + name of the function + ends with a colon

- How to call/use a function?
 - Add the program statements and parameters to execute the function.
 - To call a function: rewrite the name of the function and add parameters to its.

- What is return, why and how do we use it?

- The "return" statement causes a function to exit and hand back a value to its caller. => function takes its input and returns something
- The return statement is used when a function is ready to return something to its caller

- Do we have to use return in **every** function?

- No. But functions that don't have return in the end will automatically return None (void functions.) Functions that return are fruitful functions.

- What are function arguments/parameters, why and how we use it?

- Most functions require arguments: the arguments provide for generalization.
- Parameters are values that are passed get assigned to variables.
- How to use function from a different file other than our currently working file?
- Import it bruh

Note: Function **arguments** are sometimes **also** called function **parameters**

Reference:

- https://drive.google.com/file/d/1j29iupzwJ11P0Jujf_XzhcjTkN5DPRZZ/view?usp=sharing, chapter 4
- [Python cheat sheet](#)



Turtle exercise

1. Write a function that prints out “Hello world” 3 times (note: no arguments, no return)
2. Write a function that takes **2 numbers as arguments** and print out sum of them (note: has arguments, no return)
3. Write a Python function that **draws a square**, named `draw_square`, takes **2 arguments**: `length` and `color`, where `length` is the length of its side and `color` is the color of its bound (line color)
4. Now, another programmer named ‘T.Anh’ will use your code in exercise 1. He writes as follows:

```
for i in range(30):  
    draw_square(i * 5, 'red')  
    left(17)  
    penup()  
    forward(i * 2)  
    pendown()
```

Copy this code into your editor, run the whole program and see what it draws:

Note: If your code does not run, try not to modify T.Anh’s code, modify your function instead

```

from turtle import *

# Your
# draw_square
# function

for i in range(30):
    draw_square(i * 5, 'red')
    left(17)
    penup()
    forward(i * 2)
    pendown()

```

5. Write a Python function that draws a star, named `draw_star`, take 3 parameters: `x`, `y`, and `length`. Where `x`, `y` are the location of the star, `length` is the length of its side



Hint: Turn 144 degree at each point, Google 'python 3 turtle go to position'

6. Again, your function will be used by other programmers, they write as follows:

```

speed(0)
color('blue')
for i in range(100):
    import random
    x = random.randint(-300, 300)
    y = random.randint(-300, 300)

```

```
length = random.randint(3, 10)
draw_star(x, y, length)
```

Copy this code into your editor, run the whole program and see what it draws:

```
from turtle import *
|
[REDACTED]
Your
draw_star
function

speed(0)
color('blue')
for i in range(100):
    import random
    x = random.randint(-300, 300)
    y = random.randint(-300, 300)
    length = random.randint(3, 10)
    draw_star(x, y, length)
```



Serious exercise


7. Write a function that removes the dollar sign (“\$”) in a string, named `remove_dollar_sign`, takes 1 arguments: `s`, where `s` is the input string, **returns** the new string with no dollar sign in it

Hint: Google “Python string replace remove”

8. Now, another programmer named Hiep will use your code in exercise 3. He writes as follows:

```
string_with_no_dollars = remove_dollar_sign("$80% percent of $life is to  
show $up")  
if string_with_no_dollars == "80% percent of life is to show up":  
    print("Your function is correct")  
else:  
    print("Oops, there's a bug")
```

Copy this code into your editor, run the whole program and see what it prints out:

```
 Your remove_dollar_sign function  
  
string_with_no_dollars = remove_dollar_sign("$80% percent of $life is showing $up")  
if string_with_no_dollars == "80% percent of life is showing up":  
    print("Your function is correct")  
else:  
    print("Oops, there's a bug")
```

If it prints out “Your function is correct”, we’re good

If it prints out “Oops, there’s a bug”, you might want to come back and check your function


9. Write a function that extracts the even items in a given integer list, named `get_even_list`, takes 1 parameter: `l`, where `l` is the given integer list (`[1, 4, 5, -1, 10]` for example), returns a new list contains only even numbers (`[4, 10]` if the given list is `[1, 4, 5, -1, 10]`)
10. Let's take your function to the test. The tester will write his/her test code as follows:

```
even_list = get_even_list([1, 2, 5, 9, -10, 6])

if set(even_list) == set([2, -10, 6]):
    print("Your function is correct")
else:
    print("Oops, bugs detected")
```

Copy this code into your editor, run the whole program and see what it prints out:

Your `extract_even` function



```
even_list = get_even_list([1, 2, 5, -10, 9, 6])

if set(even_list) == set([2, -10, 6]):
    print("Your function is correct")
else:
    print("Oops, bugs detected")
```

If it prints out **"Your function is correct"**, we're good

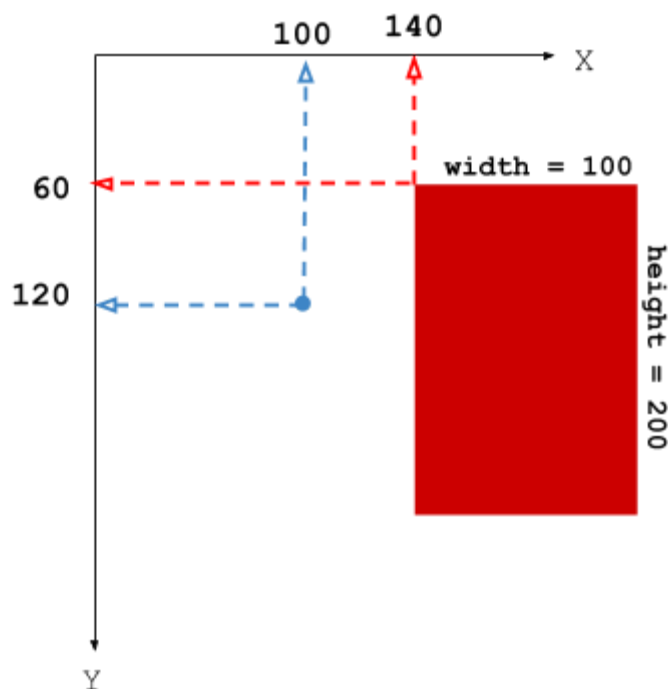
If it prints out **"Oops, bugs detected"**, you might want to come back and check your function

*Note: **set** is an unordered data structure, meaning set of (1, 2,3) equals set of (3, 1, 2)*

11. Write a function named `is_inside` that checks if a point is inside a rectangle, takes 2 parameters, the first is a list with 2 elements respectively represents x and y coordinates of the given point, the second is a list with 4 elements respectively represents x, y coordinates and width height of the given rectangle

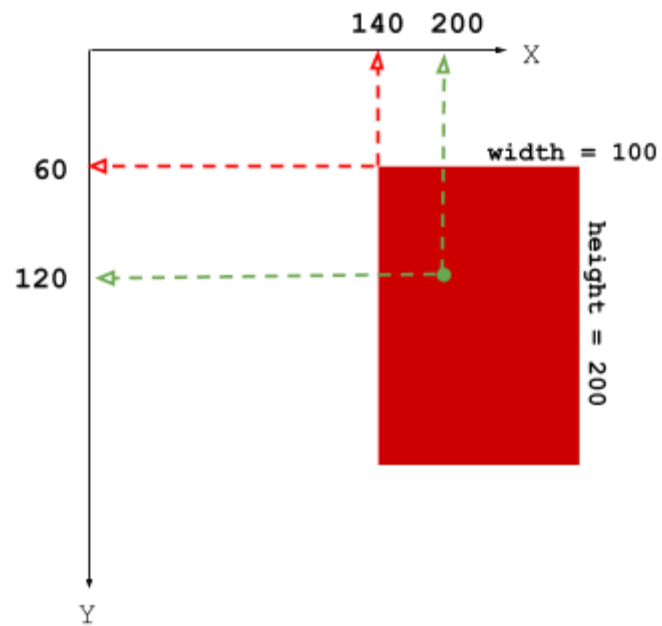
For example:

`is_inside([100, 120], [140, 60, 100, 200])`
should return False



and

`is_inside([200, 120], [140, 60, 100, 200])`
should return True



12. **(Optional)** Write test cases (as we did in exercises 8 and 10) to check if your `is_inside` function is correct

12. (Optional) Download [this starter code](#) and unzip it. Inside you will find the BackColor Game with UI and without core logic.

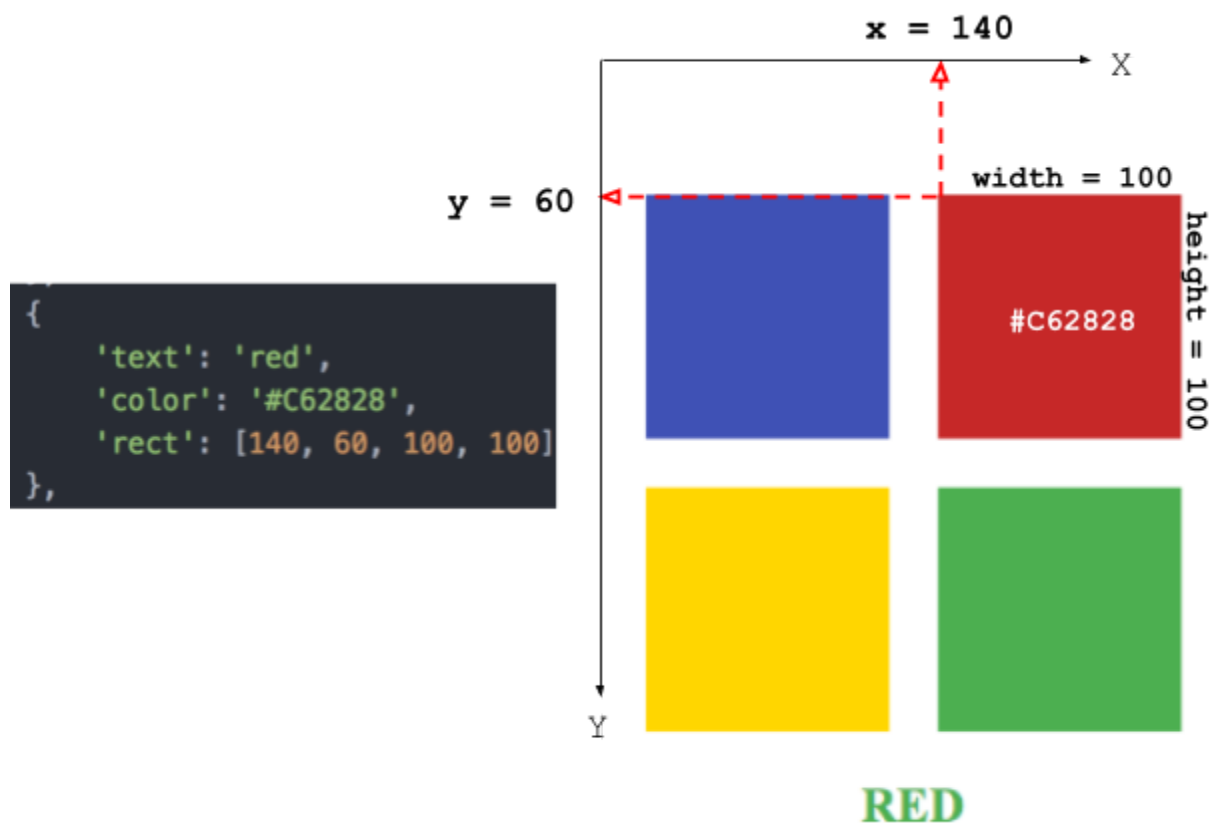
You can try running it by typing “python app.py”.

Now Open file `backcolor.py` and have a look at the `shapes` data structure, what type of data is this, dictionary, list or both?

If you don't know what '#C62828' is, scroll to the last page

Inside an item of `shapes` is the information about a colored rectangle drawn in the UI:

(Note: the **text** is not shown here but in the quiz)



Your job is to write the `generate_quiz` and `mouse_press` (though you can play a little bit, but you **SHOULD NOT** touch `get_shapes()` function) to serve the following functionality:

`generate_quiz()`

Each time the UI developer wants to generate quiz, she will call `generate_quiz` and expect a list in return, this list, must contain 3 elements (in this order):

`text`: The text to be shown to users, it does not necessarily match with the color below, i.e: "BLUE", "RED"

`color`: The color of the shown text

`quiz_type`:

0 if users must select one the rectangles by the **Meaning** of the text as the answer

1 if users must select one the rectangles by the **Color** of the text as the answer

`mouse_press()`

Each time users click on the screen, the UI developer will call `mouse_press` to check if users have just answered correctly

`x, y`: The coordinates of the position that users have just clicked

`text`: The Quiz's text being shown to users

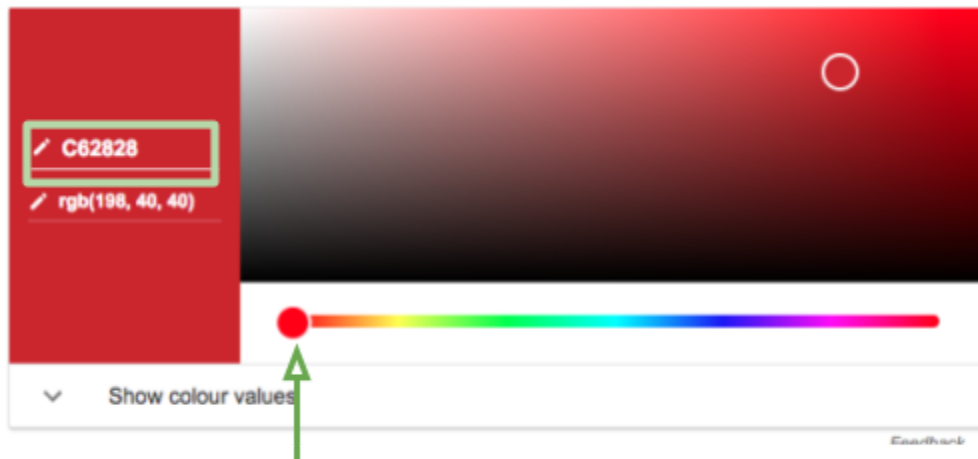
`color`: The Quiz's color being shown to users

`quiz_type`: The current Quiz Type - users should select by Meaning or the Color of the Text

The return value must be `True` or `False`, which represents users' correctness

To understand the functions' arguments better, you should print them out, run and play with the UI before go for the coding

#C62828 is hex color, Google: “color picker” and try to move the sidebar left and right:



Drag this left and right