{EPITECH}
LEARN DIFFERENT*

PRE-POOL

DAY 08

PRE-POOL

Hack The Box
In addition to the tasks below, we encourage you to discover the Hack The Box Academy.
Try to go as far as possible!
Work on it as soon as you have a bit of time, or whenever you need a break in you day!

matplotlib and numpy

Task 00

Today you'll discover some Python's *third party* libraries, to extend your program features.

"Third party" implies that those library does not already comes with your standard Python installation. You will have to install those third party libraries yourself.

For this day, you will need the following packages:

- ✓ Matplotlib ;
- ✓ Tkinter.

The well named **PIP** (Package Installer for Python) is the usual tool for this job.

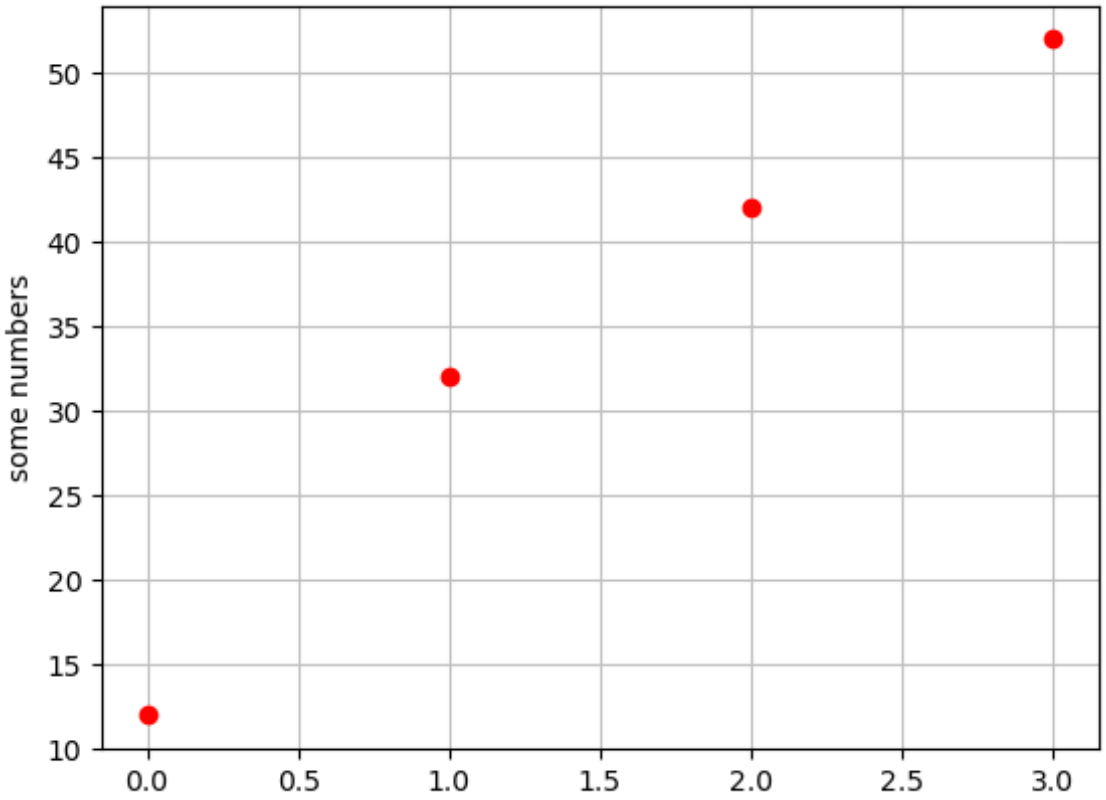
Task 01

Can you explain the following snippet of code?

```
import numpy as np
x_values = np.linspace(x_min, x_max, 100)
```

Task 02

Display the points (0; 12), (1; 32), (2; 42) and (3; 52) in a chart similar to this one:



Task 03

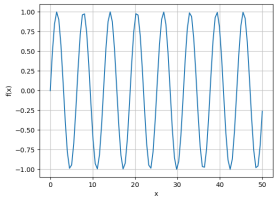
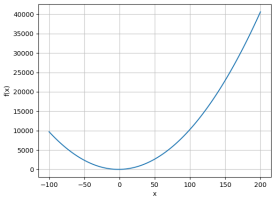
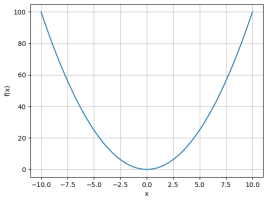
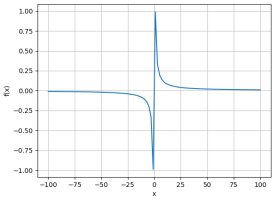
Write a function that takes an array of points as argument and displays the points in a nice and clean chart.

Task 04

Write a `plt_fct` function that plots any function taking `x` as a parameter.
Its arguments must match the following example.

```
def f(x):
    return x**2 + x*3 + 2

plot_fct(math.sin, 0, 50)
plot_fct(f, -100, 200)
plot_fct(lambda x: x**2, -10, 10)
plot_fct(lambda x: 1/x, -100, 100)
```

By the way, can you explain what is `lambda x: x**2` and `lambda x: 1/x`?

Tkinter

Task 01

Open a tk window with a LabelFrame and a Frame in it.

Check the `pack` or `grid` methods for Tk Widgets.

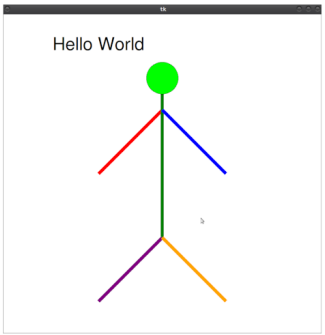
Add an Entry (input field) and a button inside the LabelFrame.

Add a Button bellow your input field inside the LabelFrame.
When it's clicked: the content of your Entry box is printed in UPPERCASE in your terminal.

Task 02

Add a Canvas in your Frame and load a background image into it.
Your background image must fill the Canvas.

Task 03



Draw a stickman figure using Tkinter's drawing functions.
It should be done with 5 lines and 1 circle.

Moreover, put some text near your stickman's head.

Get familiar with how coordinates work in computer graphic.

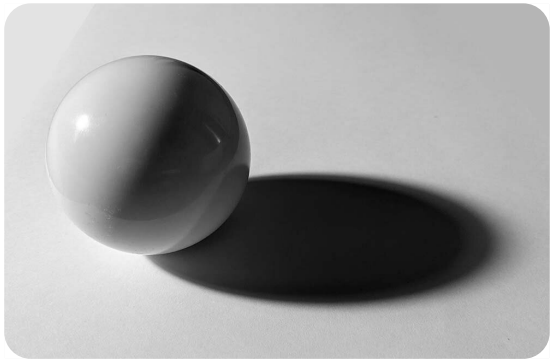
Task 04

Animate your stickman.

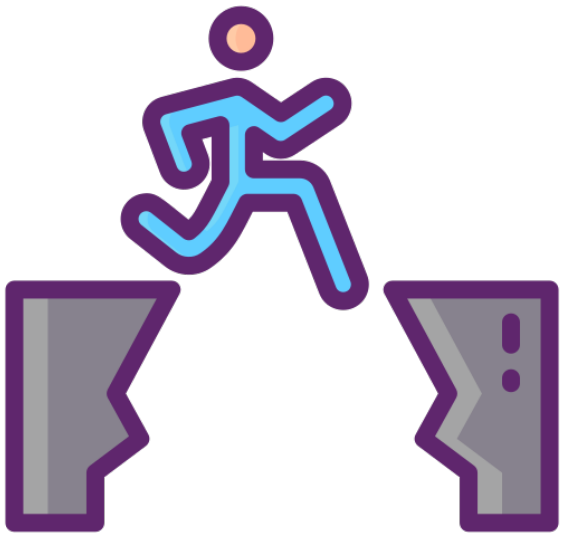
You can use the `after` method on your canvas to register a callback to be triggered after a certain amount of time.

CHALLENGE

Make a sphere as realistic as possible.
You can get inspiration from the following image:



Make it as configurable as possible (to modify the position, size, color of the sphere, the appearance of the shadow,...).



Packaging

Task 00

Using Tkinter, add a full game GUI: live score, menu button, time, life bar, inventory,...

Task 01

Make your program a Windows executable and a Linux binary file.

v 0.2