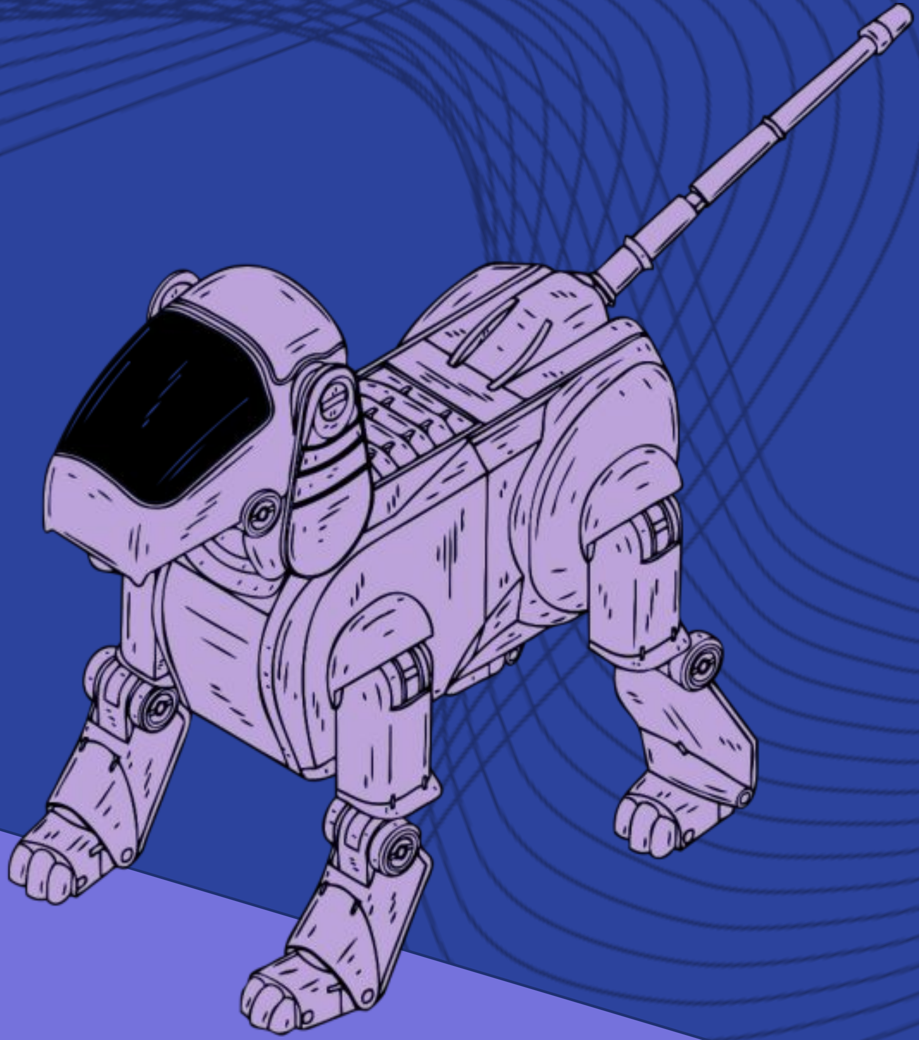
Virtual screen pet

Level 3 – Python

Helping others



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Introduction to Coding

What is Python?

- Python is a popular general-purpose programming language that can be used for a wide variety of applications.
- Python is an interpreted, interactive, object-oriented programming language. It incorporates modules, exceptions, dynamic typing, very high-level dynamic data types, and classes.

Where to access Python?

- https://www.python.org/downloads/ - downloadable app for PCs (allows you to save files directly onto a computer)
- https://trinket.io/ - online version (allows you to create an account, much like scratch)

Introduction

Looking after a pet is a great responsibility. It teaches about taking care of not only yourself but another living creature which can prove quite difficult.

So why not start with your very own screen pet?!

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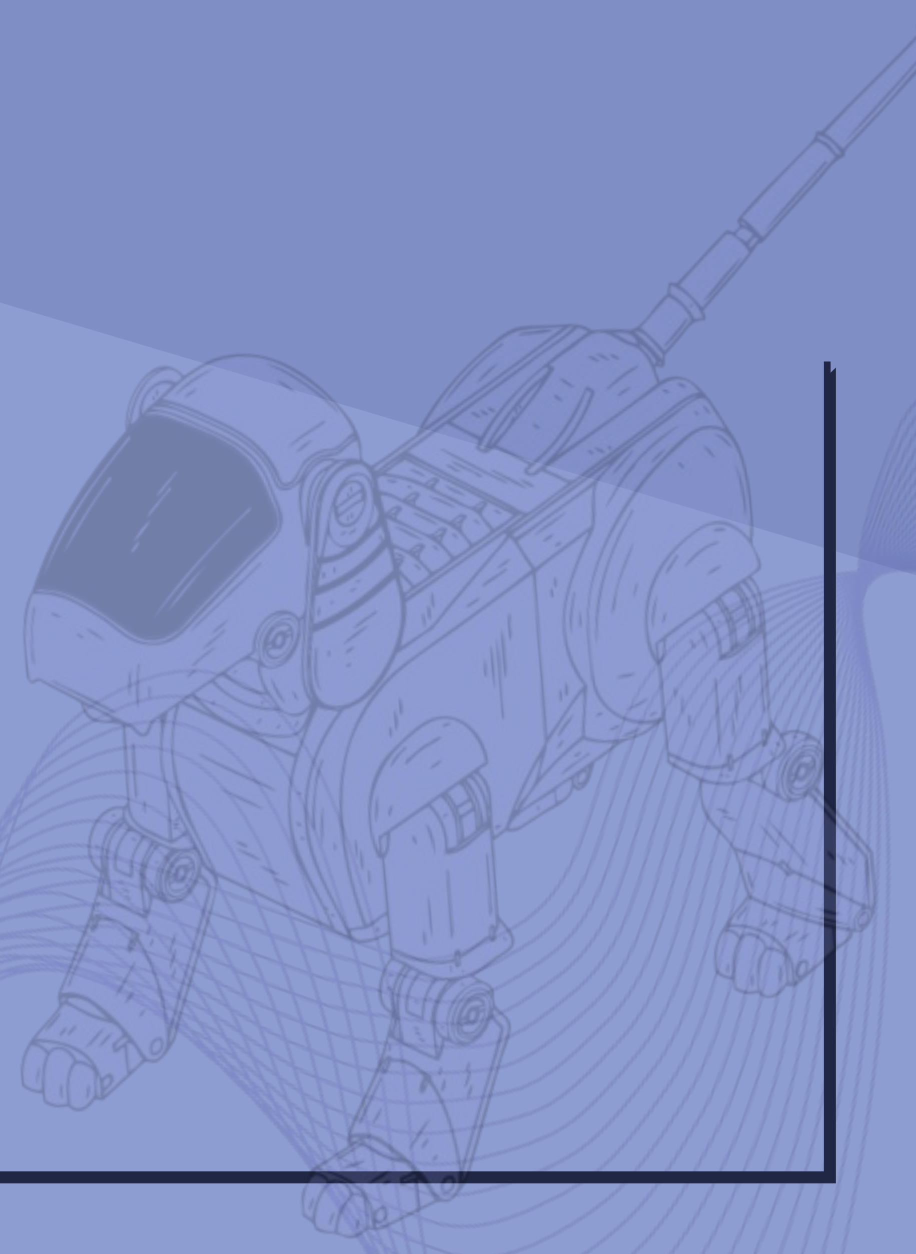
Task

Your task is to create a screen pet in python using turtle graphics to demonstrate the importance of properly looking after another creature

Process

Your code should…

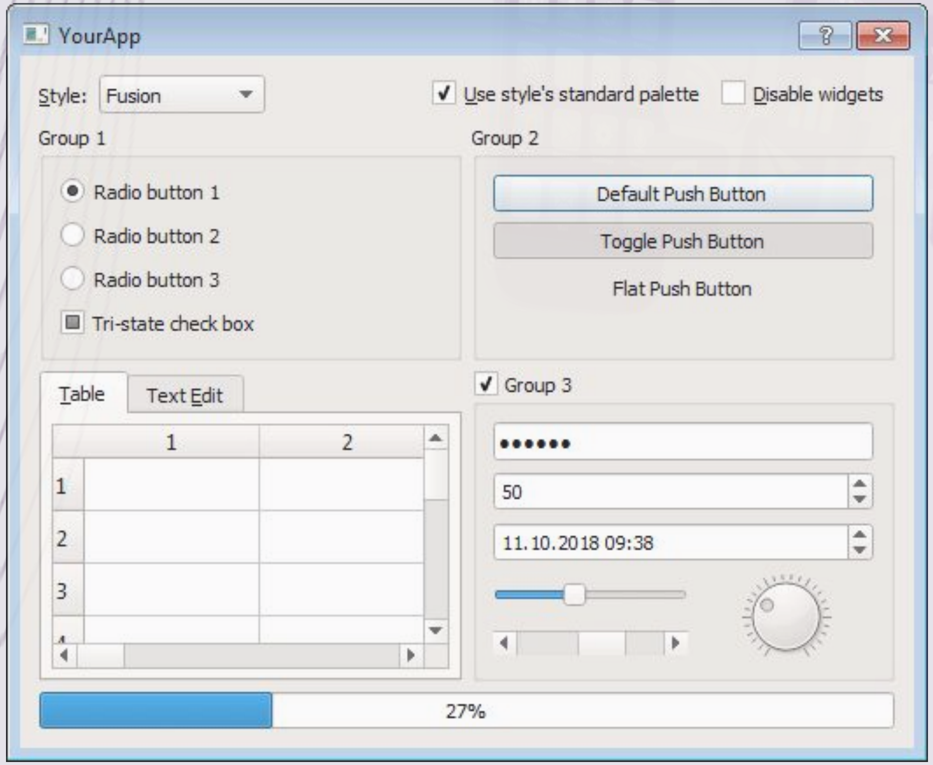
- Allow the user to create the shape of a basic pet and allow them to modify the shapes in the programme to create a different animal.
- Use Tkinter to configure a canvas and change the colour of the different shapes used in the construction of an animal.



Python’s Tkinter module

The Tkinter module is a series of tools that python programmers use for displaying graphics and getting input from the user. This is instead of running the program in a shell, so the window can be designed and styled by the programmer.

It allows the programmer to create a GUI (Graphical User Interface- a visible part of the programme that you can interact with). Examples of GUI’s include icons and menus for applications on a smartphone.

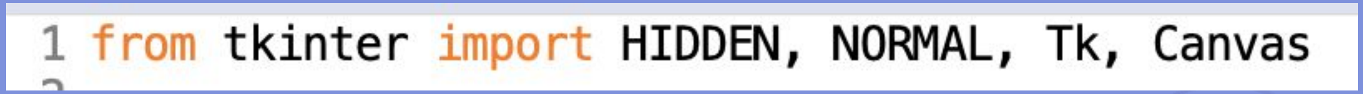


Tkinter allows you to build a GUI by using what we call widgets (packs of ready-made code). These can create pop-up windows, buttons, menus, sliders and so on (above is an example of what Tkinter can allow you to create)

Step 1

Canvas module from Tkinter

Line 1: the Tkinter module (as explained in the previous slide), has a variety of built-in widgets. We will be using the canvas widget today to create a location for the screen pet to be drawn on (much like an artist on a canvas). The information preceding where the canvas is referenced, just tells python the features of the canvas.

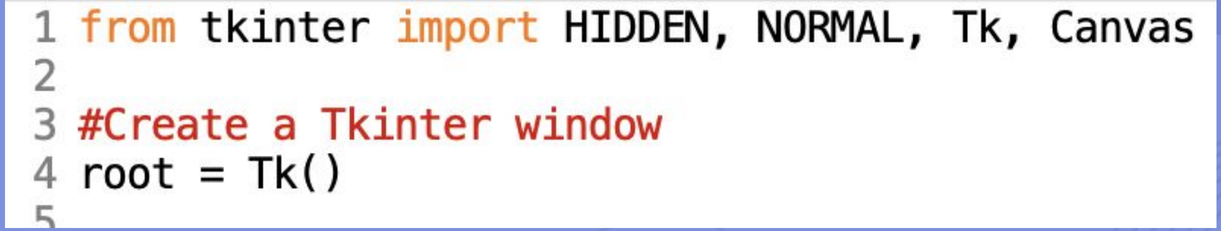


```
1 from tkinter import HIDDEN, NORMAL, Tk, Canvas
```

Step 2

Creating the window

Line 4: this line of code will create the window which will pop up when the code is run, which will display the output of all the code we will write.

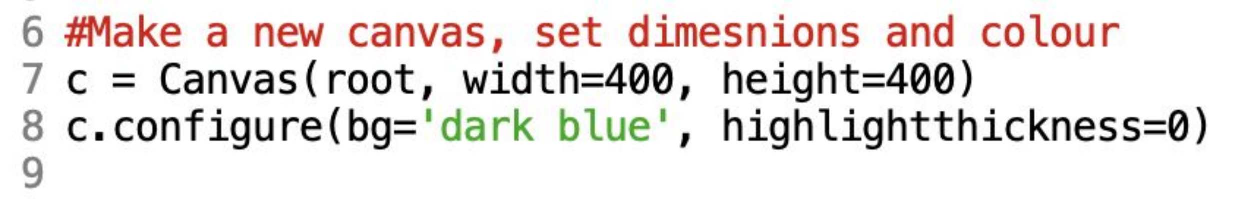


```
1 from tkinter import HIDDEN, NORMAL, Tk, Canvas
2
3 #Create a Tkinter window
4 root = Tk()
5
```

Step 3

Changing the properties of the canvas

Line 7: the width of the canvas (which will be displayed in the window created in step 2), will be 400 pixels, and the height the same (will be a square background).



```
6 #Make a new canvas, set dimesnions and colour
7 c = Canvas(root, width=400, height=400)
8 c.configure(bg='dark blue', highlightthickness=0)
9
```

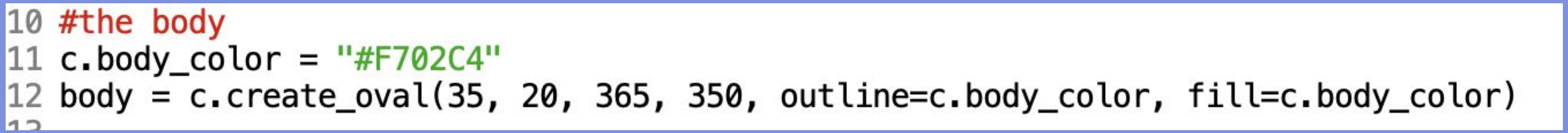
Line 8: using c.configure, the colour of the background (bg) can be changed, as well as setting the thickness of the “pen” that will be used to draw out the shapes that make up the picture. The background here is dark blue, however, use the link on the next slide to evaluate all the possible colours and pick your favourite.

https://trinket.io/docs/colors

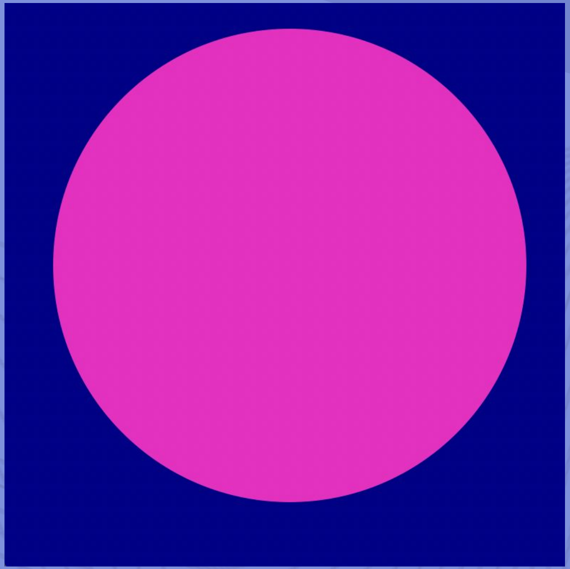
Step 4

Creating the body of your screen pet

Line 11- depending on which animal you choose to make depends on the colour body that you will go with. In this example, we will be making a pig pet (hence the pink colour). Using the website from the previous slide, see if you can use the hex codes to pick a colour



```
10 #the body
11 c.body_color = "#F702C4"
12 body = c.create_oval(35, 20, 365, 350, outline=c.body_color, fill=c.body_color)
```

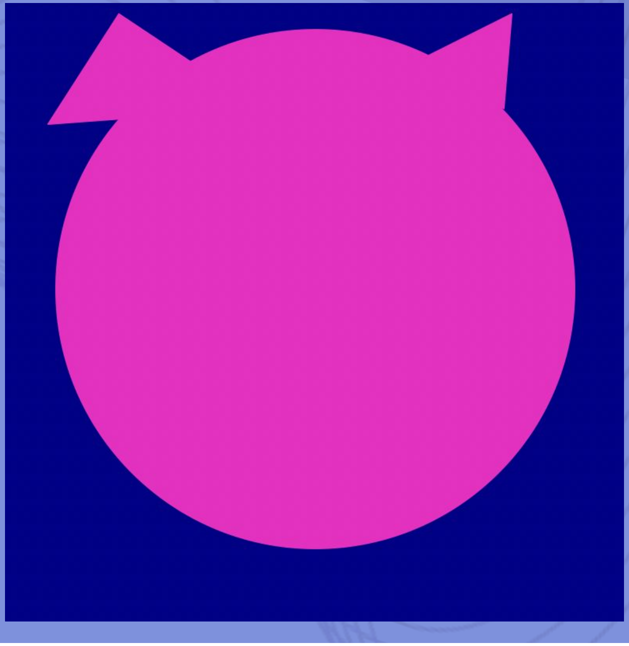


Line 12- the oval/circular shape of the body is created in this line by entering the numbers 35,20,365 and 350 and filling with the colour defined in line 11.

Step 5

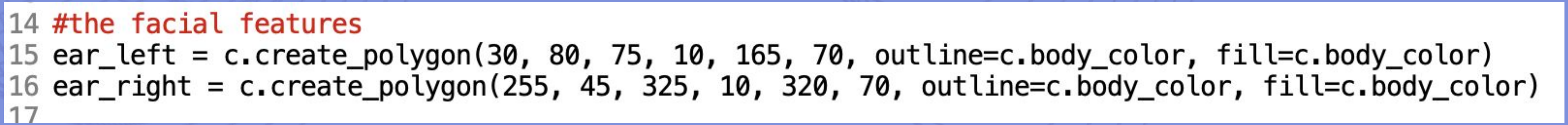
Creating the ears of your pet

Line 15 and 16: depending on which animal you choose depends on the shape of the ears you make. Enter the following numbers to get ears much like the ones in the example, but feel free to experiment with size, shape and colour later on.



Alternative polygons in Tkinter:

```
points = [150, 100, 200, 120, 240, 180, 210, 200, 150, 150, 100, 200]
canvas.create_polygon(points, outline='#f11', fill='#1f1', width=2)
```



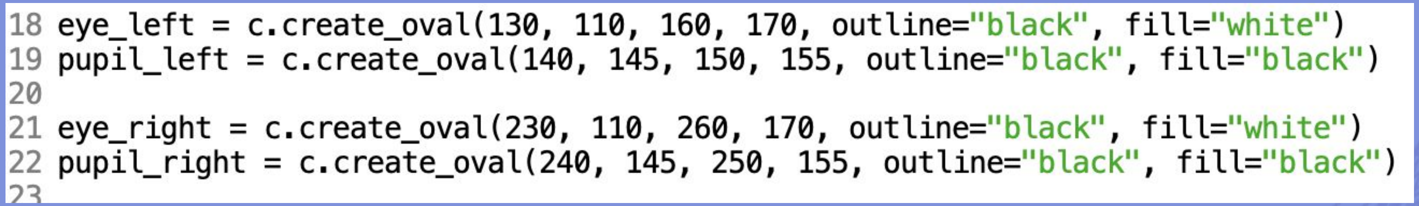
```
14 #the facial features
15 ear_left = c.create_polygon(30, 80, 75, 10, 165, 70, outline=c.body_color, fill=c.body_color)
16 ear_right = c.create_polygon(255, 45, 325, 10, 320, 70, outline=c.body_color, fill=c.body_color)
17
```

Step 6

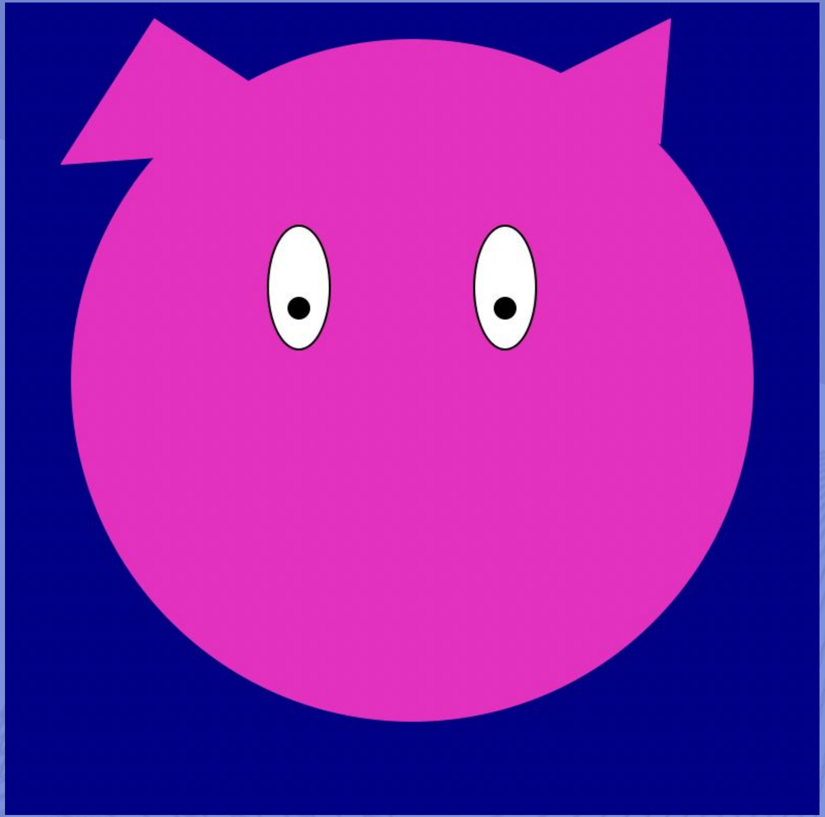
Creating the eyes

Line 18 and 19: creating the left eye. Using the same principles as creating the body shape and the ears, create an oval eye with a circular pupil, on the left-hand side of the face.

Line 21 and 22: using different coordinates, but the same principles, the right eye will look like this:



```
18 eye_left = c.create_oval(130, 110, 160, 170, outline="black", fill="white")
19 pupil_left = c.create_oval(140, 145, 150, 155, outline="black", fill="black")
20
21 eye_right = c.create_oval(230, 110, 260, 170, outline="black", fill="white")
22 pupil_right = c.create_oval(240, 145, 250, 155, outline="black", fill="black")
23
```

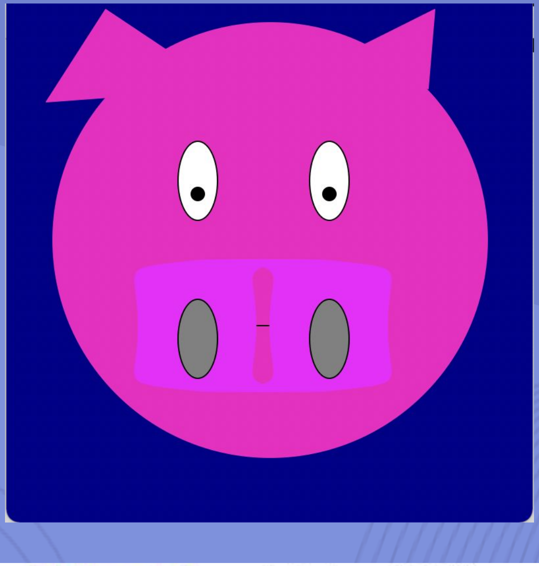


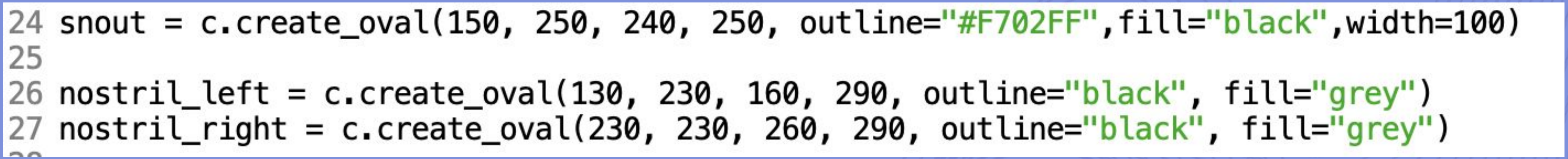
Step 7

Creating the nose

Lines 24, 25 and 26: as you have probably grasped by now, drawing in Tkinter is all about experimenting with where each shape should be placed.

For this pig example, the nose will look like a snout and so we will draw a big oval with two smaller nostrils



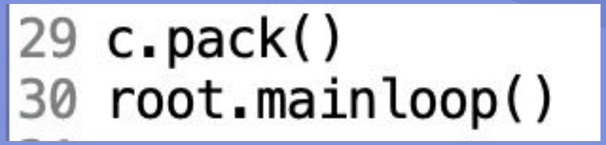


```
24 snout = c.create_oval(150, 250, 240, 250, outline="#F702FF",fill="black",width=100)
25
26 nostril_left = c.create_oval(130, 230, 160, 290, outline="black", fill="grey")
27 nostril_right = c.create_oval(230, 230, 260, 290, outline="black", fill="grey")
```

Step 1

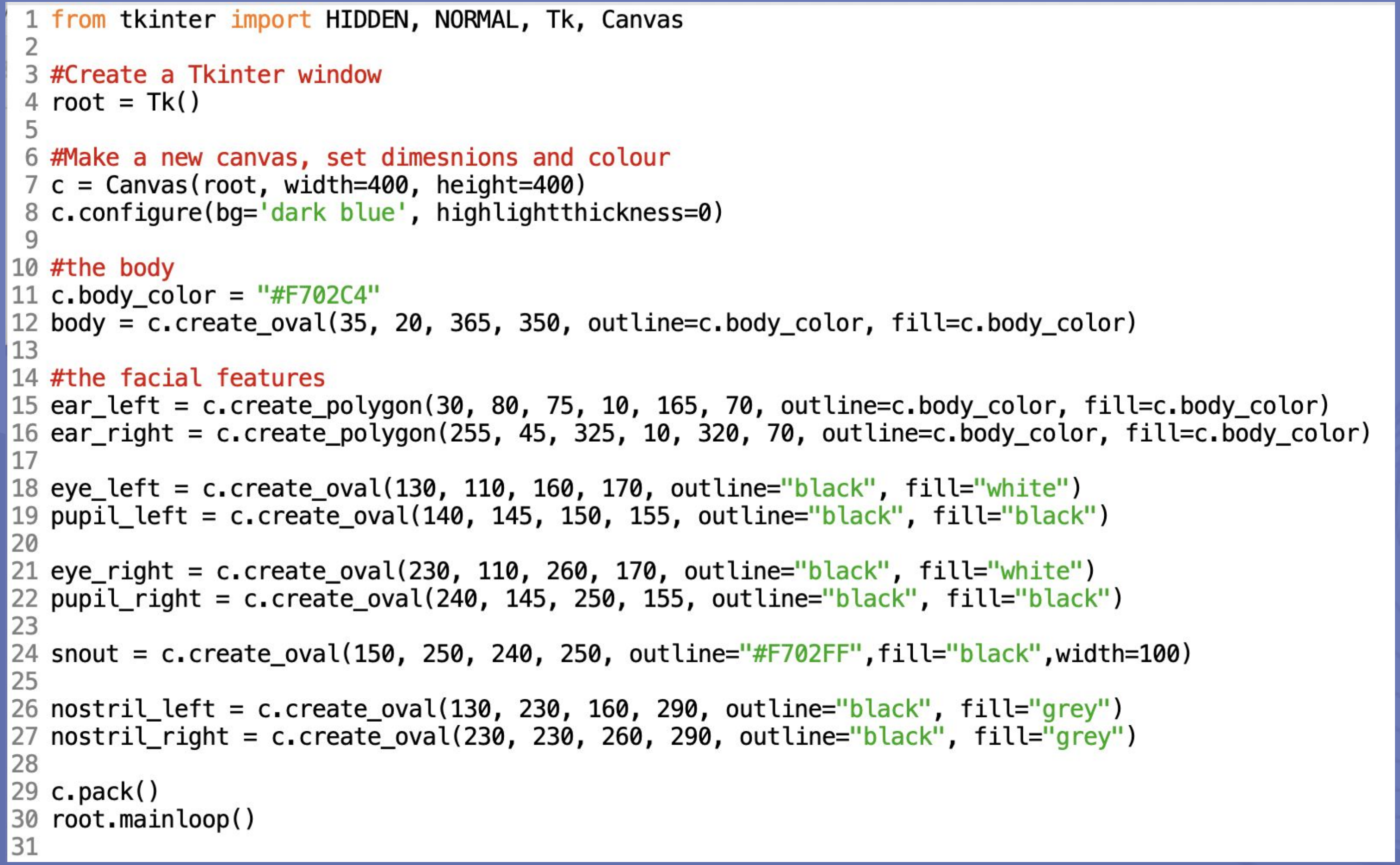
What happens in the step

Line 29 and 30: the final two lines in the code will ultimately create the canvas and draw the shapes onto it in the window.

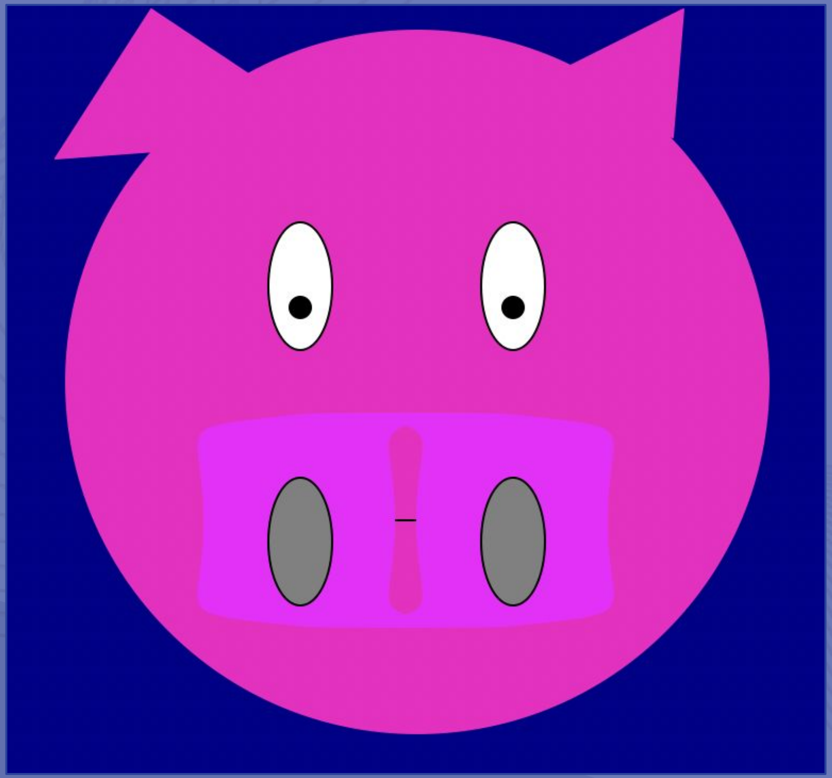


```
29 c.pack()
30 root.mainloop()
```

The final code



```python
from tkinter import HIDDEN, NORMAL, Tk, Canvas

#Create a Tkinter window
root = Tk()

#Make a new canvas, set dimesnions and colour
c = Canvas(root, width=400, height=400)
c.configure(bg='dark blue', highlightthickness=0)

#the body
c.body_color = "#F702C4"
body = c.create_oval(35, 20, 365, 350, outline=c.body_color, fill=c.body_color)

#the facial features
ear_left = c.create_polygon(30, 80, 75, 10, 165, 70, outline=c.body_color, fill=c.body_color)
ear_right = c.create_polygon(255, 45, 325, 10, 320, 70, outline=c.body_color, fill=c.body_color)

eye_left = c.create_oval(130, 110, 160, 170, outline="black", fill="white")
pupil_left = c.create_oval(140, 145, 150, 155, outline="black", fill="black")

eye_right = c.create_oval(230, 110, 260, 170, outline="black", fill="white")
pupil_right = c.create_oval(240, 145, 250, 155, outline="black", fill="black")

snout = c.create_oval(150, 250, 240, 250, outline="#F702FF",fill="black",width=100)

nostril_left = c.create_oval(130, 230, 160, 290, outline="black", fill="grey")
nostril_right = c.create_oval(230, 230, 260, 290, outline="black", fill="grey")

c.pack()
root.mainloop()

```



Extension

Come up with your own design for a screen pet if you haven't already, or add complexity to your design...

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Links to everyday life

Pets

Help others by teaching care and responsibility.

Geometry

Tkinter uses many different shapes and the coordinates of these shapes to draw graphics.

Design

You can use this project as a stepping stone by experimenting and designing new graphics for any occasion!

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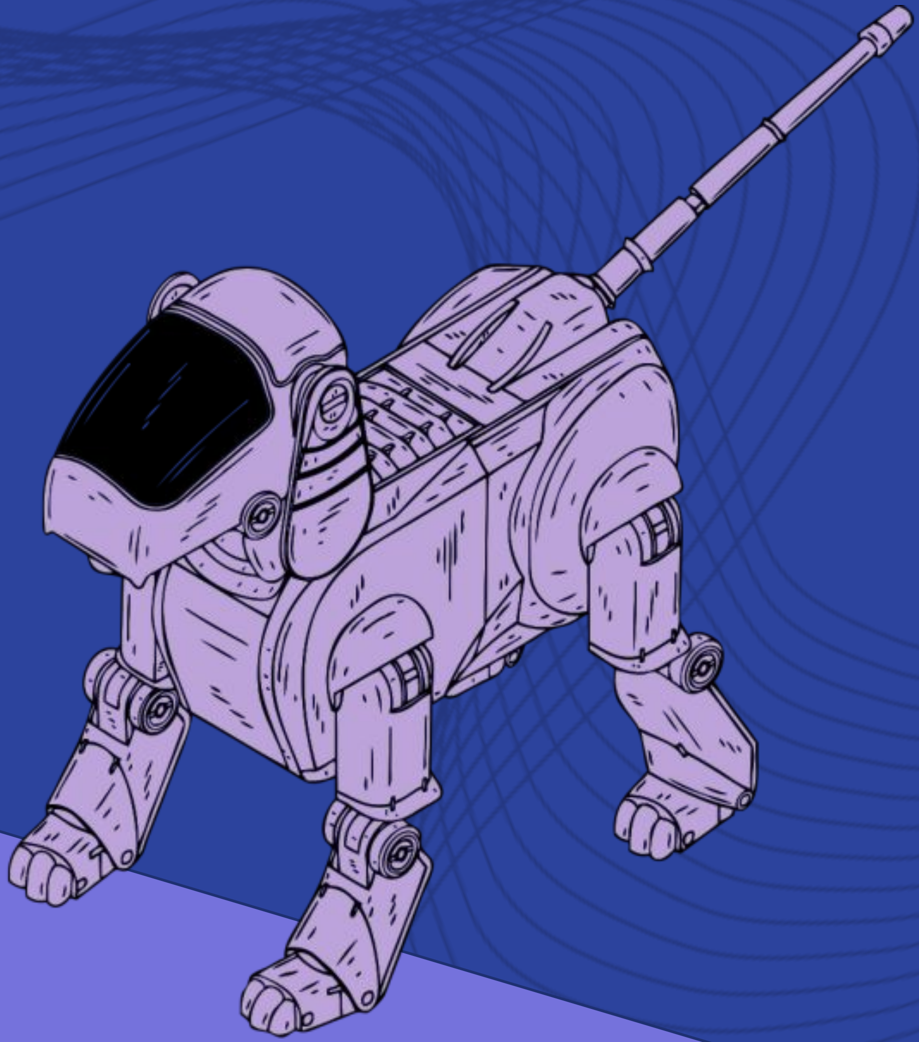
Conclusion

Learning outcomes

- ✔ You should be confident in using Tkinter to draw shapes and make a simple face.
- ✔ You should be able to use different colours from the python library.

Congratulations!

You have completed programming your screen pet



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