python

with the **Ursina 3D Engine**

Python Coding
with **Ursina**

Course Stage: **Hello World!**

You will learn: -

i) What python is, what 'modules' are, and whether python is important in the computing world today

ii) How to set up a project folder for your python code with Ursina

iii) How to code moving 3D objects with textures, how to set colours, and to print text on screen

What is **python**?

1) Who invented it?
2) Is it popular?
3) Any examples of where it has been used?
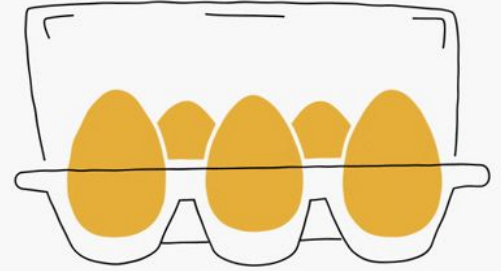
What is **python**?

1) Guido van Rossum
2) Yes, very!
3) Google, Instagram, Netflix, Data Science, Machine Learning...

Python uses modules

```
================================
>>> import random
>>>
>>> print(random.randint(1,10))
2
```

```
from ursina import *

app = Ursina()

app.run()
```

You can import modules at the top of your python code.

Different modules allow you to use different functions.

The time module (time.py) allows you to find the date, time events to the millisecond, and, of course, to get the time of day.

The random module (random.py) allows you to get random numbers.

The ursina module (ursina.py) allows you to…?

ursina engine

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open source game engine

hello world!

Suggested steps:

1) Set up a window and get Ursina running
2) Create a 3D sphere
3) Put a texture on the sphere
4) Keep updating the sphere's rotation
5) Make a dark background, like space?

Let's make a **3D, rotating world :)**

So, what will we **basically** need to do to make our 3D (hello!) world?

Discuss ideas with a partner, then let's see how well you've **decomposed** the steps in this programming goal.

project setup and assets

1 Create a <mark>new folder</mark> on your H: drive called 'ursina projects'

Hello World!

2 Open **IDLE**

3 Create a new file called **hello.py** and save it in your new folder

4 Find a **planet texture**; also save it into your new ursina folder

```python
from ursina import *

app = Ursina()

planet = Entity(model='sphere', texture='earth')
planet.scale = 4


def update():
    planet.rotation_y += 0.4


app.run()
```

Code Challenges!

1 Can you change the rotation speed of your planet?

2 Can you make your planet change scale (get bigger or smaller) as it updates?

3 Can you add a small moon -- with its own texture?

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```

Changing the window's background colour
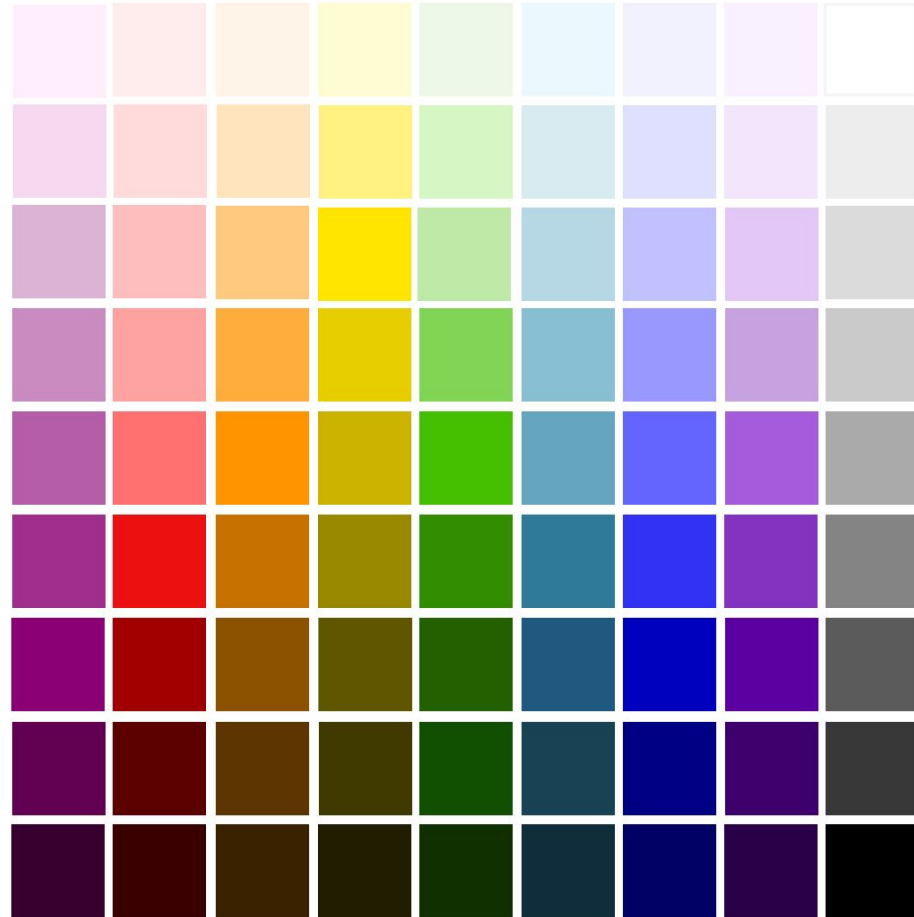
window.color = color.black

or

window.color = color.rgb(0,0,0)

or

window.color = color.rgb(255,0,255)

(shhh because pink)

```
message = Text('<bold>hello world!',background=True)
message.scale=2
message.background.color=color.lime
message.appear(speed=0.1)
```


We can **print text to the screen** :)

First, print '**hello world!**' to the screen.

Next, print whatever message you like.

Can you change the appearance of your text and its background? Can you make a transparent background?

Course Stage: Hello World! 2.0

You will learn: -

**i) How to use lists and iteration to create lots of objects easily**

```
# Code 1
p = Entity(model='sphere',texture='earth')
p = Entity(model='sphere',texture='earth')
p = Entity(model='sphere',texture='earth')
p = Entity(model='sphere',texture='earth')
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p = Entity(model='sphere',texture='earth')
p = Entity(model='sphere',texture='earth')
```

```
# Code 2
For i in range(28):
    p = Entity( model='sphere',
                texture='earth')
```

Which bit of code, **code 1** or **code 2**, will create the most spheres?
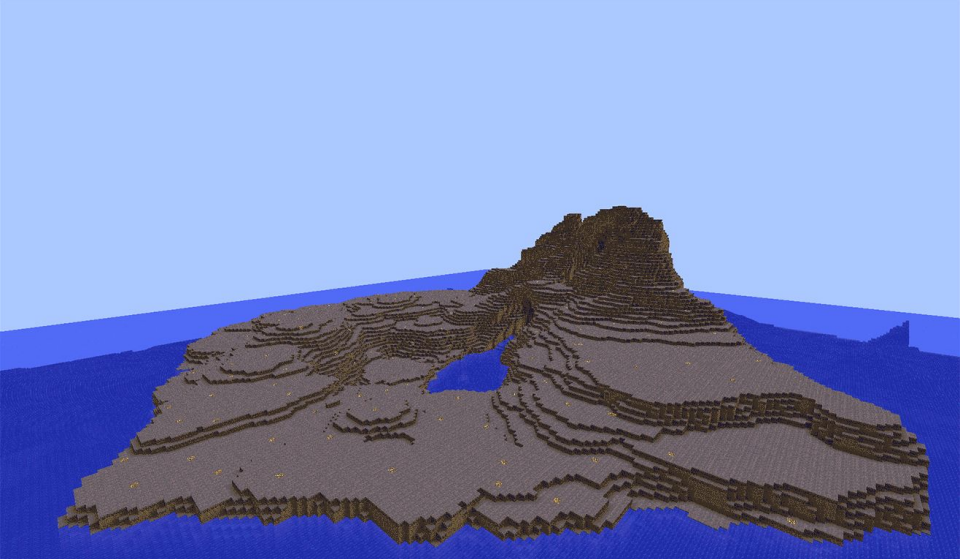
Python Coding
with **Ursina**

Course Stage: **PythonCraft!**

You will learn: -

i) What **Perlin noise** is and how to use it to code **Minecraft-like terrains**

ii) How to **fix code** to get a **character moving** across your Minecraft world

iii) How to use **lists** and **iteration** to add trees, mobs, and anything else

Download and place the PythonCraft project folder on your H: drive :)
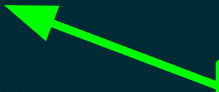
Open the pythonCraft.py main module file :D

Extension

Can you fix the code? The character doesn't seem to be able to move.

What might be the bug?

```python
17    # Initialise and set up our first-person character.
18    steve = Character(speed=0.01)
19
20    # Our main program update loop.
21    def update():
22        # Allow character to move over terrain.
23        steve.move(cambridge)
24
25    # Function that responds to key and mouse presses.
26    def input(key):
27        steve.input(key) # Character responds to 'escape' key.
28
29    # Start the program :)
30    app.run()
```

```python
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```

This value is too small