Teaching Python using Minecraft

A quick introduction

http://www.fnc.co.uk

Edinburgh Raspberry Pi Jam
CodeBase
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Outline

- Motivation
- Why Python?
- Teaching Strategy
- Quick start
- Examples
- Outlook

Talk assumes that Raspbian Linux has been installed.

Motivation

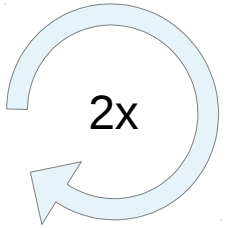
- Most children have played Minecraft.
  - Instant connection between interest and programming.
- Use Minecraft as a graphical display.
  - Straightforward Python application programmer interface.
- Simple enough for P6 or P7 children understand.
  - Used in East Dunbartonshire school.

Why Python?

- Most programming languages are typed.
- Syntax errors or bugs need to be fixed.
  - Similar to other typed languages, there are rules.
  - Encourage functional testing and thinking about design before implementation.
- Simple syntax that is very well documented.
- Industry standard language.

Teaching Strategy

- Introduce a working example
  - A few minutes for pupils to look at it and run it.
  - A few minutes to discuss the example as a class.

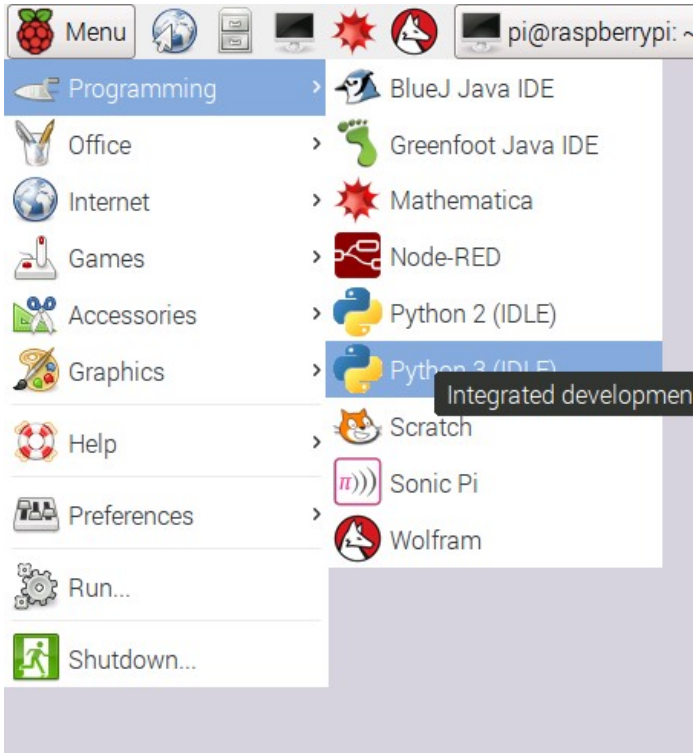


- Set a challenge problem
  - Wait a few minutes for pupils to solve it.
  - Pause if needed and give a hint

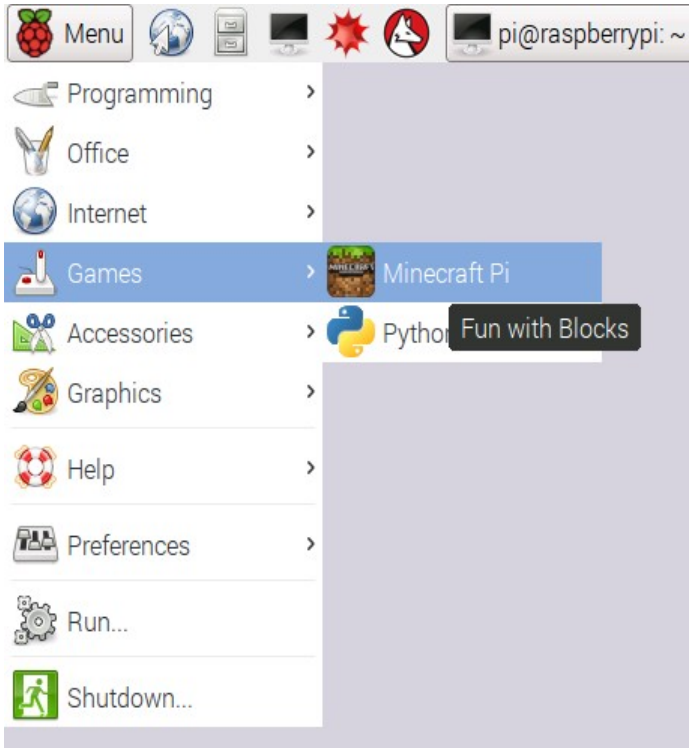
- Pattern : small group, large group, small group.
  - Bursts of concentration.
  - Prevent children from giving up.

Quick start

1) Start IDLE3 from menu



2) Start Minecraft from menu



3) Press tab key or escape back to main menu to break focus

4) Download the example programs and documentation

```
git clone https://github.com/williamhbell/MinecraftPython.git
```

addBlockOnce.py

```
#!/usr/bin/env python3
#
# Import needed libraries
from mcpi.minecraft import Minecraft
import mcpi.block as block
mc = Minecraft.create()  # Connect to Minecraft, running on the local PC
pos = mc.player.getPos() # Get the player position
x = pos.x # Assign the value of the x coordinate to x
y = pos.y # Assign the value of the y coordinate to y
z = pos.z # Assing the value of the x coordinate to z

# Set the block where the player is to be Spruce
mc.setBlock(x, y, z, block.WOOD.id, 1)
```

MinecraftPython/examples/addBlockOnce.py

printPosition.py

```
#!/usr/bin/env python3
#
# Import needed libraries
from mcpi.minecraft import Minecraft
import mcpi.block as block
import time

mc = Minecraft.create()  # Connect to Minecraft, running on the local PC

# A while loop that continues until the program is stopped.
while True:
  pos = mc.player.getPos() # Get the player position
  # Post the position to the local chat
  mc.postToChat("x="+str(pos.x)+", y="+str(pos.y)+", z="+str(pos.z))
  time.sleep(0.5) # Sleep for half a second
```

MinecraftPython/examples/printPosition.py

Outlook

- Can quickly build interesting programs.
  - Move the player around as well as the blocks.
  - Create animations using air blocks.
  - Structures can chase the player.
  - Build sensors to check where the player is.
- Download the examples and give them a try.