

- GirlsinSTEM HackJam

Creating & coding together with Python & Minecraft

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Introduction:

Working in groups, first design, then build a public building or monument to celebrate a fantastic achievement in STEM using Minecraft. Later, using the Python-Minecraft API, control the interactions between the user and the Minecraft world.

Demonstration:

First Minecraft on the Raspberry Pi computer - exploring and building, then Python - Minecraft API - teleport, get & set blocks, chat.

Design:

Using paper, design a structure to celebrate your chosen achievement in STEM.

Build:

Using the tools and objects in Minecraft construct the building or monument. If time allows, construct the landscape around it, gardens, picnic areas, car parks, playground as well as the interior. Include necessary facilities, eg. a reception area, a cafe, a theatre.

Code:

Create a walk through tour to guide and lead visitors to the key viewing points. Add commentary through a script or messages in the chat.

Share: Share your creation with others by inviting them to take a fly-through your building. If you can, record video of the tour and post to a video sharing site later and tag #girlsinstem



Computer Scientist Margaret Hamilton developed on-board flight software for the Apollo 11 Moon mission.

Minecraft Pi - Explorer tips

Mouse movement controls the camera view. **Left button** - smash blocks. **Right button** - place blocks. **WASD keys** control movement. **Number keys 1 - 8** - choose different blocks. **Space bar** - jump. **Double space & space** - fly and land. **E key** - select other blocks. **Escape key** - to main menu. **Tab key** - releases the mouse from camera control. **Alt & Tab** - allows you to swap between active applications.

Display issues: Minecraft does funny things to the display on the Raspberry Pi. For example, if you increase the screen size, the blocks menu doesn't work perfectly - just reduce the screen while you select the blocks you want and increase again. Also, Minecraft obscures other windows. If something doesn't appear to work, minimise the Minecraft window and you will probably find some windows lurking behind waiting for an answer.

Hacking Minecraft with Python - step by step

Open the **Python 3** application. Make sure that you are using the largest font size by selecting **Options >> Configure IDLE >> Size : 20 and Bold**. Don't change the **Indentation Width** or you will have problems!

Open the **message.py** file. If your Minecraft window is quite large, it may be hiding something you need to read. The message.py file is in **Documents >> Minecraft_Projects >> craig**

To execute the program you can either press the **F5 key** or select **Run >> Run Module**

If everything is working correctly, a message should display in the Minecraft chat.

Now, change the message to say something else. To test your modified code, you will need to **Save As...** before running (**F5**). It won't let you change the original file as these have been write protected.

There are other examples of python files that you can use and modify. You could try combining some together

message.py

```
from mcpi.minecraft import Minecraft
mc = Minecraft.create()
mc.postToChat("Hello, Minecraft World")
```

teleport_path.py

```
import time
from mcpi.minecraft import Minecraft
mc = Minecraft.create()

# Set x,y and z values
x = 14.6
y = 2.0
z = 16.5

# Change the player's position
mc.player.setPos(x,y,z)
time.sleep(2)

for a in range(10):
    x = x - 3
    mc.player.setPos(x,y,z)
    time.sleep(0.25)
```

Creating a fly-through tour - with code

As you move Steve through the Minecraft world, the XYZ coordinates display the current position in the world in the top left of the screen.

You can use the Python-Minecraft API to find and change the player coordinates. This means you can teleport Steve anywhere in the world.

You might use one of the teleport scripts to control Steve's movement. It would be a good idea to make a note of Steve's current XYZ position before teleporting - as Steve might be teleported far under the ground. If you make a list of coordinates you would like Steve to visit, you could write a program that will teleport Steve to each point one after the other.

Links to this document: <http://exa.is/girlsinstem>

Craig Richardson's book: <https://www.nostarch.com/programwithminecraft>

Python source files: <https://github.com/teknoteacher/girlsinstem>

Adventures in Minecraft: <http://www.stuffaboutcode.com/p/adventures-in-minecraft.html>

Raspberry Pi Website: <https://www.raspberrypi.org/>

Get Started With Minecraft: <https://www.raspberrypi.org/learning/getting-started-with-minecraft-pi/>