

# MINECRAFT

PI EDITION



*Let's  
Hack*

Welcome to Hacking Minecraft.

This adventure will take you on a journey of discovery. You will learn how to set up Minecraft, play a multiplayer game, teleport around the world, walk on water, build a giant cube and much much more.

Each time you complete a task tick it off in the table below, get a peer to check it and then when you have completed four then see your teacher to get your skills checked off . If Minecraft is already installed then jump straight to task 2.

ACTIVITY	You ✓	Peer ✓	Teacher ✓
1 Install the Game			
2 Play Game for 5 Minutes			
3 Find your IP address			
4 Set up a Multiplayer			
5 Play for 5 minutes			
6 Send a Message			
7 Where am I?			
8 Teleportation			
9 Laying a Block			
10 Review			
11 Walk in Water			
12 Build a Cube			
Final Review			

“Well done you are an MC Hacker”

## FINAL REVIEW

1. What have you learnt ?

2. What was a difficult and why?

3. What has been the best part?

4. What would you like to code next?

## HACKING MINECRAFT

### HACK SIX Building a Cube

Now that you can walk on water you are ready to magic up a cube. Imagine being able to walk around the Minecraft world and place a giant cube whenever and wherever you wanted to!

This final code creates a 10 x 10 x 10 cube near to Steve.

```
import sys
import time
sys.path.append("./mcpi/api/python/mcpi")
import minecraft
mc = minecraft.Minecraft.create()
```

**Add the code below and build a cube.**

```
block = 1
x, y, z = mc.player.getPos()
mc.setBlocks(x+1, y+1, z+1, x+11, y+11, z+11, block)
```

#### Extension

1. How many blocks are there in the final cube?
2. Change the blocks to something more exciting
3. Can you get the code to drop a box every 30 seconds? HINT (Make use of a While loop)
4. Can you create a code which builds the block and then fills it with melons? Think about a cube within a cube

**Congratulations you are a Minecraft Hacker**

**\*\*\*Level Up!\*\*\***

## PART ONE: INSTALL THE GAME AND PLAY

Your first task is to download the program:

1. Boot up your Raspberry Pi with Raspbian.
2. Log into the Pi
3. Run the GUI, type in "startx".
4. Next click the icon for LXTerminal to open a new terminal window. Use the following commands (in **bold**) to download and launch:

In the **LX TERMINAL** type:

```
wget https://s3.amazonaws.com/assets.minecraft.net/
pi/minecraft-pi-0.1.1.tar.gz
```



LXTerminal

Or try:

```
wget http://goo.gl/o2aene -O mcpi.tar.gz --no-check-
certificate
```

Next stage is to decompress the file with the code:

```
tar -zxvf minecraft-pi-0.1.1.tar.gz
```

Then to run move to the Minecraft folder with:

**cd mcpi**

You can type **ls** to list all the files in the **mcpi** folder

Then type: **./minecraft-pi**

**Mine-Craft Raspberry Pi addition should then launch  
ENJOY!**



## PART TWO: GET YOUR MULTIPLAYER ON

Let's play against each other:

1. Firstly find the IP address of your Raspberry Pi, in the LX Terminal type the command:

**ifconfig**



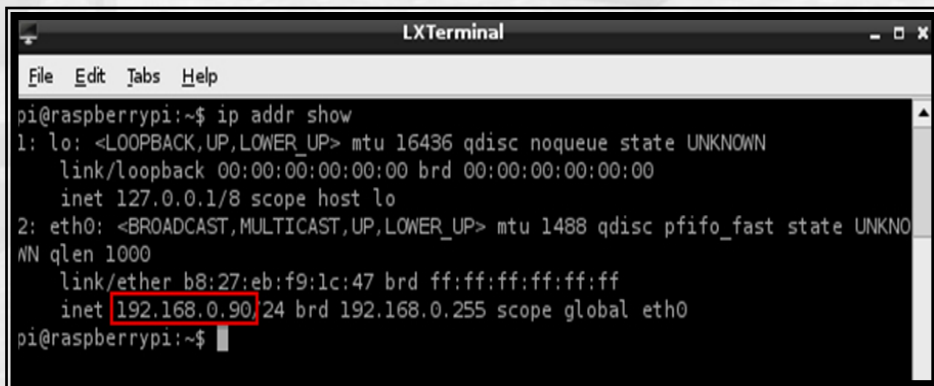
Your IP Address should look something like this:

**192.168.0.1**

The Router is called a **DHCP Server (Dynamic Host Configuration Protocol)** and will assign IP addresses automatically to the Raspberry Pi when they are connected

1. Take the CAT 5 cable
2. Plug it into your Raspberry Pi via the CAT 5 cable into the router
3. Check that the Raspberry Pi has a valid IP address, open an **LX Terminal** session and type the command:

**ip addr**



```
LX Terminal
File Edit Tabs Help
pi@raspberrypi:~$ ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 16436 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1488 qdisc pfifo_fast state UNKNOWN qlen 1000
    link/ether b8:27:eb:f9:1c:47 brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.90/24 brd 192.168.0.255 scope global eth0
pi@raspberrypi:~$
```

## HACKING MINECRAFT

### HACK FIVE Walking on Water

Imagine if you could walk on water, wow that would be amazing. This can be achieved by changing the block of water below Steve to ice. This involves using **blockBelow = mc.getBlock(x, y - 1, z)** code to identify whether the block below Steve is on water, if it is then it changes the block to ICE .

*The first part of the code is the same as before:*

```
import sys
import time
sys.path.append("./mcpi/api/python/mcpi")
import minecraft
mc = minecraft.Minecraft.create()
```

*Add the code below and watch the magic!*

```
x, y, z = mc.player.getPos()
blockBelow = mc.getBlock(x, y - 1, z)
```

```
Water = 9
Ice = 79
```

```
If blockBelow == water:
    mc.setBlock(x, y - 1, z, ice)
```

### Extension

1. You can change the block codes to create something different, try coding the dirt to change to diamond when Steve walks on it.
2. Can you create a code to change more than one block?

## ARE YOU A HACKER?

1. What have you learnt so far?

2. What was difficult and why?

3. What has been the best part so far?

4. What would you like to code next?

If everything has been setup correctly, your Raspberry Pi should have a valid IP address. In the PREVIOUS screenshot, the Raspberry Pi has been configured with the following IP address: **192.168.0.90**

To check that the Pi is communicating with the router you can **Ping** it with the following command:

**ping 192.168.0.1 -b**

```
pi@raspberrypi ~ $ ping 192.168.0.1 -c 10
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_req=1 ttl=255 time=3.51 ms
64 bytes from 192.168.0.1: icmp_req=2 ttl=255 time=2.49 ms
64 bytes from 192.168.0.1: icmp_req=3 ttl=255 time=3.25 ms
64 bytes from 192.168.0.1: icmp_req=4 ttl=255 time=3.61 ms
64 bytes from 192.168.0.1: icmp_req=5 ttl=255 time=3.43 ms
64 bytes from 192.168.0.1: icmp_req=6 ttl=255 time=4.30 ms
64 bytes from 192.168.0.1: icmp_req=7 ttl=255 time=3.00 ms
64 bytes from 192.168.0.1: icmp_req=8 ttl=255 time=2.75 ms
64 bytes from 192.168.0.1: icmp_req=9 ttl=255 time=2.97 ms
64 bytes from 192.168.0.1: icmp_req=10 ttl=255 time=3.01 ms

--- 192.168.0.1 ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9014ms
rtt min/avg/max/mdev = 2.499/3.238/4.309/0.488 ms
pi@raspberrypi ~ $
```

This screen above shows a ping between a Raspberry Pi and the router which, in this case, has an IP address of **192.168.0.1**. The **-c 10** option sends 10 packets and the echo replies are shown above with the time taken.

### LET'S PLAY:

Decide which student will start the game, **one student** launches Minecraft, with "Start Game".

Once loaded then the rest of you can launch Minecraft, but use the **"Join Game"** option.

*Hint:* When you click on "Join Game", select "Steve Pi"

## HACKING MINE CRAFT

### HACK ONE: Post a message

We are going to have some fun with Minecraft Pi and the chat window. To begin, you will need to be able to write Python code into a text editor.

1. Start a new game up, **single player**
2. Go back to the **LXTerminal window** on your desktop using your mouse, and open a **new tab** by clicking on **File** and **New Tab**.

*(You need an open tab so that you can type commands in LXTerminal to run your code, while Minecraft Pi is still running)*

To create your first Python Minecraft hack, you need to run Python in super user mode

In the LX Terminal window type the following:  
**sudo idle**

- Start a new Python program and type the following code:

```
import sys
sys.path.append("./mcpi/api/python/mcpi")
import minecraft
```

*#This is the code required for all your Minecraft programs and basically imports the Minecraft module into your Python program.*

- Underneath this type the following, making sure to use a capital letter for the second minecraft:

```
mc = minecraft.Minecraft.create()
```

*#This line connects the Python program you are coding to Minecraft.*

## HACKING MINE CRAFT

### HACK FOUR Laying a Block

In this hack Steve will walk around the world and as he does will lay a block of **10** This program uses the **mc.player.getPos()** to get the players current position and then uses **mc.setBlock(x, y, z, block)** to place the block at the users location.

Again use the same code structure as before :

```
import sys
Import time
sys.path.append("./mcpi/api/python/mcpi")
import minecraft
mc = minecraft.Minecraft.create()
```

```
block = 10
```

```
while True:
    x, y, z = mc.player.getPos()
    mc.setBlock(x, y, z, block)
    time.sleep(0.1)
```

#### What block did Steve place?

The 'block' variable refers to the number of the block in Minecraft. These can be changed to make the player place a different block. Maybe diamond or sand or even TNT!



## HACKING MINECRAFT

### HACK THREE: Teleportation

Now that you know where your player is within the world you can teleport them to a new location.

This hack uses the **mc.player.setPos(x,y,z)** which sets the player's position to the x, y and z locations in the world

Modify your program to include the following lines:

```
import sys
import time
sys.path.append("../mcpi/api/python/mcpi")
import minecraft
mc = minecraft.Minecraft.create()
```

```
x, y, z = mc.player.getPos()
```

```
mc.player.setPos(pos.x, pos.y + 50, pos.z)
```

This two simple lines of code firstly locate the players current position and save it as a variable x, y, z and then the second line of code sets the players position 50 blocks up on the Y position, in other words 50 blocks in the air

#### Extension

1. Can you send your player underground?
2. Can you adapt the code to move the player **across** the Minecraft world 10 blocks every 10 seconds?
3. What happens if you change the X, Y, Z values each to zero ?  
Where are you?
4. What is the maximum X, Y, Z value that can be coded?

### HACK TWO: Finding your location

In this hack we will find Steve's location within the Minecraft world and post it to the on screen chat.

Go back to your Python window and save the code as a new name. Remember all programs start with importing the Minecraft modules although this time we require the time module, type:

```
import sys
import time
sys.path.append("../mcpi/api/python/mcpi")
import minecraft
mc = minecraft.Minecraft.create()
```

The next line of the code is to get the players' current position, type

```
time.sleep(1)
pos = mc.player.getPos()
```

This gets (`getPos` (get position) returns the players' X, Y and Z location and stores it in variable called "**pos**"

Next break `pos` into the three axis,

```
x = xpos
y = ypos
z = zpos
```

Then print to the chat page:

```
mc.postToChat("Your player is at " x, y, z)
```

Or

```
Print X, Y, Z
```