"Why build when you can code?"

Run the game

Click Menu > Games > Minecraft: Pi Edition to run the game.

Basic Movement Controls!

Get familiar with the game. Click Start Game, then click Create New (or choose an existing one) to enter a world:

- The **mouse** changes where you look
- Holding **left mouse button** destroys blocks
- **Right mouse button** 'places' blocks
- **W, S, A, D** move you forward, backward, left and right
- **E** opens the inventory
- **ESC** takes you back and to the Menu.
- **Space** is jump, double tapping Space makes you fly or stop flying

The Minecraft API (Application Program Interface)

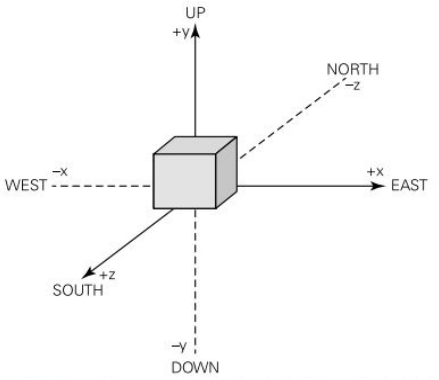
What is an API? An API is a set of tools for building software applications.

The API works by changing the 'server', which runs underneath the game, allowing you to change the game as it is being played. Some of the things you can do with it:

- Post messages into the game.
- Get and Change (or set) the player's position.
- Find the type of a block (Dirt, Grass etc).
- Change a block to a different one.
- Set different blocks using code.

A world of blocks

Minecraft is a world of cubes or blocks, all with a relative size of 1x1x1, and every block has a position in the world designated by X, Y, and Z. X and Z are the horizontal positions and Y the vertical. The player's position (x,y,z) will be represented in the upper left hand corner of the screen.



Hello Minecraft World

The first program programmers create is called “Hello World” and the goal is to get “Hello World” printed on the screen. Your first task is to get “Hello Minecraft World” displayed in the Minecraft chat window.

1. Open Minecraft

2. Open Python 2 IDLE (not Python 3) by clicking: Menu > Programming > Python 2.

3. Go to: File > New Window to create a new program and save it as myprogram.py.

4. You are going to need 3 modules, the minecraft.py and block.py modules and the standard time module so you can introduce delays into your program.

5. Type the following code into your program to import the modules.

```
import mcpi.minecraft as minecraft
import mcpi.block as block
import time
```

6. Use the Minecraft python library to create a connection to the game, your program will use this to talk to Minecraft and make things happen.

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

7. Using the minecraft connection, mc (from above), you can interact with the game and send the player(s) a message. Then use time.sleep() put in a 10 seconds delay into your program.

```
mc.postToChat("Hello Minecraft World")
time.sleep(10)
```

8. Make sure Minecraft is still running and that you are ‘in a world’.

9. Run the Python program by clicking 'Run, Run Module' in IDLE.

10. Switch back to Minecraft to see the results of your hard work - be quick though as its only on the screen for a few seconds, if you miss it, re-run the program and try again.

11. Any errors will be shown in red text in the Python Shell, make sure you typed the code correctly, be careful of upper and lower case letters as Python is case sensitive.

Falling down

Move Steve (the player) up in the air and let him fall to the ground, by adding the following to your program.

1. Find out where Steve is, using mc.player.getPos() and put his position in a variable called playerPos.

```
playerPos = mc.player.getPos()
```

2. Change Steve's position 50 blocks up using my.player.setPos and adding 50 to his Y position.

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

3. Put a message on the screen and wait for Steve to fall to the ground.

```
mc.postToChat("Dont look down")
time.sleep(5)
```

4. Run the program by clicking 'Run > Run Module' in IDLE.

Changing Blocks

1. Turn the block which Steve is standing on into Diamond. Find out which block Steve is standing on by using mc.player.getTilePos().

```
playerTilePos = mc.player.getTilePos()
```

2. Change the block below Steve using mc.setBlock().

```
mc.setBlock(playerTilePos.x, playerTilePos.y - 1,
playerTilePos.z,block.DIAMOND_BLOCK.id)
```

3. Run the program.

Walking on Air

Change your program so that it loops forever by using while(True) and constantly change the block below Steve into a Diamond. Allowing you to walk on air.

```
while(True):
    playerTilePos = mc.player.getTilePos()
    mc.setBlock(playerTilePos.x,
                playerTilePos.y - 1,
                playerTilePos.z,
                block.DIAMOND_BLOCK.id)
```

Rainbow blocks

You can get colored blocks by using wool. Change your program to use random colored wool by passing a number 0-15 (0=”white”, 1=”orange”, 2=”magenta”, etc) after the block id. To create random numbers, we will need to import python’s random module at the top of the program.

1. Use random in your Python program to get the random number

```
import random
```

2. Use the setBlock command to use WOOL instead of DIAMOND_BLOCK and pass a random number between 0 and 15 for the wool color.

```
woolColor= random.randrange(0,15)
  mc.setBlock(playerTilePos.x,
              playerTilePos.y - 1,
              playerTilePos.z,
              block.WOOL.id, woolColor)
```

Get your Current Position

Prints out the player's position in IDLE. You can also try making it print in the Mine Craft chat.

```
def getYourCurrentPos():
    x = pos.x
    y = pos.y
    z = pos.z
    return x,y,z

print getYourCurrentPos()
```

Some other useful API functions

- mc.postToChat(message) - communicate with the player(s) in the game
- mc.getBlock(x, y, z) - get a block type for a specific position
- mc.setBlock(x, y, z, blockType, blockData) - set (change) a block to a specific blockType
- mc.setBlocks(x1, y1, z1, x2, y2, z2, blockType, blockData) - set lots of blocks all at the same time by providing 2 sets of co-ordinates (x, y, z) and fill the gap between with a blockType
- mc.player.getPos() - get the precise position of a player
- mc.player.setPos(x, y, z) - set (change) the players position
- mc.player.getTilePos() - get the position of the block where the player current is

Block Reference

.id
"The id (or type) of block"

AIR = Block(0)
STONE = Block(1)
GRASS = Block(2)
DIRT = Block(3)
COBBLESTONE = Block(4)
WOOD_PLANKS = Block(5)
SAPLING = Block(6)
BEDROCK = Block(7)
WATER_FLOWING = Block(8)
WATER = WATER_FLOWING
WATER_STATIONARY = Block(9)
LAVA_FLOWING = Block(10)
LAVA = LAVA_FLOWING
LAVA_STATIONARY = Block(11)
SAND = Block(12)
GRAVEL = Block(13)
GOLD_ORE = Block(14)
IRON_ORE = Block(15)
COAL_ORE = Block(16)
WOOD = Block(17)
LEAVES = Block(18)
GLASS = Block(20)
LAPIS_LAZULI_ORE = Block(21)
LAPIS_LAZULI_BLOCK = Block(22)
SANDSTONE = Block(24)
BED = Block(26)
COBWEB = Block(30)
GRASS_TALL = Block(31)
WOOL = Block(35)
FLOWER_YELLOW = Block(37)
FLOWER_CYAN = Block(38)
MUSHROOM_BROWN = Block(39)
MUSHROOM_RED = Block(40)
GOLD_BLOCK = Block(41)
IRON_BLOCK = Block(42)
STONE_SLAB_DOUBLE = Block(43)
STONE_SLAB = Block(44)

```
BRICK_BLOCK        = Block(45)
TNT                = Block(46)
BOOKSHELF          = Block(47)
MOSS_STONE         = Block(48)
OBSIDIAN           = Block(49)
TORCH              = Block(50)
FIRE               = Block(51)
STAIRS_WOOD        = Block(53)
CHEST              = Block(54)
DIAMOND_ORE        = Block(56)
DIAMOND_BLOCK      = Block(57)
CRAFTING_TABLE     = Block(58)
FARMLAND           = Block(60)
FURNACE_INACTIVE   = Block(61)
FURNACE_ACTIVE     = Block(62)
DOOR_WOOD          = Block(64)
LADDER             = Block(65)
STAIRS_COBBLESTONE = Block(67)
DOOR_IRON          = Block(71)
REDSTONE_ORE       = Block(73)
SNOW               = Block(78)
ICE                = Block(79)
SNOW_BLOCK         = Block(80)
CACTUS             = Block(81)
CLAY               = Block(82)
SUGAR_CANE         = Block(83)
FENCE              = Block(85)
GLOWSTONE_BLOCK    = Block(89)
BEDROCK_INVISIBLE  = Block(95)
STONE_BRICK        = Block(98)
GLASS_PANE         = Block(102)
MELON              = Block(103)
FENCE_GATE         = Block(107)
GLOWING_OBSIDIAN   = Block(246)
NETHER_REACTOR_CORE = Block(247)
```