**Name: Session:**

**Advanced Programming in Java**

**Lab Exercise 12.23.2020**

**Programming Minecraft in Python**

1. Once the Raspberry Pi has booted, double click on the desktop shortcut to Minecraft.
2. Minecraft should now start. Click on the Start Game button.
3. You have the choice of Select a pre-made world or create a new one. For our purposes we will choose **Create a New World**.
4. At this point you can play Minecraft as you normally would.
5. Here are some useful keyboard shortcuts:

Mouse movement – turn, aim, third person camera movement

Left mouse button – Destroy blocks

Right mouse button – Place blocks

Mouse wheel – Scroll through the quick-bar

Esc – Opens of closes the menu and gives back cursor control

1 to 8 – Selects the quick-bar item

W – Move forward

A – Pan left

S – Move backward

D – Pan right

Spacebar – Jump, double tapping toggles Fly Mode. In Fly Mode pressing will gain altitude

Left Shift – Sneak

E – Opens a list of blocks

O – Release the mouse cursor from the game window

1. Now let us write a program to make stuff happen in Minecraft. We will write a program in the Python programming language.
2. Minimize Minecraft by hitting the O key to release the mouse cursor and clicking on the Minimize button. Note that depending on your monitor the minimize could be hidden by the Minecraft world.
3. Create a folder on the Desktop (if there isn’t one there already) to save your Python programs in. You can do this by right-clicking on the Desktop and select New|Folder. Name your folder My Python.
4. Start IDLE.
5. Once IDLE has started, Choose File|New Window from the menu bar.
6. In the new window, type the following code:

import mcpi.minecraft as minecraft

mc = minecraft.Minecraft.create()

x = 10

y = 30

z = 12

mc.player.setPos(x, y, z)

1. Save this file with the filename

*transport.py*

1. Select Run|Run Module from the menu bar. When the program runs, your will see the Python shell open and it will connect to Minecraft and transport the player to coordinate (10, 30, 12).
2. To check this out go back to Minecraft by clicking on Minecraft in the task bar.
3. Be warned, depending on your World, you could be inside an object or underwater. If underwater, double click the spacebar and increase your altitude. If stuck inside an object, edit transport.py with different coordinates and run it again.
4. From now on you will be shifting between IDLE and Minecraft. When you are in IDLE you should have Minecraft minimized. When you need to write a new program, select File | New Window and type in your code and save the code under the appropriate file name (always put a .py extension on the file name).
5. When you are in Minecraft it is a bit more fun if you maximize Minecraft to full screen. When you do this there is a little bit of a delay until you have mouse control of your screen. You will have keyboard control immediately.
6. Now let’s write a program that will place a flower everywhere you go (repeat steps 10 – 14). Here’s the code. Save it is *flower.py*.

import mcpi.minecraft as minecraft

import time

mc = minecraft.Minecraft.create()

block = 38

while True:

pos = mc.player.getPos()

x = pos.x

y = pos.y

z = pos.z

mc.setBlock(x, y, z, block)

time.sleep(0.2)

1. When you run this, try moving around the world and you will notice that everywhere you go, you plant a flower.
2. Now let’s try building a chat application.

Here’s the code. Save it as *chat.py*.

import mcpi.minecraft as minecraft

mc = minecraft.Minecraft.create()

chatMsg = raw\_input(“Enter a message: “)

whilechatMsg != “/exit”:

mc.postToChat(chatMsg)

chatMsg = raw\_input(“Enter a message: “)

1. Now let’s freeze the water we walk on.

Here’s the code. Save it as *freeze.py*.

import mcpi.minecraft as minecraft

mc = minecraft.Minecraft.create()

import time

while True:

time.sleep(0.2)

pos = mc.player.getPos()

x = pos.x

y = pos.y

z = pos.z

blockBelow = mc.getBlock(x, y – 1, z)

water = 9

ice = 79

if blockBelow == water:

mc.setBlock(x, y – 1, z, ice)

1. Now let us try our hand at building a house. Before we can do that we need to clear some land. With Minecraft running, create the following file using IDLE and save it as *clearout.py*.

import mcpi.minecraft as minecraft

import mcpi.block as block

mc = minecraft.Minecraft.create()

pos = mc.player.getTilePos()

x = pos.x

y = pos.y

z = pos.z

air = block.AIR.id

mc.setBlocks(x-50, y, z-50, x+150, y+150, z+150, air)

1. Run clearout.py
2. Go back to Minecraft and see what it has done.
3. Minimize Minecraft and create the following in a new file and save it as buildHouse.py

import mcpi.minecraft as minecraft

import mcpi.block as block

mc = minecraft.Minecraft.create()

SIZE = 20

stone = block.COBBLESTONE.id

air = block.AIR.id

window = block.GLASS.id

roof = block.WOOD.id

floor = block.GOLD\_ORE.id

def buildHouse():

midX = x + SIZE/2

midY = y + SIZE/2

mc.setBlocks(x, y, z, x+SIZE, y+SIZE, z+SIZE, stone)

mc.setBlocks(x+1, y+1, z+1, x+SIZE-2, y+SIZE-2, z+SIZE-2, air)

mc.setBlocks(x+3, y+SIZE-3, z, midX-3, midY+3, z, window)

mc.setBlocks(midX+3, y+SIZE-3, z, x+SIZE-3, midY-3, z, window)

mc.setBlocks(x, y+SIZE, z, x+SIZE, y+SIZE, z+SIZE, roof)

mc.setBlocks(x+1, y+1, z+1, x+SIZE-1, y+1, z+SIZE-1, floor)

pos = mc.player.getTilePos()

x = pos.x + 2

y = pos.y

z = pos.z

buildHouse()

1. Go back to Minecraft and see what it has done.
2. Now let us build a glass house by creating a new document, typing in the following code and saving it as *buildGreenHouse.py.*

import mcpi.minecraft as minecraft

import mcpi.block as block

mc = minecraft.Minecraft.create()

SIZE = 20

air = block.AIR.id

window = block.GLASS.id

roof = block.WOOD.id

floor = block.GOLD\_ORE.id

def buildGreenHouse():

mc.setBlocks(x, y, z, x+SIZE, y+SIZE, z+SIZE, window)

mc.setBlocks(x+1, y+1, z+1, x+SIZE-2, y+SIZE-2, z+SIZE-2, air)

mc.setBlocks(x, y+SIZE, z, x+SIZE, y+SIZE, z+SIZE, roof)

mc.setBlocks(x+1, y+1, z+1, x+SIZE-1, y+1, z+SIZE-1, floor)

pos = mc.player.getTilePos()

x = pos.x + 2

y = pos.y

z = pos.z

buildGreenHouse()

1. Run clearout.py and buildGreenHouse.py (in that order)
2. Go back to Minecraft and see what it has done.