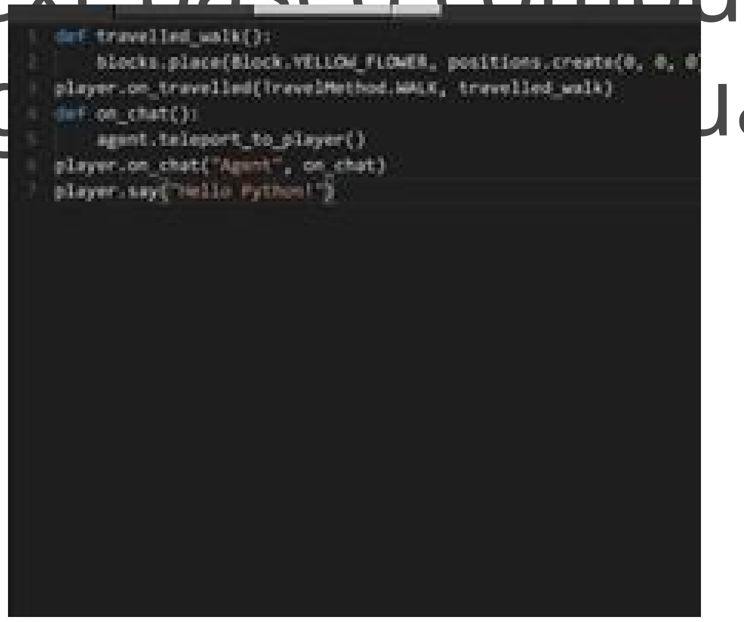
WHAT WE WILL LEARN TODAY?

- I will learn and apply the coding concept of functions.
- I will create, test, and debug my Python code.
- I will embrace and demonstrate a coding mindset.

IMPORTANT VOCABULARY

There are some important things for us to understand before we begin playing– let's review some concepts first!

Functions	Python	Syntax
a specially made command that can execute a group of commands (or any piece of code)	a text-based computer prog uage 	a set of rules that are used to create the programming language structure `player.say(“hi”)`

```
def travelled_walk():
    blocks.place(Block.YELLOW_FLOWER, positions.create(0, 0, 0
player.on_travelled(TravelMethod.WALK, travelled_walk)
def on_chat():
    agent.teleport_to_player()
player.on_chat("Agent", on_chat)
player.say("Hello Python!")
```

GOAL FOR THE DAY

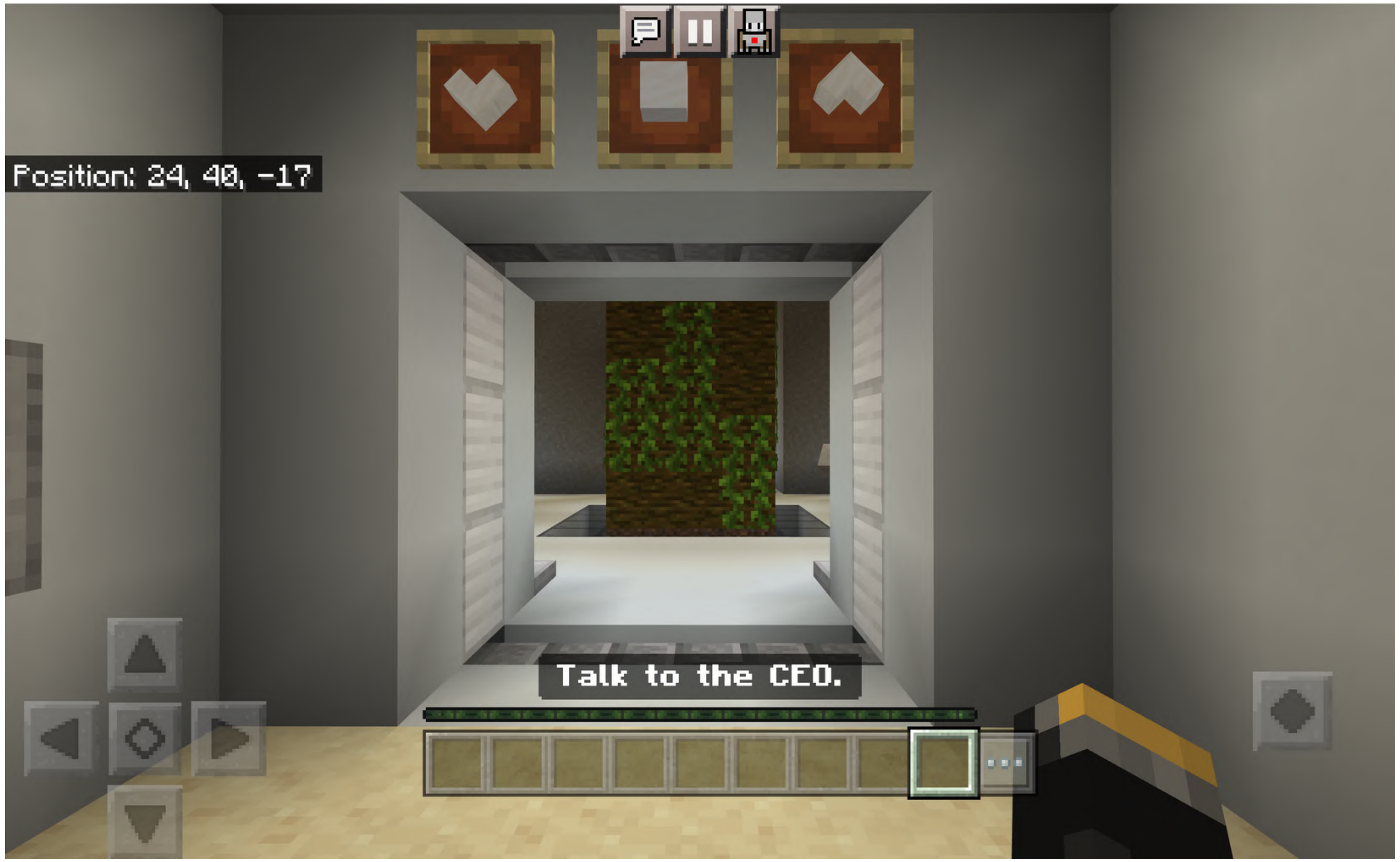
Welcome!

Today, you will continue to develop the Agent. CodingMine wants to develop the Agent to help an ecological organization. This organization wants to plant a large number of trees and they must complete this task very quickly, as they have a fast approaching deadline! It is not an easy job to prepare the soil to plant pastures of trees... can the Agent help complete this task for the organization?

CODING CONCEPTS

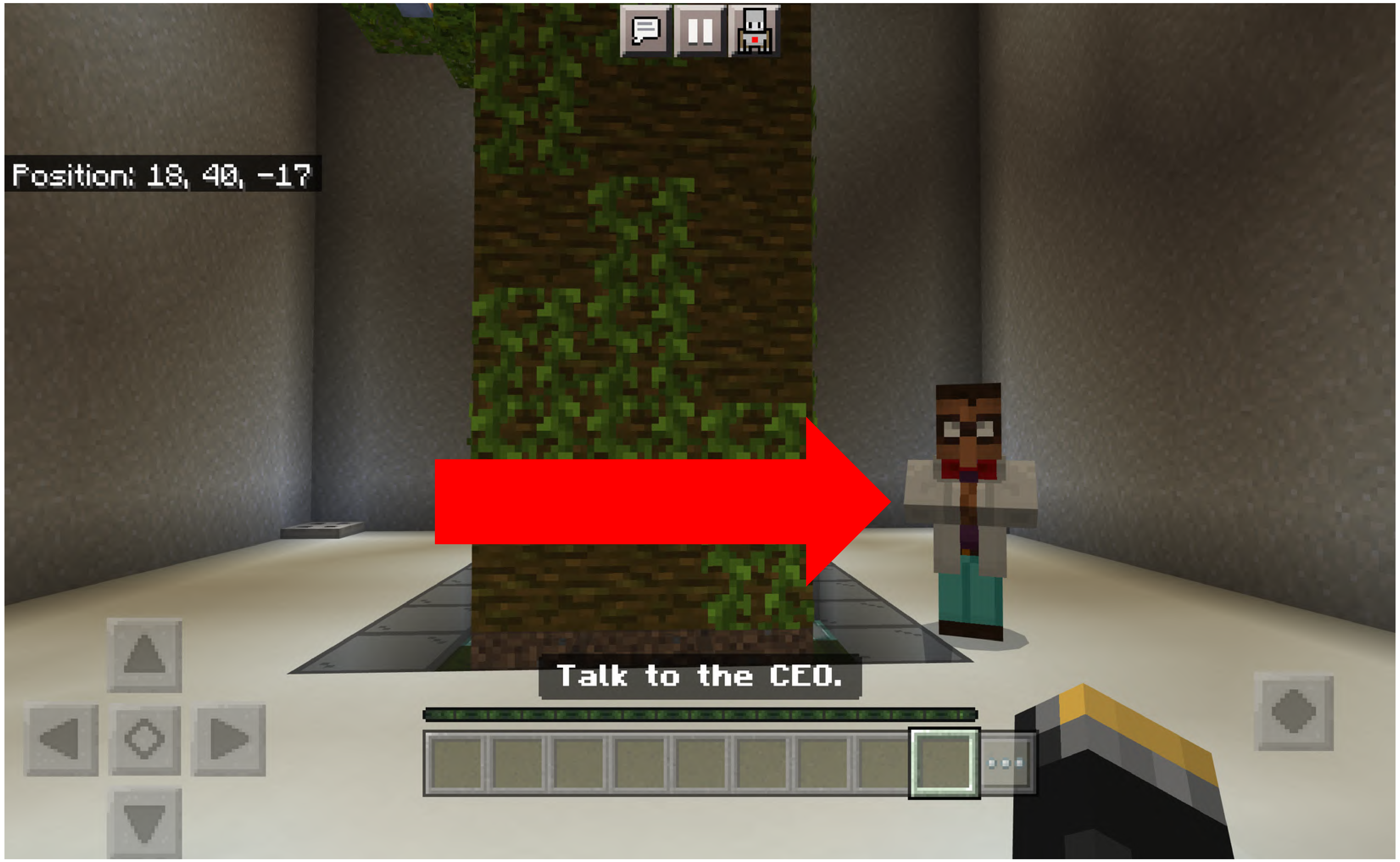
Functions	Comments
Functions are a specially made command that can execute a group of commands (or any piece of code). Functions are a great way to shorten code and make it less confusing as they can replace repetitive parts, often sequences. To write a function, you must write out the syntax **def**, which stands for define. By doing this, we are telling the computer that we want to make (or define) our own function. When naming a function, we should follow the same rules as when naming a variable. After the name, there is a pair of brackets followed by a colon.	**Comments** are pieces of text in a code that the computer does not run. It is a great way to organize and annotate a code. Comments are mainly written so that any developer can look at the code and clearly understand what each part of the code does. In order to comment in a line of text in Python, you must use a hashtag (#) before the code comment.

WELCOME

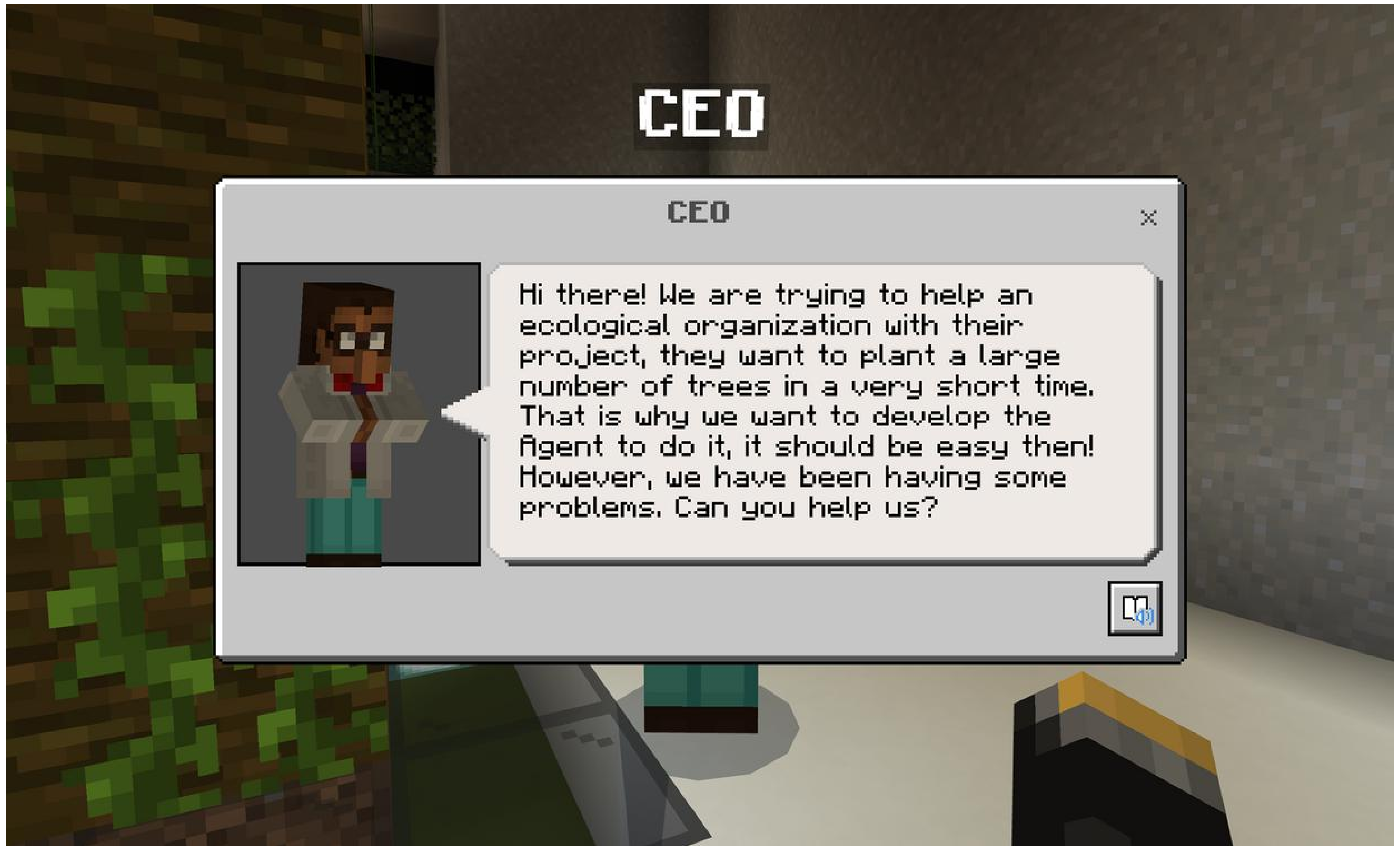


This is your spawn point, the location where you begin game play.

TALK TO THE CEO



TALK TO THE CEO

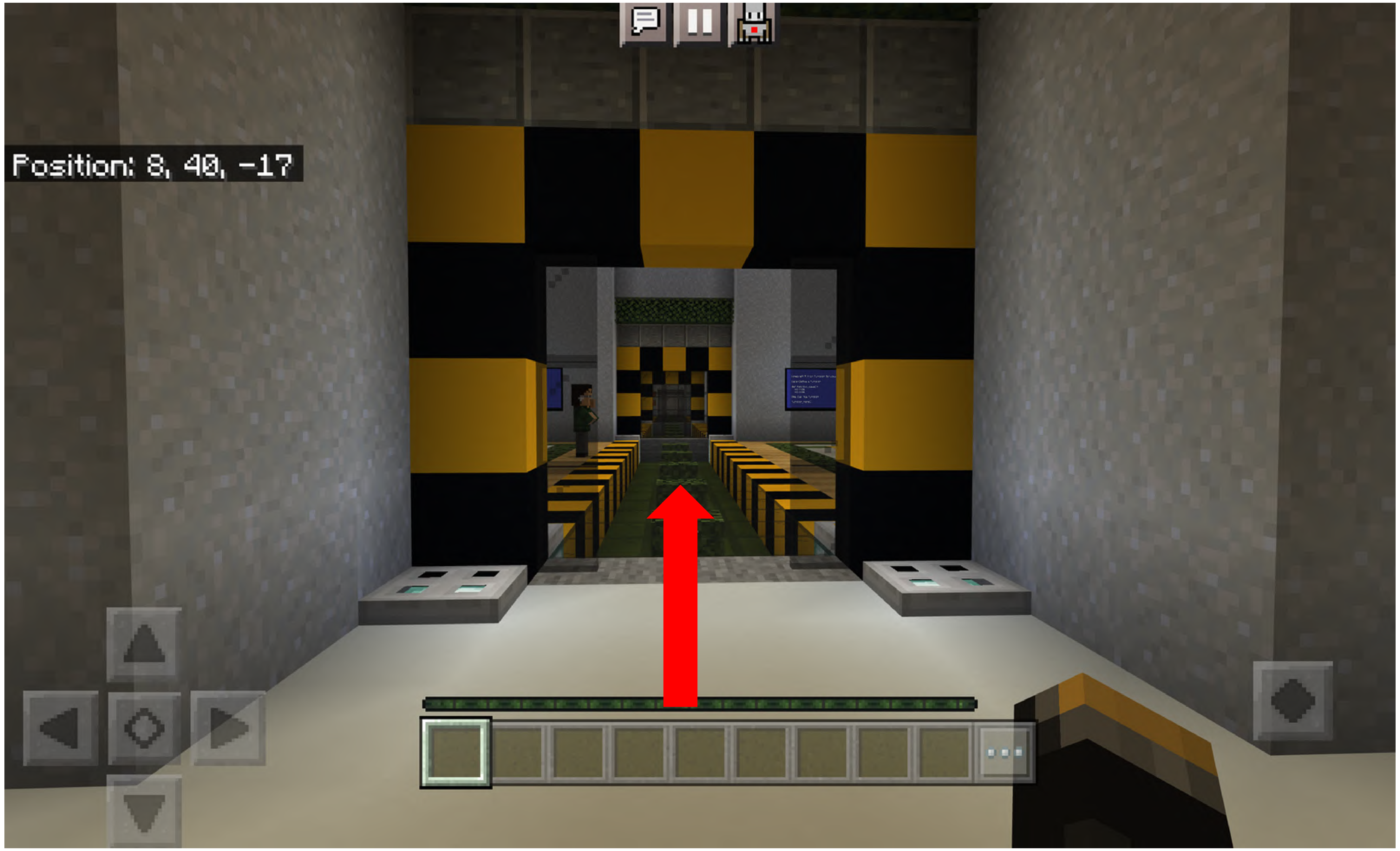


Hi there! We are trying to help an ecological organization with their project, they want to plant a large number of trees in a very short time. That is why we want to develop the Agent to do it, it should be easy then! However, we have been having some problems. Can you help us?

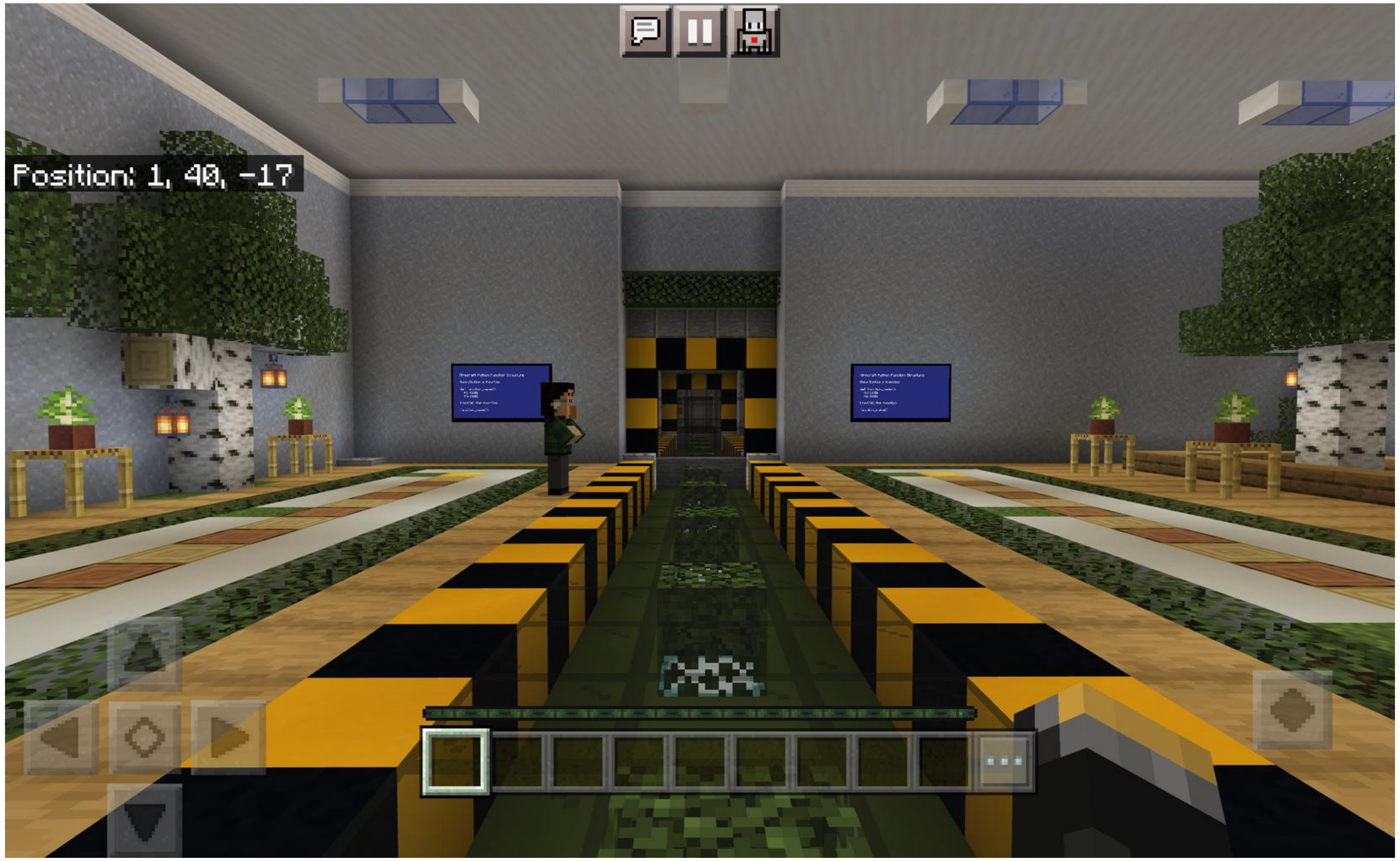
This is the pop-up screen we will see on our screen.

After you have read the message, click on the “X” in the top right corner to continue game play.

WALK INTO THE ROOM TO BEGIN

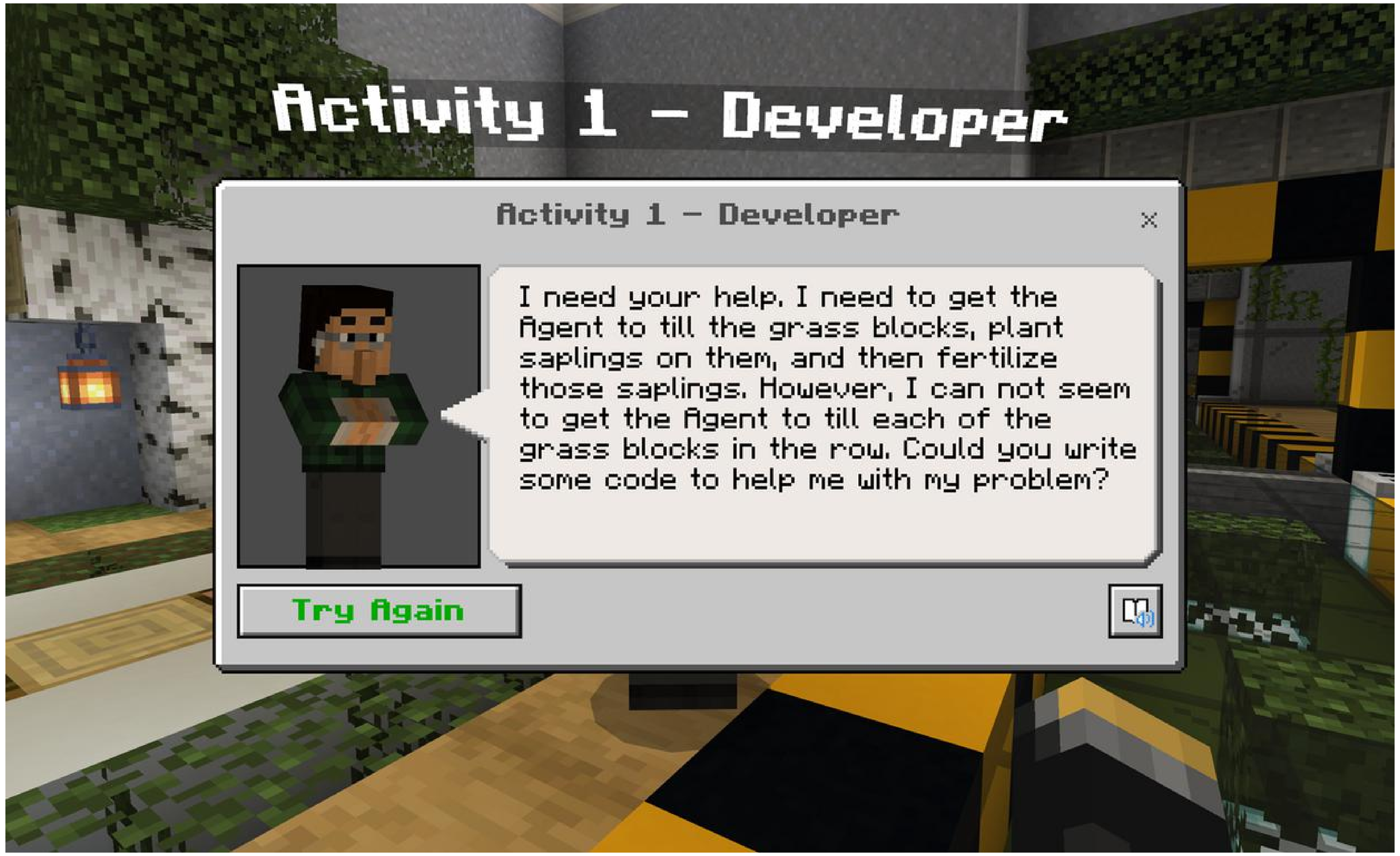


ACTIVITY #1



Our first activity requires us to write code to have the Agent till, plant, and fertilize a row of trees in their designated spots. This activity has 2 parts.

TALK TO THE DEVELOPER



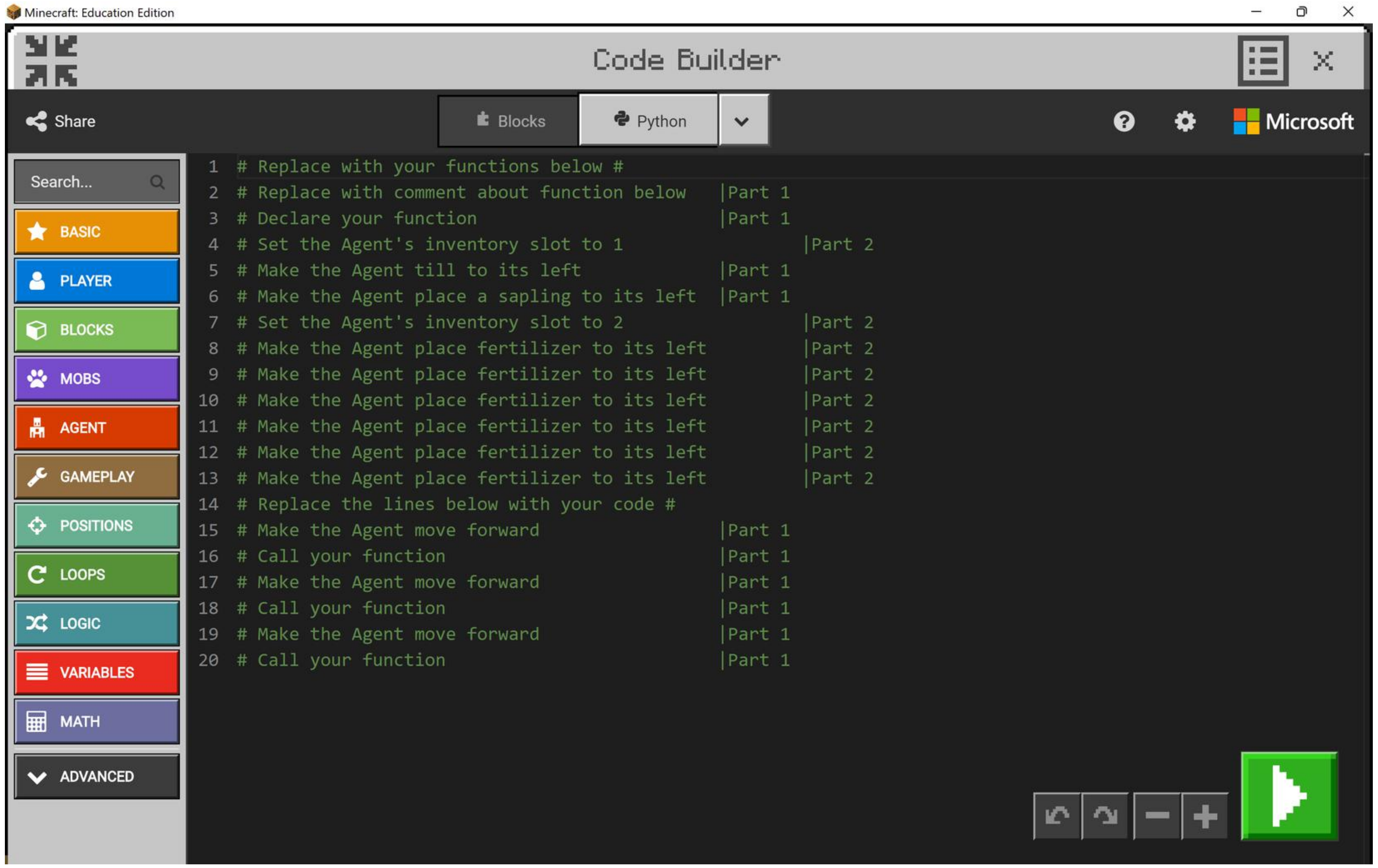
I need your help. I need to get the Agent to till the grass blocks, plant saplings on them, and then fertilize those saplings. However, I can not seem to get the Agent to till each of the grass blocks in the row. Could you write some code to help me with my problem?

This is the pop-up screen we will see on our screen.

After you have read the message, click on the "X" in the top right corner to continue game play.

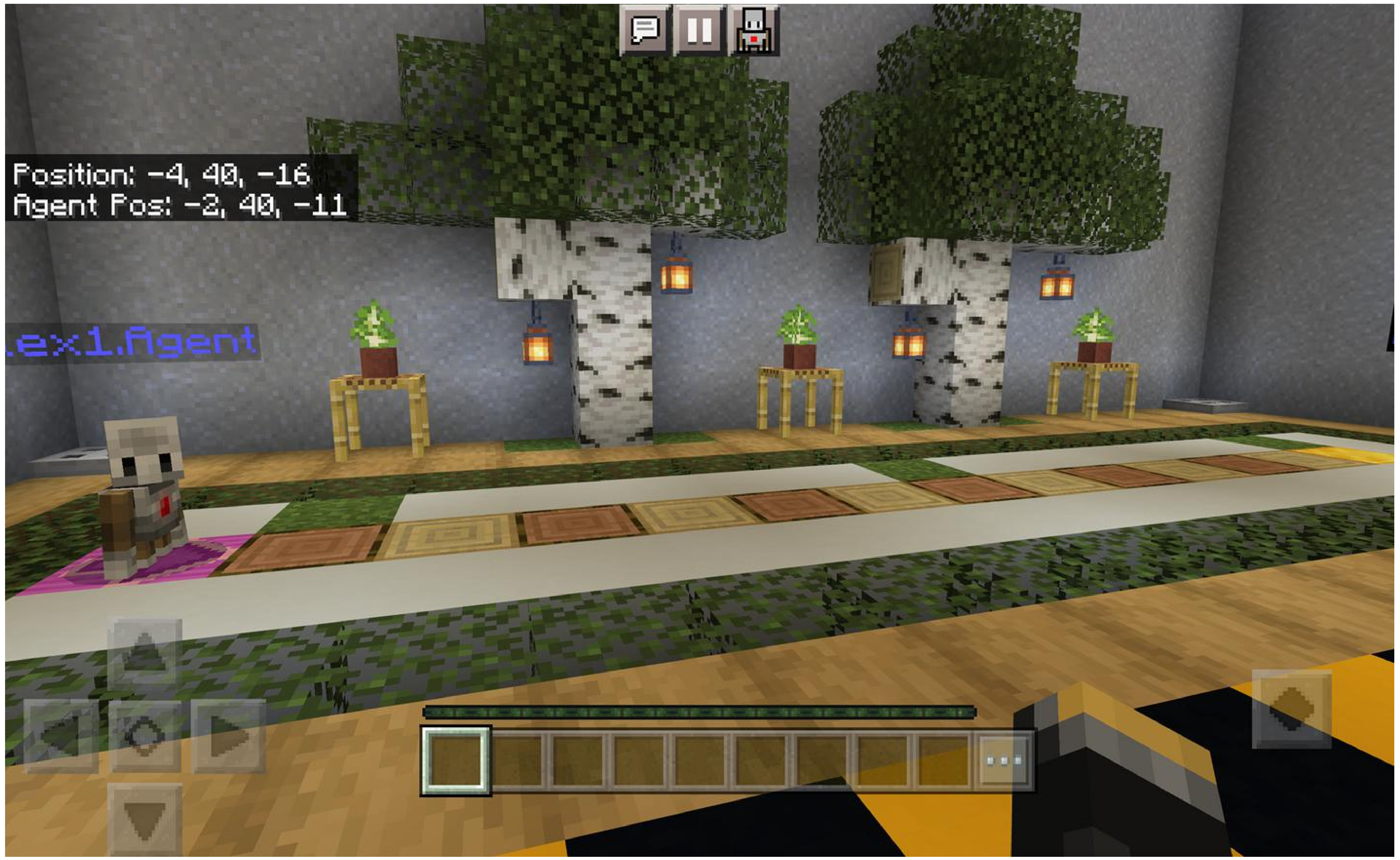
CREATE YOUR CODE: PART 1

Part 1
Code the Agent to move toward while tilling and planting saplings on the grass blocks to its left. Make a function in the dedicated area of the coding window. Inside the function, write a sequence to have the Agent till and place a sapling to its left. Write some code to have the Agent move forward, while calling their function at certain intervals.
(HINT: Write code comments about what each function does throughout your code to help you.)



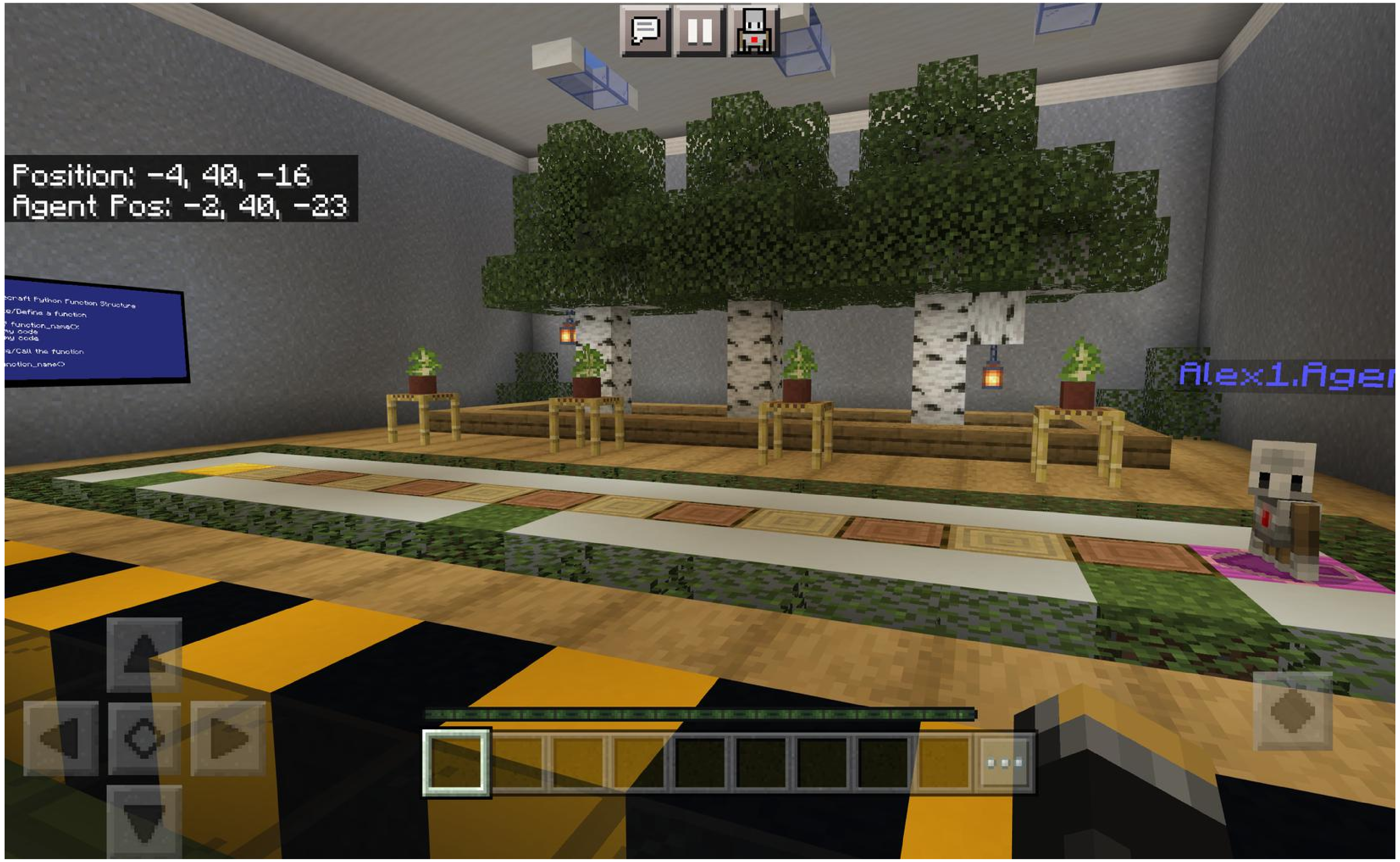
```
# Replace with your functions below #
# Replace with comment about function below   |Part 1
# Declare your function                       |Part 1
# Set the Agent's inventory slot to 1                 |Part 2
# Make the Agent till to its left             |Part 1
# Make the Agent place a sapling to its left  |Part 1
# Set the Agent's inventory slot to 2                 |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Replace the lines below with your code #
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
```

TEST YOUR CODE



You need to run your code after each part. This activity will be completed in 2 parts. The activity is complete when the Agent reaches the gold block.

ACTIVITY #1: PART 2

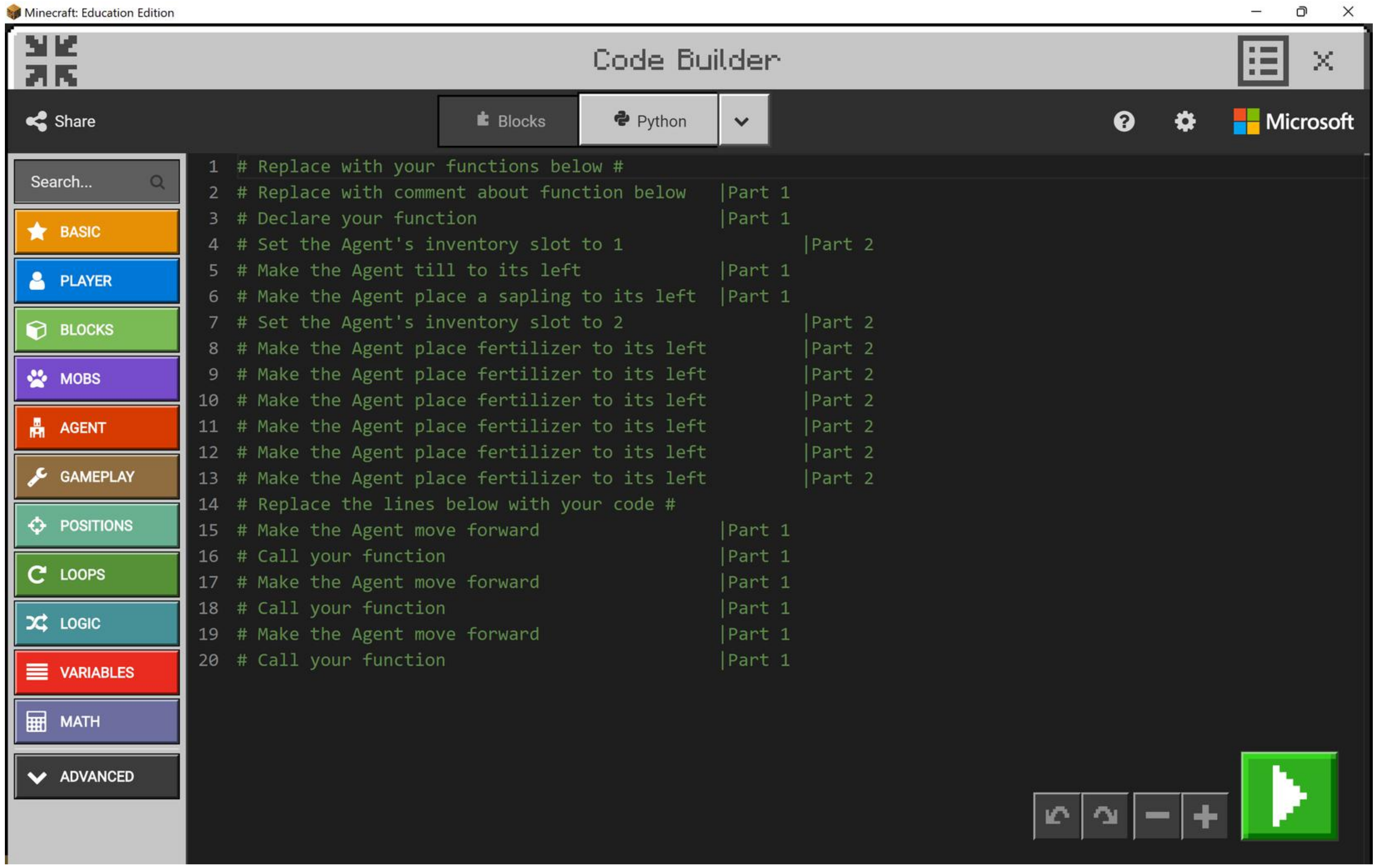


```
Position: -4, 40, -16
Agent Pos: -2, 40, -23
```

```
ecraft Python Function Structure
e/Define a function
 function_name():
my code
my code
e/Call the function
nction_name()
```

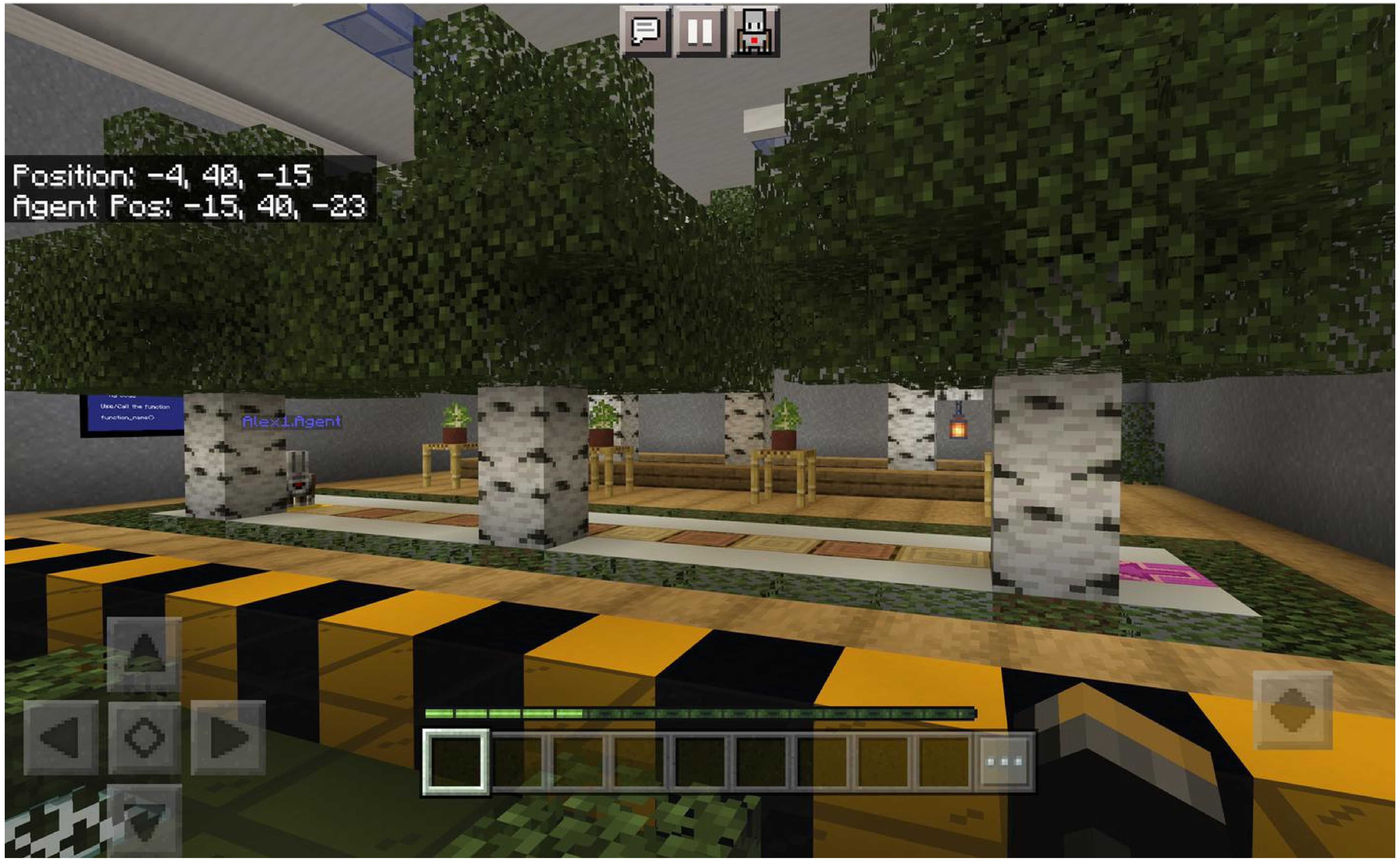
CREATE YOUR CODE: PART 2

Part 2
Now, you will add to your code so the Agent places fertilizer on each sapling five times. To do this, you will have to change the Agent's inventory slots, 1 and 2, each time. You only need to change the code in the function instead of having to change it each time in the main code. When you run your code, the Agent should move forward and on the grass blocks, the Agent should till, plant, and fertilize.



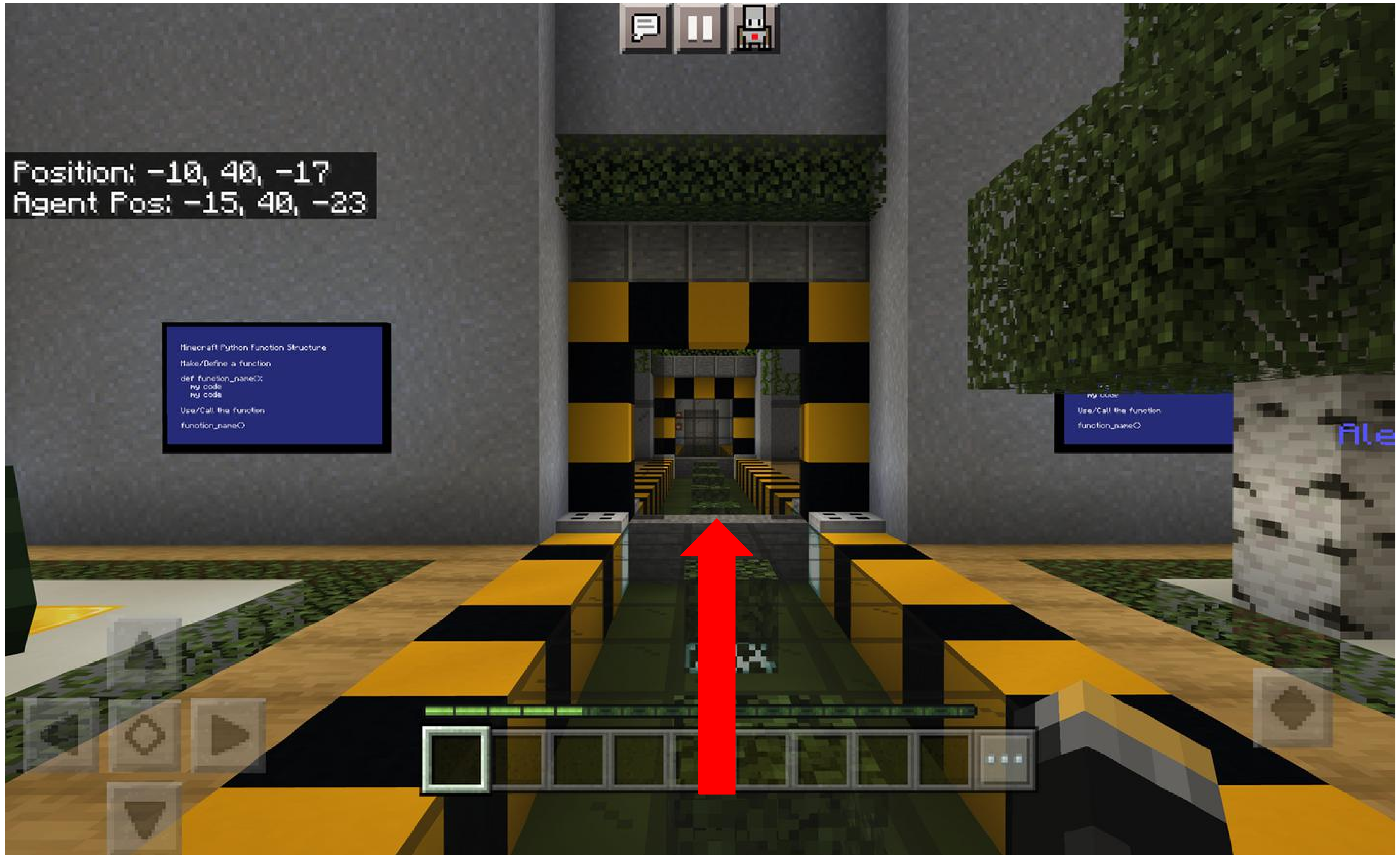
```
# Replace with your functions below #
# Replace with comment about function below   |Part 1
# Declare your function                       |Part 1
# Set the Agent's inventory slot to 1                 |Part 2
# Make the Agent till to its left             |Part 1
# Make the Agent place a sapling to its left  |Part 1
# Set the Agent's inventory slot to 2                 |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Make the Agent place fertilizer to its left         |Part 2
# Replace the lines below with your code #
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
# Make the Agent move forward                 |Part 1
# Call your function                          |Part 1
```

TEST YOUR CODE


Position: -4, 40, -15
Agent Pos: -15, 40, -23

MINECRAFT EDUCATION EDITION

MOVE TO THE NEXT AREA

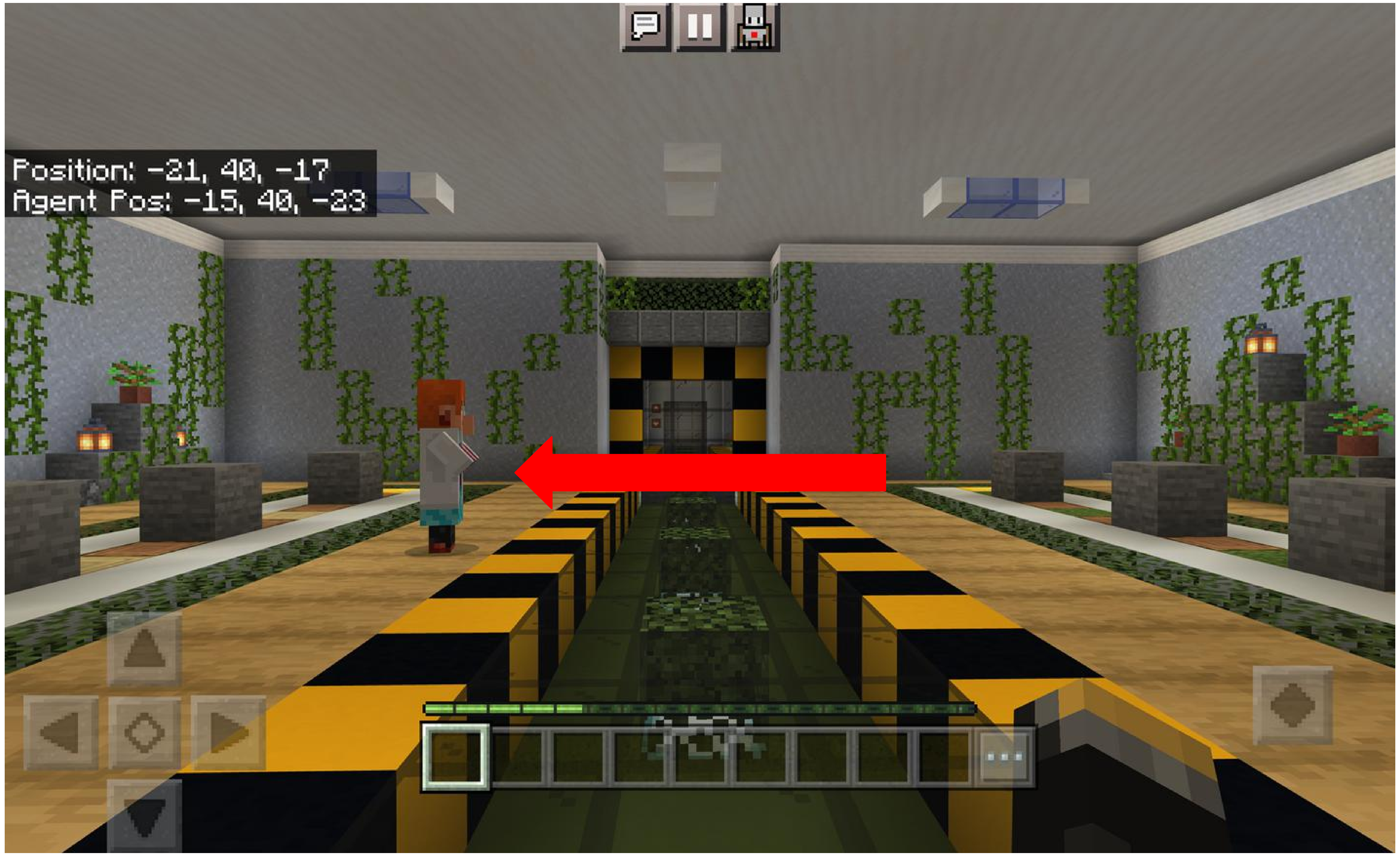


```
Position: -10, 40, -17
Agent Pos: -15, 40, -23
```

```
Minecraft Python Function Structure
Make/Define a function
def function_name():
    my code
    my code
Use/Call the function
function_name()
```

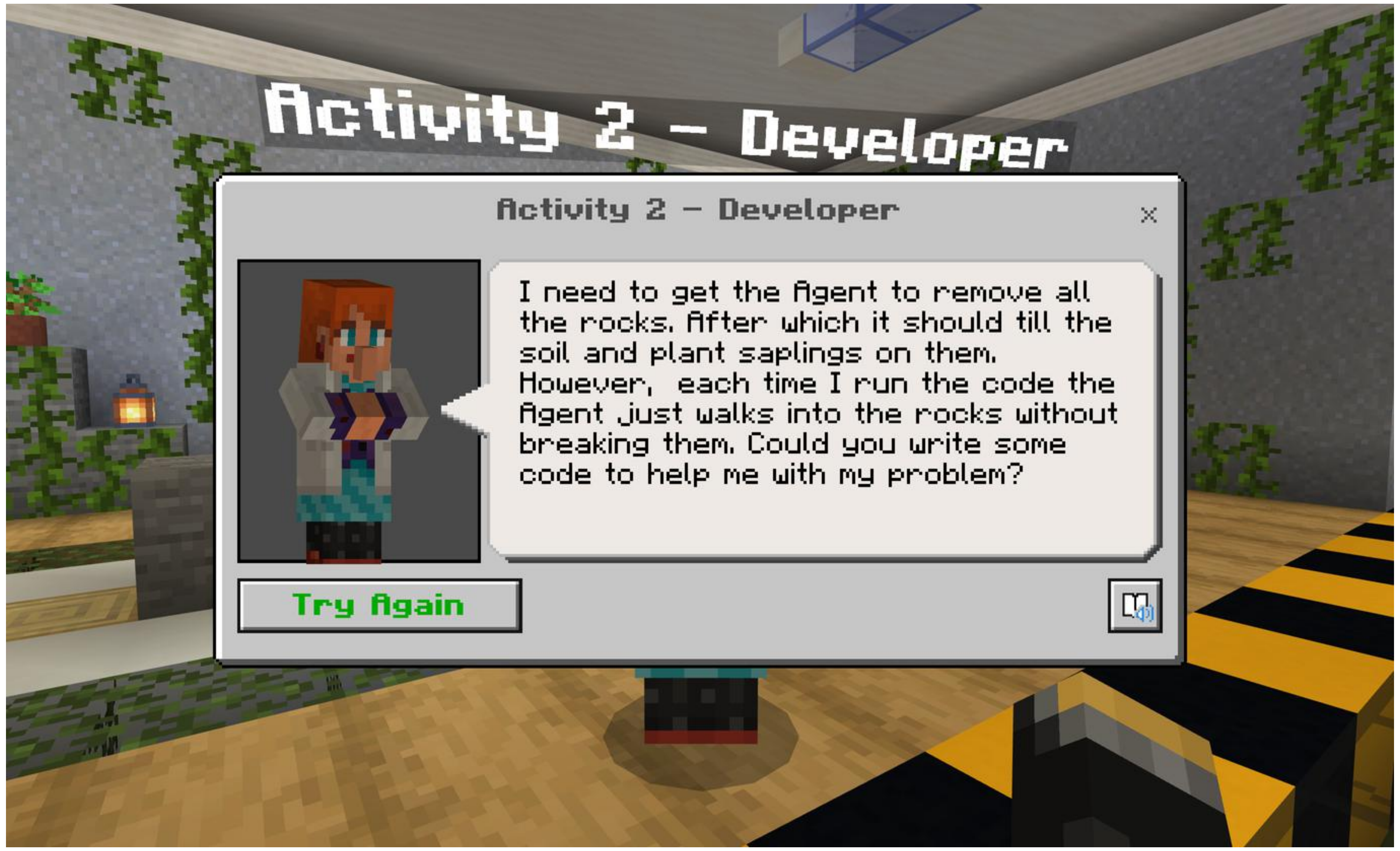
Continue on to the next area and begin Activity #2.

ACTIVITY #2



Move towards the developer to find out about your next activity.

TALK TO THE DEVELOPER



Activity 2 - Developer

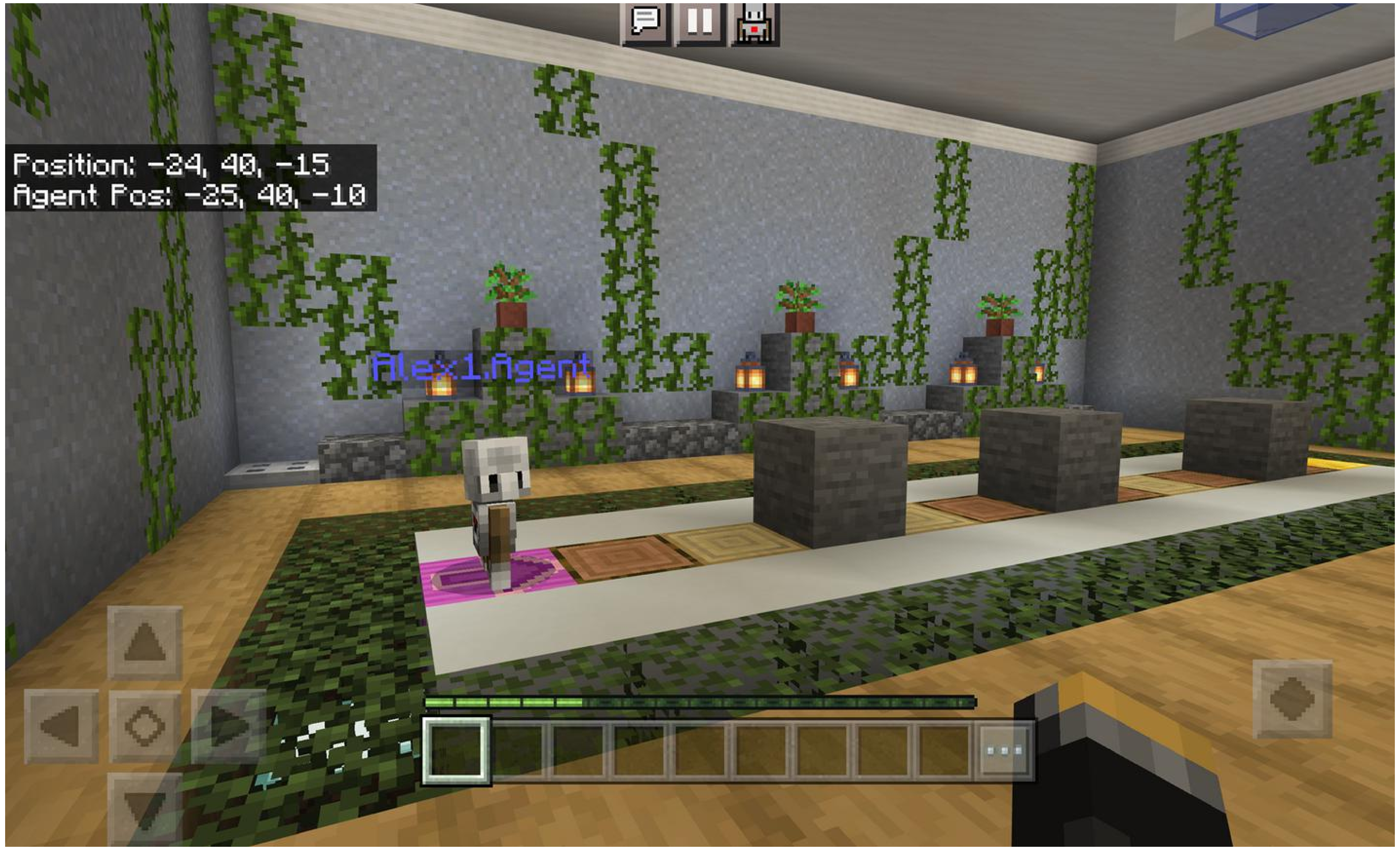
I need to get the Agent to remove all the rocks. After which it should till the soil and plant saplings on them. However, each time I run the code the Agent just walks into the rocks without breaking them. Could you write some code to help me with my problem?

Try Again

This is the pop-up screen we will see on our screen.

After you have read the message, click on the “X” in the top right corner to continue game play.

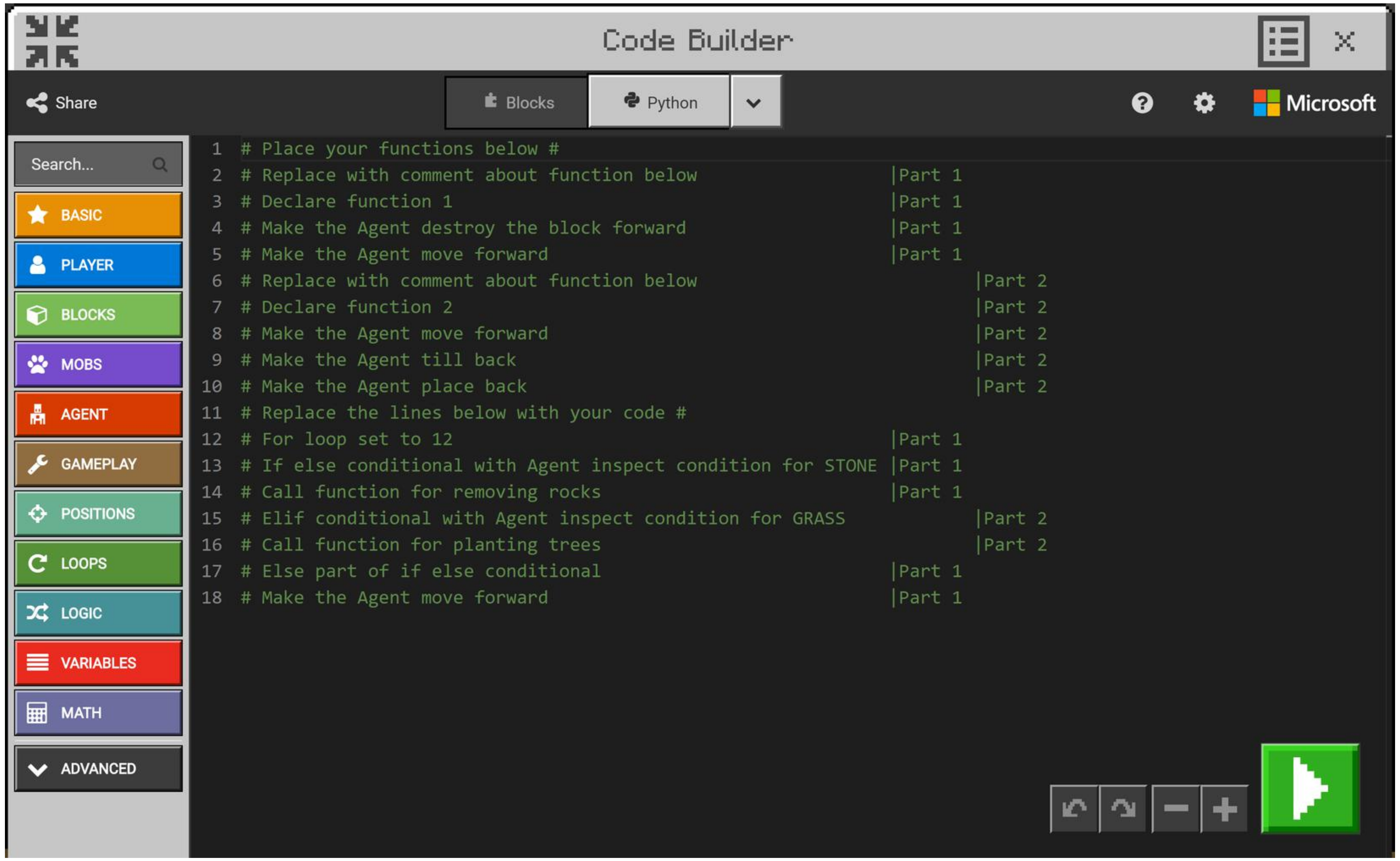
ACTIVITY #2



We are going to code the Agent to clear the ground of rocks and then till and plant saplings into their designated spots.

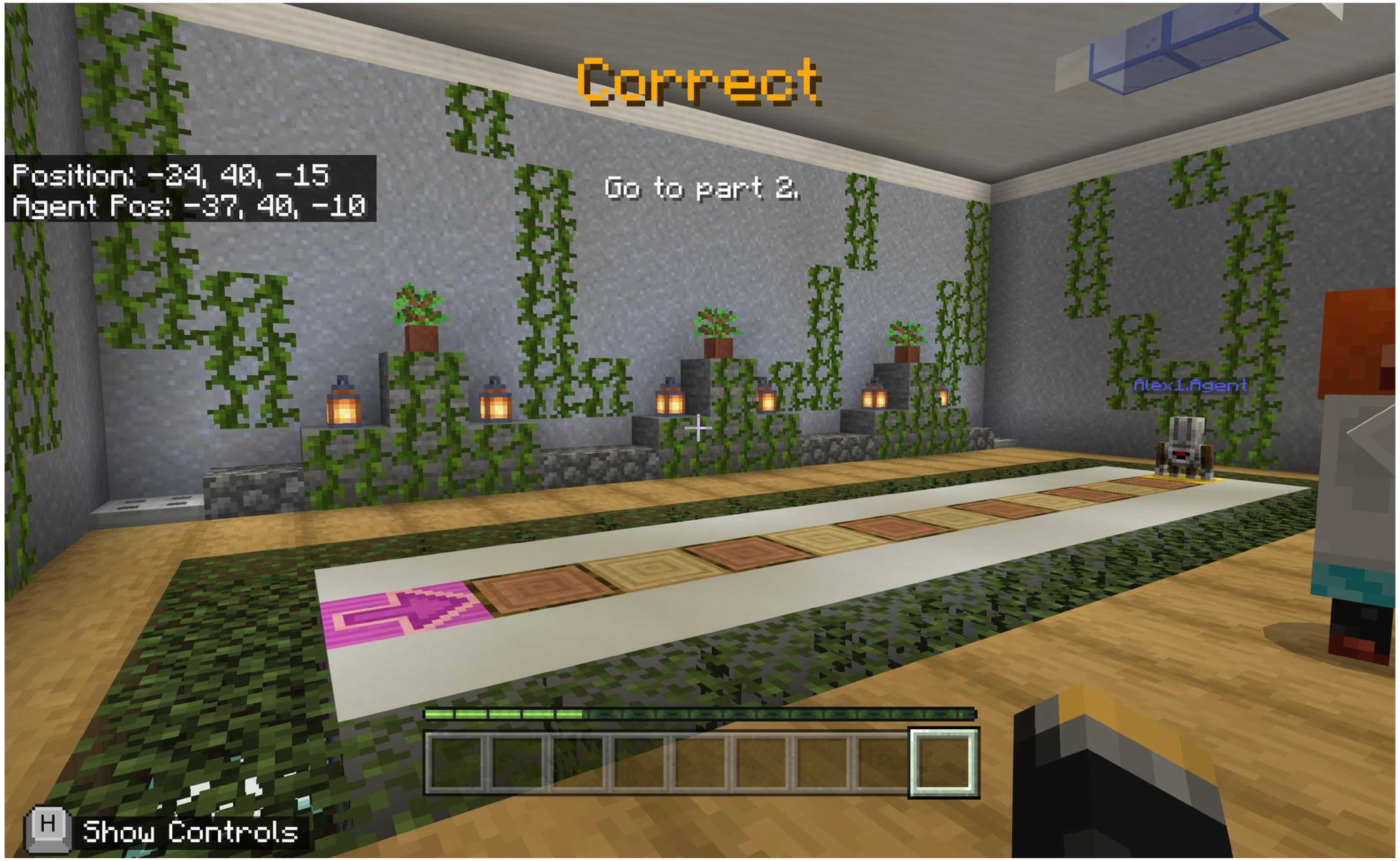
CREATE YOUR CODE: PART 1

Part 1
Code the Agent to move forward and break each stone in its path. You can complete this by writing a function to make the Agent break a block in front of it, collect it, and move forward.



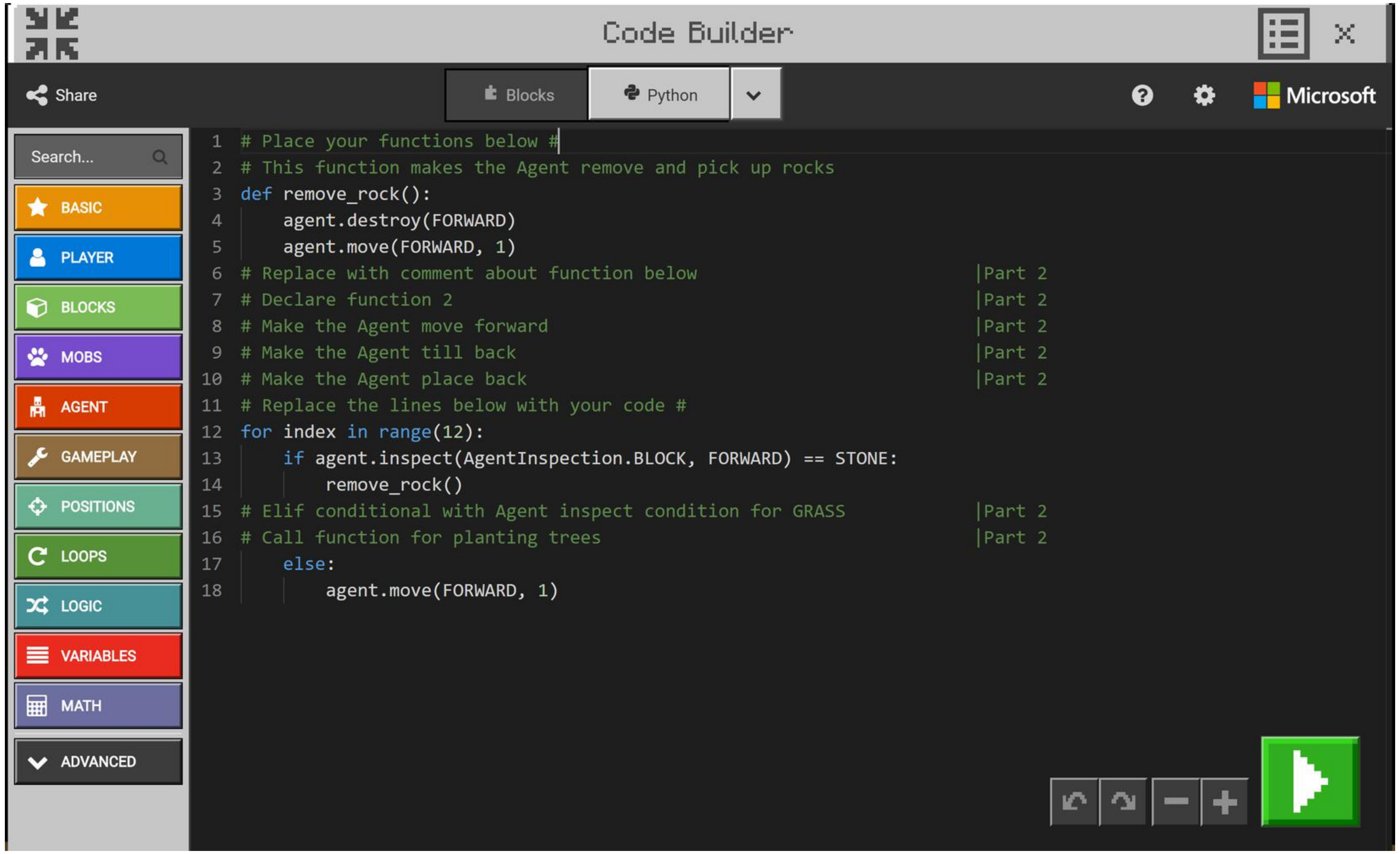
```
# Place your functions below #
# Replace with comment about function below                 |Part 1
# Declare function 1                                        |Part 1
# Make the Agent destroy the block forward                  |Part 1
# Make the Agent move forward                               |Part 1
# Replace with comment about function below                         |Part 2
# Declare function 2                                                |Part 2
# Make the Agent move forward                                       |Part 2
# Make the Agent till back                                          |Part 2
# Make the Agent place back                                         |Part 2
# Replace the lines below with your code #
# For loop set to 12                                        |Part 1
# If else conditional with Agent inspect condition for STONE |Part 1
# Call function for removing rocks                          |Part 1
# Elif conditional with Agent inspect condition for GRASS           |Part 2
# Call function for planting trees                                  |Part 2
# Else part of if else conditional                          |Part 1
# Make the Agent move forward                               |Part 1
```

TEST YOUR CODE



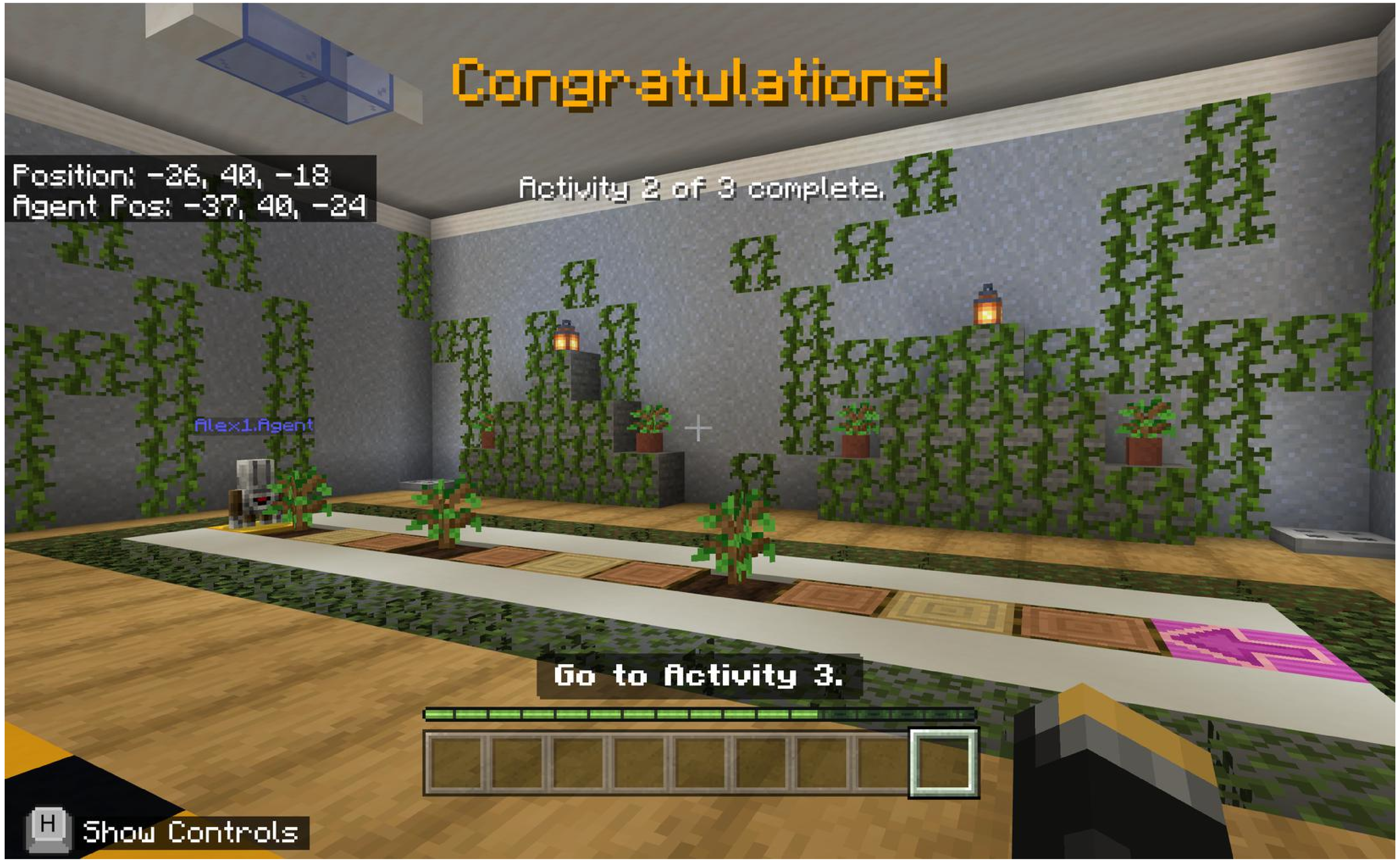
CREATE YOUR CODE: PART 2

Part 2
Now, the Agent needs to do the same things while tilling the soil and planting saplings. When the code is run, the Agent will move forward, breaking each stone, and till and plant saplings on the grass blocks. (HINT: The parameters for the Agent till and place commands need to be set to **back**, as the Agent cannot till and plant on the block that it is standing on).



```
# Place your functions below #
# This function makes the Agent remove and pick up rocks
def remove_rock():
    agent.destroy(FORWARD)
    agent.move(FORWARD, 1)
# Replace with comment about function below                         |Part 2
# Declare function 2                                                |Part 2
# Make the Agent move forward                                       |Part 2
# Make the Agent till back                                          |Part 2
# Make the Agent place back                                         |Part 2
# Replace the lines below with your code #
for index in range(12):
    if agent.inspect(AgentInspection.BLOCK, FORWARD) == STONE:
        remove_rock()
# Elif conditional with Agent inspect condition for GRASS           |Part 2
# Call function for planting trees                                  |Part 2
    else:
        agent.move(FORWARD, 1)
```

TEST YOUR CODE

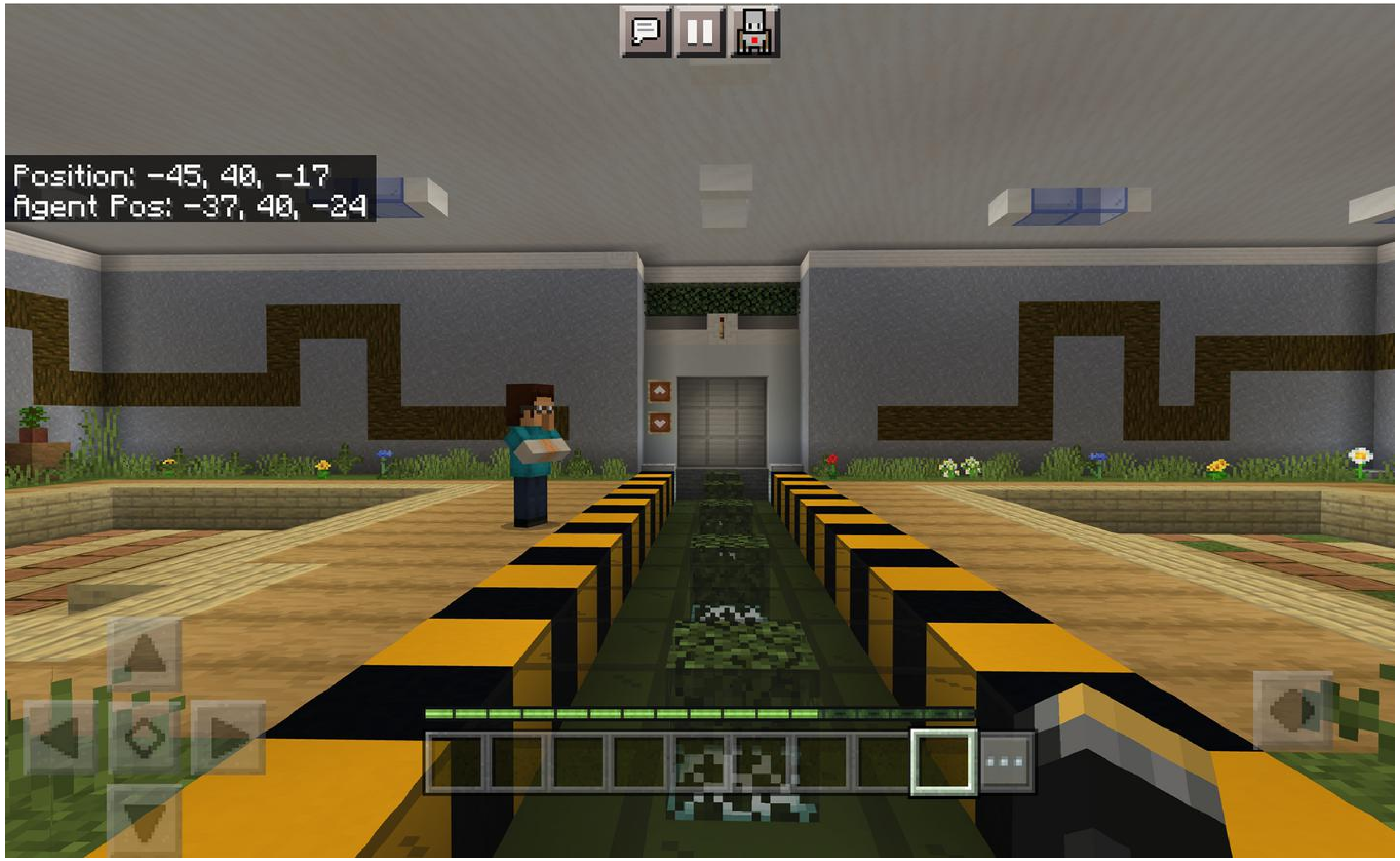

Congratulations!

Activity 2 of 3 complete.

Position: -26, 40, -18
Agent Pos: -37, 40, -24

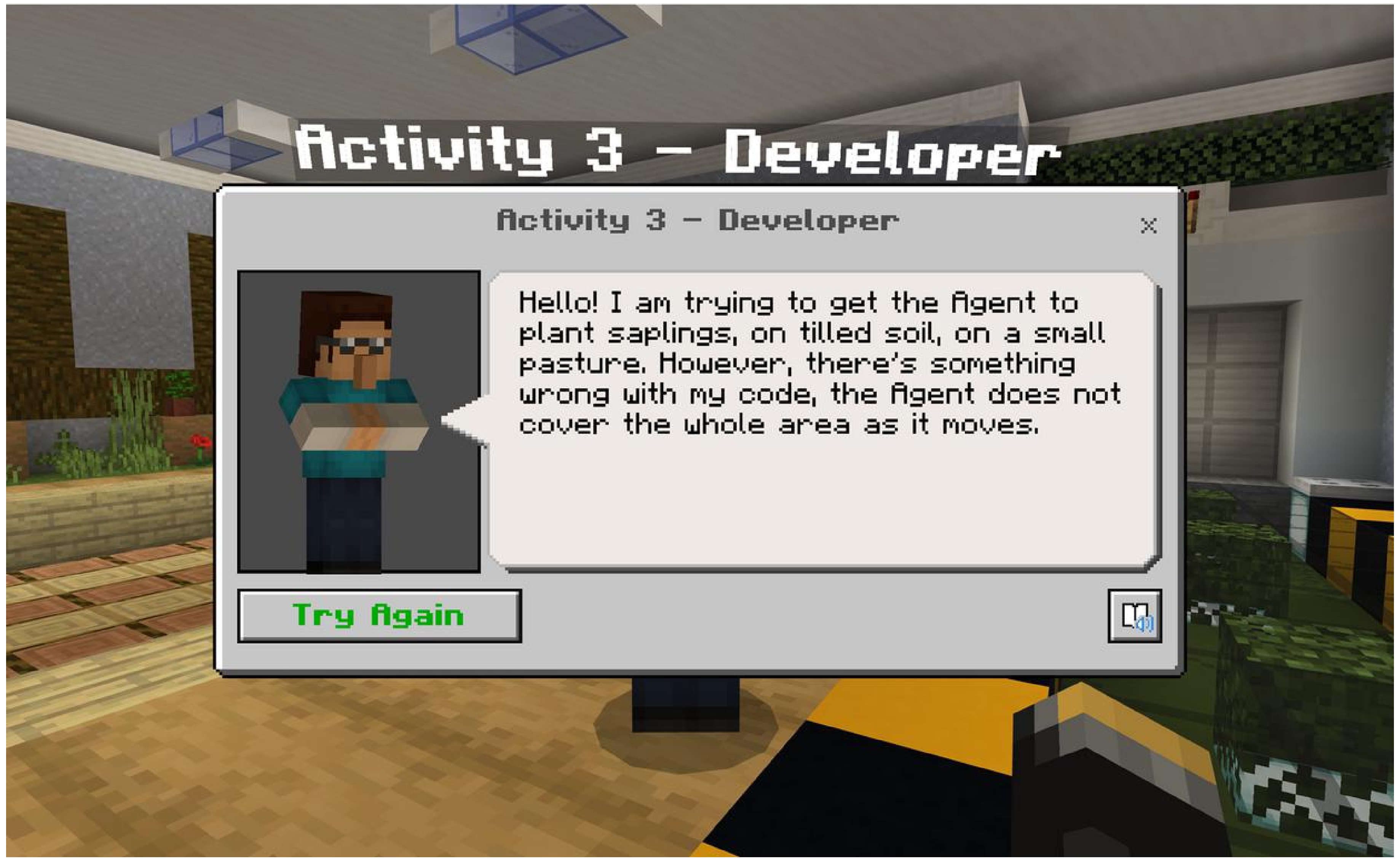
Go to Activity 3.

ACTIVITY #3


Position: -45, 40, -17
Agent Pos: -37, 40, -24

Walk over to the next area and talk to the Developer!

TALK TO THE DEVELOPER

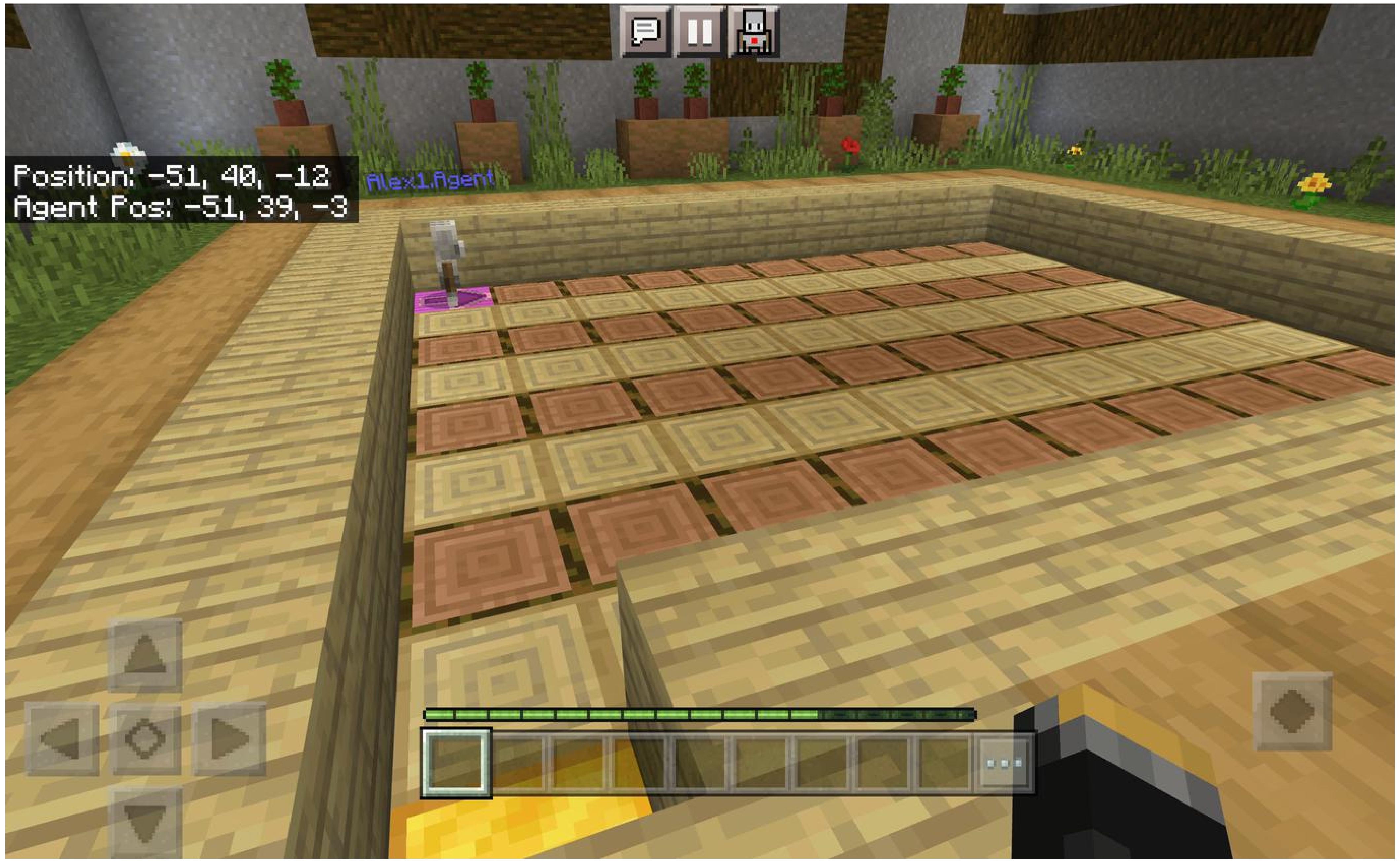


Hello! I am trying to get the Agent to plant saplings, on tilled soil, on a small pasture. However, there's something wrong with my code, the Agent does not cover the whole area as it moves.

This is the pop-up screen we will see on our screen.

After you have read the message, click on the "X" in the top right corner to continue game play.

ACTIVITY #3



In this activity, you need to help code the Agent to move across a large area (Part 1) and then plant saplings only on grass blocks in the pasture (Part 2).

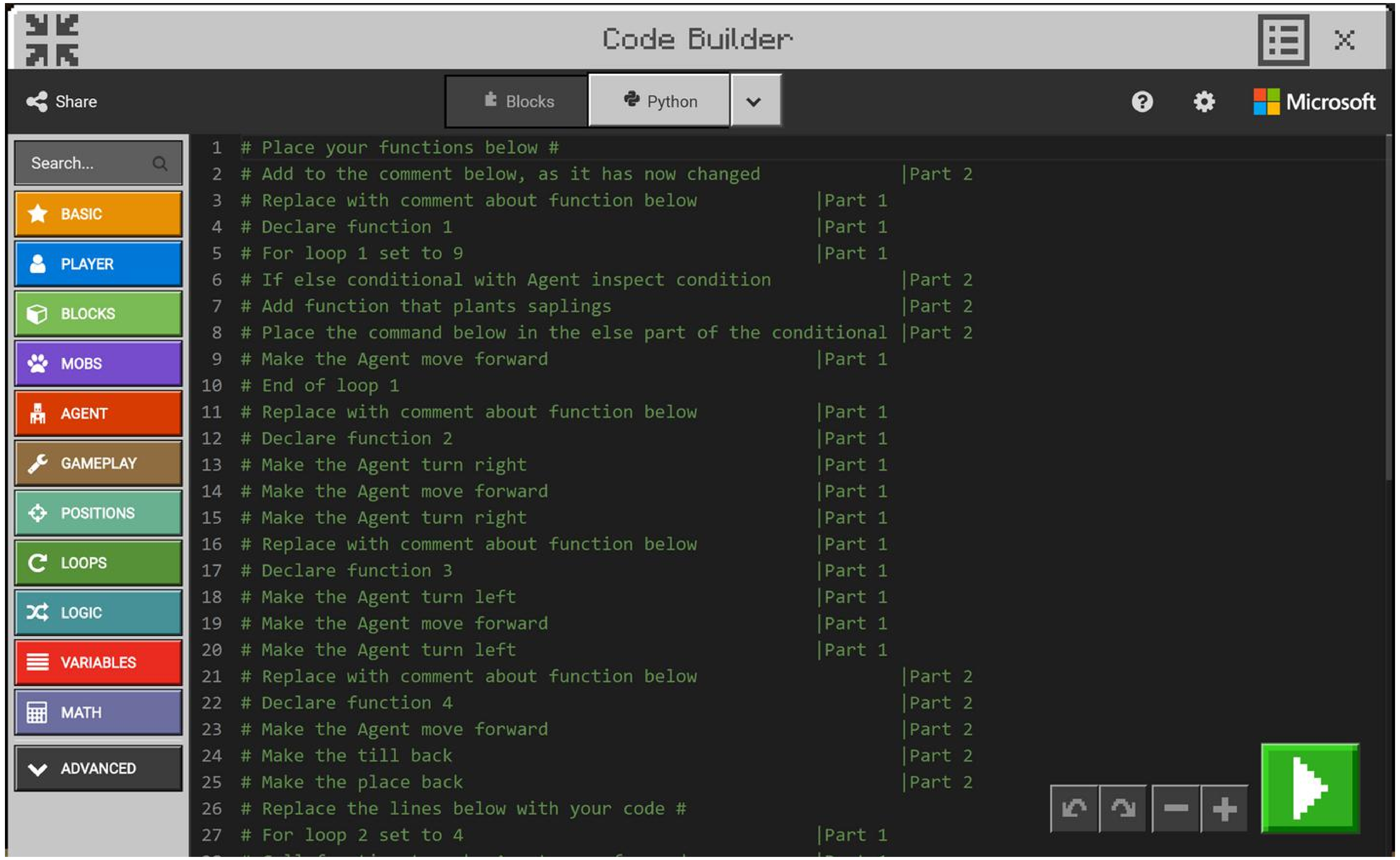
CREATE YOUR CODE: PART 1

Part 1

Code three new functions with sequences:

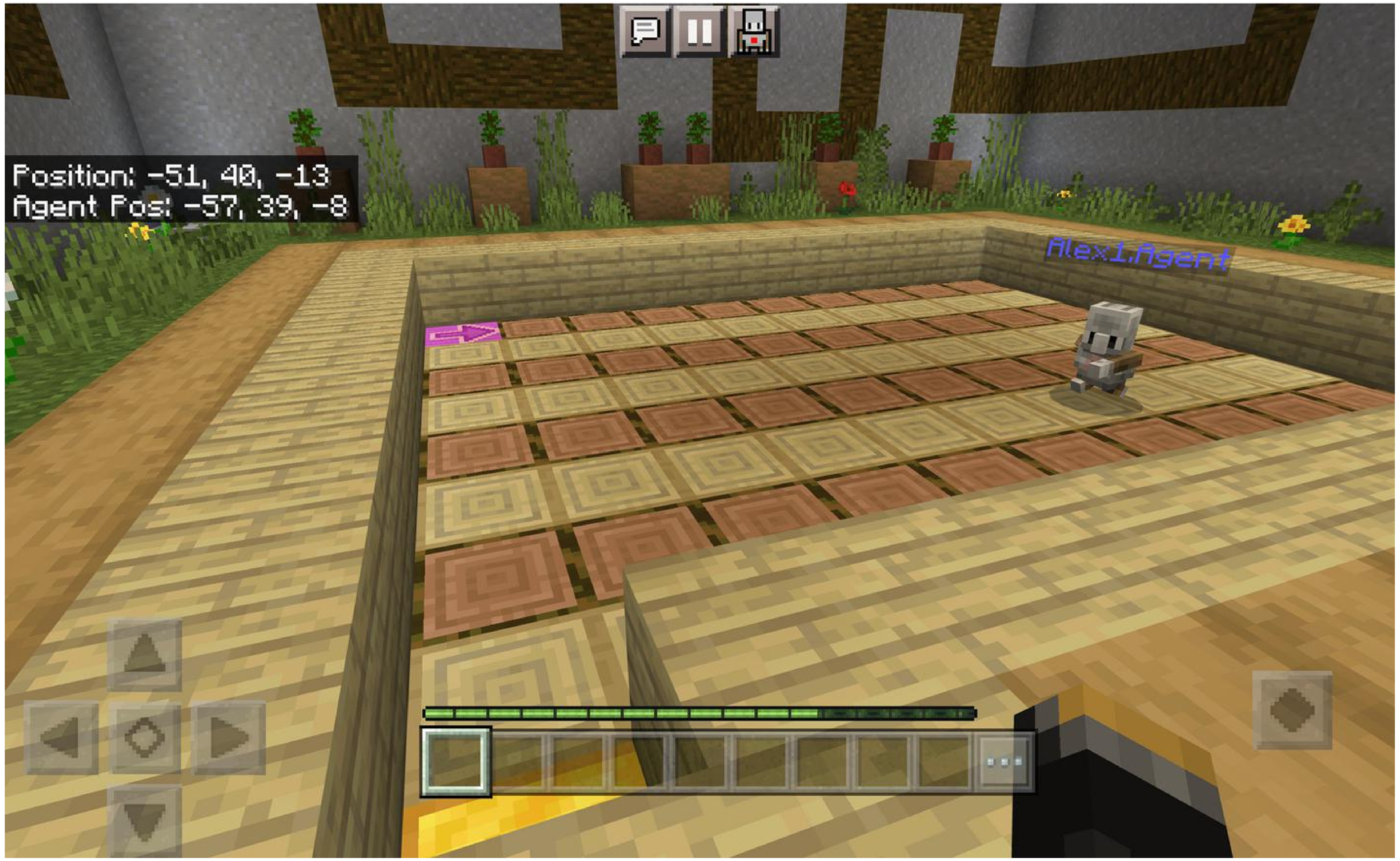
- One to make the Agent move forward
- One to make the Agent turn left
- One to make the Agent turn right

Then use these functions in a for loop to make the Agent pass over every block in the area, row by row, until it reaches the gold block.



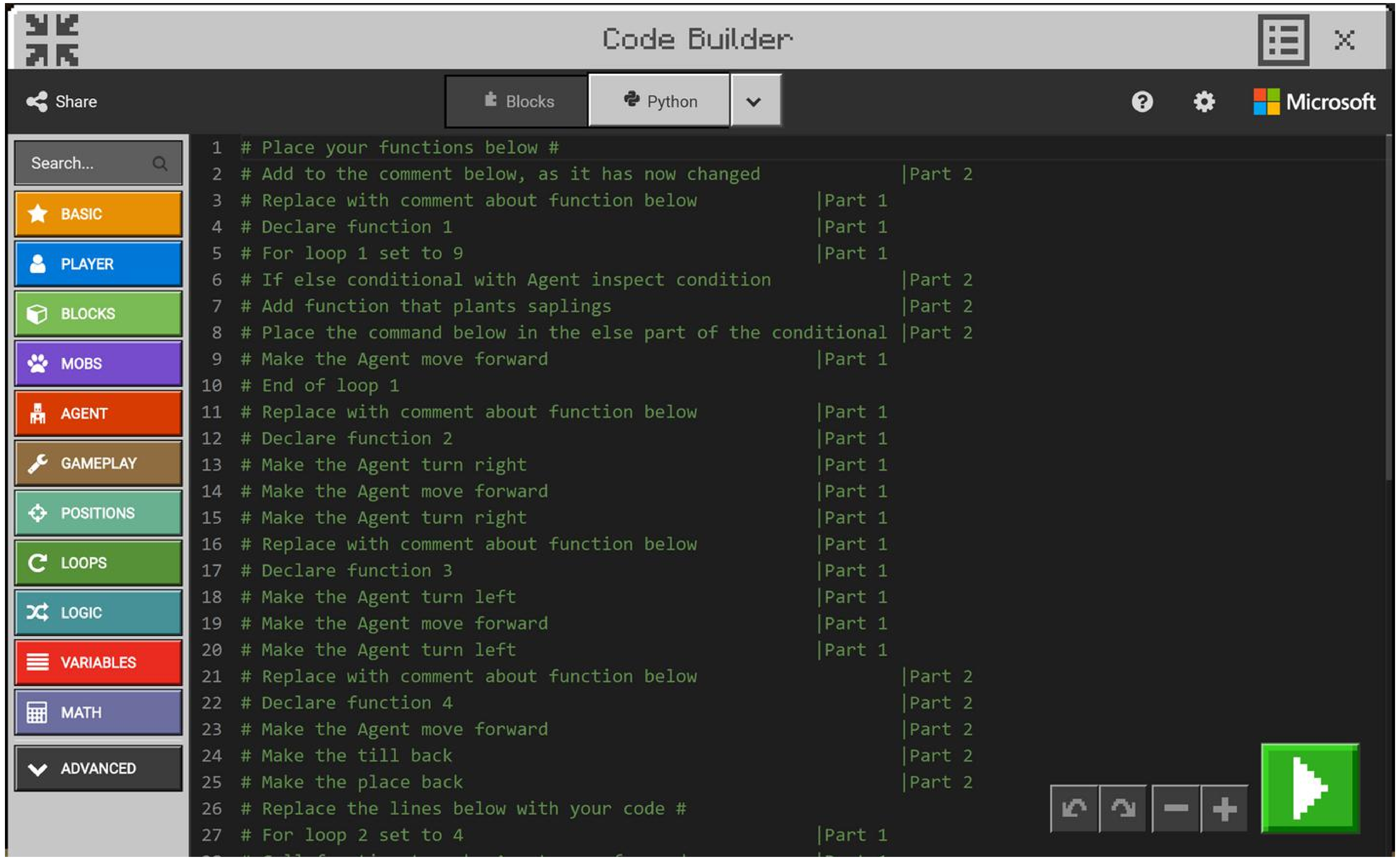
```
# Place your functions below #
# Add to the comment below, as it has now changed             |Part 2
# Replace with comment about function below           |Part 1
# Declare function 1                                  |Part 1
# For loop 1 set to 9                                 |Part 1
# If else conditional with Agent inspect condition            |Part 2
# Add function that plants saplings                           |Part 2
# Place the command below in the else part of the conditional |Part 2
# Make the Agent move forward                         |Part 1
# End of loop 1
# Replace with comment about function below           |Part 1
# Declare function 2                                  |Part 1
# Make the Agent turn right                           |Part 1
# Make the Agent move forward                         |Part 1
# Make the Agent turn right                           |Part 1
# Replace with comment about function below           |Part 1
# Declare function 3                                  |Part 1
# Make the Agent turn left                            |Part 1
# Make the Agent move forward                         |Part 1
# Make the Agent turn left                            |Part 1
# Replace with comment about function below                   |Part 2
# Declare function 4                                          |Part 2
# Make the Agent move forward                                 |Part 2
# Make the till back                                          |Part 2
# Make the place back                                         |Part 2
# Replace the lines below with your code #
# For loop 2 set to 4                                 |Part 1
```

TEST YOUR CODE



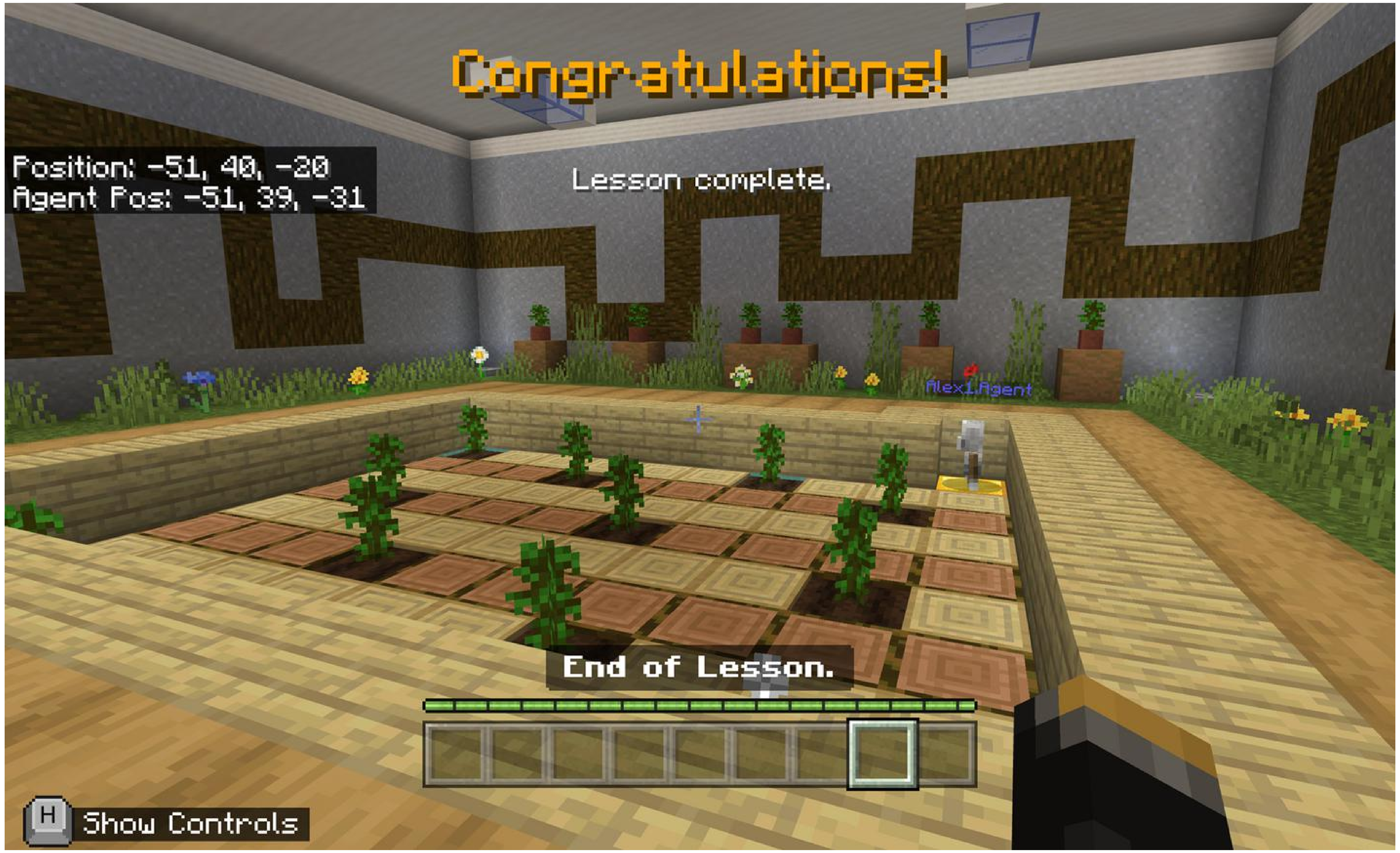
CREATE YOUR CODE: PART 2

Part 2
Now, you need to add to the code to make the Agent till the grass blocks that it passes over and plant a sapling. In your function, add an if else conditional that inspects for grass blocks in their function that moves the Agent forward. When the code is run, your Agent should move across the entire area and when it finds a grass block, it will till the soil and plant a sapling.



```
# Place your functions below #
# Add to the comment below, as it has now changed               |Part 2
# Replace with comment about function below             |Part 1
# Declare function 1                                    |Part 1
# For loop 1 set to 9                                   |Part 1
# If else conditional with Agent inspect condition              |Part 2
# Add function that plants saplings                             |Part 2
# Place the command below in the else part of the conditional |Part 2
# Make the Agent move forward                           |Part 1
# End of loop 1
# Replace with comment about function below             |Part 1
# Declare function 2                                    |Part 1
# Make the Agent turn right                             |Part 1
# Make the Agent move forward                           |Part 1
# Make the Agent turn right                             |Part 1
# Replace with comment about function below             |Part 1
# Declare function 3                                    |Part 1
# Make the Agent turn left                              |Part 1
# Make the Agent move forward                           |Part 1
# Make the Agent turn left                              |Part 1
# Replace with comment about function below                     |Part 2
# Declare function 4                                            |Part 2
# Make the Agent move forward                                   |Part 2
# Make the till back                                            |Part 2
# Make the place back                                           |Part 2
# Replace the lines below with your code #
# For loop 2 set to 4                                   |Part 1
```

SUCCESS!


Congratulations!

Position: -51, 40, -20
Agent Pos: -51, 39, -31

Lesson complete.

End of Lesson.

Recap

What you’ve done today:

- Learned and applied the coding concept of functions.
- Created, tested, and debugged my Python code.
- Embraced a coding mindset.

REFLECTION

- What is a function?
- Why are functions useful?
- What are comments?
- How do you write a comment?