Minecraft 3D Camp

JCC

Overview

The Tech Em Studios Minecraft in 3D camp is a four day (twelve hour) camp that seeks to educate students on Python programming, computer science and 3D technology as it applies to activities through the Minecraft PE (Pocket Edition) app. Students will learn about how a computer works by building logic gates and circuits using tools in Minecraft. Activities will include building logic gates to combine to illustrate computer circuitry, understand concepts of computer science, basics of Python programming, print their minecraft creations using a 3D printer and extend their minecraft building skills.

Performance Objectives

Students will able to-

- understand switching devices; binary and digital.
- have basic understanding of how a computer carries out tasks.
- create logic gates on Minecraft with use of Redstone.
- Use Python programming in Minecraft.
- 3D print their creation in Minecraft.

Materials:

- iPads
- Macbooks
- Latest version of Minecraft PE
- Mineways
- 3D Printer

Objectives for the camp:

- learn about 3D printing and how they can use it in Minecraft
- Complete various build challenges [a link to example build challenges on reddit]

    - Judged competition for a design that incorporates working switching devices, logic gates and circuits
    - Best roller coaster/theme park
    - National or International Monuments
        - For Beginner: Washington Monument,
        - For Advanced: Mt. Rushmore, Taj Mahal, Eiffel tower, etc.
    - Haunted House
- Plan a creation to potentially be 3D printed
- **Extra activity: challenges**
    - Hunger games bout
    - Any build challenge

GENERAL NOTE- I like to give them a solid amount of free play either at the end of the day or spread throughout so that they are less tempted to goof off during other activities

Day 1

Objectives:

- Build challenges, we probably want to split the kids up into older and younger kids. We could have an individual build challenge(haunted house) and then a group one with the older vs younger kids(castle).
- Depending on time we can have them at least get started on their 3d print designs on the laptops. Unless they have minecraft accounts they won't be able to play on servers.

Icebreaker:

- Students and instructors/interns will introduce themselves: name, age and favorite Minecraft platform(PC, PE, Xbox, etc.)

Day 2

Objectives:

- Redstone. Younger kids- learn basic and/or/not gates and then build doors or other contraptions using the gates and pistons.
- Older kids- learn basic gates and then build a half adder and explain how this could be scaled up to make a full calculator. If time allows, build contraptions with pistons.
- All kids- build challenge utilizing redstone
- Print 3d designs

Day 3

Objectives:

- Make sure that everybody has a 3d print design by the end of the day.
- Start Python programming in Minecraft exercises

```
import mcpi.minecraft as minecraft
mc = minecraft.Minecraft.create()

import mcpi.block as block

pos = mc.player.getTilePos()

for y in range(150):
    mc.setBlock(pos.x+2,pos.y+y,pos.z,block.TNT.id)
```

```
import mcpi.minecraft as minecraft

mc = minecraft.Minecraft.create()

mc.postToChat("Hello Minecraft World")

import time

while(1):
    pos = mc.player.getTilePos()

    print(pos.x)
    print(pos.y)
    print(pos.z)



    time.sleep(5)
```

- Print 3d designs

Day 4 (final day)

- Fun day- have the kids play a hunger games round on their map as well as the other groups map.
- Longer free play time this day

Objectives:

From Minecraft ASE curric.

20min Teach students Logic gates with their associated truth tables (preferably on a whiteboard).

- AND, OR, NOT, XOR

25min Have students make logic gates on Minecraft using redstone [like circuit coder]

- AND, OR, NOT
- http://vignette1.wikia.nocookie.net/minecraft/images/c/cf/StandardLogicGates.png/revision/latest?cb=20111215190153

- Have students create a new world in Minecraft that is flat (and peaceful)
- Have students add the following items to their inventory list:
  - Stone
  - Redstone
  - Lever (switch)
  - Redstone torch
  - Door (or other similar item)

30min Have students create Full Adder:

15min First, draw the diagram of full adder on a whiteboard and have students refer to whiteboard.

15min When students begin to finish, explain how it works.

Evaluation:

- Did the students meet your objectives?
- Did the lesson accommodate all of your learners?
- What were the strengths and weaknesses of the lessons?
- If you were to use this lesson again, what would you change?

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