CS320-103: Software Engineering, Spring Semester 2022

Individual Project Proposal

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MineVisuals

Summary:

My individual project idea is to design a tool, that allows the user to upload an image, and it converts it to an image only using Minecraft blocks. It will then provide the user with an in-game command to place the blocks in the world – creating the uploaded image. While generating the command, the user may select what blocks they would like to either blacklist or whitelist.

Technologies:

Command Block Language:

CBL is the language used in Minecraft command blocks based off C++.

Image Processing:

I will need to understand the basics of image processing to scale images according to the user's specifications and be able to create the new image to closely resemble the original input.

Python:

Python will be my main programming language during this project.

Visual Studio Code:

Visual Studio Code will be my IDE for this project as I have some time developing in it but would like to gain a better understanding of the software. It also allows for very nice extensions such as rainbow indent and rainbow brackets.

Development Plan:

Steps that User Goes Through (Will also be the majority of the development steps:

1. User interface
2. Image upload
3. Minecraft size selection
4. Scaling image
5. Choosing blocks
6. Generating block array
7. Preview image
8. Generate CMDs
9. Copy CMDs to clipboard

Extra Steps that will be Completed Prior to Use:

1. Developing Minecraft data pack
2. Getting Minecraft texture files
3. Getting average color from each texture

Sources:

Ian, Mark, Paul:

My computer science friends will provide me with help, access to coffee, a whiteboard, and emotional support when everything stops working.

MC Texture Files:

The Minecraft texture files will provide me with access to the game blocks so that the average colors may be determined, and a preview of the finished product may be provided to the user.

Minecraft Wiki:

The Minecraft wiki will be beneficial in providing me with advanced knowledge on command blocks and Command Block Language (CBL).

Stack Overflow:

Stack Overflow will be beneficial in providing me with information on specific use cases in python and help me to determine more efficient ways to solve a problem. This will be very useful because some of the processes used by this application may take a considerable amount of time – especially for larger images and a larger block palette.

W3 Schools:

W3 Schools will provide me with knowledge in Python, the main language that my project is based off.

YouTube*:*

YouTube will provide me with information on how image processing works, Python, CBL, and understanding new methods of going about solving problems.

Challenges:

1. Minecraft command blocks may only have commands up to 32,000 characters long
2. Minecraft command blocks may only have one command inside of them
3. The maximum number of executions from a Minecraft function is around 100,000 commands
4. Learning image scaling algorithms
5. I'm unsure of how my computer will be able to handle placing a grid of 256*256 = 65,536 blocks individually
6. Preforming image pixel checks individually may be time consuming so a high-level algorithm may have to be created