8-Bit Builder
493 Final Project Write-Up

Molly Mintz, Tim Standen, Megha Patel

In approaching this project, the problem that we wanted to solve is being able to design a 3D scene with different shapes and designs. To solve this problem we needed a system that would allow users to move and change 3D objects to build the scene that they wanted. We also needed a system that would store user's projects beyond refresh.

To solve this, we built 8-Bit Builder, a web application that allows users to select 3D objects with different shapes, colors and textures, and then move and place those objects where they want them. Users can then save projects, and continue to work on them later.

8-Bit Builder was built using the Meteor framework. The backend of the system was built with MongoDB and Javascript. The backend includes an Accounts database which stores username and password, and allows a user to create an account and delete an account. It also includes a Projects database which stores username, project name, and information about the project that the user is saving. That project information can then be retrieved to recreate the scene with objects that the user has saved.

The frontend was built with HTML, CSS, three.js, Javascript, and jQuery. When you first start our application it will take you to our login page. Our login page is simple and intuitive. It contains a box with two inputs with are clearly labeled as username and password. It also contains two buttons, one for creating a account and one for logging in. If a user tries to login with invalid credentials an alert will pop up notifying them.

Once you have logged in you will be redirected to a page we refer to as “project options”. On this page there is a header displaying “8-bit builder” in the left hand corner and a welcome message in the right hand corner along with a log out and delete account button. We have chosen throughout our project to keep our UI as simple and unimposing as possible, so as to avoid confusing the viewer, and making the program seem welcoming and easy to use.

Once you get past the project options page you get to the main page. This page uses our new technical component, three.js. This has allowed us to easily render complex 3d graphics on a webpage. This has allowed us to build a game with three modes and several different blocks and textures. The game is interacted with using a changing cursor that can be moved around with either the mouse or the arrow keys and the z and x keys. In Add mode, you have a green cursor that changes shape to show the currently selected geometry. By clicking or pressing the spacebar, you can add a new object at the current location of the cursor. In Move mode you will have a yellow cursor that will allow you to move objects already in the scene to new locations. Move the cursor to intersect with a block, then click or hit spacebar to move it around. The cursor will now turn into that block and texture. In Delete mode you have a red cursor that, on clicking or hitting space, will remove whatever object it is intersecting with.

The rotate button at the top allows you to rotate an object 90 degrees around its y-axis. This effect will only be noticeable on the wall and double block objects.

We have included a variety of shapes and textures to chosen from that can be chosen from the respective menus. The shape in the window on the left will change to show the object currently selected by those menus. The tile is a unique, 2d geometry for coloring the surface of the build area, and has a unique set of textures. When the tile is selected, the textures menu will

switch the 3d textures for the 2d textures. By doing this, we avoided adding an additional dropdown menu and cluttering our UI.

A working version of 8-bit builder can be found at https://eightbitbuilder.herokuapp.com.