

Lego Activity for kids



Team 10: LVRC (Lego VR for Covid)

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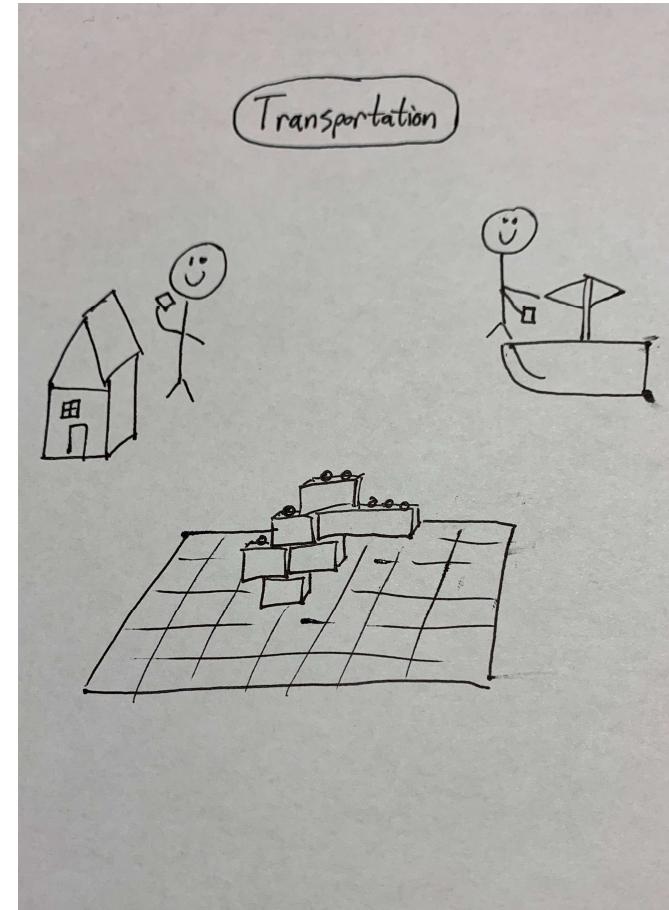
Motivation

- Helps students get real time experience of Lego activities while doing online classes.
- Activities help students concentrate better in online classes as they are able to view their classmates simultaneously instead of being isolated.
- We can have a large variety of Lego pieces for different activities which a main (teacher) will assign.
- There is no additional cost in terms in purchasing and distributing Lego pieces to individual homes if the target design/activity changes!

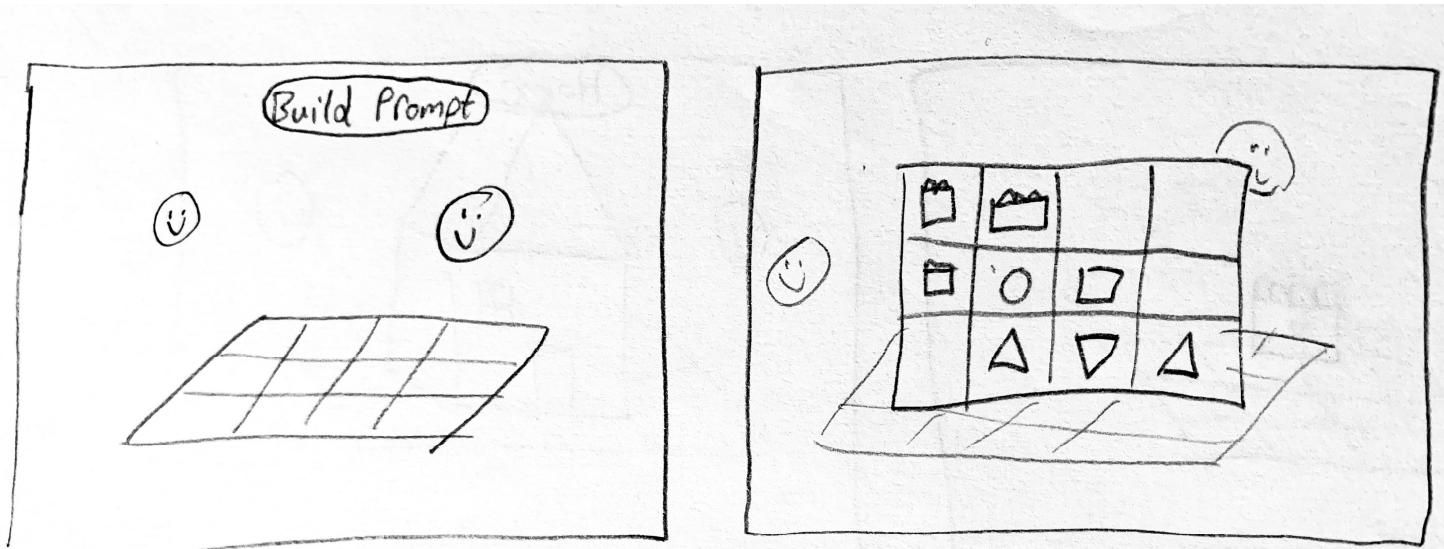


High Level Overview

- We will build a multiplayer LEGO model building application for students to use in schools to promote discussion and engagement.
- Support connection between multiple Google cardboard users through Unity Multiplayer.
- Establish some level of interaction between students and teacher would also be a player who can build and view models.
- Provide Legos of different shapes, sizes and colors in order to create different objects.
- Players will collaborate to build models.



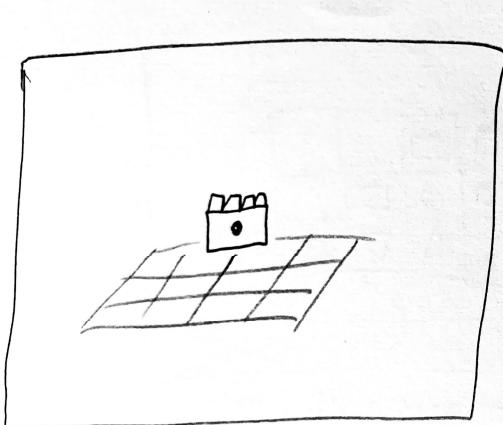
Story Board



Multiple players join a collaborative build space and are given a build prompt.

The player opens a 2D inventory to select a Lego brick to add to the scene.

Story Board



The player uses the rectile pointer and joystick to move and rotate the brick in 3D space, fitting it in to a defined grid.



The players collaborate to build a model which represents the build prompt.

- Legos will "fit" into each other by only being inserted in a 3D grid. When a Lego is moved around, it will snap into that grid. If another Lego brick is already in that grid location, the user will not be able to place it there.
- The Lego is complete when the user decides they are done building. Since this is primarily a tool to encourage discussion and creativity, we don't have a concept of "completing" the build in the UI.
- The player will be able to come back to an existing build by choosing it when they create a new build space.

Story Board: Controls

There are 2 modes:

1. User Mode – Allows user to move around the model with help of joystick
2. Lego Mode – Helps Move and Rotate Legos

We can toggle between the 2 modes based on whether the user has a Lego selected (if they do, they are in Lego mode).

Controls for Lego Mode

- Rotation – Using joystick left and right movement
- Moving(Distance of lego from user) - Up and down movement of Joystick
- Moving(XY plane) - Use of reticle pointer and holding and release the front button of the controller.
- Inventory using X button



Controls for Lego Mode

Preliminary Prototype

Summary: Create a basic multi-user environment in Unity / GVR where users can interact with cubes.

1. Multiple players can join the game and view the scene.
2. The users can move, create, and destroy basic cubes (proxy for Legos).
3. Basic Inventory UI (2d menu): Will have option 1) Create Cube 2) Destroy currently selected cube. Menu pops in front of the user on pressing a button.

Final Prototype

- Finished Legos of different sizes and shapes can be inserted into the scene.
- Complex Lego movements like rotation and placement within a grid to build models.
- The players can see the current build prompt and collaborate on a model together.

Timeline

Week	Task
March 8 – March 15	Study about creating Multiplayer environment in Unity.
March 16 – March 22	Create a Unity multiplayer environment
March 23 – March 29	Create scene with proxy Legos pieces (cubes)
March 30 – April 5	Work on basic interaction with pieces
April 6 – April 12	Perfecting Preliminary Prototype
April 13 – April 19	Add finished Legos + Define grids for activities
April 20 – April 26	Add other manipulation actions to Legos
April 27 – May 3	Addons to Pieces (art/material) + Scene aesthetics
May 4 – May 8	Final changes and buffer time for Demo