

Super Powered LEGO

Shrinking Player & No Brick Search

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1 Shrinking Player

When playing with LEGO as children, we often imagined how the world would look from the perspective of a LEGO figure. The wish to experience LEGO as if the bricks were as tall as we are, seems to have stayed with us into adulthood. When asking people about what they wished for in a LEGO experience, the number one answer given, was the ability to walk around in the LEGO world and see the assembled structures from the eyes of a LEGO person. Therefore, this feature should be added to the super-powered version of the VR LEGO builder.

A corresponding interaction to shrink has to be designed. The user needs to choose how much they are going to shrink and where they will arrive within the LEGO world. The following steps were taken to convey the necessary information as naturally as possible.

Firstly, a free 3D model of a LEGO figure was sourced from the internet, imported into unity, and added to the scene in two different scales. This model will act as a placeholder for the user and communicate their size after shrinking. Secondly, the "Throwable" script was added to the model. Now the user was able to pick up the LEGO figure and place it anywhere within the scene.



Figure 1: Two LEGO figures in different scales

Next, a new script was created and added to the figure to handle the player's shrinkage. Whenever the user lets go of the figure, the script scales the player object down to the LEGO person's scale. The player is also teleported to the figure's location within the built structure. If the player's position was outside of the buildable area, the player would not be shrunk and the figure teleported back to its original position. As it can be difficult to judge the exact position of the LEGO figure within the build volume, a line renderer was added to the bottom of the model. This line adds additional spatial cues, aiding the user in the estimation of the model's position on the plate.

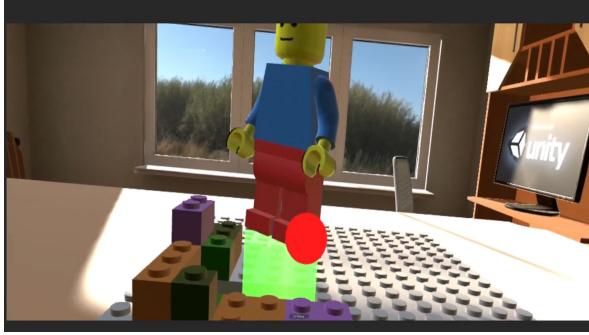


Figure 2: Held figure with guide-line

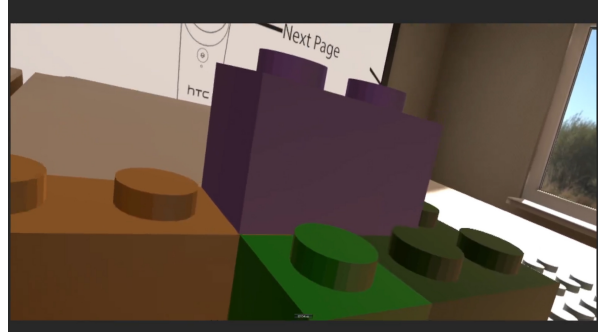


Figure 3: Player's view after shrinking

Since the LEGO figure is always returned to its original position after being dropped, there is no way for the user to throw it out of reach. To truly ensure the player can never lose the shrink handler by accident, the figure containing the script was made kinematic and will always be returned to its original position after being picked up.

Finally, the user needed a way to revert themselves to their original scale and position. To ensure a consistent mental model, the player can do so, by clicking the down button on the controller's directional pad. As this button was used to clean up the scene and return everything to its starting position, adding the ability to revert the shrinking, should be in line with the user's mental model.

2 No Brick Search

Similar to the wish for the ability to experience the LEGO world from the eyes of a LEGO character, most people, asked about the most annoying part of building with LEGO, gave the same answer: Searching for bricks that are needed for a specific step.

The previously developed coloring feature helps to reduce the search pool of provided bricks. However, users still have to search for a specific brick among the uncolored ones. Providing only the needed bricks for an assembly step would eliminate the search time. Therefore, a system was implemented to provide this feature.

Previously an instructional page was represented by a material that was displayed on the large screen on the wall. To provide the bricks necessary to complete an assembly step, extra information needed to be stored somehow. Therefore, a new object was created to represent a construction manual page more accurately. The new object contains the material to be displayed on the screen, as well as a list of brick types and their corresponding materials.

When changing the manual page, the screen's material is changed as it was previously. Additionally, all bricks contained within the page's brick list are spawned next to the base plate. On top of this, all bricks spawned in by previous pages are removed from the scene by using the previously implemented cleanup method to prevent cluttering.

Now, the system always provides all necessary bricks for an assembly step and thus eliminates the annoying part of searching for bricks.



Figure 4: Provided bricks for two different steps

Whether the elimination of the brick search has a positive or negative effect on the user's level of fun is to be determined during the study and constitutes an interesting insight into the human mind. It will potentially uncover if the search is a negative part of LEGO assemblies that should be eliminated, or if it is an essential part of what makes LEGO fun.