

From Lego to Desktop Bricks, Analyzing the Formal Elements

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1 Legos as a System

The colored plastic blocks of Legos are a fond memory of many childhoods largely due to the compelling play mechanic they produce. Through the design of the pieces, Lego compels players to create, play and imagine.

Lego pieces all contain some form of pegs and holes, usually on the top and bottom respectively. The pegs form a unit of width and length such that pieces can be made to be x pegs wide and y pegs long. Typically the pieces conform to a standard height, which is of a ratio of 6 to 5 with the width of a peg. The standard pieces are simply one unit high with varying length and width. The bricks can be configured to connect through the pegs by aligning the bricks properly. As a result, there are many possible ways to connect two bricks, while the overall grid structure of the pegs remains aligned.

This basic structure makes it almost always possible to fill a gap in any construction with the proper piece. There is a great deal of freedom in terms of potential ways to connect two pieces due to the peg and alignment permutations. Once pieces are connected, however, they are locked into an abstract “grid” making further construction easy. In this way, the system enforces a structured building process without feeling restrictive. In fact, Lego manufactures the pieces to high tolerances so that as more and more are connected, the overall grid structure remains in tact.

Beyond standard bricks, there are also accent pieces. These pieces still contain pegs and holes that allow them to connect to any other piece, however their height and other characteristics vary. Some are slanted, based on roof shingles, and some are designed after specific real world elements like doors or windows. The height, length and width of these pieces still conform to the standard grid structure, making it possible to seamlessly incorporate these pieces into any structure.

Legos are manufactured to make connecting pegs to holes easy. It is possible to remove and connect any two Legos without difficulty. Furthermore, when two Legos are connected they typically remain that way. It is possible for connections to break, particularly ones that hold the weight of many other Legos. This again enforces structured building without feeling restrictive because poorly designed constructions have a tendency to fall apart. With some planning a wide range of difficult to break structures are possible.

The aesthetics of Lego are perhaps the most compelling reason to play with them. They are bright plastic of either primary colors, or colors that simulate some kind of real world building material. They are relatively light and have a pleasant texture. The most striking aesthetic feature is the sounds Legos make. When they hit each other they make a pleasant plastic noise, and when attached and detached they make a satisfying snap. In addition there is a feel to connecting the pieces that makes it enjoyable push them together.

Another element is the presentation of Legos. They come in a container which allows players to rummage through to get pieces. As more pieces are incorporated into play, they typically find their way into various corners of the work space. Thus, putting them away is somewhat unpleasant. The result is an interesting mechanic. Legos encourage players to leave them out. Since when Legos are out and unconnected they are most attractive to play with, essentially Legos encourage the player to play more by their design. In addition, Lego sets come with instructions on how to build models, which is a fun way of teaching players how to play.

2 Desktop Bricks

Since many of the elements of Lego are physically based, a digital version presents an interesting design challenge. The most overt design choice was to allow the bricks to roam free on the desktop. This decision blurs the line between work and play, much the way Legos do when floating around on your real desk.

In Desktop Bricks, there are several decisions related to the feel of Lego assembly. First, moving the Desktop Bricks is done with the mouse. This allows a feel of using the index finger to actually move the brick. The connection process emulates real Legos. As two Legos begin to align they fall into the grooves before being pushed together. Finally, the connection itself is accompanied by an authentically recorded Lego snap.

Desktop Bricks use the same Lego grid, but only in two dimensions. The thinking is that to make a 3d Lego interface on a 2d screen where the player can only use the mouse would result in a sophisticated spatial logic puzzle. The player would be solving a complex problem every time they decided to connect or disconnect two pieces. In real Legos, players do solve spatial geometry problems, but in a much more intuitive way. The drawback of 2d is that it reduces the number of permutations of connections between two Legos. The gain of simple interface seems to outweigh this, and in Desktop Bricks players still feel free despite the even more restrictive grid structure.

One missing element of Lego is breaking. After prototyping an inelegant simulation of breaking, it is clear that the stress rule is important to playability. If the rule for bricks

disconnecting due to stress is even slightly off, the feel to the player is that they are being arbitrarily punished for no reason. It is essential that the player have intuitive understanding of why the bricks broke, otherwise the player does not feel responsible for any weaknesses.

Finally, Desktop Bricks is an early prototype and could use some improvement. It lacks a box to present the bricks. Such a system would allow rewarding the player to not put the Legos away. The drawback there is that people may become infuriated if they can't get Legos off their computer desktop. One solution may be to lower the Desktop Bricks to underneath the work windows.

3 Future Work

Perhaps the most interesting part of the Desktop Brick design challenge has been the idea of persistent desktop games. Legos are fun, but a train set may be even more enjoyable. Desktop Trains would allow construction and operation of trains all on your desktop. Another area to explore would be a tower defense game. Unfortunately, Desktop Tower Defense has been taken, but Desktop Castle could entail the construction of a castle on your desktop during your free time. Then at random intervals, barbarians attack. Perhaps they show up even if the player is doing something away from the computer.