Incompatible BLOCK: Wonders Accompanied Interface

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1. Introduction

Incompatible BLOCK is a 3D modeling software with an interface of wonders. For interface design, the elements of enhancing user curiosity as well as intuitiveness and intelligibility are important. We incorporate wonders born from the discrepancy between three dimensions and two dimensions into the interface to enhance user curiosity. The wonders of the conversion into three dimensions, as expected by the user, are projected to make the interface predictable to some extent.

In Incompatible BLOCK, user can generate a form by combining cubes and can draw lines for the form, floor, and background by a 2D operation. Figure 1 shows a screen of the Incompatible BLOCK with a model produced by using it. The pens lined on the right side of the screen are tools to draw lines for the cubes, floor, and background. On the left side of the screen are the hand tool for managing a cube, the rotation tool for rotating the space, and the zoom tool for zooming the space. The door tool, on the lower left side, is used to close a session.

2.Interface

2.1.Moving a Cube

If a cube is moved to a screen position on the screen by dragging, the Incompatible BLOCK judges the destination and places the cube at the expected position in 3D space, as described below.

Rule 1. If a cube moved onto a 2D floor, the software places the cube on a 3D floor.

Rule 2. If a cube is moved to a look-as stacking position on the screen, it can be placed to be touched other cubes (Fig. 2).

Rule 3. A cube in empty space is moved vertically or horizontally from the start position.

Additionally, by dragging, the floor can be moved along the XZ plane.

2.2.Changing a Cube Height

In addition to Rule 3 above, there are two methods of changing a cube height. One method uses a "shadow". A shadow can be pulled out from a cube by dragging the bottom of the cube down (Fig. 3). The height of the cube is changed in the 3D space so that it will look afloat. Actually, the cube moves in the direction of view each time the shadow is moved down.

If a cube is added upward to the bottom of a form adjacent to the floor, the added cube looks as if it is under or over the floor. In the real world, however, a form buried in a floor cannot be seen. By considering this, the Incompatible BLOCK shifts the whole form up so that the form will be adjacent to the top of the floor (Fig. 4).

2.3.Changing the Number of Cubes by Using Shadow

User can increase the number of cubes by pulling out several shadows from a single cube. In the real world, this can be compared to several building blocks lined in the direction of view, and the same number of cubes as shadows can be added to 3D space (Fig. 5). In contrast, the number of cubes can be reduced by pulling out a small number of shadows when several cubes are overlapping and look like one. In other words, the number of shadows corresponds to the number of cubes.

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2.4.Changing a Pen Size

The Incompatible BLOCK enables the user to draw lines directly on the screen for the cube, floor, or background by 2D operation. Since lines can be drawn only on the visible sides, the back of the form is not painted. And, the apparent boldness of a drawn line is fixed, irrespective of space zooming. In other words, zoom-out makes a pen thick and zoom-in makes it thin (Fig. 6).

2.5.Collapsing Blocks

We believe that "modeling" means "destroying" as well as "creating". When a session is closed, the cubes collapse by the gravity (Fig 7). At this time, the user returns from the wonder world to general 3D world.

Using Incompatible BLOCK, the user can experience wonders and recognition at the same time.
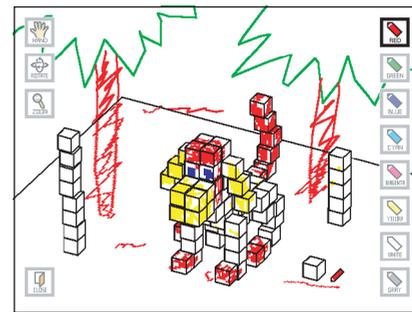

Figure 1. The screen of Incompatible BLOCK with a model produced by using it.
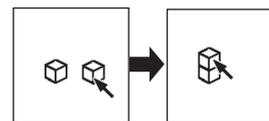

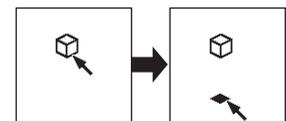Figure 2. Stacking a cube.

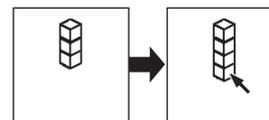Figure 3. Changing a cube height by using shadow.

Figure 4. The upward placement of a cube.
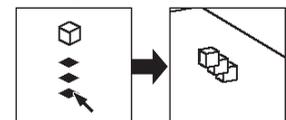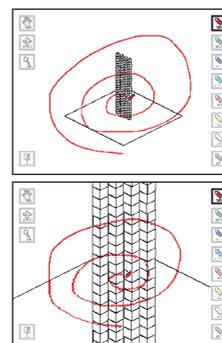

Figure 5. Changing the number of cubes by using shadow.
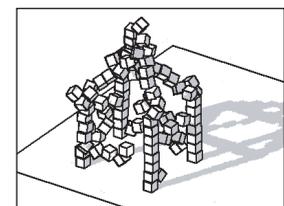

Figure 6. Changing a pen size.

Figure 7. Collapsing Blocks.