1. Introduction
We propose herein a new type of software-toy, called "Hyper-Paint", that combines the use of blocks and drawing in order to investigate the possibility of realizing a software-toy that offers the advantages of a computer for creating expressions that are difficult to create in real world (Figure 1).

While block toys, such as LEGO, and drawing toys are well-known traditional children’s toys, expressions of such toys by computer and software techniques have only recently appeared [1-4]. We proposed Hyper-Paint that combines a block toy and a drawing toy, that expression is hard in real world. Using Hyper-Paint, the user can create 3D objects consisting of blocks that can then be pasted into a large box representing the surroundings, both of which can be colored. In this sketch, we describe herein the features of Hyper-Paint and discuss the software from a design viewpoint.

2. Feature
The user can create 3D objects by stacking blocks. As adopted in some block-toy software, the user adds blocks by clicking the previously placed blocks or the large box that represents the surroundings (Figure 2). In addition, the user can delete unnecessary blocks or draw the blocks and the large box toward the screen directly in Hyper-Paint. Since the paint appears only on the side that the user can see, which is similar to actual spray painting.

3. Evaluation
When Hyper-Paint was used by men and women of various ages, we found that some experience was required in order to create the desired shape. However, the users appeared to be surprised and interested by the concept of what were, at first, assumed to be 2D line drawings turning out to be rendered in 3D. In addition, we found that applications such as "Shadow Reversal (Figure 3)" and "Deceiving Picture (Figure 4)" were possible using Hyper-Paint. The Hyper-Paint appears to offer new vantage points for creating drawings, as well as opportunities for discovery. Later, we will objectively verify the utility of the Hyper-Paint.

Figure 5 shows an example work produced using Hyper-Paint. Although real toys are intuitive and easy to understand, these advantages should be balanced against increased opportunity for discovery offered by the software-toy.

4. Future work
In the future, we hope to introduce a function to knock down blocks, simulating that in the real world, intuitive save and load functions, a variety of colors and block shapes, and a function that allows users to collaborate over the internet.

5. References

*e-mail: fujiki@gsd.design.kyushu-u.ac.jp
†e-mail: tomimatsu@design.kyushu-u.ac.jp