

# Bitcube: The new kind of Physical Programming Interface with Embodied programming

Kim Jaeyoung, Kang Byongsue, Rhee Shinyoung, Kim Byengwol, Yun Hyeonjin, Sung Junghwan  
HELLO!GEEKS Inc.

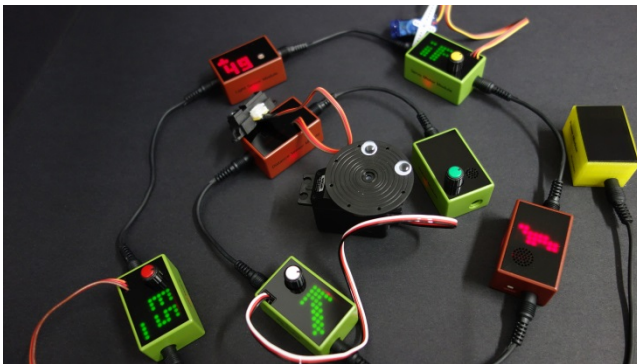


Figure 1. Demonstration of BitCube

## 1. Introduction

BitCube is a new kind of physical programming interface. It is a set of tangible blocks that consists of three functional parts, Power + Sensor + Action. Power block is a type of rechargeable battery with Micro USB connector. BitCube has diverse sensor blocks which are perceiving data, such as light, distance, sound, Bluetooth signal, etc. Action blocks receive data from sensor blocks, and actuate LED, buzzer, motor, etc.

BitCube is new, simplified way of interacting with art and technology. You can also learn the programming logic from BitCube without the need for PC literacy, and make artistic works very easy. You just connect BitCube blocks each other by data cables and make dynamic interactive artworks. BitCube has the potential to change existing programming paradigms through making algorithms in a totally new way called 'Embodied Programming'.

## 2. Making Algorithms in BitCube

BitCube is a great tool of education for children who want to make their own creation with art and technology. In most cases, children have problems with learning programming languages. The biggest one is that programming languages require an abstract and logical thinking when children are learning them.

Most of programming languages composed of digits, characters, and logical expression, it is called a symbol. But children tend to think with images, relation of objects, it is called a sub symbol. Thinking with physical objects is a good way for children when they trying to understand algorithms, especially about abstract relations between programming languages. Embodied programming is the new way for learning algorithms through body, mind, and physical objects including computer.

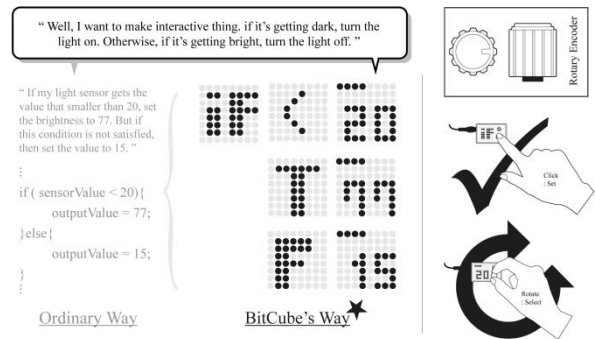


Figure 2. Development Method with BitCube & Embodied Programming Interface in BitCube

## 3. Experience Scenario and Condition

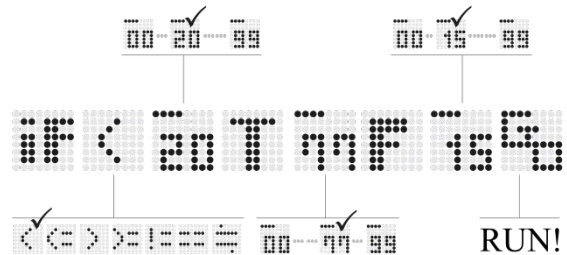


Figure 3. Programming Sequence

Do you want to make some interactive artwork by your own? It will be so easy if you have BitCube. You can build something and get it move with BitCube. Just follow simple steps below :

(1) Design (2) Set (3) Play & Enjoy!

- First of all, imagine the output of your creature what you want to make, and design your artwork.
- Second, pick modules and connect each other with data cables. Then arrange them and decorate them as good as you want with various materials.
- Now, it's time to make your creature breath. You have to make algorithms for action in BitCube's way. Set the algorithm with your hand by clicking and rotating the rotary encoder on the module. Module shows what value it comes and it uses immediately. You can change the action state as you designed.
- Finally, Play with your creature and Enjoy!



Figure 4. Making Process