# BE STEM READY Learning Music box




This robotics course introduces programming, sensors and motion.

The kit includes sensors and programmable components for learning.

sensor, photoelectric sensor, color light, ultrasonic, camera and many building blocks parts. Students can build various building block robots with their imagination, and use graphical programming software to program the robot and experience the joy of hands-on creation.

# Learning Target

01

## Knowledge goal

Understand the related knowledge of color sensors and how to use color sensors.

02

## Ability goal

Familiar with the use of color sensor module, master the basic operation of variables.

03

## Emotional attitudes and values

Learn to think in essence.

# Learning Target

01

## Learning focus

Master the basic usage of color sensor.

02

## Learning difficulties

Flexible application of knowledge of variables and their operations.

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# Course Introduction



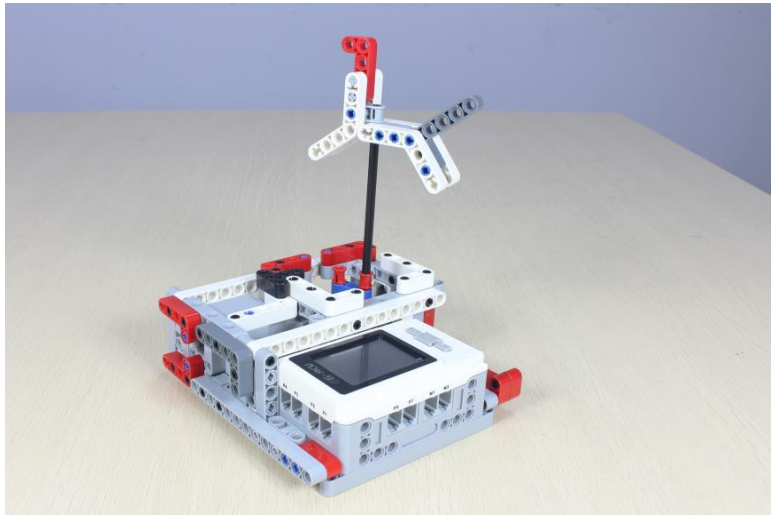
# Course Introduction



**Have you seen a music box?**

Music Box, also known as Musical box, is a musical instrument with motorized pronunciation. It was invented by Swiss watchmaker Anto Fabres in 1796. It can automatically play music by turning the links in the box. At present, this antique is collected in Shanghai Musical Box Treasures Exhibition Hall. Music boxes were very expensive in the 18th and 19th centuries because of their exquisite workmanship. They only spread among nobles, and ordinary people looked down on them.

# Course Introduction



Music box

## Know about the music box

The robot in this class is called "Music Box". After the music box is turned on or wound, it can make a pleasant sound. Today, the robot we made makes some adjustments. We add a sensor to make it sense different colors to make various sounds.

Let's study together.

# Teaching New Knowledge

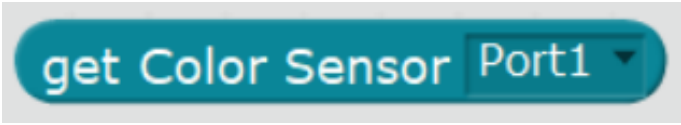


# Teaching New Knowledge

Color sensor detects the color by comparing the color of an object with a reference color, and outputs the detection result when the two colors are consistent within a certain error range.

Usage:

[Electronics]-[sensor]-[color detection]

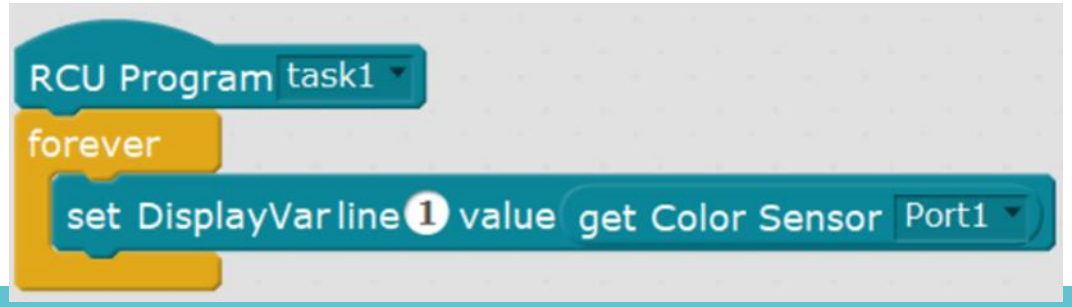



P is the connected port: display the values measured by the color sensor on the controller screen-red is 1, green is 2, blue is 3, yellow is 4, black is 5, and white is 6.

Note: the color sensor has a certain distance when detecting objects.

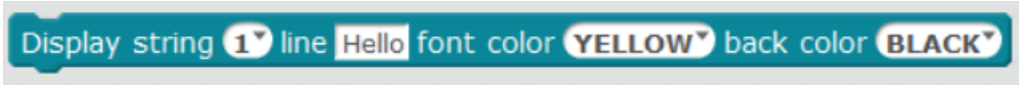
It is easier to detect the color genus in a suitable distance

Sex, the results will be more accurate.



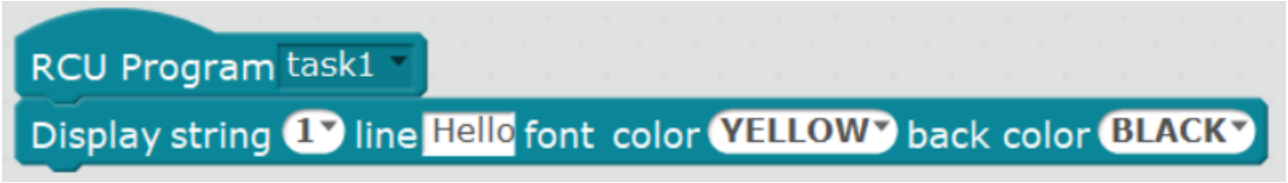
# Teaching New Knowledge

Display string: [Electronic Module]-[Display]-[Display String]




The blanks above the module respectively indicate: the display position and the line; A string to display; There are 8 kinds of font colors; There are 8 kinds of background colors. Pay attention to the fact that the font is the same color or near color as the background, so the content is not visible or obvious.

Example:




Drawing graphics: [Electronic Module]-[Display]-[Drawing Solid Rectangle]

The spaces above the module respectively indicate: the starting horizontal coordinates of the graph; The starting longitudinal coordinate of the graph; Width of drawing graph; Height of drawing graph; There are 8 colors for graphic filling.

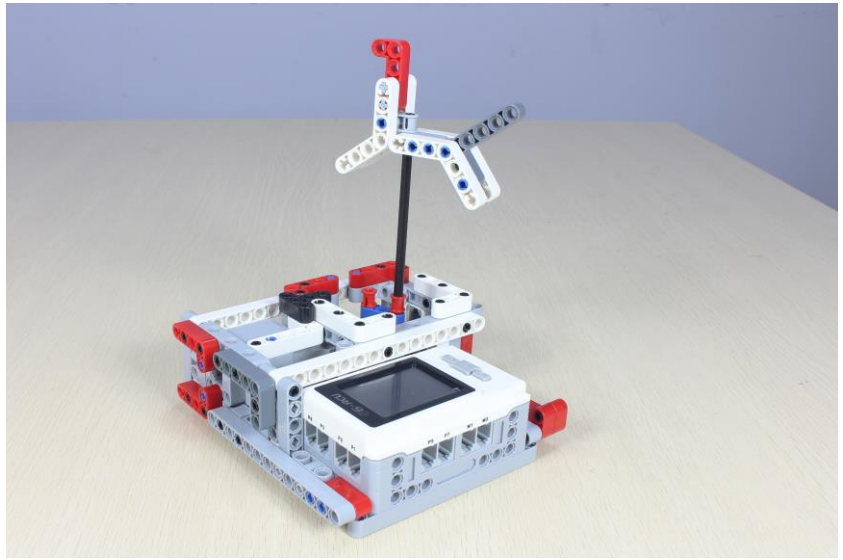
Example:



# Task Practice



# Task Practice



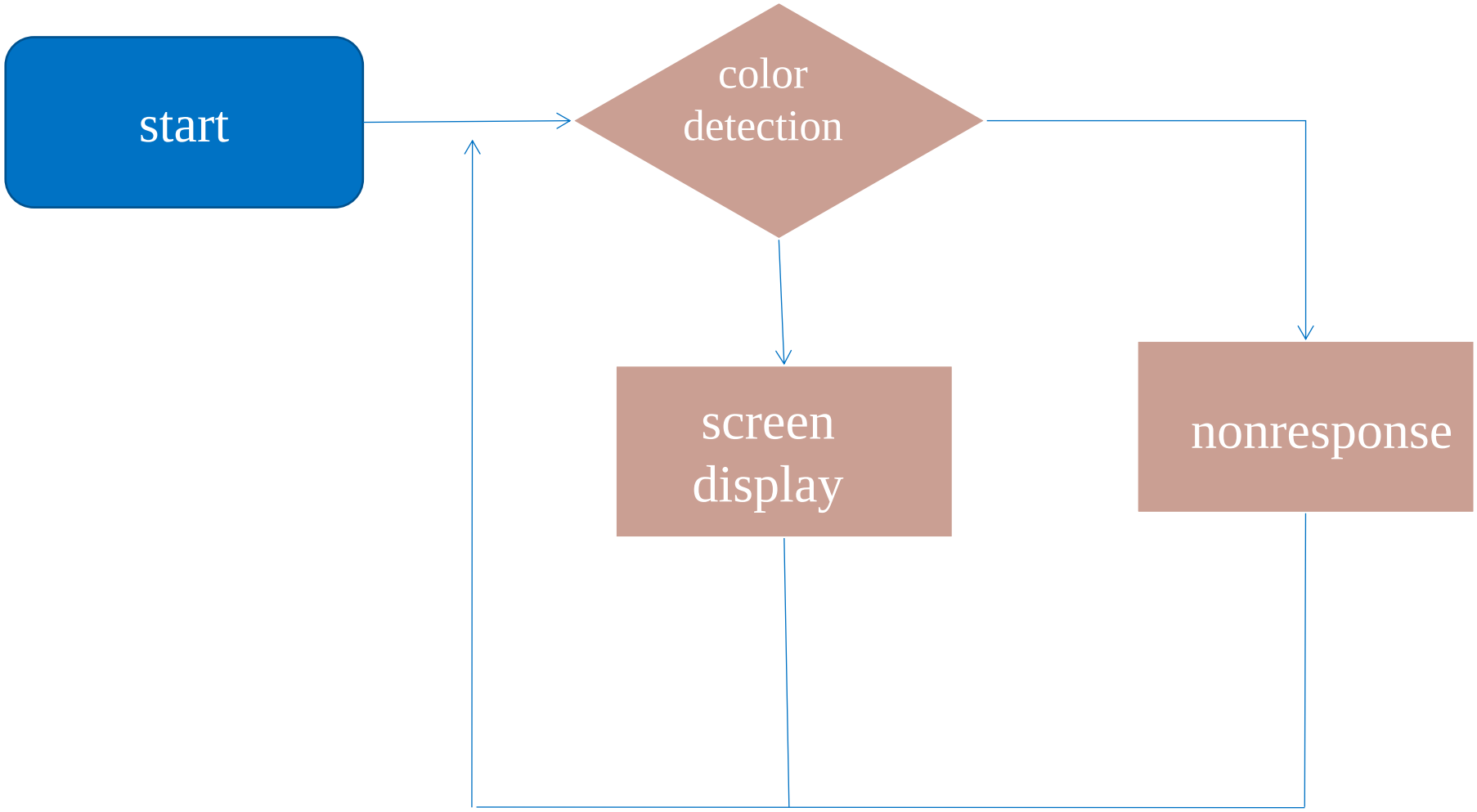
## Assembly requirements

1. stable structure
2. focus is right
3. shape match

# Programming and Debugging

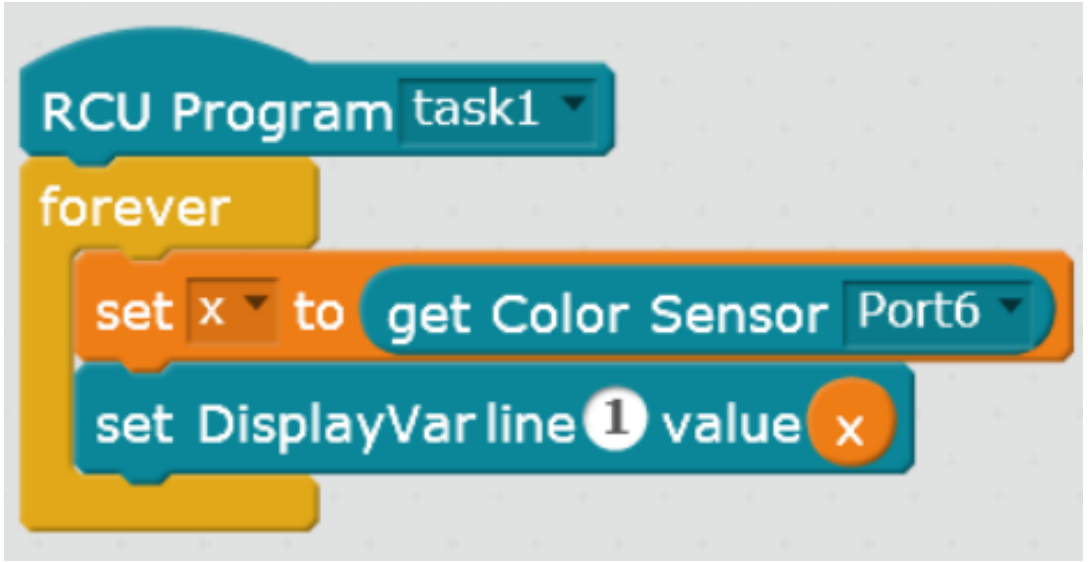


# Programming and Debugging



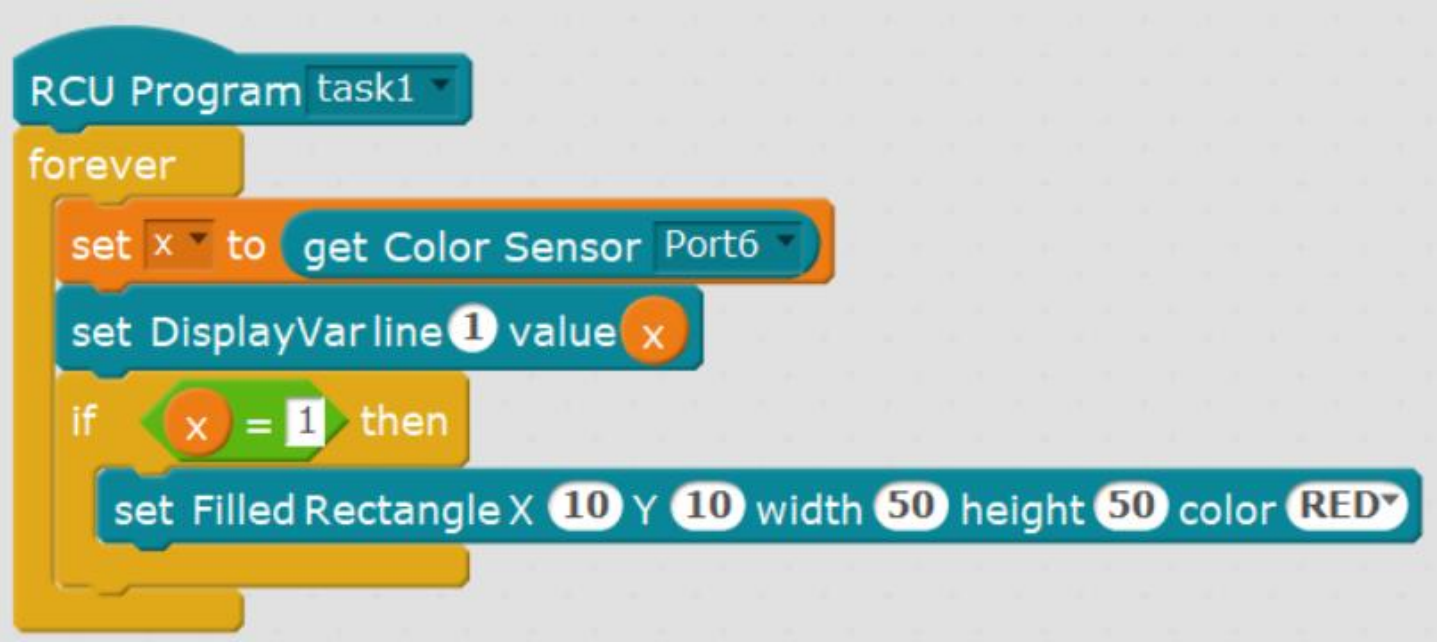
# Programming and Debugging

1. When red is detected, the corresponding value is displayed on the screen.



# Programming and Debugging

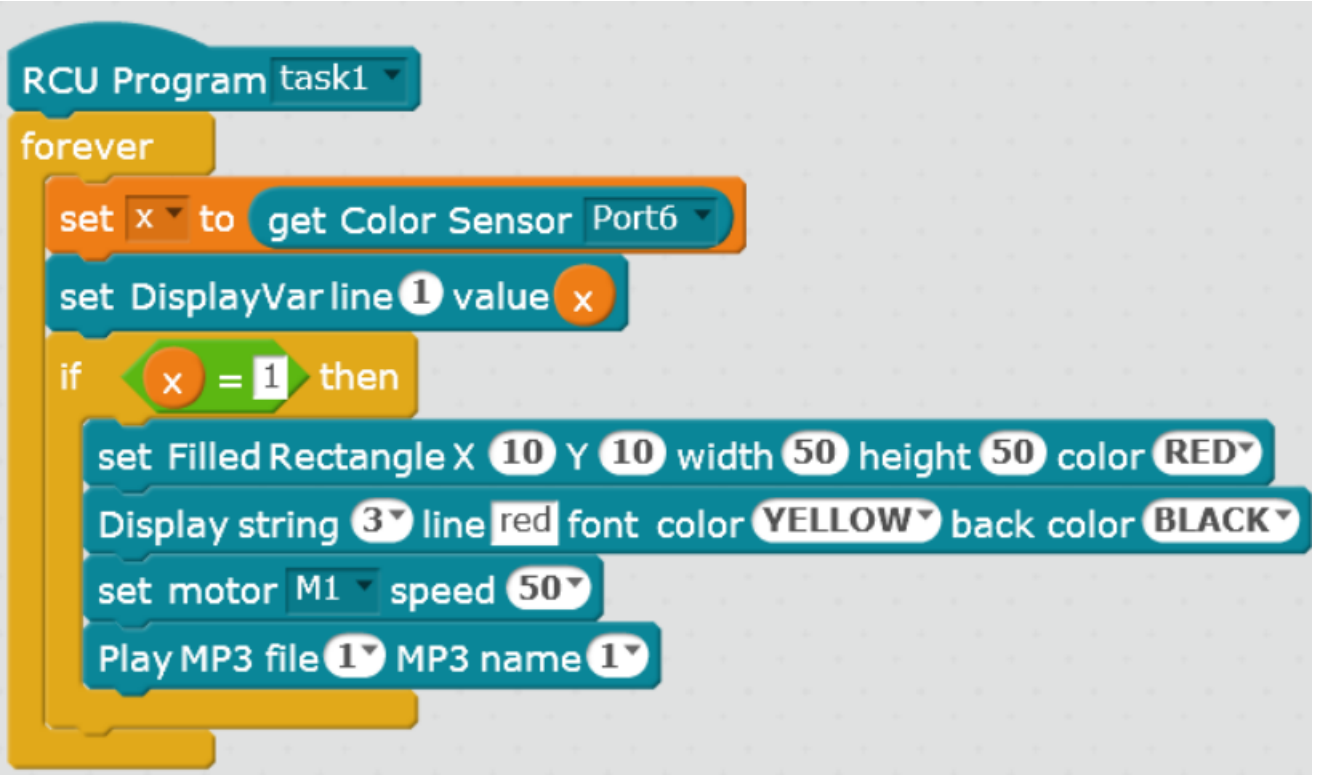
2. When red is detected, a red color block is displayed on the screen.



# Programming and Debugging

3. When red is detected, music and rotating dolls are displayed and played on the screen:

- The first line, the value
- The second line, the red color block
- The third red, the character "red"



# Checking Effect



# Test Effect



Review the learning content and deepen your impression.

**Question 1**

What is the name of the robot made today?

**Question 2**

What forces will be affected by today's robots?

**Question 3**

Detect what color the finger is.

# Thank you for watching

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