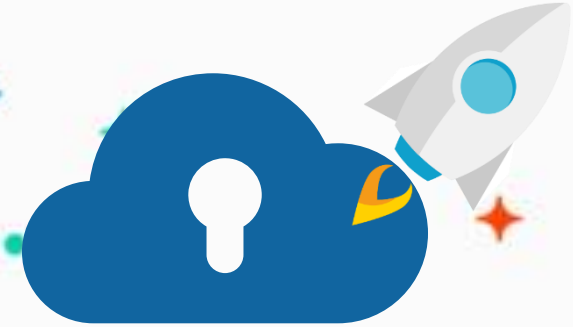

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Lesson 5. Clown

LECTURER:

Lesson Objective

Learning Objectives

1. Learn about the communication of expressions.
2. Know how to use the dot matrix screen.

Possible Difficulties

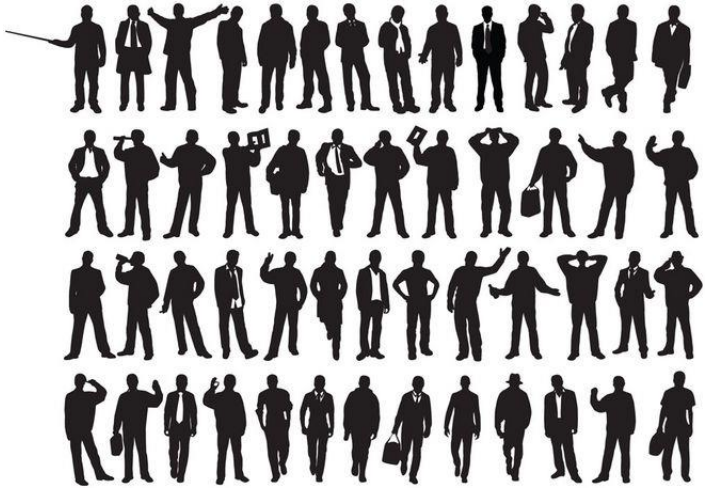
1. The direction of the pattern displayed on the dot matrix screen
2. How to use the remainder to switch expression patterns.

Background Information



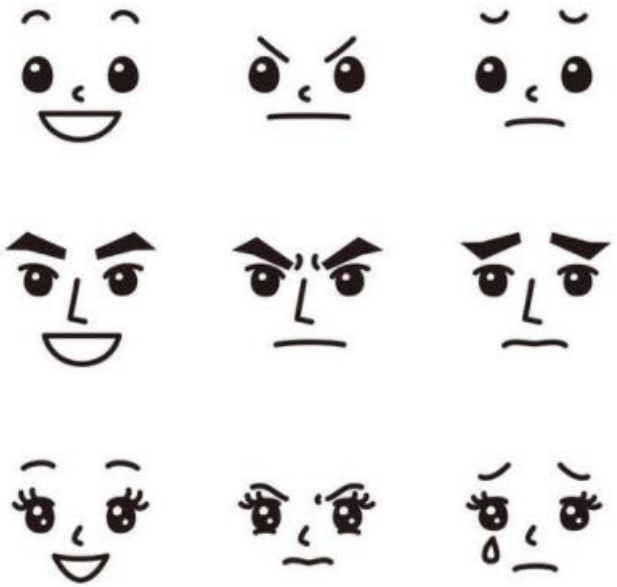


Background Information



Expressions are a form of external expression of human emotions. There are three main ways of human expression: facial expression, language tone expression, and body posture expression.

Background Information



Facial expression refers to the expression of various emotional states through the changes in eye muscles, facial muscles, and oral muscles. For example, eyes can not only express feelings but also communicate ideas, and facial expressions are a very important means of non-verbal communication.

Artists often express the inner emotions and emotions of the characters through the depiction of the facial expressions of the characters and vividly show the spiritual outlook of the characters.

Background Information



Facial expressions serve as a powerful tool for communication. A fascinating demonstration of this is through imitation. Humans and orangutans alike often physically mimic the emotions of those around them.

When individuals sense another's sadness, they naturally display sadness themselves - as Darwin once observed. This imitation is likely an effort to express sympathy and shared sorrow in response to difficult experiences.

Background Information



Facial expressions can be divided into eight categories: excitement, joy, surprise, sadness, fear, shyness, contempt or disgust, and anger. In general, the muscle groups around the eyes and mouth are the most expressive parts of the face.



Knowledge Introduction

Knowledge Introduction



Clowns are comedians with the most facial expressions. They often perform on stages, circuses, variety shows, carnivals, children's shows and birthday parties. In order to let everyone feel the emotions of the characters as much as possible, they tend to exaggerate all expressions. Therefore, actors who play clowns need to have a very deep understanding of different expressions.

Knowledge Introduction



When clowns perform, they often wear oversized shoes and exotic clothes. Their faces are also painted, especially the nose. These wacky, hilarious costumes bring laughter to the audience. Usually, clowns entertain audiences by embarrassing themselves.

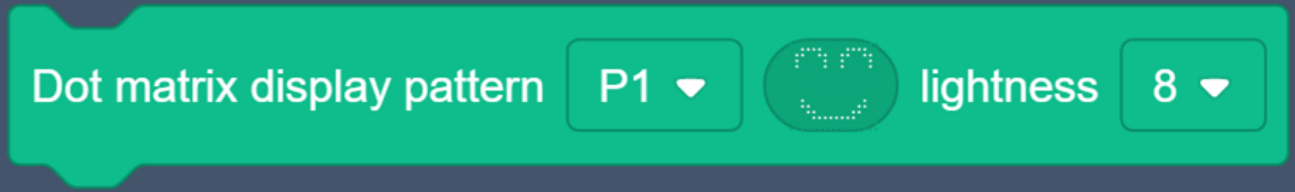
Today, we will use the dot matrix screen to make the eyes of the clown and make different expressions through different eyes.

Dot Matrix Screen



The 16x16 dot matrix screen is an electronic component that can be used to display Chinese characters, letters, numbers and expressions. A variety of functions can be realized, including 16-level brightness adjustment, customizing the on and off of each point, scrolling display strings, displaying hand-drawn expressions, etc.

Programming Module | Show Pattern



Make the dot matrix screen display the specified pattern.

Parameter value: 1-8, connection port

Parameter value: 4*16-bit "0000" data, each 4-bit data represents a row of dot matrix data, calculated in hexadecimal.

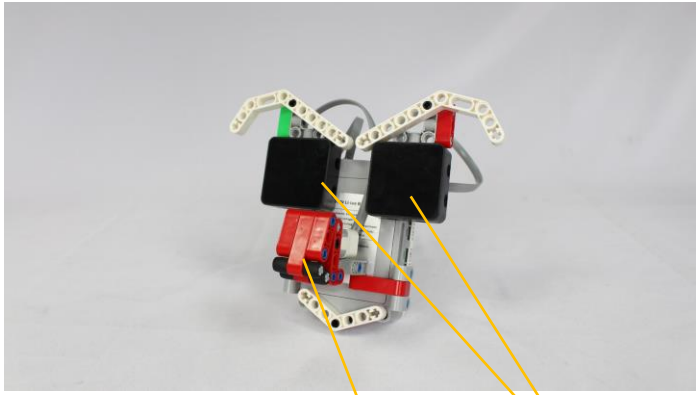
Parameter value: 0-15, 16 levels of controllable brightness adjustment



Practice

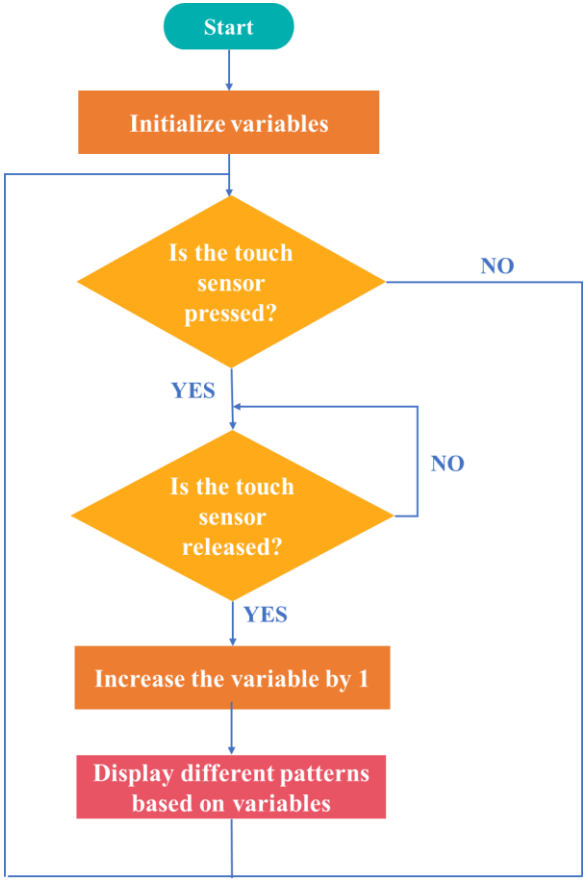


New Knowledge



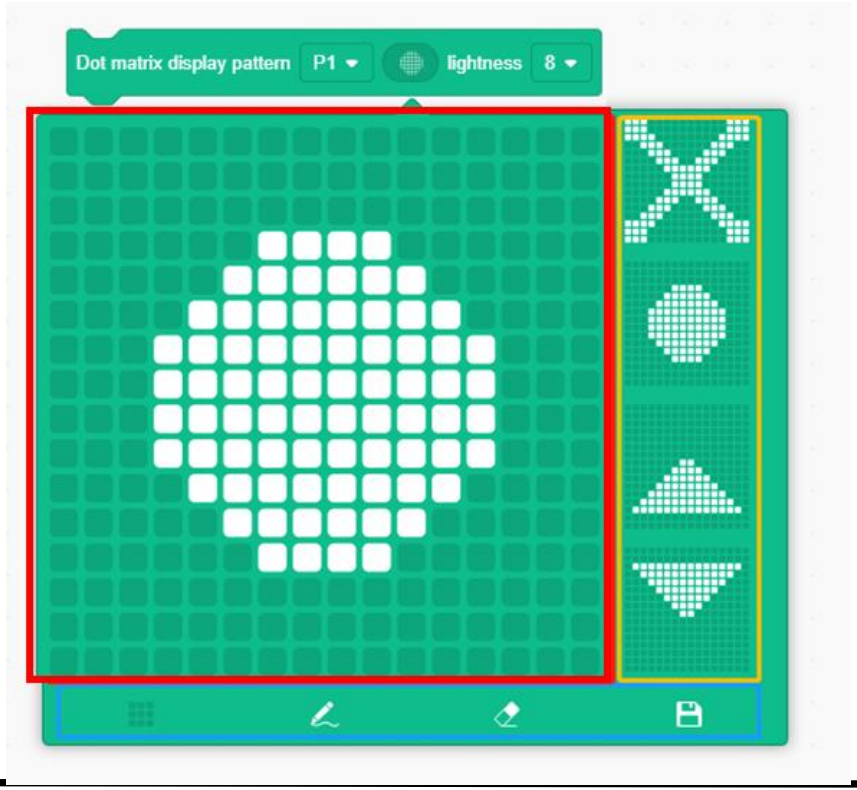
According to the building manual, build a clown robot to realize the function of changing expression by pressing the nose.

Practice | Flow Chart



Press the button and release it to switch between different eye shapes.

Then, the variable will continue to increase, but the number of expressions is limited. When the variable value exceeds the number of expressions, the expression will no longer change. In switching expressions, you need to use a remainder algorithm.

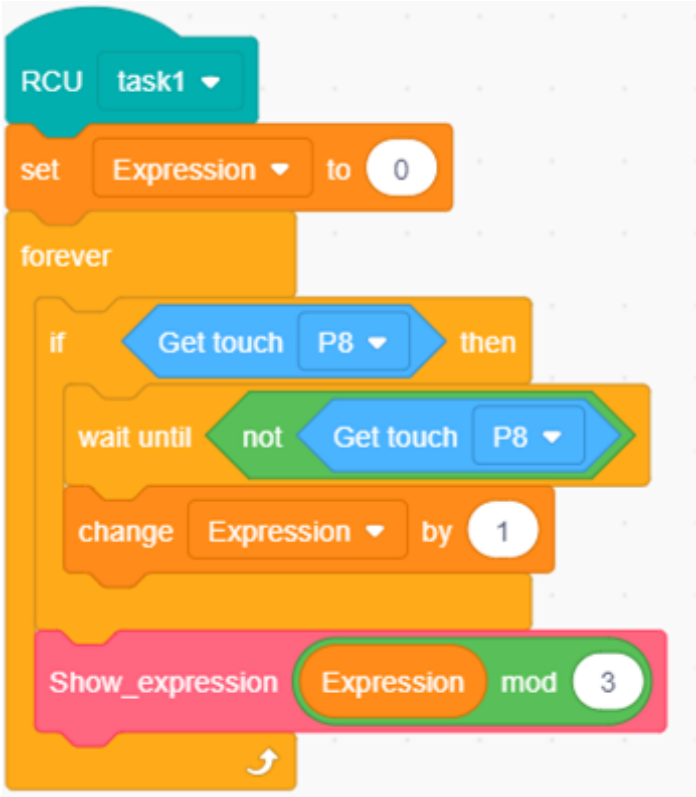


Dot matrix screen

Patterns can be made in the drawing area, and the four functions in the functional area are clear, brush, eraser and save.

- Clear: Clear the current pattern.
- Brush: switch to brush mode for drawing patterns.
- Eraser: switch to eraser mode for erasing patterns.
- Save: the pattern can be saved to the call area for easy reuse.

Practice | Programming

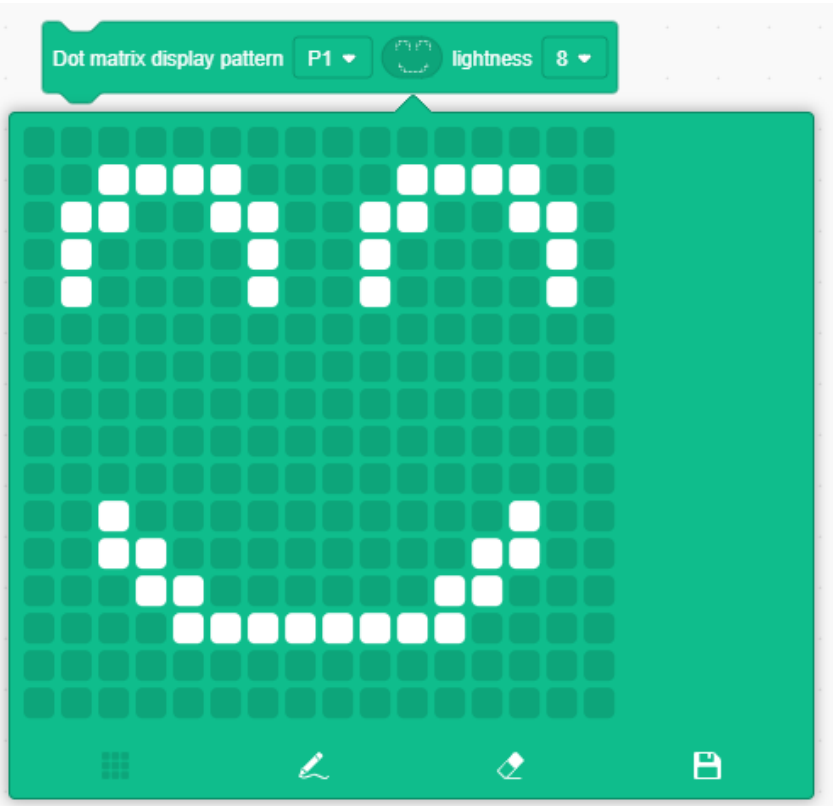


Initial setting

After initialization, it is repeated to determine if the button is pressed and released.

The variable will increase when the button is fully pressed and then released.

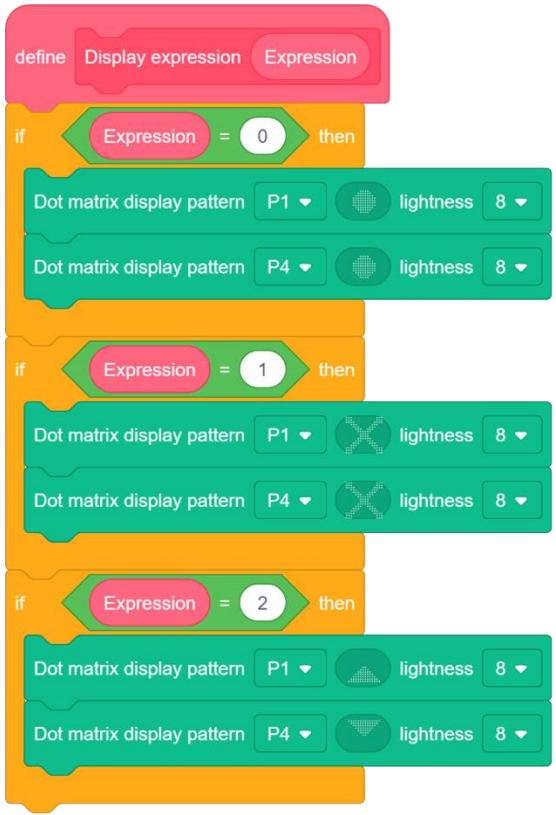
Practice | Programming



Make patterns

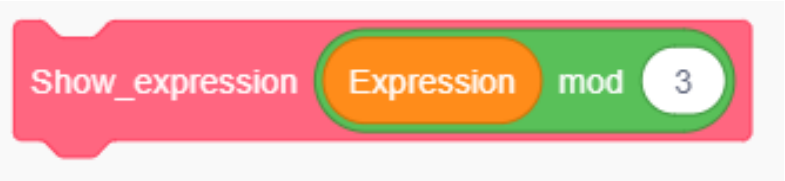
Make different patterns by clicking on the squares on the dot matrix screen.

Practice | Programming



Function of displaying expression

Define the display expression function, and the expression parameters are used to judge the displayed eyes.

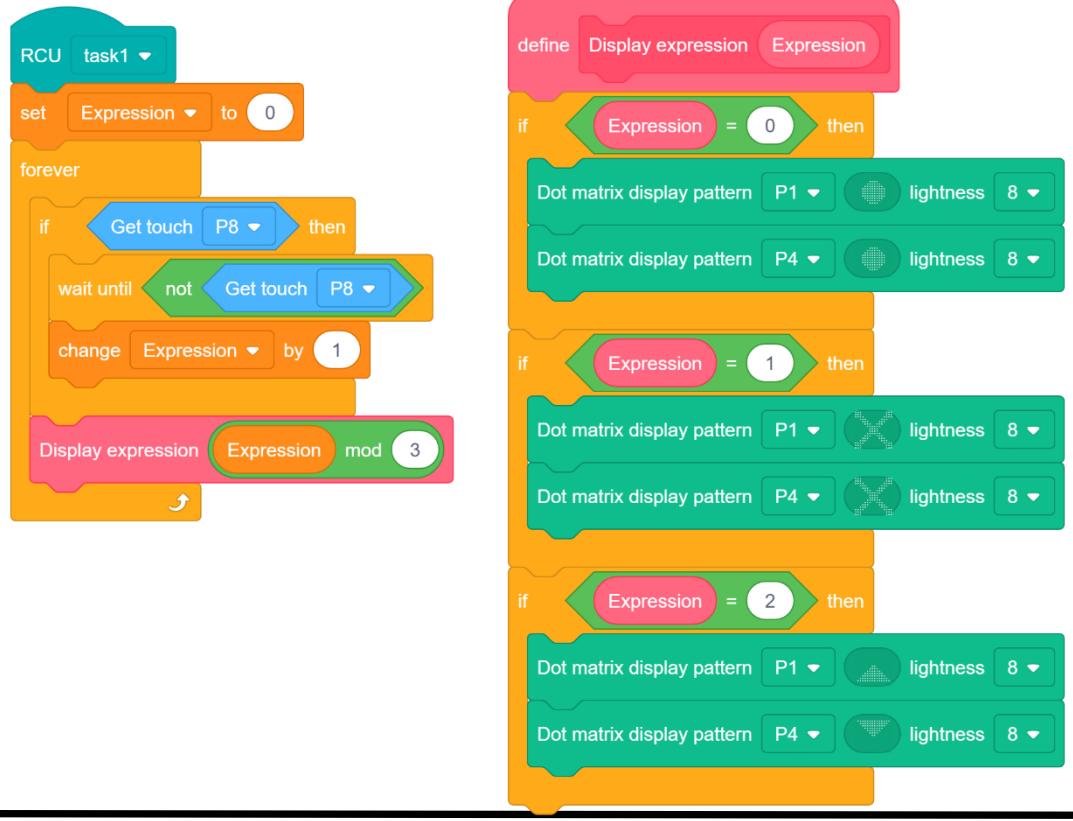


Function of opening the door

The parameter to display the expression needs to use the remainder operation.

As shown in the figure, the result of the remainder operation can only be one of the three numbers 0, 1, and 2.

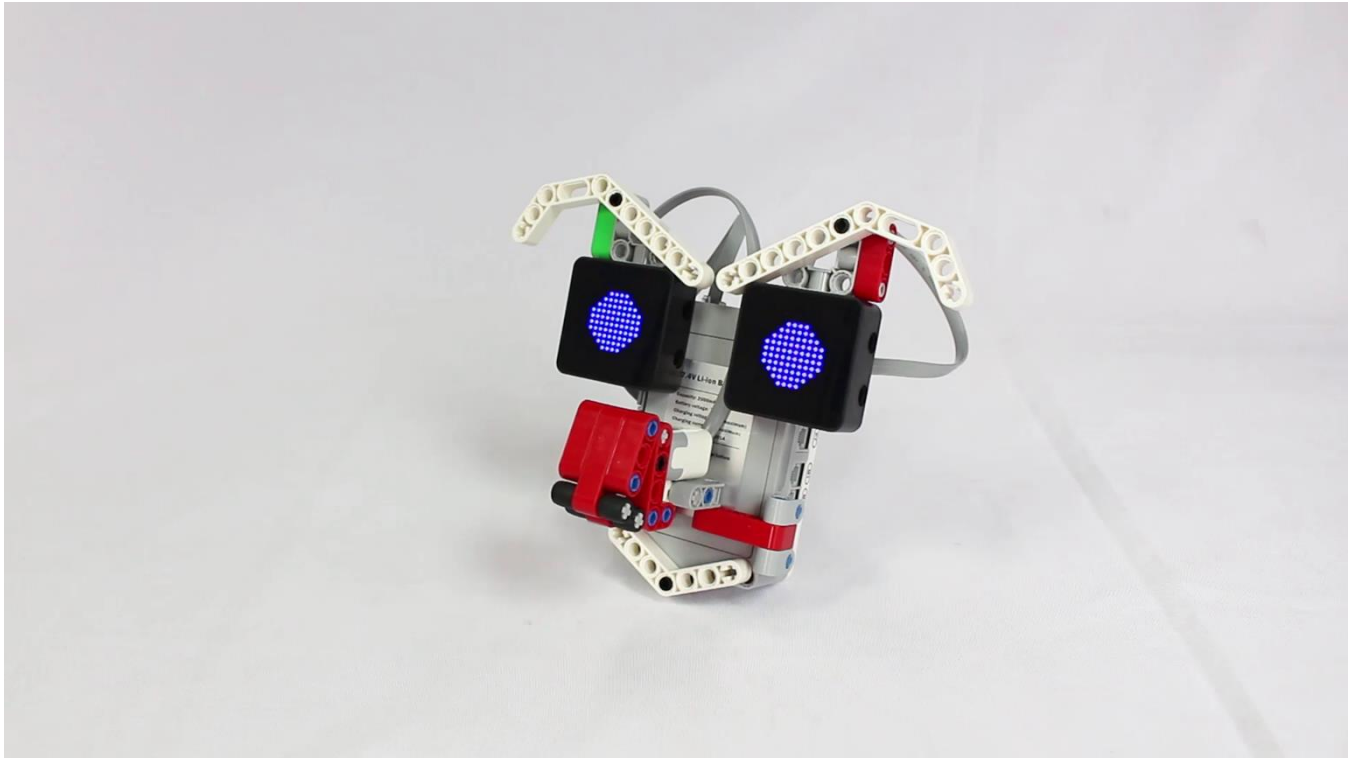
Practice | Programming

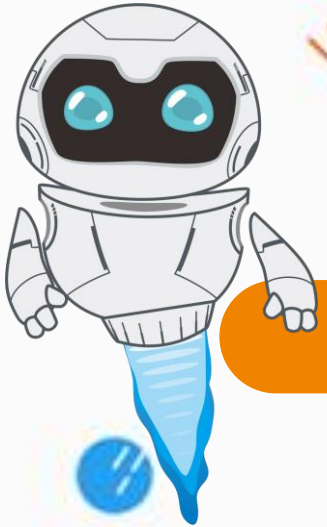


Integrate the program

According to the flowchart, integrate each segment of the program.

Practice | Programming





Results

Program Optimization

This lesson realizes the function of changing expressions by pressing the nose. When the nose is pressed and then released, different expressions can be displayed in a cycle.

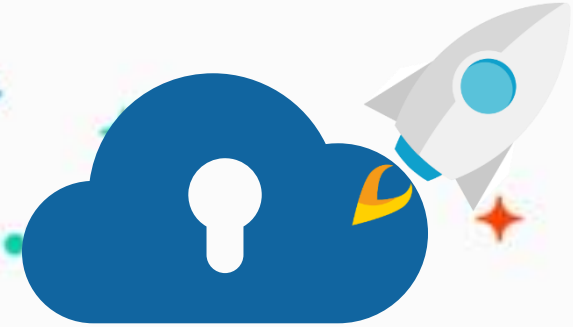
Next, modify the program and modify the remainder operation, so that the robot can display more expressions in a loop.

Requirements: To play 5 expression patterns in a loop.

Further Reading



May 25 is celebrated as Clown Day in Peru in honor of Jose Alvarez Velez, also known as “Tony Perejil”. He brought joy to people in Lima's slums in the 1970s and 1980s, and was called "the poor man's clown".



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Thanks!

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