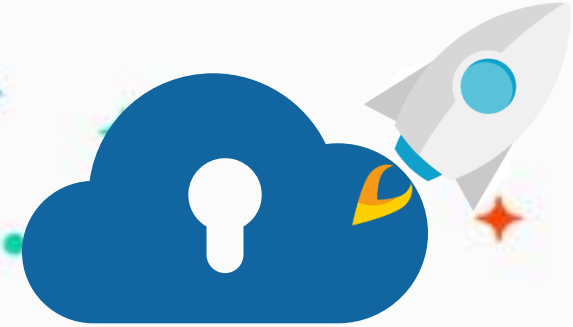

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Lesson 4. Code-scanning Gate

LETURER:

Lesson Objective

Learning Objectives

1. Learn about electronic gates.
2. Understand the electronic password.

Possible Difficulties

1. Compare the data in the list.
2. Variables are used to determine the number of digits.



Background Information



Background Information



As the name suggests, a door lock is a device used to lock the door to prevent others from opening the door.

There are many classifications of door locks, and the requirements for door locks are different on various occasions. Generally speaking, anti-theft door locks for home use have high security and relatively cheap prices.

In China, the levels of different locks are determined according to the time required for disassembly. The more time it takes to open the door lock destructively, the higher the level.

Background Information



Traditional door locks have some limitations in terms of security. For example, there are not many keys, and customers need to provide additional keys; the door lock has a very small probability of being opened by a key from the same manufacturer; after the key is lost, the safest way is to change the lock, etc.

Background Information



In large enterprises or factories, people are more accustomed to using electronic combination locks. Electronic combination locks are electronic products that control the operation of circuits or chips through password input, thereby controlling the closing of mechanical switches and completing the tasks of unlocking and locking. With the development of science and technology, electronic combination locks are no longer limited to traditional mechanical keys. Touch panels that can avoid fingerprints to record passwords, face recognition, scan code recognition, etc., have appeared on the market, and electronic locks with more complete functions and safer protection.

Background Information



In addition to a single unlocking mode, some high-end products also use multiple password authentication methods. For example, the combination of face and digital password, the combination of scanning code and face, the combination of voice and password, through multiple measures to ensure the safety of users.



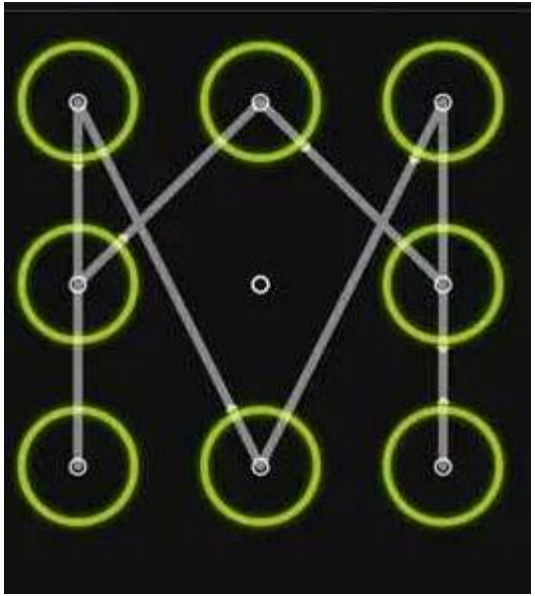
Knowledge Introduction

Knowledge Introduction



The current mainstream combination lock works like this. First, we need to set a management password for it. The management password has higher authority and can manage the entire electronic system of the combination lock, but it cannot be used to open the door directly. After the management password is set, the door-opening password can be set. This password can only be used to open the door, and cannot modify the password or set as a new password.

Knowledge Introduction

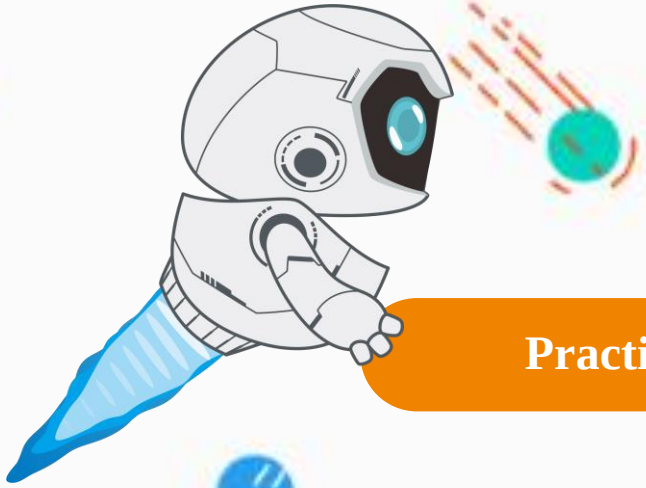


No matter how complicated the unlocking form of the electronic combination lock is, the essence is the comparison between the preset password and the input password. For example, face recognition can convert the characteristics of the face into digital form and save it in the preset password; scan the code to open the door and read whether the QR code data is consistent with the preset password. When the password is correct, open the door and the password Multiple errors will trigger the power-off protection mechanism. When programming, we should think more about the essence behind different forms, and don't be blinded by the form.

Knowledge Introduction

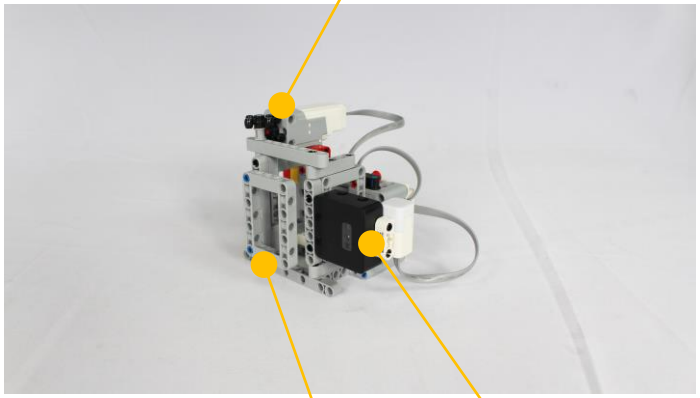


Today, we will use the Scanning Camera to make a door lock that scans the code to open the door and feel how the combination lock works through the comparison of the list data.



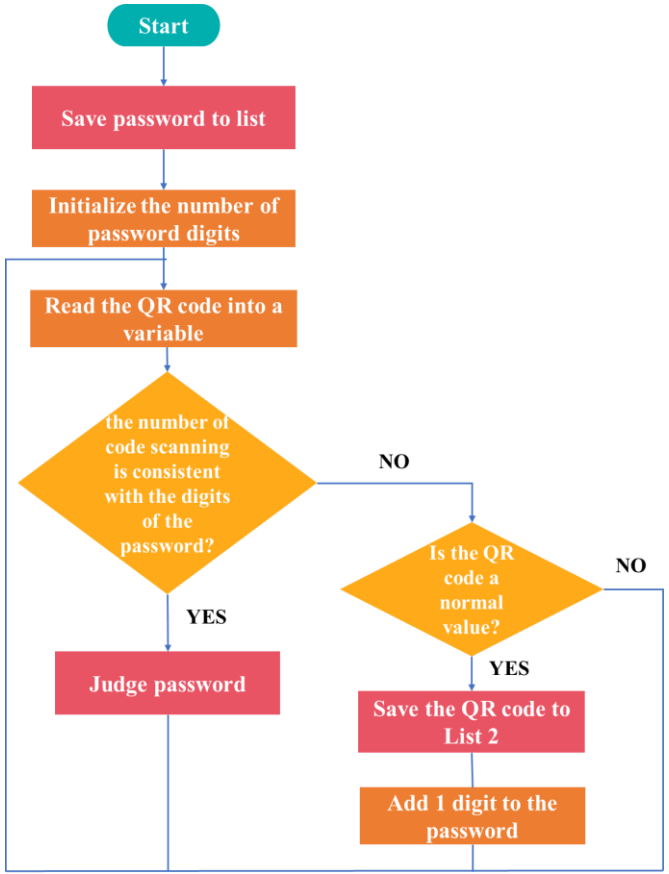
Practice

New Knowledge



Build a code-scanning door according to the construction manual, and realize the function of opening the door by scanning the code and the function of alarm.

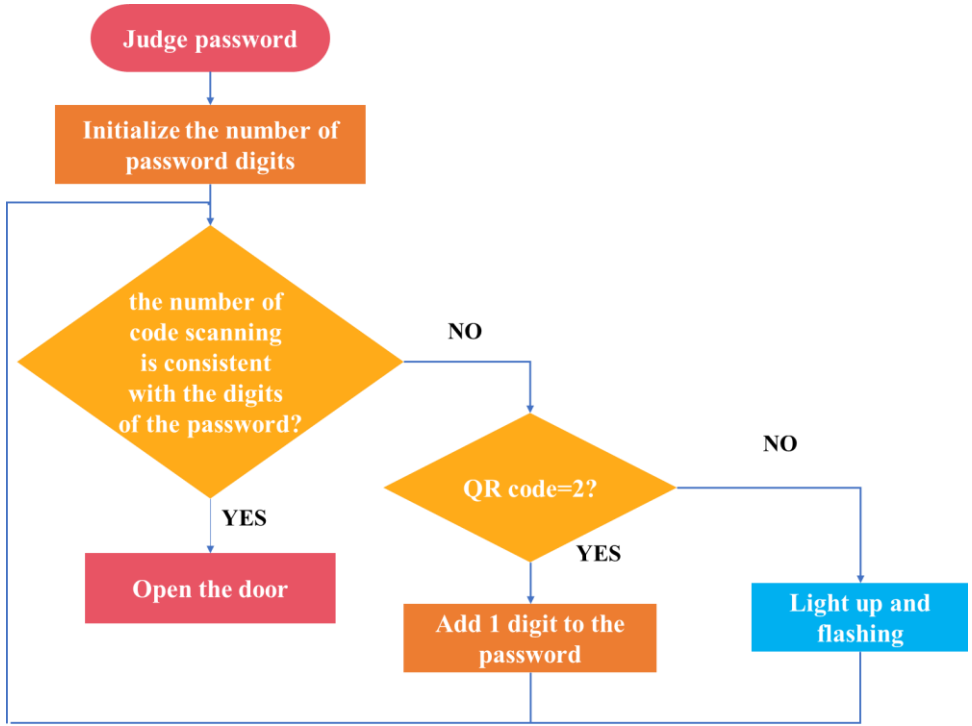
Practice | Flow Chart



After scanning the code, the data is stored in the controller. When the number of code scanning is consistent with the digits of the password, it is judged whether the password is correct. If it is correct, the door will be opened, and if it is incorrect, the red light will flash.

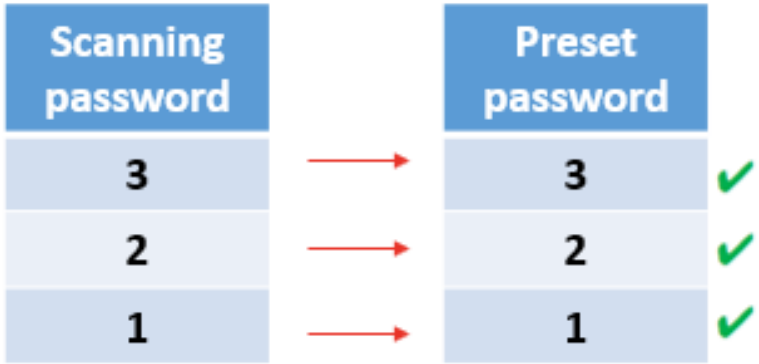
List 1 in the figure refers to the preset password, and List 2 is the scan password. Judging the password is the key to the program, and sort out the ideas through another flow chart.

Practice | Flow Chart



Compare each number in the two lists, for example, the first number in list 1 (preset password) is equal to the first number in list 2 (scanned password), then continue to compare until the number of digits in the password is the same as the scanned number unanimous. In the process of comparison, as long as any set of passwords is found to be unequal, the alarm will be turned on.

Practice | Flow Chart



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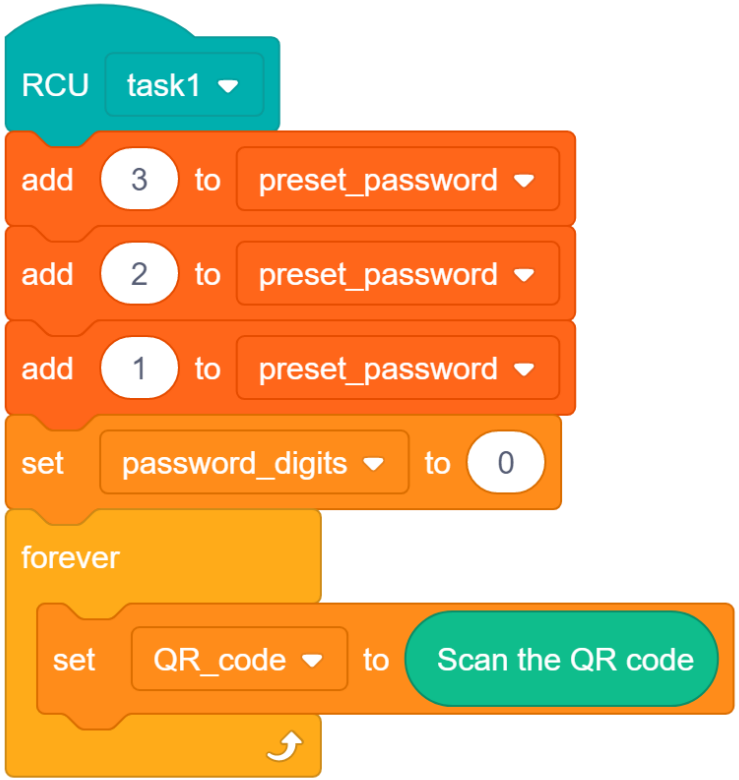
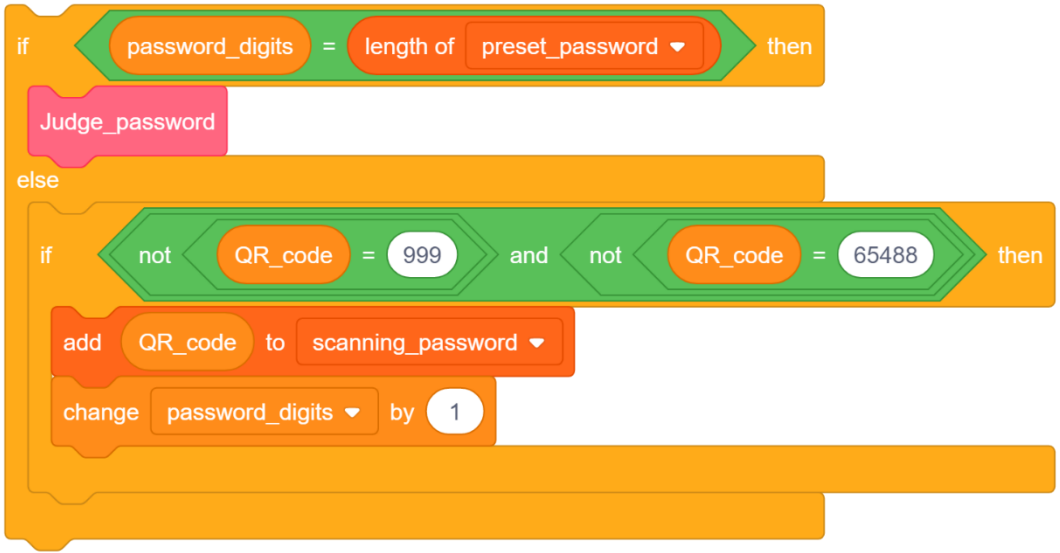
Practice | Programming



Initial settings

Set the password and then repeatedly read the value of the scanning camera to the variable.

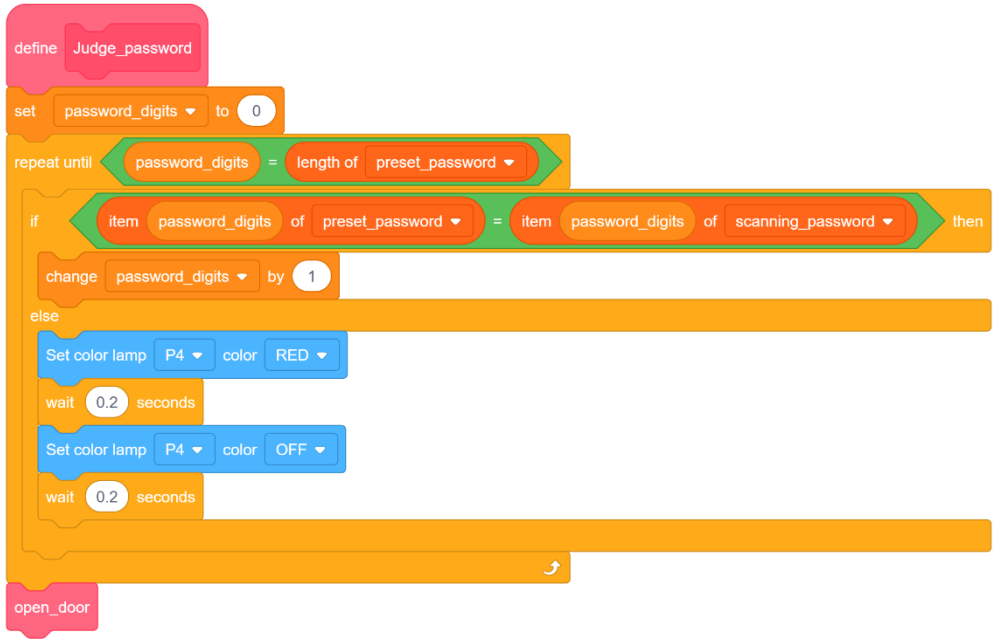
Practice | Programming



Judgment of scanning

Save the scanning password (QR code) to the list, and judge whether the scan password is correct after scanning enough passwords.

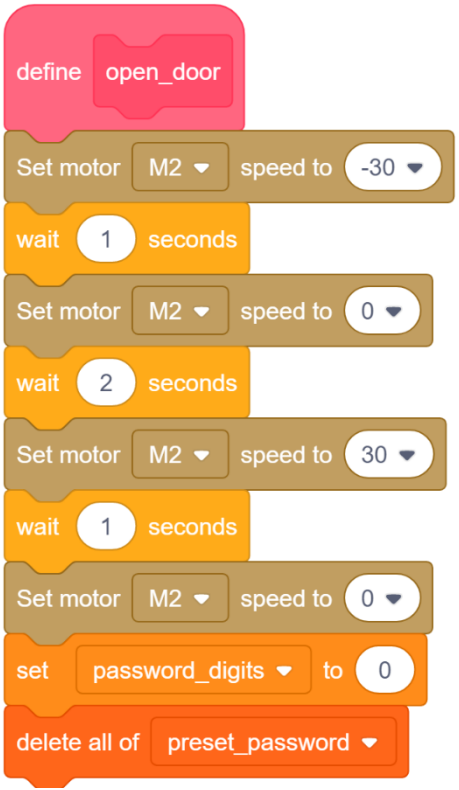
Practice | Programming



Function of judging password

Determine whether the numbers of each item in the two lists correspond one-to-one, and if they do not correspond, an alarm will be issued, and if they do, the door will be opened.

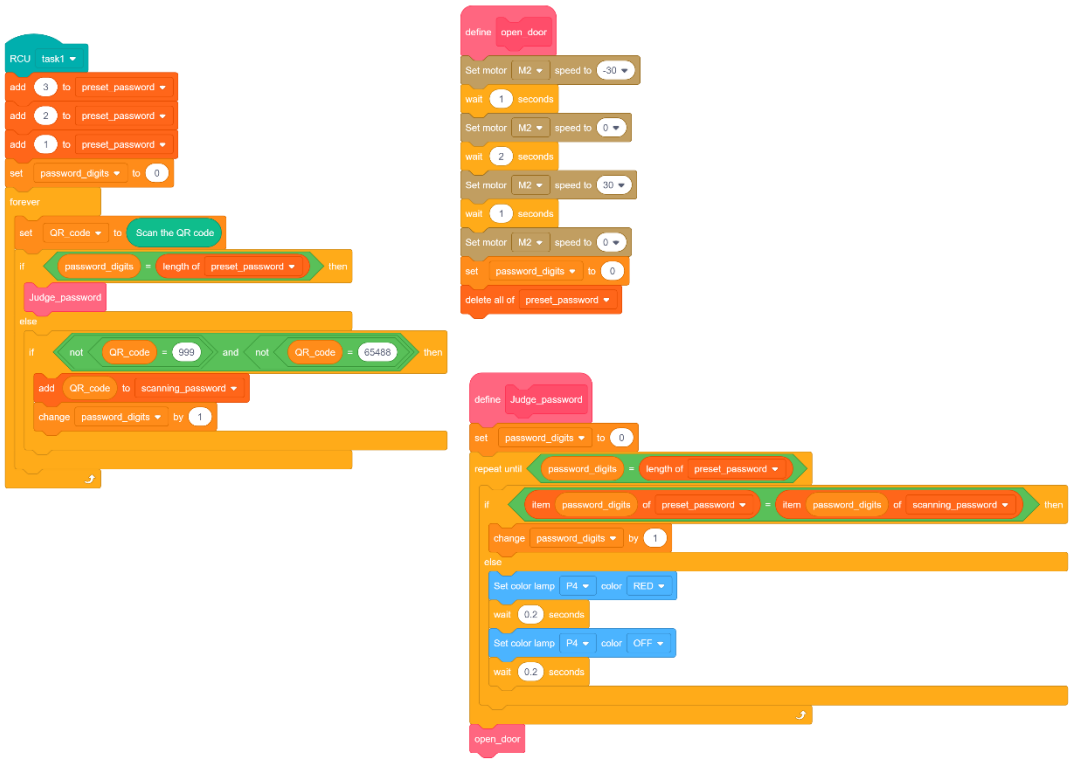
Practice | Programming



The function of opening the door

Control the motor to rotate, and initialize the combination lock after closing the door.

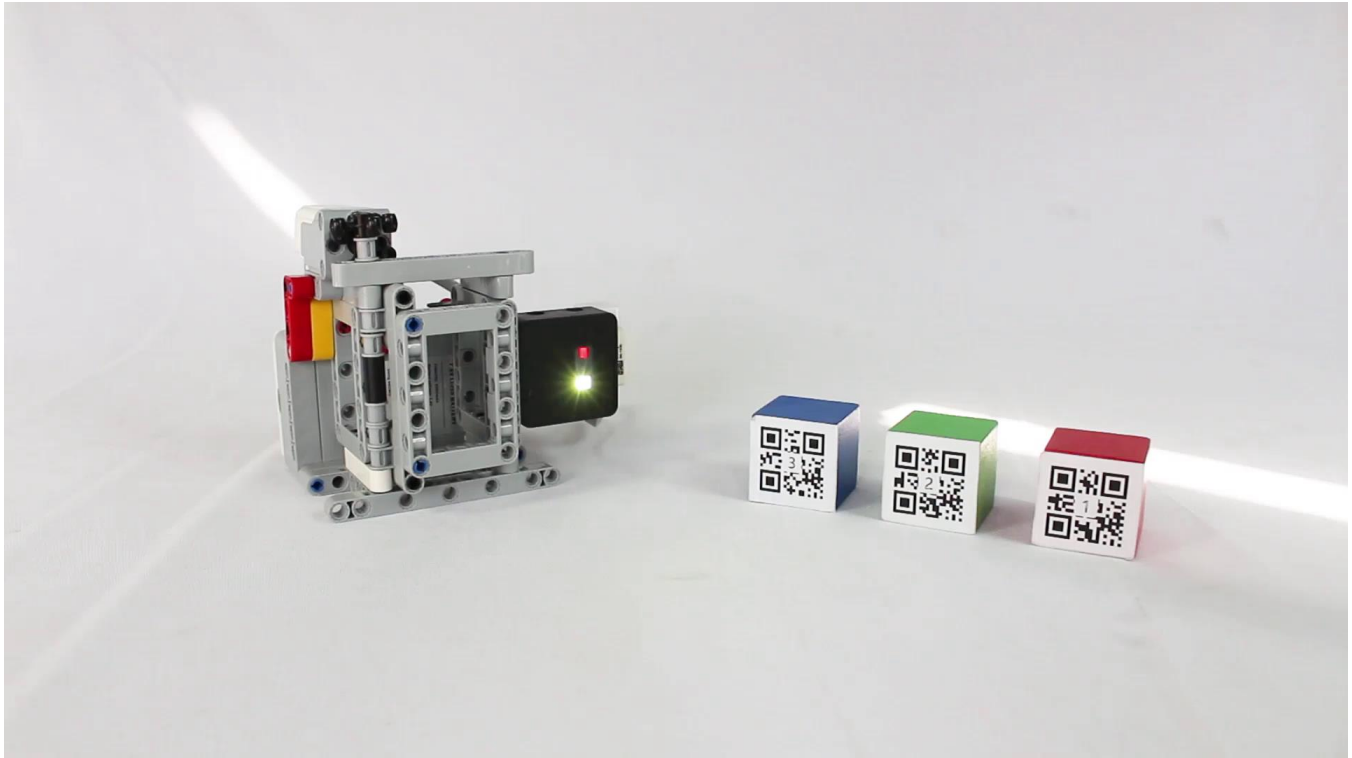
Practice | Programming

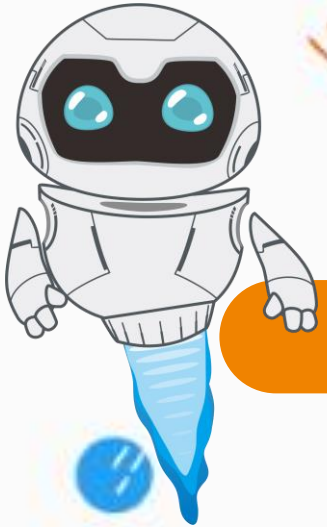


Integrate the program

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

Practice | Programming





Results

Program Optimization

This lesson realizes the function of scanning the code to open the door. Only by scanning the QR code according to the password in turn can the door be opened correctly, otherwise the door will be closed.

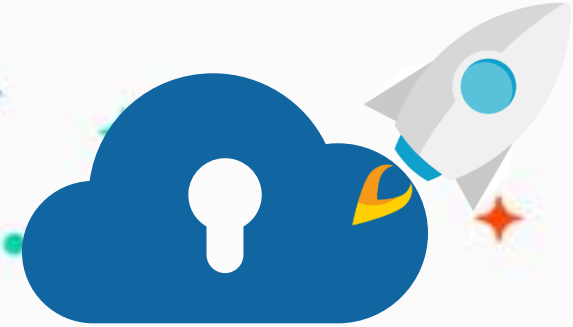
Next, modify the program, add more items in the preset password list, and combine more complicated door opening passwords.

Requirement: Add a preset password item and make a 6-digit password.

Further Reading



Visible light interactive technology is an Internet of Things technology independently patented by China. Simply put, we can transmit and transmit data through the light we see. Through technological breakthroughs, we can now use this light for daily interactions. Including opening the door, taking the bus, and paying, etc. can be done with it. It's similar to how we scan the QR code now, except that the process of scanning the QR code is replaced by light transmission. Hundreds of millions of data can be sent out in just one second, and there is no way for you to intercept it in just one second. Therefore, it is superior to QR codes in terms of security and its data volume.



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Thanks!

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