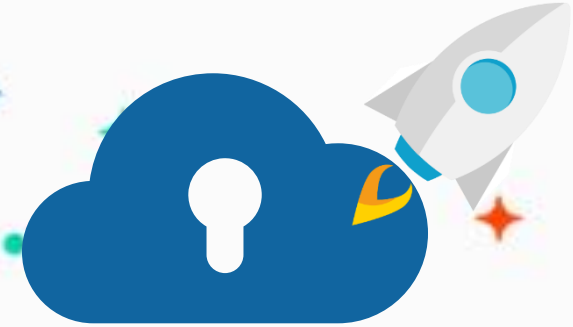

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Lesson 13. Accurate Shooting

LECTURER:

Lesson Objective

Learning Objectives

1. Learn about shooting games.
2. The programming method of the shooting target swinging back and forth.

Possible Difficulties

1. Write a program without using the wait module.
2. Control the shooting target to swing back and forth within a range.



Background Information



Background Information



Amusement parks are entertainment venues that offer a wide range of activities and are often located near densely populated cities. They are classified as theme parks and feature a variety of attractions including simulations of primitive societies, futuristic worlds, thrilling rides, quiz games, and classic shooting games. Some parks offer a complete selection of activities while others focus on specific ones.

Background Information



The most prestigious amusement park in the world is Disneyland, built in Los Angeles, California, USA in 1958. It is the masterpiece of Mickey Mouse cartoon producer Walt Disney, attracting tens of millions of tourists every year.

Later, the same one was built on the Florida peninsula in the south of the United States. In 1983, the third large-scale amusement park named "Disney" was completed near Tokyo, Japan. In recent years, a Disneyland has also been built in Shanghai, China.

In the future, with the development of domestic and foreign tourism, the construction of amusement parks will be expanded and improved day by day. There are many roller coasters and various amusement equipment that are popular among young people in the playground. It is a good place to release stress and feel the excitement!

Background Information



Large-scale amusement projects include carousels, Ferris wheels, roller coasters, pirate ships, etc. These projects are too exciting and have certain physical requirements, such as height or weight needed to reach a certain standard, and some of them have age restrictions.

Background Information

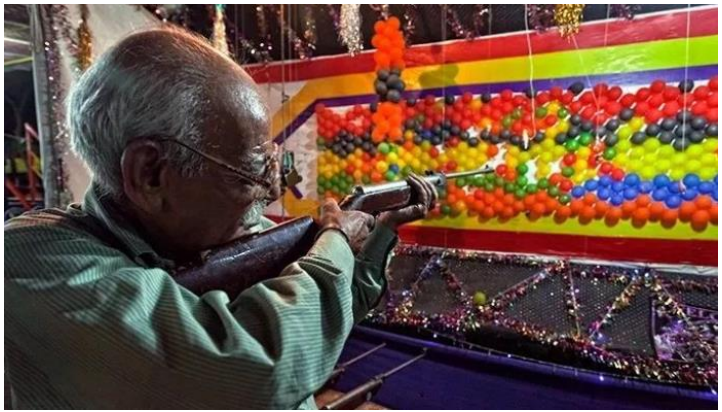


In addition to large-scale projects, there are many relaxing entertainment projects for children to play. For example, shooting, bumper cars, dance machines, rotating coffee cups, trampolines, etc. Today, we will make a shooting game. When you "hit" the target, you can get points. How many points can you get?



Knowledge Introduction

Knowledge Introduction

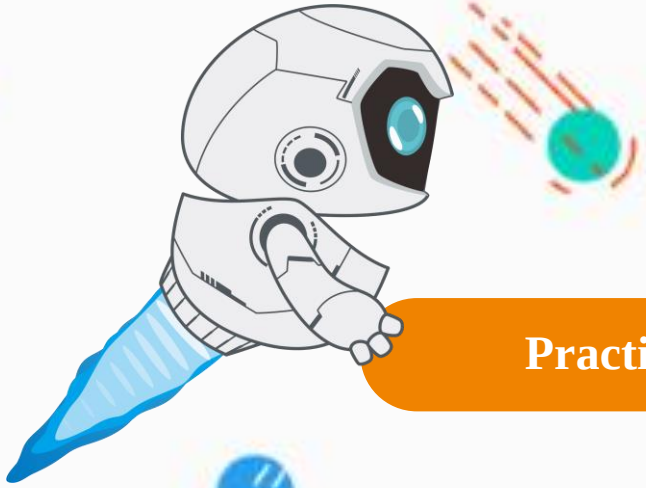


Shooting games in playgrounds have corresponding rules. Generally speaking, electric gun toys are used. There are a fixed number of bullets in the gun, which are fired after aiming. Points are scored after hitting the balloon. Different points can be exchanged for different prizes.

Knowledge Introduction

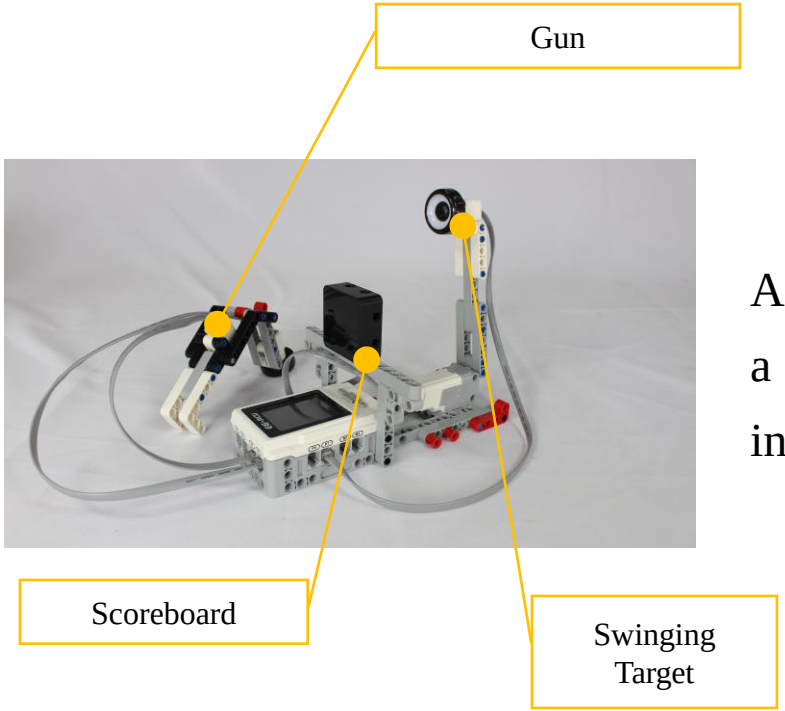


Due to the strict safety control of amusement parks in my country, the use of darts, toy bullets, and other bullets that can cause actual damage to the human body is not allowed, so shooting games are rarely seen nowadays.



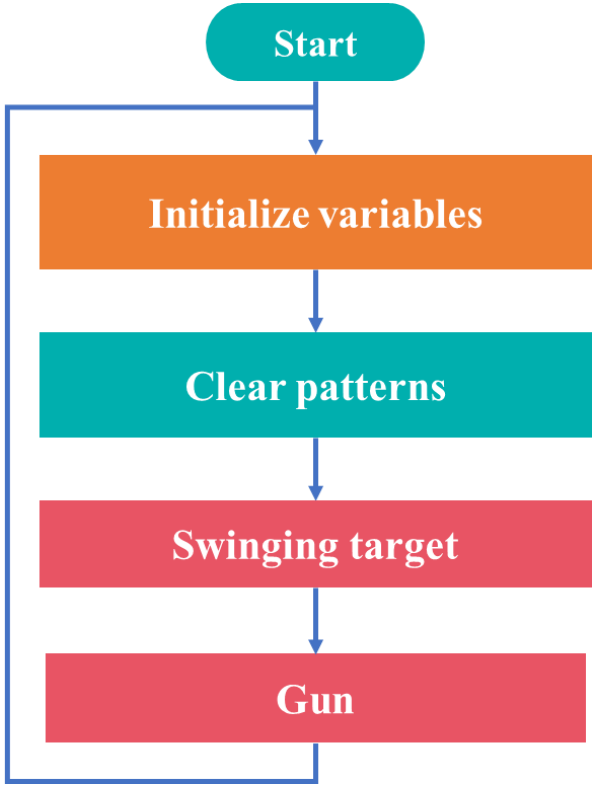
Practice

New Knowledge



According to the construction manual, build a model of a shooting game, and use infrared to detect whether it hits the target.

Practice | Flow Chart

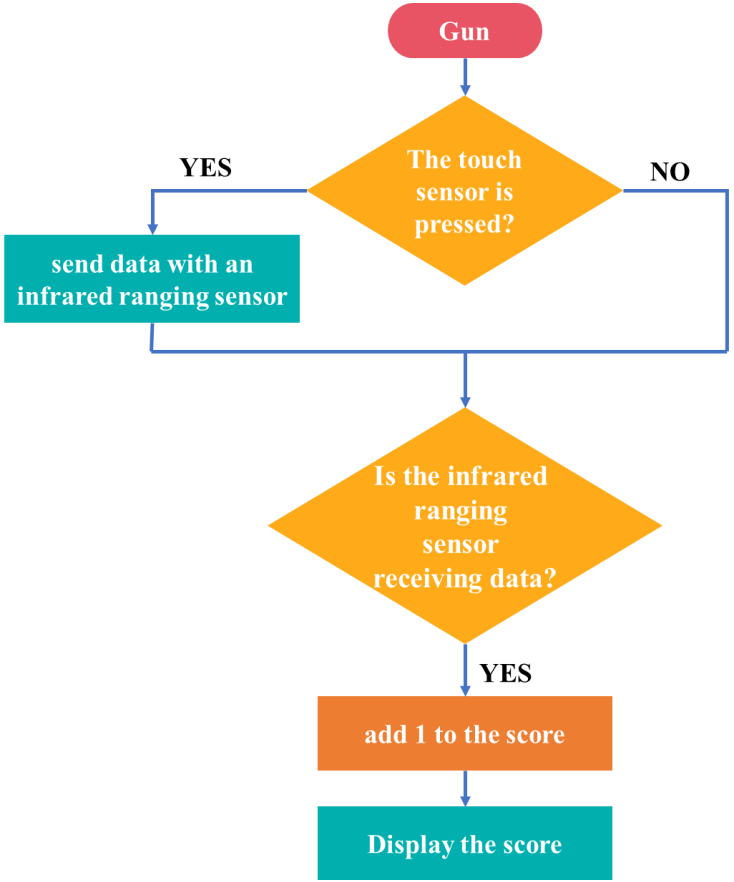


The flow of the main program is shown on the left.

Initialize the program first, and then execute two main functions: one to control the swing of the target, and the other to control the gun to shoot.

When shooting, the swinging back and forth of the target cannot be affected and there is a little randomness in the swinging.

Practice | Flow Chart

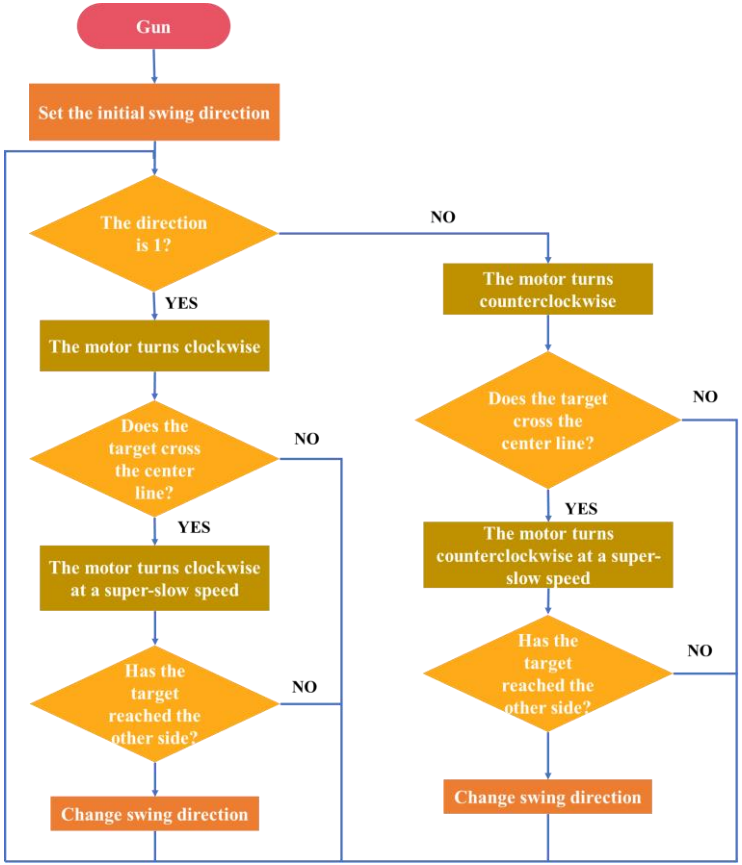


The function of the gun is shown on the left.

The gun program consists of two parts, namely launch and receive.

Pressing the touch sensor will emit infrared data, and the smart eye will increase the corresponding score when receiving the data.

Practice | Flow Chart

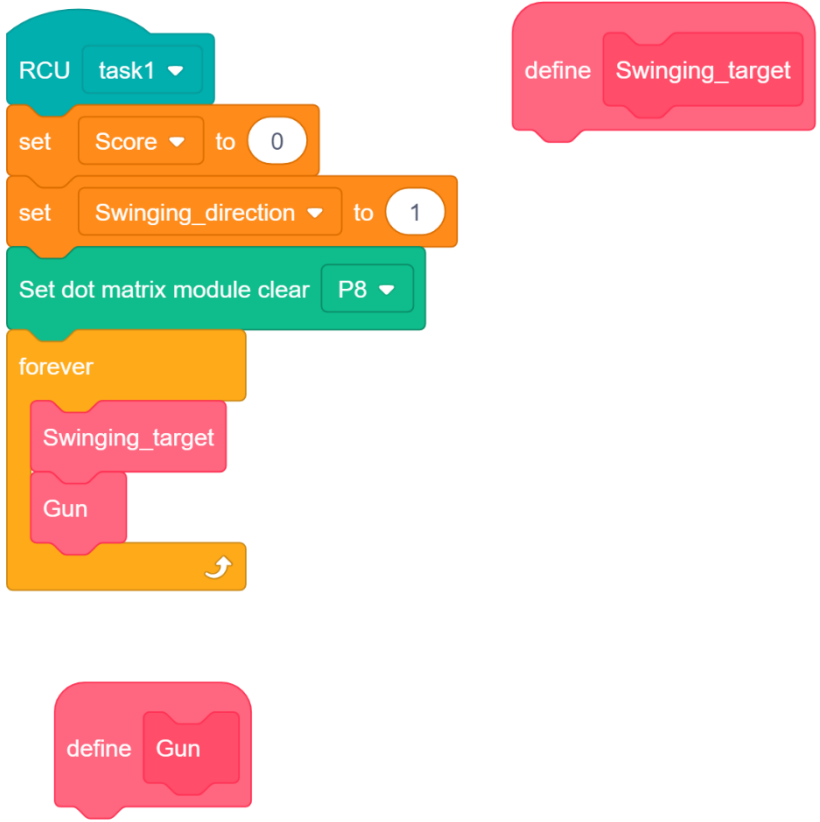


The flow chart of the swinging target function is shown on the left.

The direction of the swinging target must be specified, which is defined here as direction 1 and direction 0. Direction 1 means clockwise (forward rotation), and direction 0 means counterclockwise (reverse rotation).

To reduce collisions, targets are slowed down after crossing the center line. , switch directions when reaching the bottom of the other side.

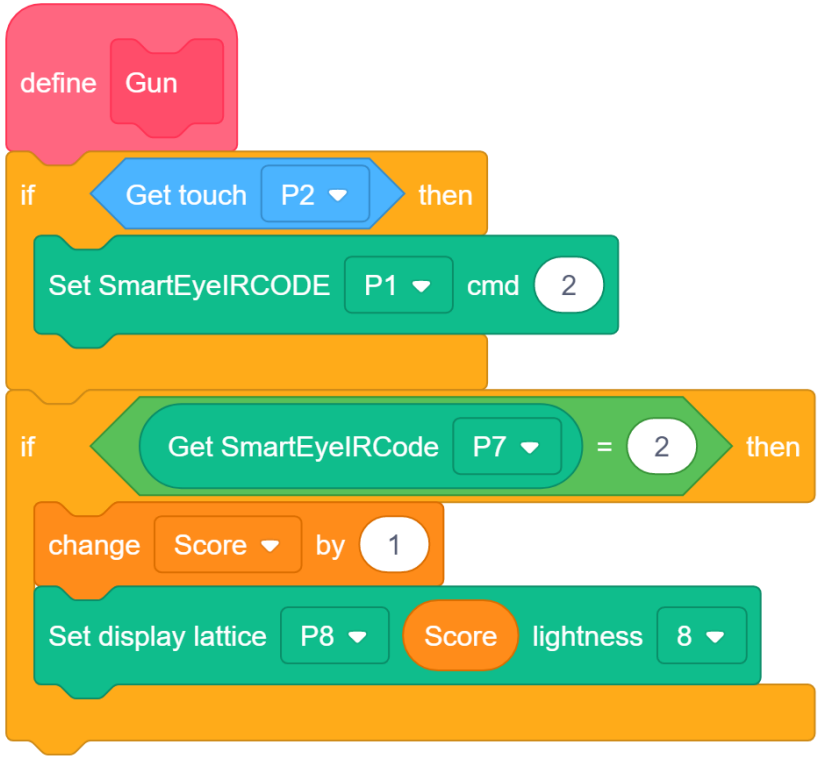
Practice | Programming



The main program

Initialize the program and name the function.

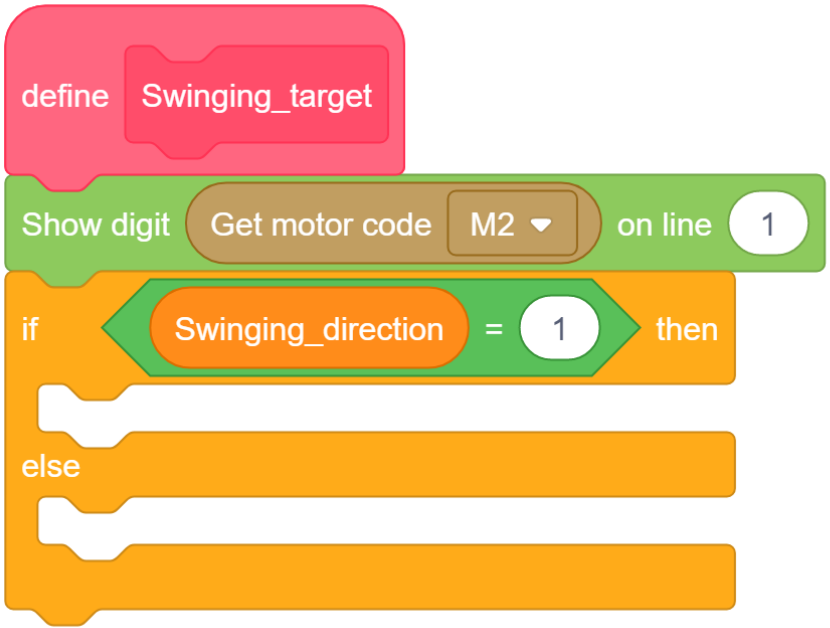
Practice | Programming



Function - Gun

The first "if...then" module is used to judge whether to shoot and the second "if...then" module is used to judge whether it hits. If it hits, it will add points and refresh the score.

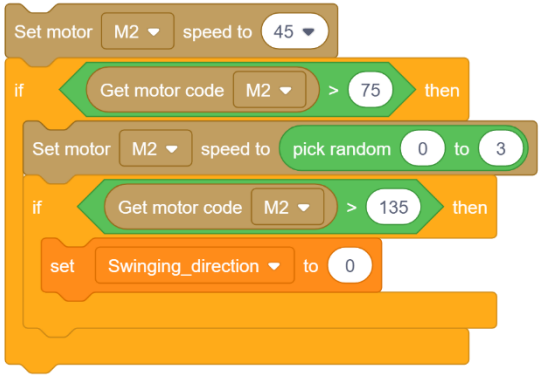
Practice | Programming

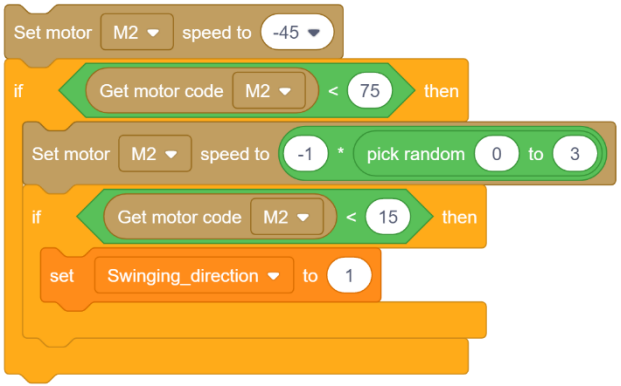


Function – swinging target

Define the swinging target, display the coded values of the motors, and establish the basic logic structure.

Practice | Programming



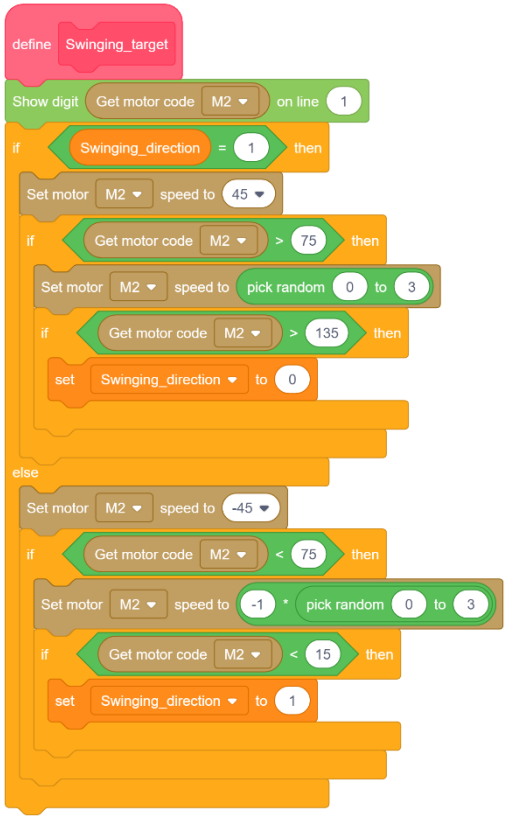


Judgment of changing lights

The left and right swings have the same structure and logic, but different values.

To prevent the target rod from continuously hitting the building blocks and destroying the overall structure, the speed of the motor needs to be limited. The swing range of the target rod is about 150, so after the target rod crosses the center line (75), the motor only provides slight power. Use the coded value to ensure that the target pole swings in place before changing the swing direction.

Practice | Programming



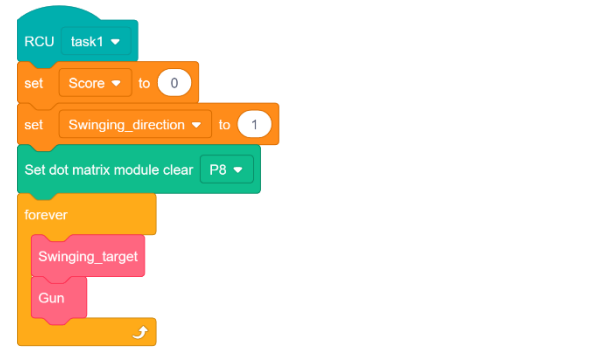
The complete function of the swinging target

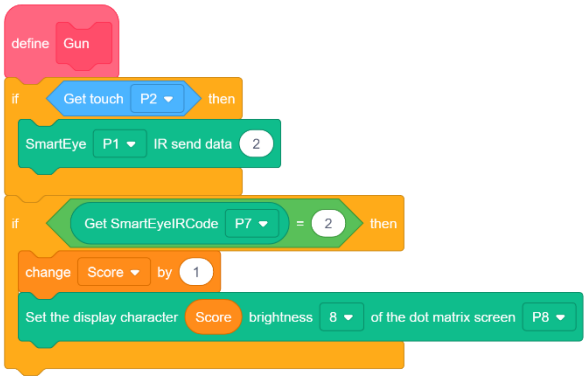
The complete swinging target function is shown on the left.

The gun target will continue to swing back and forth after the program is running.

Note: Every time you start the program, you need to swing the gun target to the left.

Practice | Programming



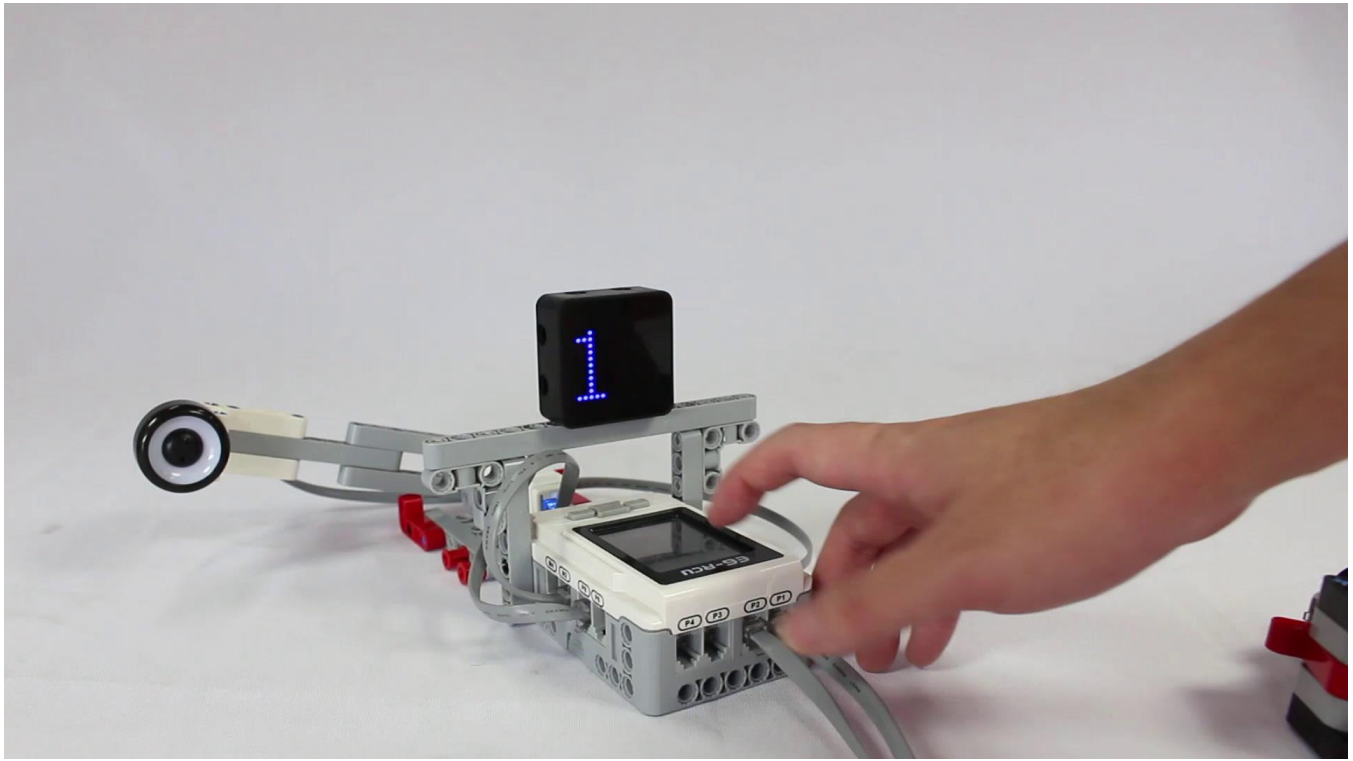


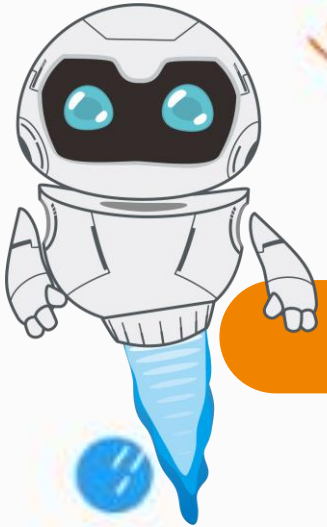


Integrate programs

Integrate programs according to the flow chart.

Practice | Programming





Results

Program Optimization

In this lesson, we implemented the game function of swinging the gun target back and forth and simulating shooting through the wisdom eye.

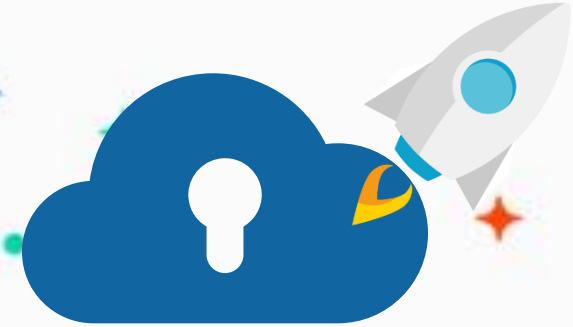
Please modify the program so that the gun target makes a sound when it is designed.

Requirements: The gun target makes a sound after being hit, while the swing of the gun target is not affected.

Further Reading



Simulated shooting is to use high-tech means such as image capture technology, image processing technology, voice processing technology, information sensing technology, virtual reality technology, multimedia technology, data acquisition and processing technology, computer communication technology, and other high-tech means of computer trinity, and use large-screen projection to generate virtual shooting environment so that players have the feeling of being in the shooting field.



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Thanks!

LECTURER: