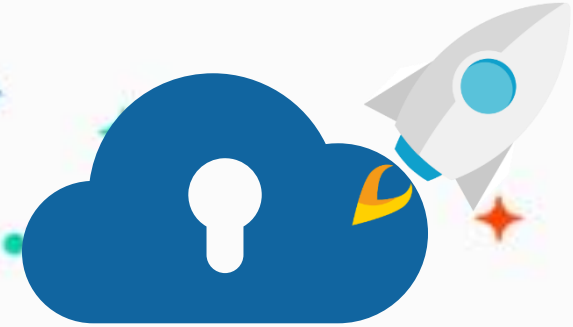

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Lesson 22. The Warrior

LECTURER:

Lesson Objective

Learning Objectives

1. Learn about the warrior.
2. Learn about the structure of the warrior robot that can wield a sword.

Possible Difficulties

1. Build a warrior robot.
2. Use the ultrasonic sensor to control the robot to patrol and wield the sword correctly.



Background Information



Background Information



Warriors generally refer to all those who have courage and martial arts. In ancient times, only nobles could become warriors because ordinary people could not support warriors.

To train a warrior, you need to start exercising from an early age and be able to provide many nutrients, which was very difficult in ancient times when productivity was low. As the saying goes, “The poor are mostly literati, and the rich mostly practice martial arts,” which shows that raising warriors is more expensive than raising scholars.

Background Information



In addition to emphasizing bravery, the warrior also emphasizes the spirit of a "scholar.” "Scholars" in ancient China, whether they were literati who made suggestions or warriors with one as ten, all followed the same principles of wisdom, trust, benevolence, and justice and had high requirements for their dignity and morality. We can feel their self-cultivation and attitudes from such famous sentences as "Scholars can be killed but not humiliated" and "Scholars die for their confidants.”

Background Information



Warriors have various weapons, and their abilities are generally reflected in their weapons. The heavier the weapon they can wield, the more they can prove their strength. Influenced by film and television, most warriors are always with swords, which are gradually called warrior swords. Today, we will make a warrior robot that can wield a sword.



Knowledge Introduction

New Knowledge

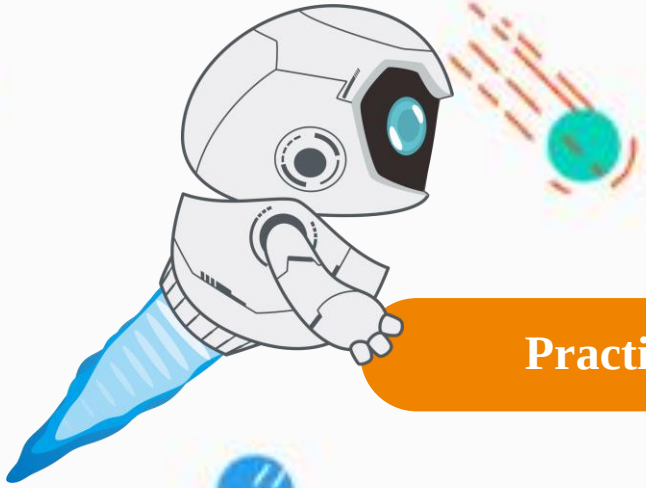


To exert force better, warriors often choose to hold the sword high before chopping it down. The chopping action is not a straight line from top to bottom but an arc with a specific angle from right to left. We will simulate this process using a turntable with gears.

New Knowledge | Hardware

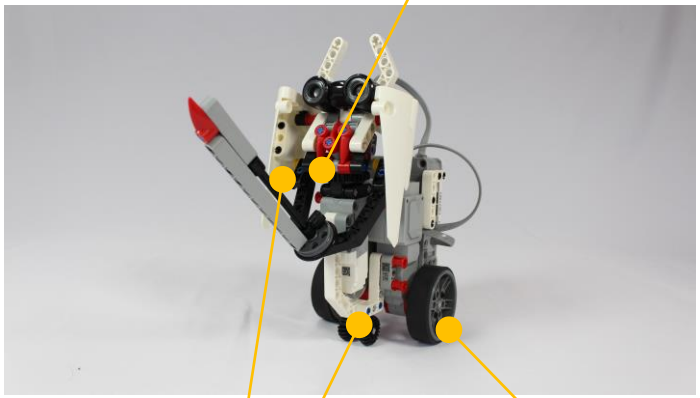


The turntable drives the gear to rotate to realize the shoulder rotation. While the gear rotates around the turntable, it drives the arm to move backward. You can first set up the following structure to test the movement of wielding a sword.



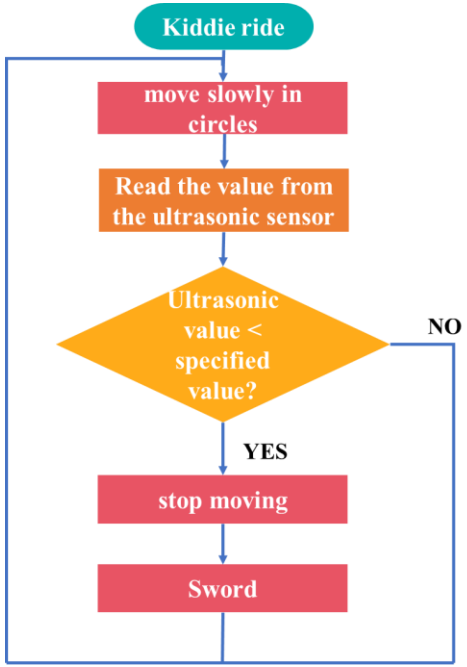
Practice

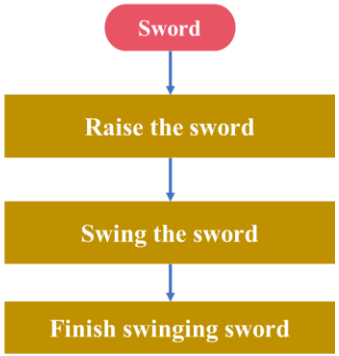
New Knowledge



According to the building manual, build a warrior robot to realize the movement of patrolling in circles and finding the target wielding a sword.

Practice | Flow Chart

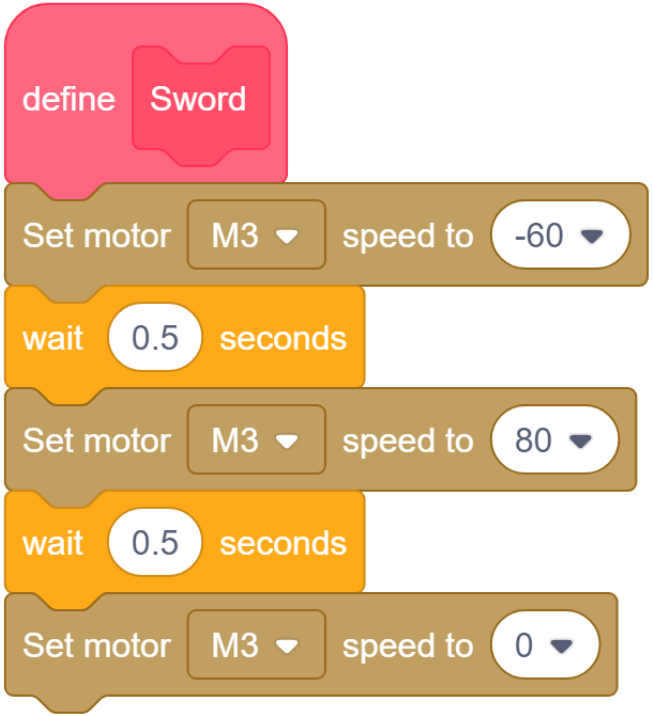




The warrior robot will wield the sword after finding an obstacle. It is essential to judge the ultrasonic value.

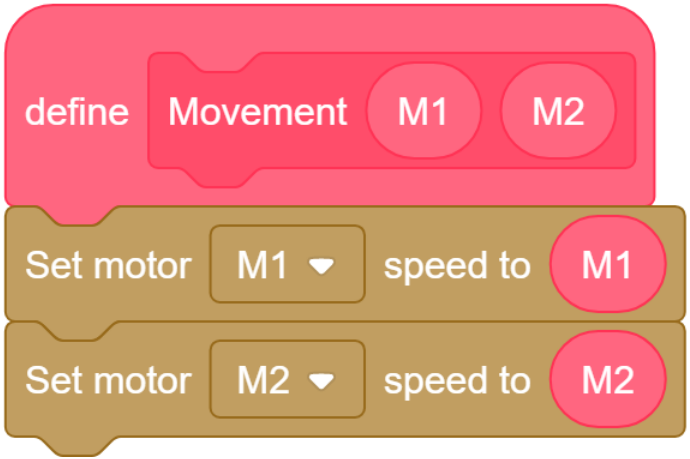
The robot will continue to patrol in circles. During this process, it will wield a sword if it detects that the object is too close.

Practice | Programming



Function – Sword

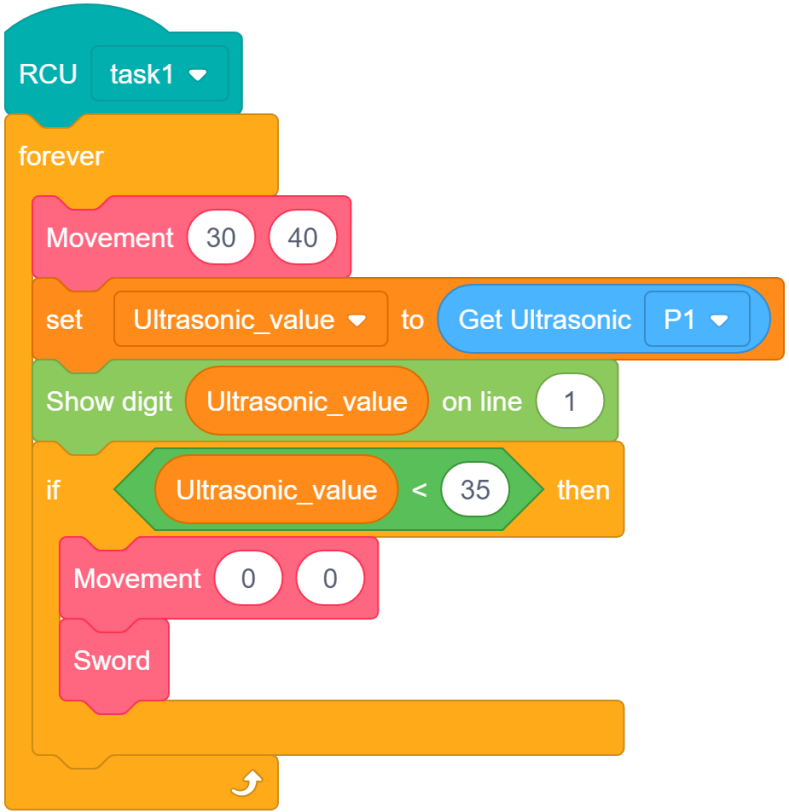
The action of the robot is divided into two parts. The first part is to raise the sword, and the second is to cut down. The time interval between each time is 0.5 seconds. After the cut-down is completed, set the motor to a non-rotating state.



Function - Movement

The two parameters, M1 and M2, control the corresponding motor rotation.

Practice | Programming



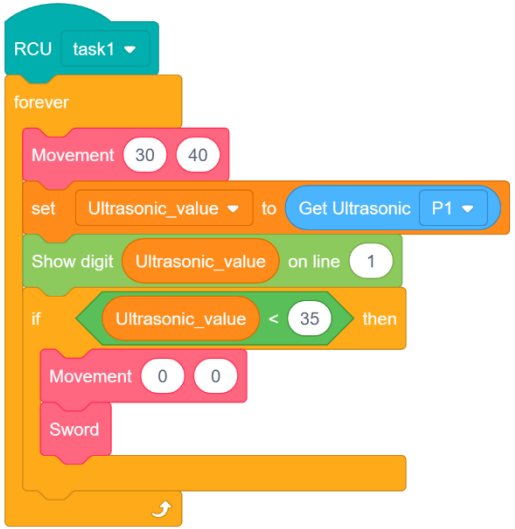
Main program

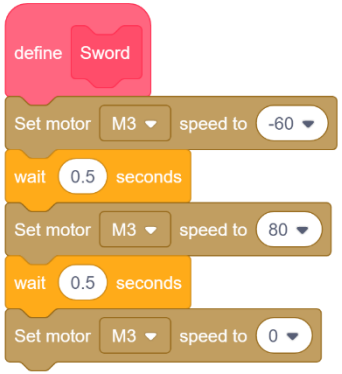
Patrol and circle: set the two motors to move at different speeds, making slow turns to move in circles.

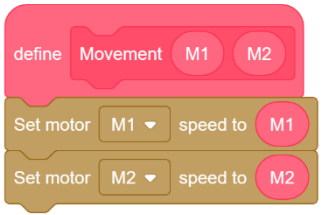
The judgment value of the ultrasonic wave can be fine-tuned. During the test, try to let the robot raise both hands to measure the value between the sword and the ultrasonic sensor.

When wielding the sword should stop moving until the wield is complete.

Practice | Programming





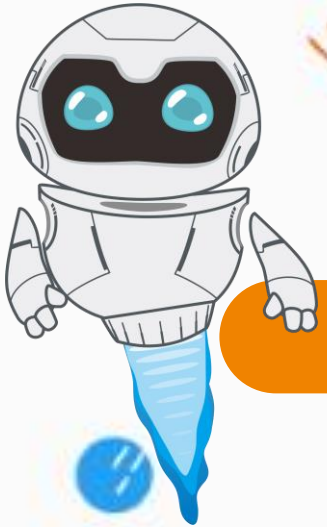


Integrate the program

Integrate the program according to the flowchart.

Practice | Programming





Results

Program Optimization

In this lesson, we implemented the function of the samurai robot patrolling and wielding a knife when encountering enemies.

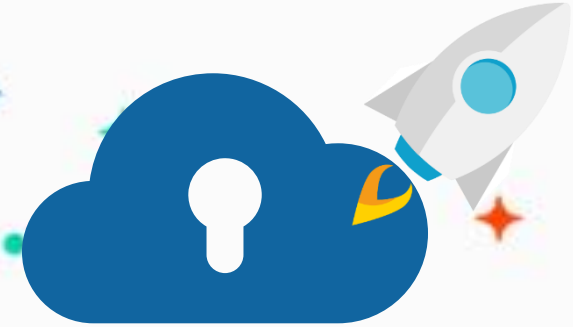
Modify the program or structure so that the robot can withstand more force when wielding the knife (hint: adjust the center of gravity, change the position of the training wheels).

Requirements: Let the robot maintain balance when wielding the sword continuously.

Further Reading

Chinese warriors are fundamentally different from Japanese samurai. Japanese samurai are a social class in Japan from the 10th century to the 19th century. In the book "Japanese History" by Inoue Kiyoshi, Japan, a samurai is clearly defined: killing, robbing, and robbers are samurai; The ronin shows the murderous nature of the Japanese samurai. The loyalty and bravery of a samurai are based on the master-slave system in which the lord he is loyal to can reward the contributions made by the samurai. At the same time, they are also a profession that destroys humanity. As a professional military group, combat is the first mission of a samurai. Except for Japan and countries influenced by the Chinese language family, many languages are represented by the Japanese "servant."





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Thanks!

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