Learning Series

Smart door



This robotics kit is a building block robot developed by Joinmax. It builds the body of the robot through building blocks and works with programming software and sensors to achieve various functions.

Learning Target

01

Knowledge goal

Learn about ultrasound and learn how to use ultrasound sensors.

02

Ability goal

Familiar with the ultrasonic module, master the basic usage of the ultrasonic sensor.

03

Emotional attitudes and values

Learn about things that are not easily accessible, and keep curious and exploring about the unknown.

Learning Target

01

Learning focus

Master the basic usage of ultrasonic sensors.

02

Learning difficulties

Understand the flexible use of [repeated execution until.

Contents

01 Course Introduction

02 Teaching New Knowledge

03 Design Assembly

04 Programming and Debugging

05 Test Effect

Course Introduction



Course Introduction

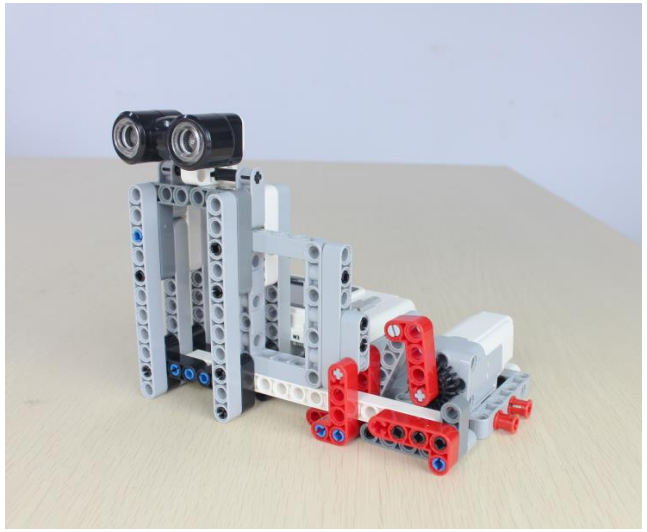


What do people mean by "slower than snails"?

On summer evenings, we often see dark things in the sky flying around. In fact, it is not a bird, but a bat belonging to mammals. They are eating mosquitoes!

Although it is night, the bat can catch tiny mosquitoes very accurately. It has to be said that it has the best stunt "echo positioning". Do you know what is the echo positioning?

Course Introduction



Voice-activated animal

Know about the voice snail

The robot in this lesson is called "Smart door".

The "echo positioning" of small bats is so powerful.

We also learn to use this skill today and apply this skill to our daily life.

Let's learn together.

Teaching New Knowledge



Teaching New Knowledge

Ultrasonic: It is a kind of sound wave with a frequency higher than 20,000 Hz. It has good directionality, strong penetrating ability, easy to obtain concentrated sound energy, and has a long distance in water. Ultrasound is obtained because its lower frequency limit is greater than the upper limit of human hearing. name. Scientists refer to the number of vibrations per second as the frequency of the sound, and its unit is Hertz (Hz).The frequency of sound waves that we can hear in human ears is 20Hz-20000Hz.We call sound waves with frequencies above 20,000 Hz "ultrasonics".The ultrasonic frequency commonly used for medical diagnosis is 1 megahertz to 30 megahertz.



Uses: It can be used for distance measurement, speed measurement, cleaning, welding, crushing stone, sterilization and so on. There are many applications in medicine, military, industry, and agriculture.

Teaching New Knowledge

Features:

1) When the ultrasonic wave is transmitted, the directivity is strong and the energy is easily concentrated.

2) Ultrasonic energy can propagate in a variety of different media and can travel far enough.

3) The interaction between the ultrasonic wave and the sound-transmitting medium is moderate, and it is easy to carry information diagnostics about the state of the sound-transmitting medium or to produce effects and treatment on the sound-transmitting medium.

4) Ultrasonic waves can be effectively transmitted in gases, liquids, solids, solid solutions and other media.

5) Ultrasonic waves can transmit very strong energy.

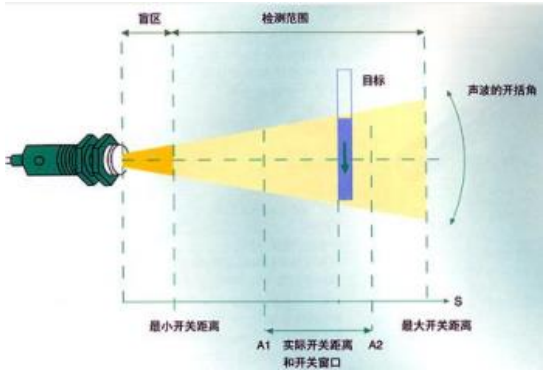
6) Ultrasound produces reflection, interference, superposition and resonance.



Teaching New Knowledge

Ultrasonic sensor:

An ultrasonic sensor is a sensor that converts an ultrasonic signal into another energy signal (usually an electrical signal).Ultrasonic waves are mechanical waves with vibration frequencies above 20 kHz. It has the characteristics of high frequency, short wavelength, small diffraction phenomenon, especially good directionality, and can be directional and propagated. Ultrasonic penetration of liquids and solids is great, especially in sunlight-opaque solids. When an ultrasonic wave hits an impurity or an interface, it produces a significant reflection to form a reflected echo, which can produce a Doppler effect when it hits a moving object. Ultrasonic sensors are widely used in industrial, defense, biomedical and other fields. working principle:



Teaching New Knowledge

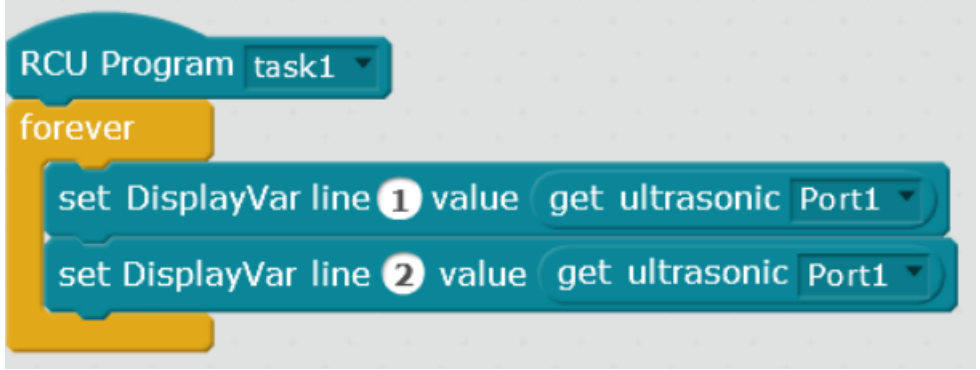
① Electronics - Sensor - get Ultrasonic



② Electronics – Display - [Set Display Var of line X]



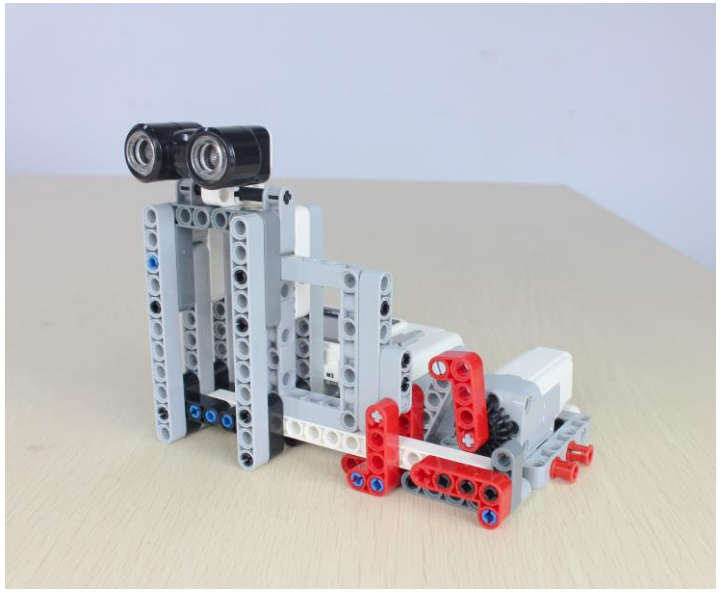
Example usage:



Design Assembly



Design Assembly



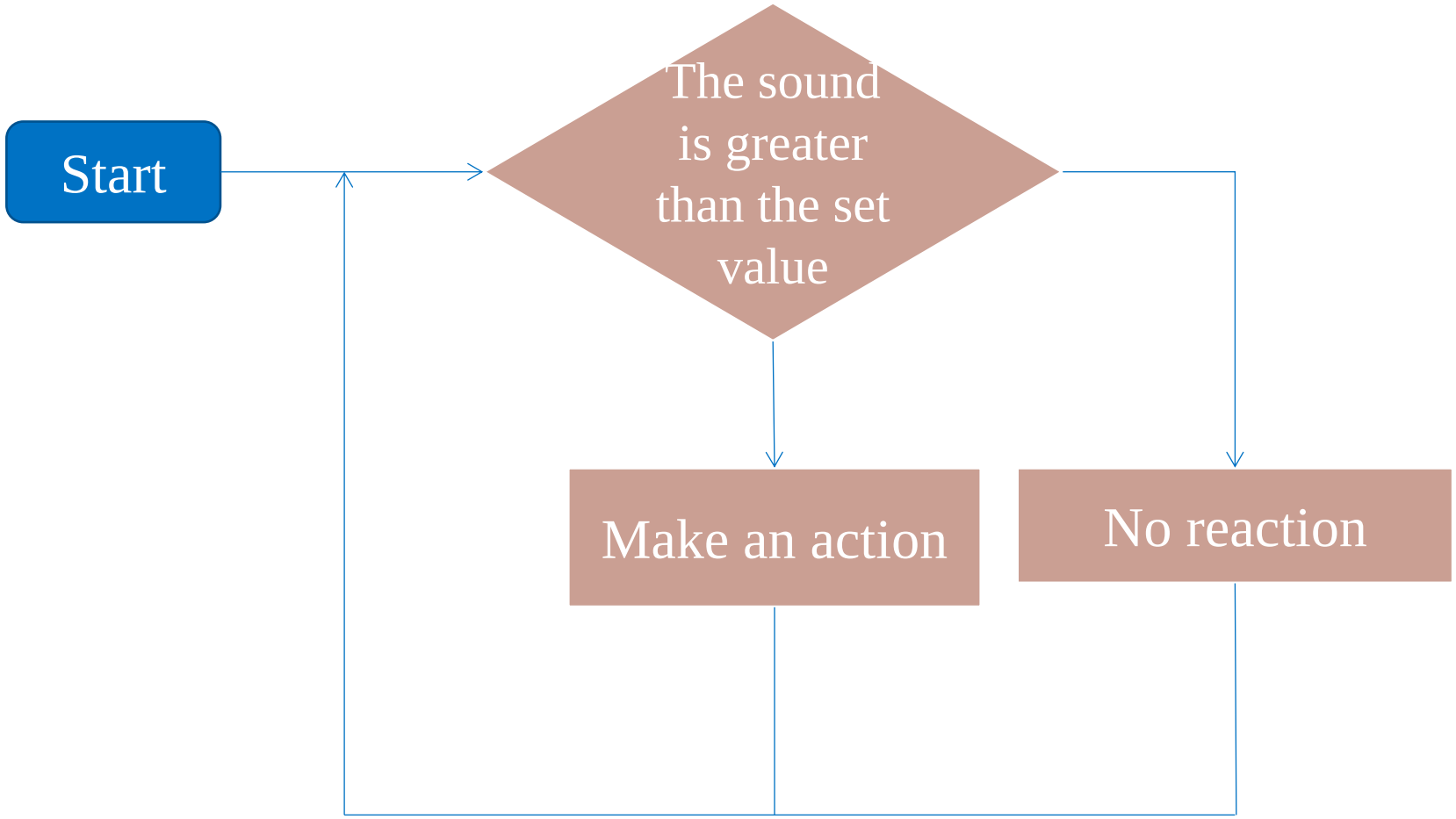
Assembly requirements

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

Programming and Debugging



Programming and Debugging

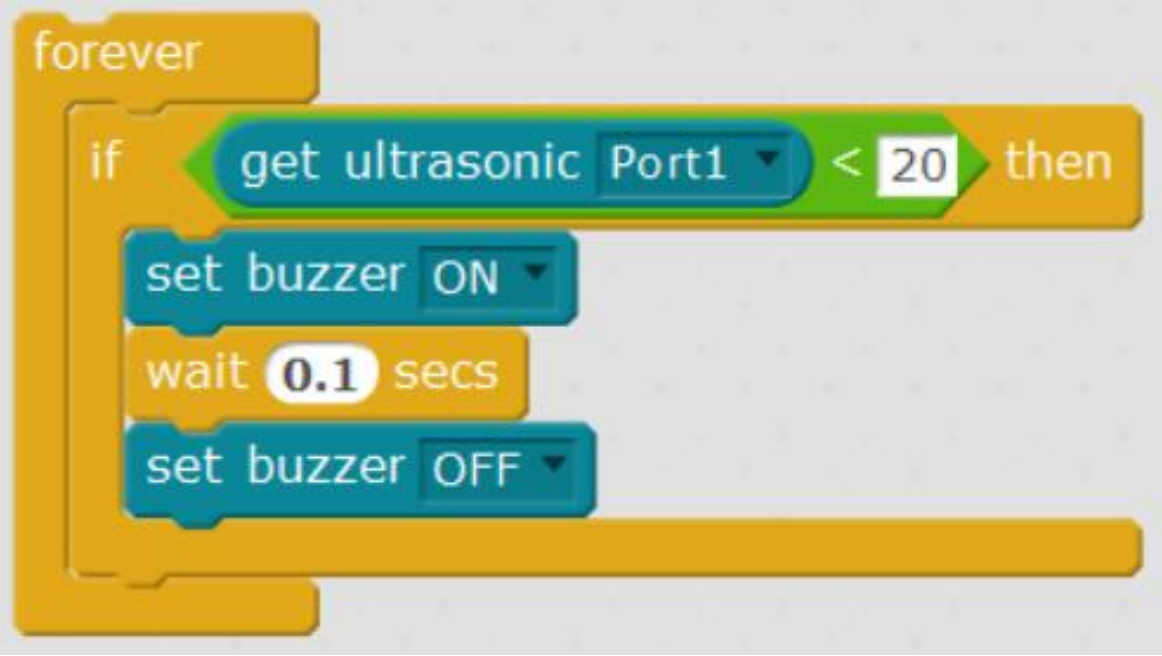


Programming and Debugging



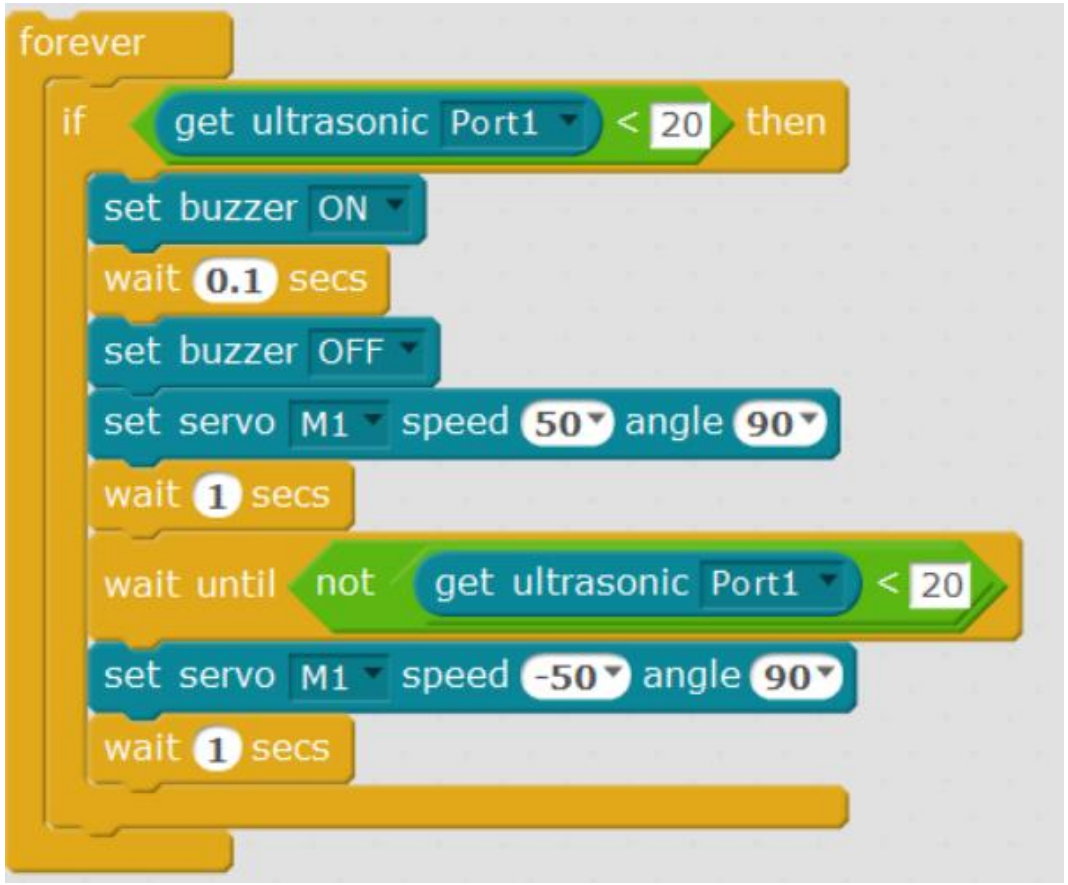
1. Place a large enough obstacle at 20cm in front of the robot to read the value when the sensor senses the obstacle and display it on the screen.

Programming and Debugging



2. When the distance is less than 20cm, the buzzer will sound.

Programming and Debugging



3. When the distance in front of the door is less than 20cm, a “drop” sounds to open the door. When not in front of the door, close the door.

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 hardware does the robot use today?

Question 3

Can an ultrasonic sensor make a sound?

Thank you for watching

