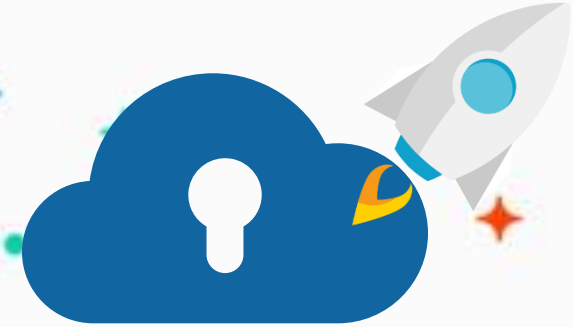

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Lesson 11. Car lights

LECTURER:

Lesson Objective

Learning Objectives

1. Learn about the types and uses of car lights.
2. Learn about how to use different lights.

Possible Difficulties

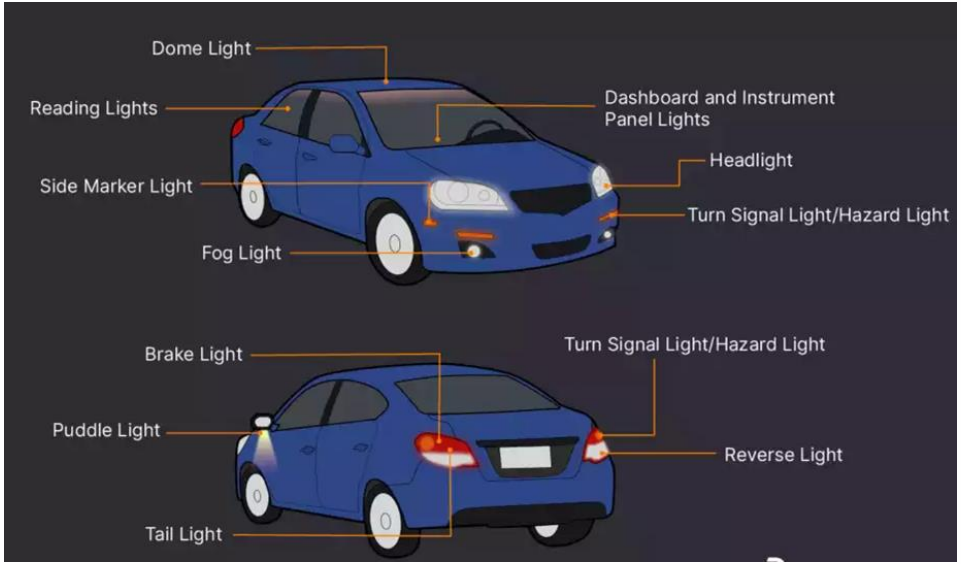
1. Function settings of different lights.
2. The mode of periodic random switching.



Background Information



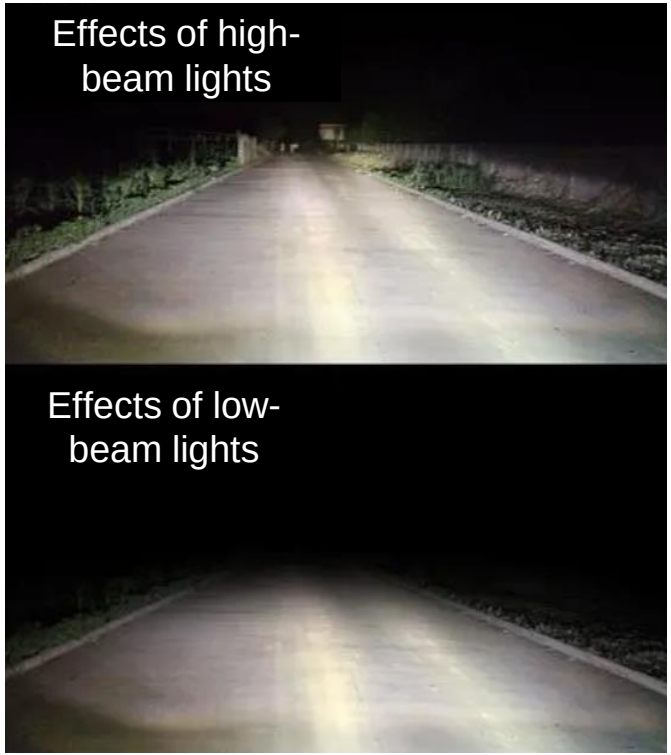
Background Information



There are many lights in the car. Do you know what their functions are?

First of all, the lights on a car are mainly divided into two types: lights for lighting and signal lights. Common lights for lighting include headlights, fog lights, tail lights, and license plate tail lights; signal lights include: position lights, brake lights, turn signal lights, parking lights, and position lights.

Background Information



Different lights are responsible for different functions.

For example, low-beam lights can only emit nearer lights for normal driving; while high-beam lights can emit farther and wider light due to a larger angle, but turning on for a long time will affect the driving of oncoming vehicles or vehicles in front, so it cannot be turned on for a long time. Under normal circumstances, the high and low beams need to be used alternately.

Background Information



In addition to the front lights to ensure the driver's vision, the taillights are also very important. The taillights are not for the driver but for the vehicle behind.

When the driver is driving, if he sees the red light of the vehicle ahead, he should be ready to brake. This is because the brake light of the vehicle in front is already on, and if you do not brake early, it will cause a rear-end collision.

Background Information



In the same way, the turn signals are also for the convenience of people outside the car to observe, to plan their route in advance. Be sure to recognize that the headlights are to help people outside the car to better observe the vehicle, not to serve drivers themselves.



Knowledge Introduction

Knowledge Introduction



Proper use of lights is very important because a large number of crashes are caused by drivers who did not turn on the turn signal early or turned on the wipers by mistake. At present, even smart cars do not have the function of turning on the turn signal. This is because the turn signal needs to be turned on in advance to make sense. Turning on the turn signal when the car has already started turning does not tell the car behind to avoid it in time.

Knowledge Introduction

In addition to simple switch lights, drivers also have customary car light language, which is generally used for driving at night.

When you are affected by the high beams of the oncoming vehicle and cannot see the route clearly, you can flash the high beam twice or once to tell the oncoming vehicle to temporarily turn off the high beams to protect yourself. driving safety.

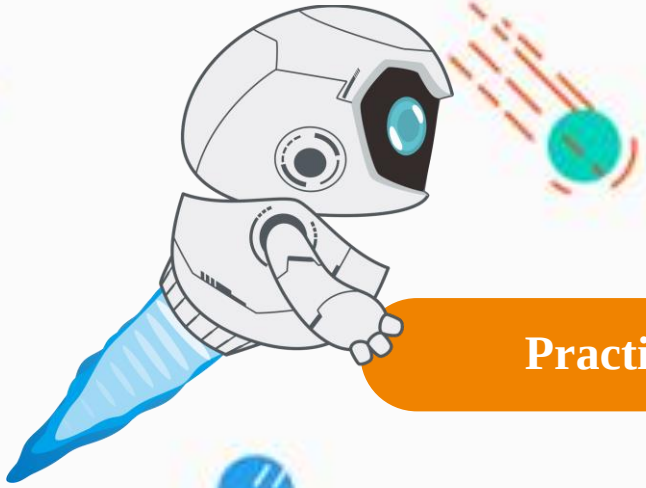
Or if you see an air leak or other accidents in the vehicle in front, you can turn on and off the high beam multiple times to remind the driver to pay attention to the problem of his vehicle.

Of course, the most important thing is that if you see the "hazard warning flash" on the vehicle, you need to avoid it in time, because double flashing means that the vehicle is malfunctioning and cannot drive normally.

Knowledge Introduction

With the advancement of technology, car lights have also changed from incandescent lamps to LED lamps, from low brightness to high brightness, and then to improve service life and reliability. Excellent headlights can provide drivers with more reliable driving information to make more reasonable driving judgments.

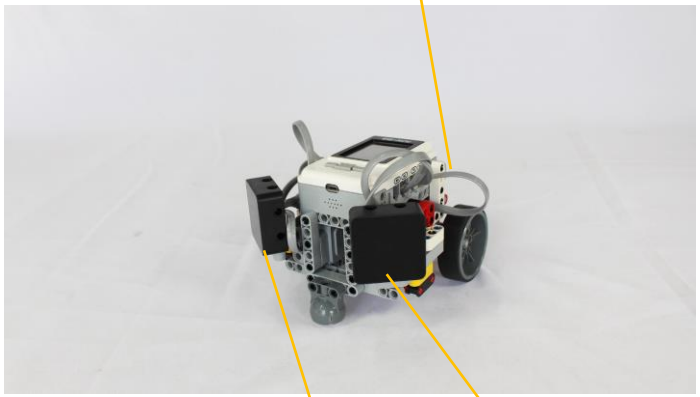
Today, we will use the dot matrix screen to make the car's warning lights and the corresponding lights will be turned on when turning, braking, parking, or malfunctioning.



Practice

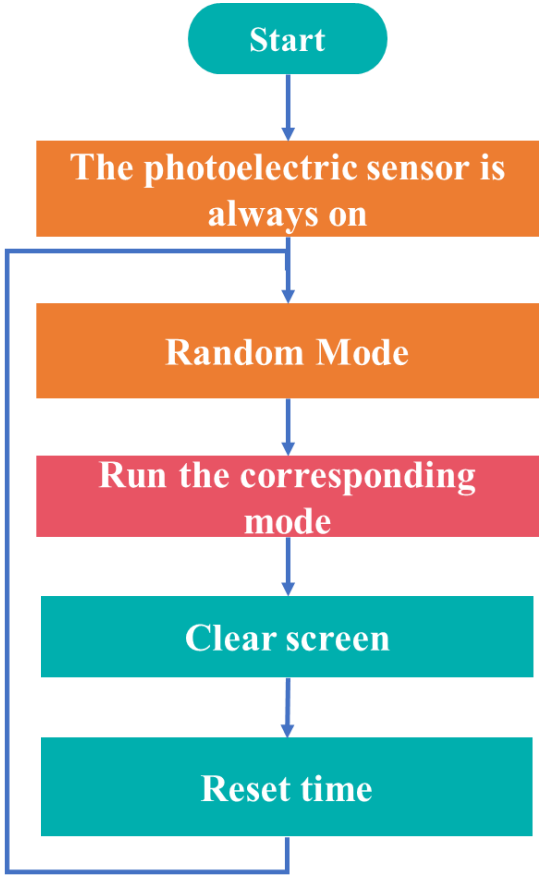


New Knowledge



Build a car robot according to the building manual and install taillights at the rear of the car. When running the program in the corresponding mode, there will be corresponding light effects.

Practice | Flow Chart

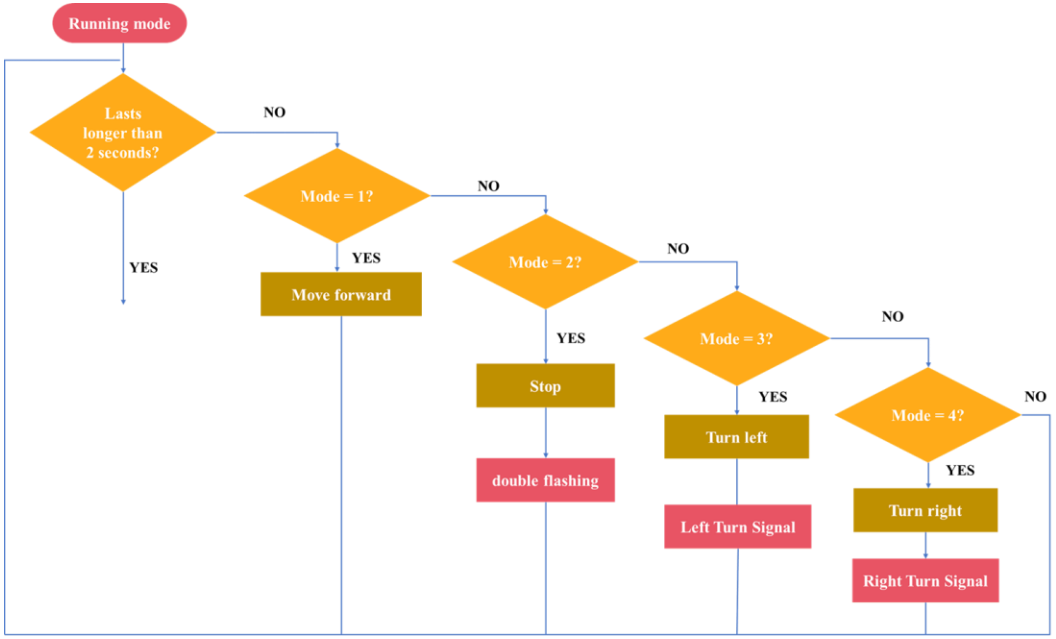


The flow of the main program is shown on the left.

The headlights are always on and run in a different mode randomly every 2 seconds.

The corresponding mode of operation is written using functions, which makes it easier to clarify programming ideas.

Practice | Flow Chart

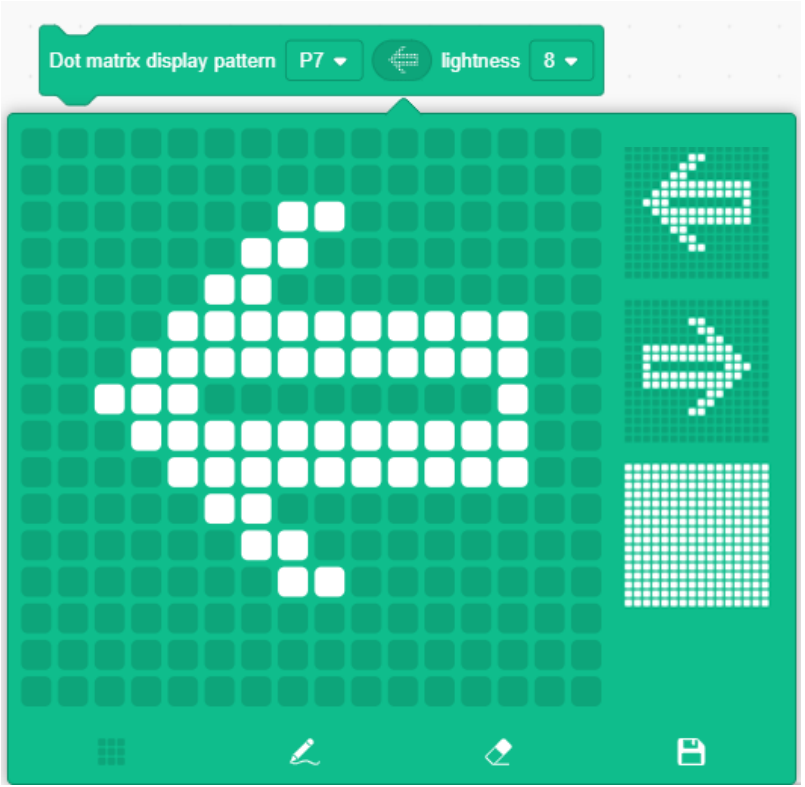


The flow chart of running different modes is shown on the left.

Every time the function is run, it will jump out of the loop after 2 seconds. In the loop, execute the corresponding pattern according to the random number.

The main program is responsible for random counting, clearing records, and resetting the time. The operating mode function is responsible for executing different modes. Modes 5, 6, and 7 can be expanded according to actual conditions.

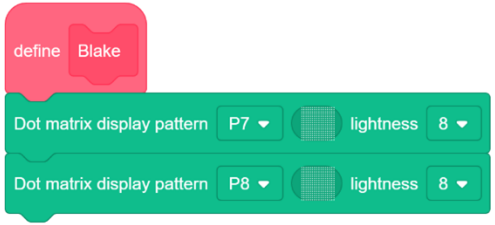
Practice | Programming

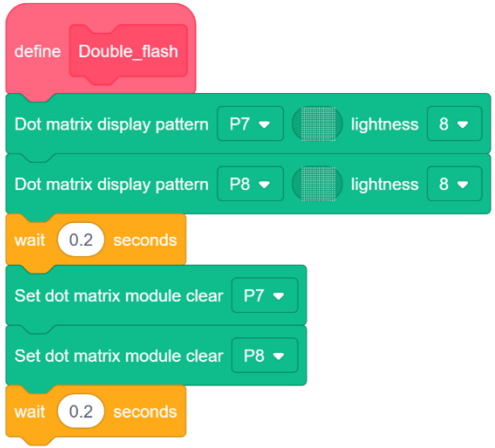


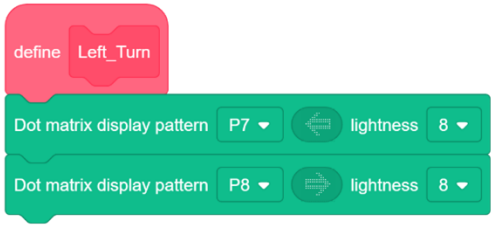
Draw pattern

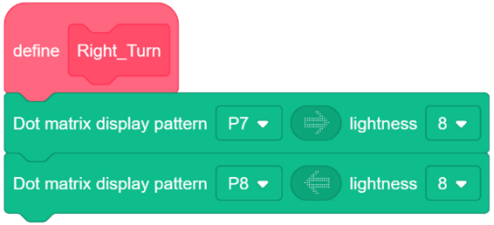
Draw patterns for left and right directions and brakes.

Practice | Programming



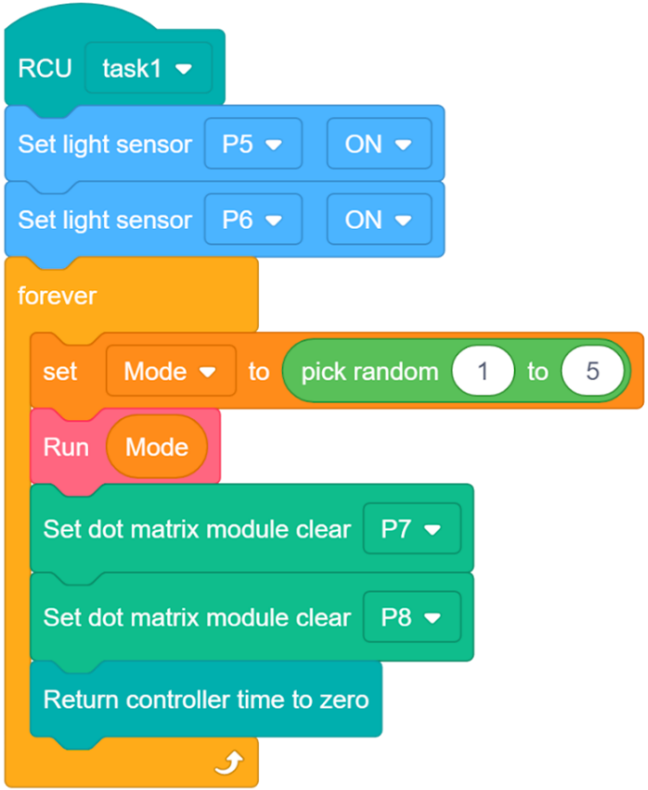






Create functions

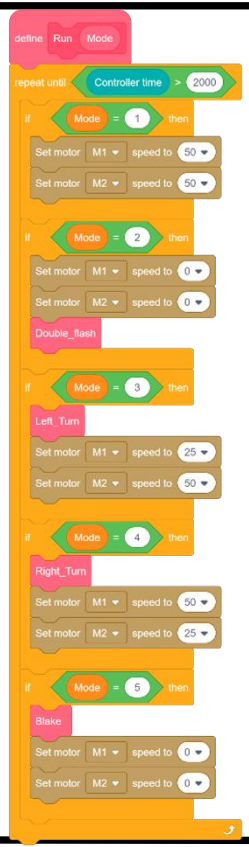
Create functions for braking, double flashing, turning left, and turning right.



The main program

Randomly set a number from 1 to 5 when running, and then let the running function execute the corresponding situation according to the random number. After the running is completed, clear the screen and restart the timing.

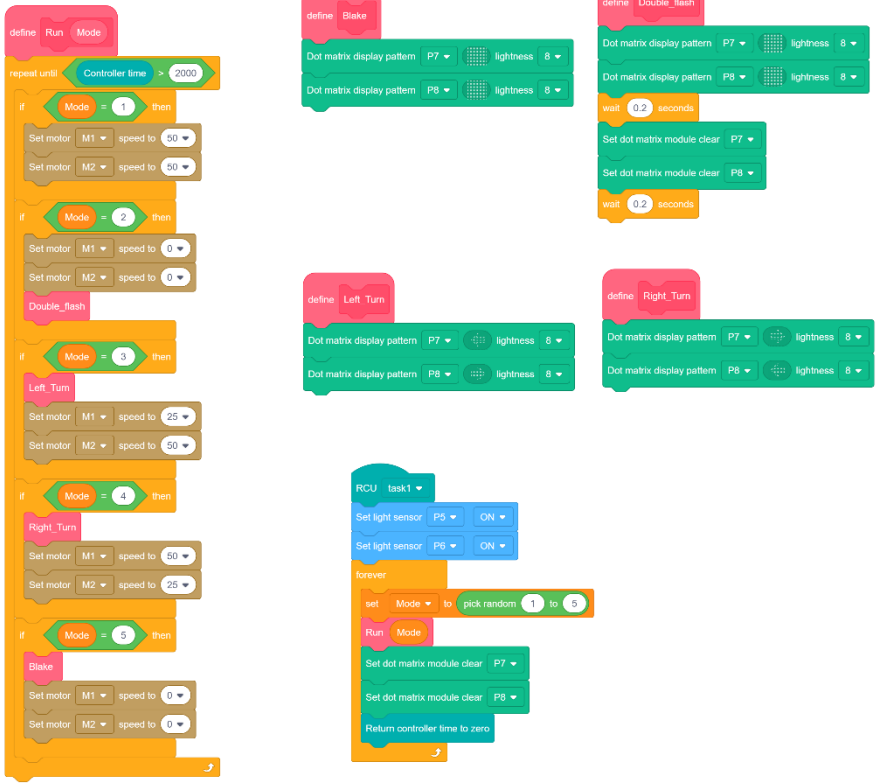
Practice | Programming



Functions of modes

Mode 1 is forward, mode 2 is failure, mode 3 is left turn, mode 4 is right turn, and mode 5 is brake.

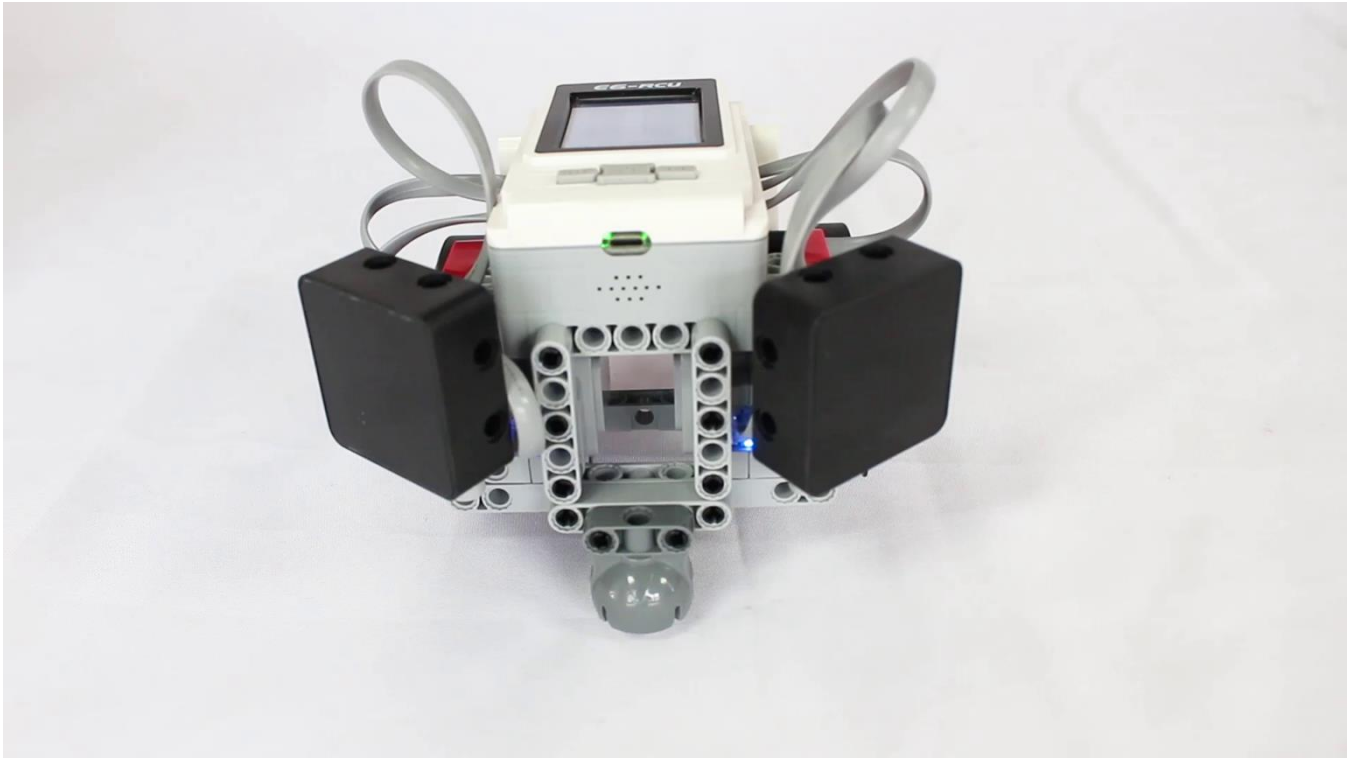
Practice | Programming

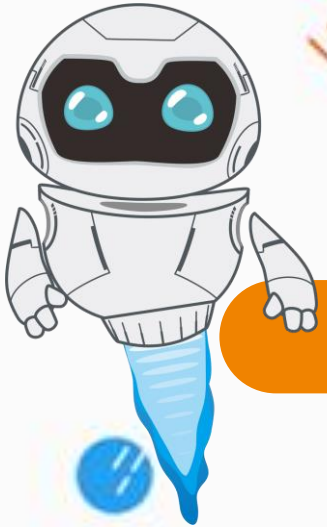


Integrate programs

Integrate programs according to the flow chart.

Practice | Programming





Results

Program Optimization

In this lesson, we realized that the car robot lights up different taillights in different modes.

Next, modify the program so that the lights can be turned on in advance when turning.

Requirements: Let the robot turn on the lights for a while before turning left and right.

Further Reading

Car light language refers to a tacit understanding of car lights. The light language is like the gesture of a traffic policeman, and it is a silent language universally used in the world. The lights on the outside of the car also include width indicator lights, brake lights, fog lights, turn signals, etc. For example, when the car has some faults or other conditions, it is necessary to turn on the double flash to remind other vehicles to pay attention.

1. The vehicle in front does not move after the green light is on

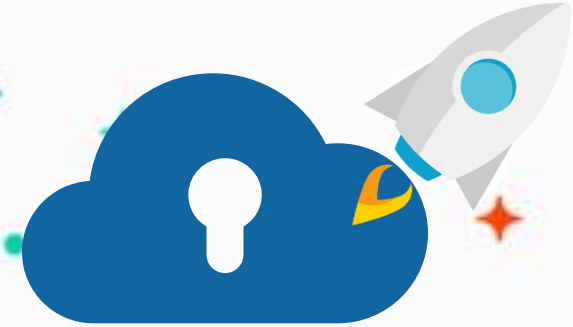
Light language: flash the headlights

2. Encountering strong lights at night

Light language: Twice the headlights to remind, and double jumps to express dissatisfaction

3. Merge when encountering vehicles

Light language: Headlight flashes to agree, headlights to flash repeatedly to reject



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Thanks!

LECTURER: