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Hello, master, I am your robot Bolt, nice to meet you, I am a STEAM (science, technology, engineering, art, mathematics) education robot, Elecrow technology planet, want to communicate with me, you need to learn to use Letscode programming software, go to download the software! Let's start the secret journey of science and technology together!
Let's code software installation and use process

1. Open the website in your browser: https://www.elecrow.com/;

2. Click on the home page: Brand>Letscode, Go to the Download page;

3. Select the corresponding system version from the drop-down list to download the installation package.
4. Open the installation package, select an installation path, and install the Letscode software.

5. Open Letscode software and add Crowbot Bolt extension;
6. Connect the car with the computer using the data line, and select the corresponding COM port;

7. Write the program, click the download button in code mode, and wait for the program to be uploaded.
CrowBolt Car Front Overview

Infrared Receiver
Photodiode (Light Sensor)
Ultrasonic Module Interface
Buzzer
N20 DC Geared Motor
Battery Box Port
Motor Port
ESP32-C3-WROOM
Power Switch
Power Indicator
Bluetooth Indicator
WiFi Indicator
Program Start Button
Reset Button
Data Transmission Indicator

Note:
1) When the blue light is on, the power is sufficient; When the red light is on, it means that the voltage is lower than 3.3V and the battery needs to be replaced, otherwise the performance of program will be affected.
2) When the blue light is on, it means that the Bluetooth function is on.
3) When the blue light is on, the WiFi function is on.
4) When the blue light is on, it indicates that there is data transmission.

CrowBolt Car Back Overview

Line Tracking Sensor
RGB_LED-3
RGB_LED-4
A/D Port
I2C Port
Back Universal Wheel
RGB_LED-2
Bluetooth Switch
WiFi Switch
Program Uploading Interface (Type-c)
Crowbot Bolt Car Port Connection table

<table>
<thead>
<tr>
<th>NO.</th>
<th>Electronic module</th>
<th>ESP32-C3-WROOM_IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Button(BTN)</td>
<td>IO18</td>
</tr>
<tr>
<td>2</td>
<td>RGB1-RGB4</td>
<td>IO25</td>
</tr>
<tr>
<td>3</td>
<td>Motor(L)-</td>
<td>IO12</td>
</tr>
<tr>
<td>4</td>
<td>Motor(L)+</td>
<td>IO13</td>
</tr>
<tr>
<td>5</td>
<td>Motor(R)-</td>
<td>IO14</td>
</tr>
<tr>
<td>6</td>
<td>Motor(R)+</td>
<td>IO15</td>
</tr>
<tr>
<td>7</td>
<td>Buzzer</td>
<td>IO33</td>
</tr>
<tr>
<td>8</td>
<td>Light Sensor 1</td>
<td>IO35</td>
</tr>
<tr>
<td>9</td>
<td>Light Sensor 2</td>
<td>IO34</td>
</tr>
<tr>
<td>10</td>
<td>Ultrasonic ranging sensor(Ultrasonic)</td>
<td>IO27</td>
</tr>
<tr>
<td>11</td>
<td>Ultrasonic ranging sensor_RGB</td>
<td>IO26</td>
</tr>
<tr>
<td>12</td>
<td>LF Sensor 1</td>
<td>IO36</td>
</tr>
<tr>
<td>13</td>
<td>LF Sensor 2</td>
<td>IO39</td>
</tr>
<tr>
<td>14</td>
<td>IR Receiver</td>
<td>IO19</td>
</tr>
<tr>
<td>15</td>
<td>WIFI Switch and indicator light</td>
<td>IO5</td>
</tr>
<tr>
<td>16</td>
<td>Blutooth Switch and indicator light</td>
<td>IO32</td>
</tr>
<tr>
<td>17</td>
<td>A / D Port</td>
<td>IO4&amp;IO23</td>
</tr>
<tr>
<td>18</td>
<td>I2C Port</td>
<td>IO21&amp;IO22</td>
</tr>
</tbody>
</table>
### Joystick Port Connection table

<table>
<thead>
<tr>
<th>NO.</th>
<th>Electronic module</th>
<th>ESP32-C3-WROOM_IO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.91 inch OLED_SCL</td>
<td>IO5</td>
</tr>
<tr>
<td>2</td>
<td>0.91 inch OLED_SDA</td>
<td>IO4</td>
</tr>
<tr>
<td>3</td>
<td>I2C Interface_SCL</td>
<td>IO5</td>
</tr>
<tr>
<td>4</td>
<td>I3C Interface_SDA</td>
<td>IO4</td>
</tr>
<tr>
<td>5</td>
<td>Buzzer</td>
<td>IO6</td>
</tr>
<tr>
<td>6</td>
<td>Vibrating Motor</td>
<td>IO7</td>
</tr>
<tr>
<td>7</td>
<td>Digital Key L</td>
<td>IO8</td>
</tr>
<tr>
<td>8</td>
<td>Digital Key R</td>
<td>IO10</td>
</tr>
<tr>
<td>9</td>
<td>Analog Key A</td>
<td>IO0</td>
</tr>
<tr>
<td>10</td>
<td>Analog Key B</td>
<td>IO0</td>
</tr>
<tr>
<td>11</td>
<td>Analog Key C</td>
<td>IO0</td>
</tr>
<tr>
<td>12</td>
<td>Analog Key D</td>
<td>IO0</td>
</tr>
<tr>
<td>13</td>
<td>X-axis Analog Quantity (Left/Right)</td>
<td>IO3</td>
</tr>
<tr>
<td>14</td>
<td>Y-axis Analog Quantity (Up/Down)</td>
<td>IO1</td>
</tr>
<tr>
<td>15</td>
<td>Z-axis Digital Quantity (Press)</td>
<td>IO18</td>
</tr>
<tr>
<td>16</td>
<td>Bluetooth Indicator</td>
<td>IO19</td>
</tr>
</tbody>
</table>

### Note:
1) When the blue light is on, the power is sufficient; When the red light is on, it means that the voltage is lower than 2.4V and the battery needs to be replaced, otherwise the performance of program will be affected.
2) When the green light is on, the buzzer or vibration motor is working.
3) When the blue light is always on, the Bluetooth connection is successful; when the blue light is flashing, it means the connection is pending.
Instructions for Joystick Factory Procedures

Turn on the light
Buzzer sounds

Omnidirectional lever

- **Y**
  - Go ahead
- **Up**
  - Go back
- **Y**
  - Turn left
- **X**
  - Turn right
- **Press to cancel the program**

Ultrasonic obstacle avoidance robot
Line tracking robot
Light chasing robot
Music playing robot

Please turn on the Bluetooth switch at the bottom of the CrowBot. After the switches are turned on, the joystick and the CrowBot will automatically connect via Bluetooth.

**Notice:**
- Preset infrared remote controller functions. If you reload other programs, the above functions will be invalid.
- If you need, visit the product link or contact customer service to ask for this factory setting program.
Instructions for CrowBolt BOLT Car Factory Procedures

- Ultrasonic obstacle avoidance robot
- Line tracking robot
- Light chasing robot
- Music playing robot
- Robot on patrol (3 in 1)

User can customize functions:
- 1 2 3
- 4 5 6
- 7 8 9
- * 0 #

- Turn on the light
- Buzzer sounds
- Go ahead
- Turn left
- Turn right
- Go back
- Cancel the program

Notice:
- Preset infrared remote controller functions. If you reload other programs, the above functions will be invalid.
- If you need, visit the product link or contact customer service to ask for this factory setting program.

CrowBot
Lesson 1 - Activate Bolt

Edit and download the program, press the button, the serial port prints:

*Hello, master! I’m Bolt!, I’ve activated!*

Hello, master!
I’m Bolt!,I’ve activated!
**Knowledge**

**Button**
Button refers to the switch that uses the function key to promote the transmission mechanism to open or close the moving circuit breaker and the static contact to complete the power circuit conversion. That is, lightly press the switch to turn on, release it to turn off.

**Serial communication function**
The serial communication function refers to the function that can transmit data between the peripheral device and the computer.

**Program**

![Program Diagram]

**Challenge**

**Self-introduction**
Each time the start button is pressed, Bolt says a word and introduces himself to the host.
Lesson 2 - Colorful Lights

Press the start button, the 4 onboard RGB_LEDs of the Bolt randomly display different colors and present the effect of flowing water lights.

Knowledge

RGB LED
The three primary colors refer to the three basic colors that cannot be decomposed in the color, namely red (Red), green (Green), and blue (Blue). The three primary color light mode of RGB lamp is an additive color model, which adds the color light of the three primary colors in different proportions to generate various different color lights.

Random number module
The value in the two brackets is the range of random numbers, and the random number contains these two values.
Challenge

Breathing Light
Press the start button, and the 4 onboard RGB_LEDs of the Bolt randomly display different colors and present a breathing light effect.
Lesson 3 - Dreamy Dance Move

Press the start button, and the Bolt car performs forward, backward, left turn, and right turn actions cyclically, and the duration of each action is 500ms.

Knowledge

DC geared motor
The DC geared motor is based on the ordinary DC motor, plus a matching gear reducer. The function of the gear reducer is to provide a lower speed and a larger torque. At the same time, different reduction ratios of the gear reducer can provide different speeds and torques.

My Blocks
My blocks, when multiple blocks are reused for a function, the blocks can be combined to form a new block. This new building block can replace a large section of building blocks and can be reused many times, concise and clear.
Program

```
setup
set pin 18 mode to INPUT

declare int variable speed
set variable speed 100
wait until read digital module at pin 18 ? = 0

loop
motor 0 speed 0 speed
delay 0.5 S
motor speed 0 speed 0
delay 0.5 S
motor speed 0 0 speed
delay 0.5 S
motor 0 speed speed 0
delay 0.5 S
```

```
define motor L1 L2 R1 R2
Set motor at pin 12 channel 12 output L1
Set motor at pin 13 channel 13 output L2
Set motor at pin 14 channel 14 output R1
Set motor at pin 15 channel 15 output R2
```

Challenge

**Original Dance**
The dance steps and atmosphere lights are independently designed. When the start button is pressed, the Bolt performs original dance movements, and the onboard RGB_LED lights display different lighting effects.
Lesson 4 - Play Music

Press the start button, and the passive buzzer of the Bolt car plays the "Christmas song" on a loop.

Knowledge

Buzzer
The passive buzzer uses the phenomenon of electromagnetic induction to connect the voice coil to the alternating current, and then the electromagnet formed will attract or repel with the permanent magnet, thereby promoting the diaphragm to sound. Connecting to direct current can only continuously push the diaphragm without producing sound, it can only produce sound when it is turned on or off.

Buzzer tone frequency table

<table>
<thead>
<tr>
<th>Tone</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>441</td>
<td>495</td>
<td>556</td>
<td>589</td>
<td>661</td>
<td>742</td>
<td>833</td>
</tr>
<tr>
<td>B</td>
<td>495</td>
<td>556</td>
<td>589</td>
<td>661</td>
<td>742</td>
<td>833</td>
<td>935</td>
</tr>
<tr>
<td>C</td>
<td>262</td>
<td>294</td>
<td>330</td>
<td>350</td>
<td>393</td>
<td>441</td>
<td>495</td>
</tr>
<tr>
<td>D</td>
<td>294</td>
<td>330</td>
<td>350</td>
<td>393</td>
<td>441</td>
<td>495</td>
<td>556</td>
</tr>
<tr>
<td>E</td>
<td>330</td>
<td>350</td>
<td>393</td>
<td>441</td>
<td>495</td>
<td>556</td>
<td>624</td>
</tr>
<tr>
<td>F</td>
<td>350</td>
<td>393</td>
<td>441</td>
<td>495</td>
<td>556</td>
<td>624</td>
<td>661</td>
</tr>
<tr>
<td>G</td>
<td>393</td>
<td>441</td>
<td>495</td>
<td>556</td>
<td>624</td>
<td>661</td>
<td>742</td>
</tr>
</tbody>
</table>
Program

Challenge

Musician
Design other music independently, press the start button, play your music, and make the RGB_LED light switch colors according to the music rhythm.
Lesson 5 - Photosensitive Light

Press the start button, and the serial port prints the analog values of the two photosensitive sensors in real time, and reversely controls the brightness of the onboard RGB_LEDs according to the brightness of the current environment.

Knowledge

Photodiode
A photodiode is a photoelectric device that uses a silicon PN junction to generate photocurrent after being illuminated. The greater the intensity of the light, the greater the reverse current. The change of light causes the photodiode current to change, which can convert the light signal into an electrical signal and become a photoelectric sensor device.
Value of “analog_now”
The value of analog_now is a standard value that is detected by the sensor under normal lighting conditions. This value needs to be determined as a control before the experiment.

Program

**Challenge**

**Smart Car Lights**
Press the start button to control the on and off of the onboard RGB_LED by detecting the brightness of the ambient light, so as to realize the function of "turn off the light when it is bright, and turn on the light when it is dark".
Lesson 6 - Light Chasing Robot

Press the start button, and use the flashlight to shine in front of the Bolt car. The car can distinguish the moving direction according to the light intensity to realize the effect of the light-chasing robot.

ESP32 ADC channels
ESP32 has two 12-bit ADCs with a total of 18 channels. Before reading the ADC data, the ADC must be set first.

How to get the data “800” and “2800”?  
Before the experiment, detect the light intensity in a normal environment, and record it, and use it as a standard value in the program for reference.
Program

Challenge
Avoid Searchlights
Press the start button, use the flashlight to shine in front of the Bolt car, the car will automatically avoid the light, and move in the opposite direction to realize the function of the car avoiding the searchlight.
Lesson 7 - The Angry Bolt

Press the start button, the serial port prints the distance value detected by the ultrasonic ranging sensor. When the distance is less than 20CM, the ultrasonic onboard RGB_LED will light up in red, and the buzzer will beep; otherwise, the RGB_LED will remain green.

Knowledge

The working principle of ultrasonic ranging sensor:
The ultrasonic ranging sensor adopts the principle of ultrasonic echo ranging and uses the accurate time difference measurement technology to detect the distance between the sensor and the target.

Algorithm analysis:
It is known that the speed of sound "V" in the air at room temperature is about 340m/s, and the distance value can be calculated by the formula $S = V \times T / 2$ and unit conversion.
Character Type

**Int**: Integer refers to data without a fractional part.

**float**: Floating point refers to data with a fractional part.

---

Program

```plaintext
setup
set Serial baud rate 115200
set pin 16 mode to INPUT
set RGB LED at pin 26 with 5 LEDs
declare int variable Dis
wait until read digital module at pin 18 ? = 0

loop
set variable Dis ~ read Ultrasonic sensor distance
Serial print(newline) Dis
if Dis < 20 then
set 1 to 6 RGB LED PWM to R 255 G 6 B 0 brightness 255 at pin 26
set pin 33 Buzzer tone 84 beat 1/2
else
set 1 to 6 RGB LED PWM to R 0 G 255 B 0 brightness 255 at pin 26
set pin 33 Buzzer tone 84 beat stop
```

---

Challenge

**Color Of Emotion**

Press the start button, and according to the distance measurement value of the ultrasonic sensor, the car displays different colors and actions.

- 0-10cm: angry (Red light + retreat)
- 10-20cm: happy (Green light + rotating)
- 20cm or more: sad (Blue light + motionless)
Lesson 8 - Obstacle Avoidance Robot

Press the start button, when the distance between the Bolt and the obstacle in front is less than 20cm, the car will turn right; otherwise, it will always keep moving forward.

Knowledge

Ultrasonic and Infrasound
The frequency of sound waves that we can hear is between 20 and 20000Hz, ultrasonic waves are higher than 20000Hz, and infrasound waves are lower than 20Hz called infrasound waves.
The ultrasonic waves that are common in our nature include wind, water currents, lightning, crustal movement, etc., which all contain ultrasonic waves, while infrasound waves are sea storms, volcanic eruptions, tsunamis, nuclear explosions, missile launches, etc. These can produce infrasound waves, both of which there is a common feature that humans cannot hear, but animals can hear, which is why animals are basically not harmed in the face of some natural disasters, because they can hear the sound waves from these earthquakes and tsunamis, and then escape asylum in time.

Program

![Program Diagram]

Challenge

Intelligent Obstacle Avoidance
Press the start button, the car will move forward until it is less than 20cm away from the obstacle in front, the car will turn left and right respectively, and detect the distance once; by comparing the distance values in the two directions, choose the direction with the largest distance to move forward.
Lesson 9 - Reversing Radar

Press the start button, the serial port prints the distance value detected by the ultrasonic sensor. When the distance between the car and the obstacle in front is less than 30cm, the closer the distance is, the faster the RGB lights flash and the buzzer beeps; When the distance is less than 5cm, stop all actions.

Knowledge

Definition of Reversing Radar
Reversing radar also known as "parking aid", is a safety aid when the car is parked or reversing. It can inform the driver of obstacles around it with sound or a more intuitive display. It relieves the driver's troubles caused by looking around when parking, reversing and starting the vehicle, and helps the driver to eliminate the defects of blind spots and blurred vision.
How to change the blinking frequency of lights?
Through the decrement of the ultrasonic ranging value, it is converted into the syllable duration of the buzzer, and then the flashing frequency of the light can be controlled.

Program

```
set variable distance = read Ultrasonic sensor distance
if distance > 4 and distance < 6 then
    set variable speed = mapping distance from [5, 90] to [30, 100]
        motor 0 speed 6 speed
    set pin 31 = Buzzer tone A4 = beat distance [0.1, 0.3]
    set pin 32 = Buzzer tone B4 = beat distance [0.1, 0.3]
else if distance < 5 then
    set pin 12 = RGB LED PWM to R G B brightness 0 at pin 29
    set pin 31 = Buzzer tone C4 = beat
    motor 0 0 0
else
    motor 0 0 0
```

Challenge

Ultrasonic Electronic Organ
Set a tone every 5cm in the distance range of 0~35cm. When the start button is pressed, the buzzer is controlled to emit different sounds by changing the distance between the ultrasonic sensor and the obstruction to achieve the effect of an electronic organ.
Lesson 10 - Tracking Robot

Press the start button, the car starts to follow the black line on the map, turn right when it deviates to the left, turn left when it deviates to the right, and back up when it exceeds the black line.

Knowledge

The programming logic of the tracking robot

1. When only the probe on the left detects the black line, the Bolt performs a left turn;
2. When only the right probe detects the black line, the Bolt performs a right turn;
3. When the probes on the left and right sides do not detect the black line, the Bolt performs the backward action;
4. When the probes on the left and right sides detect the black line, the Bolt performs the forward action.

<table>
<thead>
<tr>
<th>L</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left Turn</td>
<td>Right Turn</td>
</tr>
<tr>
<td>L</td>
<td>R</td>
</tr>
<tr>
<td>Backward</td>
<td>Forward</td>
</tr>
</tbody>
</table>
Based on this lesson, the use of ultrasonic RGB lights is added. Press the start button, the car switches the color of the ultrasonic RGB lights while doing the line patrol action.
Lesson 11 - Tracking Singing

Press the start button, the car will follow the black line on the map and play music along with it.

Knowledge

Line tracking sensor
The Line tracking sensor, that is, the infrared reflection sensor, emits infrared light through a white emitting diode. When the infrared light encounters a white obstacle or an obstacle with a brighter color, the infrared light will be reflected back and received by the black diode. When infrared ray encounters a black obstacle or an obstacle with a darker color, the infrared ray will not be reflected back.

List
A list in a variable is a type of variable, but it defines a group of string variables of the same type.
Program

setup

set pin 18 mode to INPUT
set pin 36 mode to INPUT
set pin 39 mode to INPUT

declare int variable num
declare int variable int_Song
declare int variable int_Tone
declare int variable QIT_MAX
declare int variable Speed

Set_Time
Set_Tone

wait until read digital module at pin 10 % 0 = 0

delay 1 second

loop

set variable Speed = 160
set variable num = 0
repeat 25

set variable num += 1

repeat convert string item num of Time to Integer / 25

Tracking

set variable int_Song = convert string item num of Tone to Integer
set variable int_Tone = 25

set pin 33 Buzzer tone int_Song beat int_Tone

}
Challenge

**Tracking Obstacle Avoidance**

Press the start button, and the car starts to follow the black line on the map. When it detects that the distance to the obstacle in front is less than 20cm, it stops moving, and controls the RGB lights to flash and the buzzer to sound.
Press the start button, the car will follow the black line on the map, and adjust the speed according to the distance between it and the obstacle in front. When the distance is less than 5cm or more than 30cm, the car will stop.

The application of automatic following system
The automatic following system can be used to automatically follow suitcases, automatically follow shopping carts, automatically follow baby strollers, automatically follow sorting vehicles, etc. It has functions such as wireless following, anti-collision, anti-drop, loss alarm, etc.

The working principle of the line-following car
The line-following trolley maps the ultrasonic ranging value to its speed value, and maintains the distance between itself and the moving target through this algorithm.
Program

setup
- set pin 18 mode to INPUT
- set pin 36 mode to INPUT
- set pin 20 mode to INPUT
- set RGB LED at pin 26 with 0 LEDs
- declare int variable speed
- declare int variable distance
- declare int variable QQ_MAX

wait until
- read digital module at pin 18 = 0

loop
- set variable distance = read Ultrasonic sensor distance
- if distance > 5 and distance < 30 then
  - set variable speed = mapping distance from [5, 30] to [30, 200]
  - tracking
- else
  - if distance < 5 then
    - set 1 to 6 RGB LED PWM to R 255 G 0 B 0 brightness 100 at pin 26
    - Motor 0 0 0 0
  - else
    - set 1 to 6 RGB LED PWM to R 0 G 255 B 0 brightness 100 at pin 26
    - set variable speed = 200
    - tracking
**Challenge**

**Light Chaser**

Press the start button, control the car to follow the line with the flashlight, and map the light brightness value to the speed of the car. When the light is too bright or there is no light, the car will stop moving forward.
Lesson 13 - Infrared Remote Control Lamp

Press the start button and use the 7 digital buttons on the infrared remote control to control the ultrasonic RGB lights of the car to present different colors of light.

Knowledge

The working principle of infrared remote control
The IR remote control is used to generate the remote control code pulse, drive the Infrared emission tube to output the infrared remote control signal, and the IR receiver module (remote control receiver) completes the amplification, detection, shaping and demodulation of the remote control code pulse for the remote control signal.

Char
The collective term for letters, numbers and various symbols in electronic computers or radio communications.
Program

Feature Upgrade
Press the start button, the four RGB lights of the car take turns to present different colors of light, and use the "up" and "down" buttons of the infrared remote control to control the speed of each RGB light switching.
Lesson 14 - Infrared Remote Control Car

Press the start button and use the "^", "v", "<" and ">" buttons of the infrared remote control to control the car to perform "forward, backward, left turn, right turn" movements.

Knowledge

Reading the key value of the infrared remote control
The defined variable "IR" is of different types, and the printed infrared remote control key values are also different. When inputting the judgment conditions, ensure that the data types are consistent, otherwise the code will report an error.

The difference between multiple if and if nested
Multiple ifs are judged from top to bottom. When the conditions are met, the statement body is executed; nested ifs are judged when the outer if conditions are established.
Program

On the basis of the infrared remote control car project, the upgrade function: the number "1" turns on the ultrasonic RGB light, the number "2" turns off the ultrasonic RGB light, and the number "3" controls the buzzer to sound.

Challenge

Feature Upgrade

On the basis of the infrared remote control car project, the upgrade function: the number "1" turns on the ultrasonic RGB light, the number "2" turns off the ultrasonic RGB light, and the number "3" controls the buzzer to sound.
Lesson 15 - Remote Control Obstacle Avoidance

Use the infrared remote control to control the movement of the car, and the RGB green light is always on. When the distance between it and the obstacle in front is less than 10cm, stop moving, and control the RGB red light to flash and the buzzer to sound.

Knowledge

Automotive Driving Assistance System
Driving assistance system is an important part of the current international intelligent transportation system research. It uses machine vision and sensor technology to realize real-time notification of the driver's surrounding environment, and timely warn the driver to take effective measures and eliminate accident hazards when the vehicle may be potentially dangerous.
**Status control flag**

When the forward button is pressed, the flag variable is set to 1, and the obstacle avoidance mode is turned on. When the forward button is released, the flag variable is set to 0, and the obstacle avoidance mode is turned off; this ensures that when the car is less than 20cm away from the obstacle, it cannot continue to move forward. But you can still turn left and right.

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**Program**

```plaintext
setup
set RGB LED at pin 26 with 6 LEDs
set pin 18 mode to INPUT

declare int variable speed

declare char variable IR_value

declare int variable distance

declare int variable state_value

wait until read digital module at pin 18 = 0

loop
set variable IR_value = read IR receiver
set variable speed = 200

if IR_value = ~ then
  set variable state_value = 1

if IR_value = Y then
  set variable state_value = 0

if IR_value = < then
  set variable state_value = 0

if IR_value = > then
  set variable state_value = 0

if state_value = 1 then
  Advance

define motor L1 L2 R1 R2

Set motor at pin 12 channel 12 output L1
Set motor at pin 13 channel 13 output L2
Set motor at pin 14 channel 14 output R1
Set motor at pin 15 channel 15 output R2
```
**Challenge**

**Feature Upgrade**

On the basis of the main program, add the start and stop settings of the obstacle avoidance function. When the number "1" on the remote control is pressed, the obstacle avoidance function is activated; when the number "2" on the remote control is pressed, the obstacle avoidance function is turned off.
Lesson 16 - Comprehensive Application

Press the start button, and use the digital buttons "1", "2" and "3" on the infrared remote control to control the car to perform remote control, obstacle avoidance and line inspection respectively.

Infrared applications:

1. Infrared switch
Passive infrared switches use the human body as an infrared source (the temperature of the human body is usually higher than the ambient temperature), and when infrared radiation is detected, the lighting is turned on.

2. Anti-theft device
The infrared beams emitted by the infrared transmitters form an invisible blockade that will sound an alarm when someone crosses or blocks the infrared.
3. Infrared reconnaissance
Reconnaissance satellites carry infrared imaging equipment to obtain more intelligence information of ground targets, and can identify camouflaged targets and monitor military operations on the ground at night; and monitor military operations on the ground at night;

Program
**Challenge**

**Feature Upgrade**

On the basis of the main program, the program control of digital button "4" is added. When the number "4" on the remote control is pressed, the trolley performs the movement of chasing light.
Learn more

The Bolt board also has two Crowtail module ports, allowing users to connect more sensors. We have 150+ Crowtail electronic modules which you can purchase from our website.

See the website wiki for more examples
Customer Service

If you have any questions, customer support is always stand by.

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SKU: CRB00157C
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