

05 -Count Gate

## Basic Teaching Information

Teaching facility	AI Module 1s	Teaching mode	Project-based learning	Class duration	90 minutes
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### Teaching Objectives:

1. Learn the infrared sensor and its ranging principle;
2. Learn the "variable" module;
3. Learn the logical "not" module.

### Teaching difficulties:

1. Analysis the function of count gate, build different parts according to different function;
2. Understand the concept of "variable" module. Learn the simple application of "variable" module.
3. Learn how to use logical "not" module.

## Focus

COVID-19 Coronavirus spreads the world in 2020. Wearing mask, washing your hands frequently and less aggregation are the most effective ways to prevent the spread of the virus. Buses and metros also restrict the number of passengers. Large number of staff are needed to entrance management. How to design a count gate that can calculate the number of people passes and limits the number of people entering at the same time?

## Exploration

In this lesson, we need to build a count gate that can automatically limit the number of people.

1. First, count the number of pedestrians passing through the gate. When the number reaches five, the gate closes.

The infrared sensor is used to detect the passing of passengers. The "variable" module is used to count the number of passengers.

2. Second, the closed-loop motor is used to control the closing of the gate.

## Creation

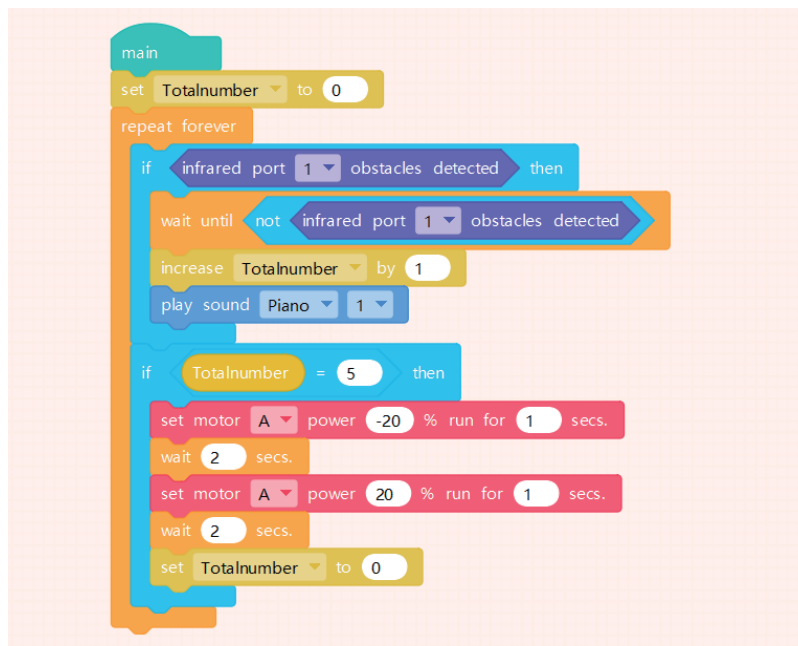
1. General chassis as the base chassis of the project;
2. 90° beam with infrared sensor as monitoring device;
3. Closed loop motor as the power output;
4. U-shaped beam and half high bevel gear as vertical drive;
5. Square beam as motor's base;
6. 110 Beams combined with 90° beam;
7. Controller.

## Programming

Count gate, which uses infrared sensors to detect passengers and count the number of people. When the number of people reaches 5, close the gate.

Define the new variable "Totalnumber" . When the infrared sensor detects the obstacle that is passenger passes, use the infrared module and the "not" module, wait for the infrared lost signal, and then increase the number of people by 1.

Use the "if...then" module, "wait" module and "not" module, after the variable "Totalnumber" accumulates to five passengers, the control motor opens the gate. Wait for two seconds, and then closes the gate, resets the variable "Totalnumber" to 0.



```
main
set Totalnumber to 0
repeat forever
  if infrared port 1 obstacles detected then
    wait until not infrared port 1 obstacles detected
    increase Totalnumber by 1
    play sound Piano 1
  if Totalnumber = 5 then
    set motor A power -20 % run for 1 secs.
    wait 2 secs.
    set motor A power 20 % run for 1 secs.
    wait 2 secs.
    set Totalnumber to 0
```

## Evaluation

How to program to avoid multiple counting of the same people waiting to pass due to the delay of passengers passing through the infrared sensor?

Using the "if...then" module, "wait" module and "not" module, the infrared sensor detects the passenger. After the infrared sensor lost the signal, increase the variable "Totalnumber" by 1.

## Show

Demonstrate the function of the count gate.

Display the function of count gate. Explain the variables and the accumulation method of infrared sensor to count the number of people.