愛動智教育系統

CUHK iCar Experiment Manual

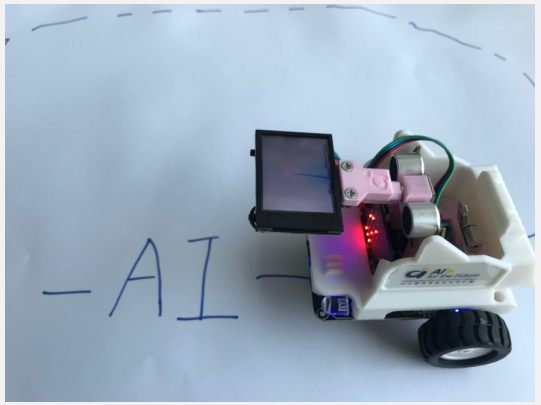
Experiment 3: Moral Dilemma Experiment

Write Your Own Code

(Evade Elderlies)

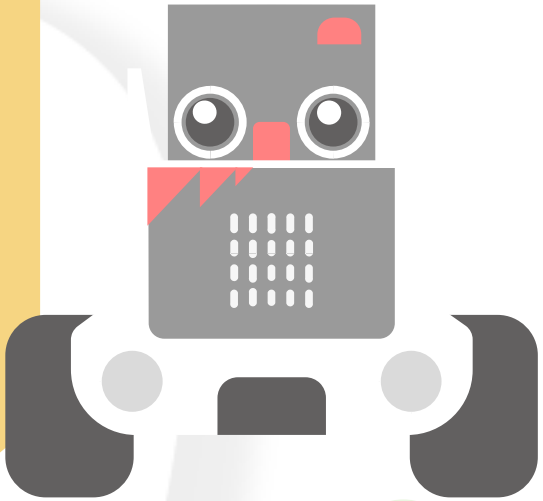
CUHK iCar

Experiment 1
Face Following



Experiment 2
Line Tracking

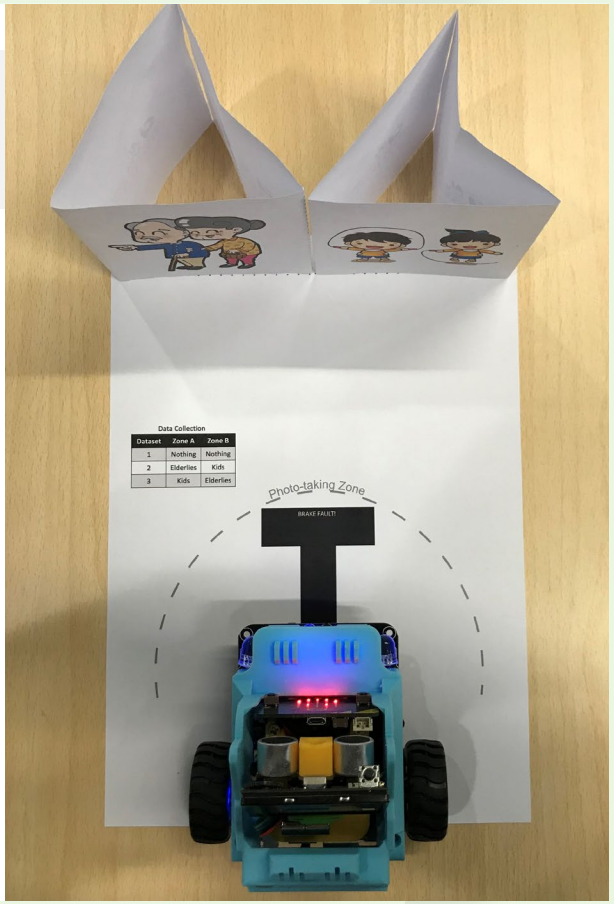
Experiment 3
Moral Dilemma



Moral Dilemma Experiment

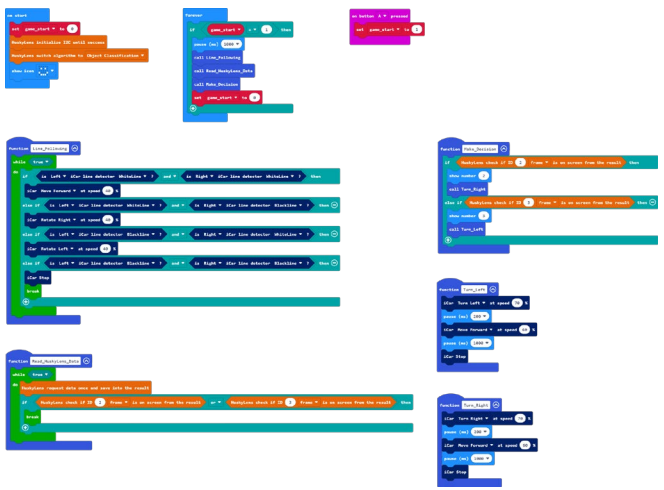
Introduction Of The Experiment

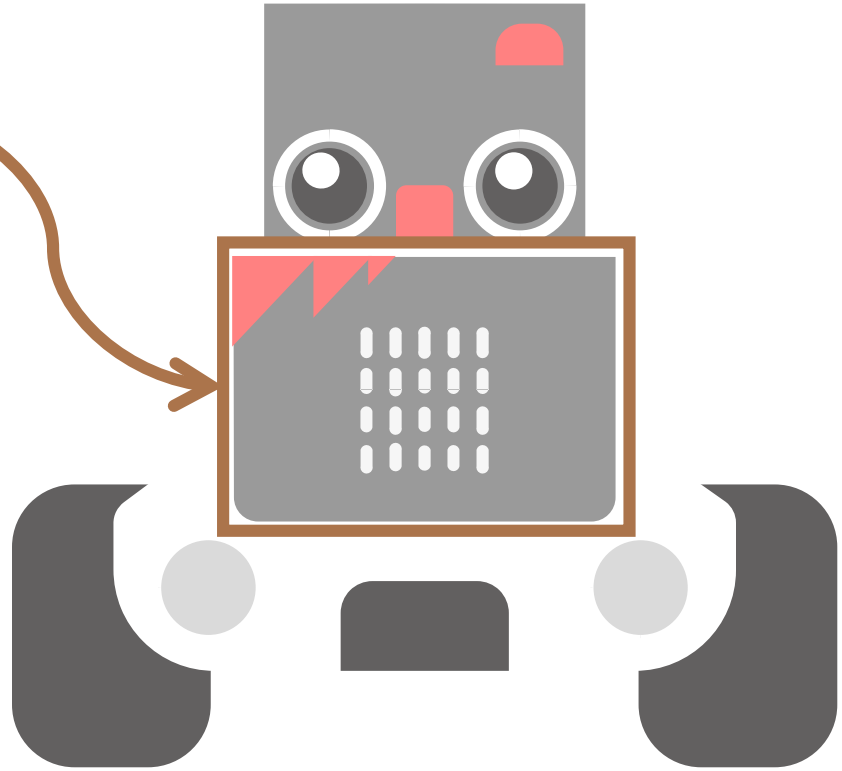
This experiment simulates the predicament of the failure of the self-driving car brake system, leaving it with two options: turn left or right while there are children and elderlies in front of you, which one will you choose to evade?



Download Program To micro:bit

Evade_elderlies.hex





Method 1

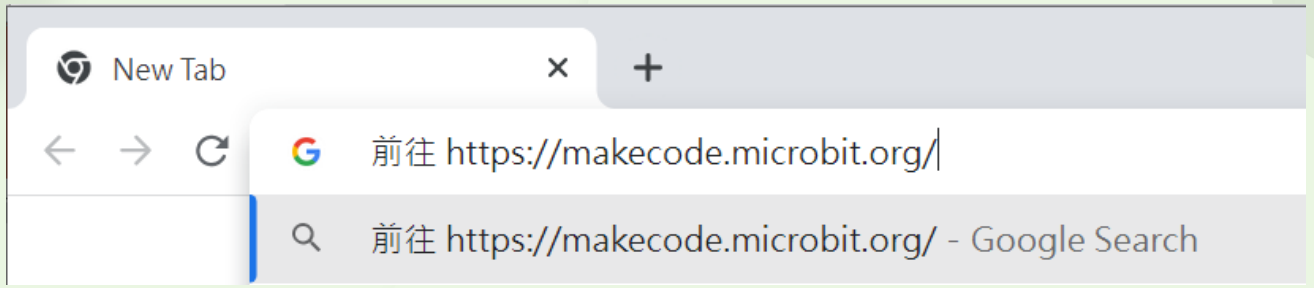
Clone the .hex to micro:bit directly

Method 2

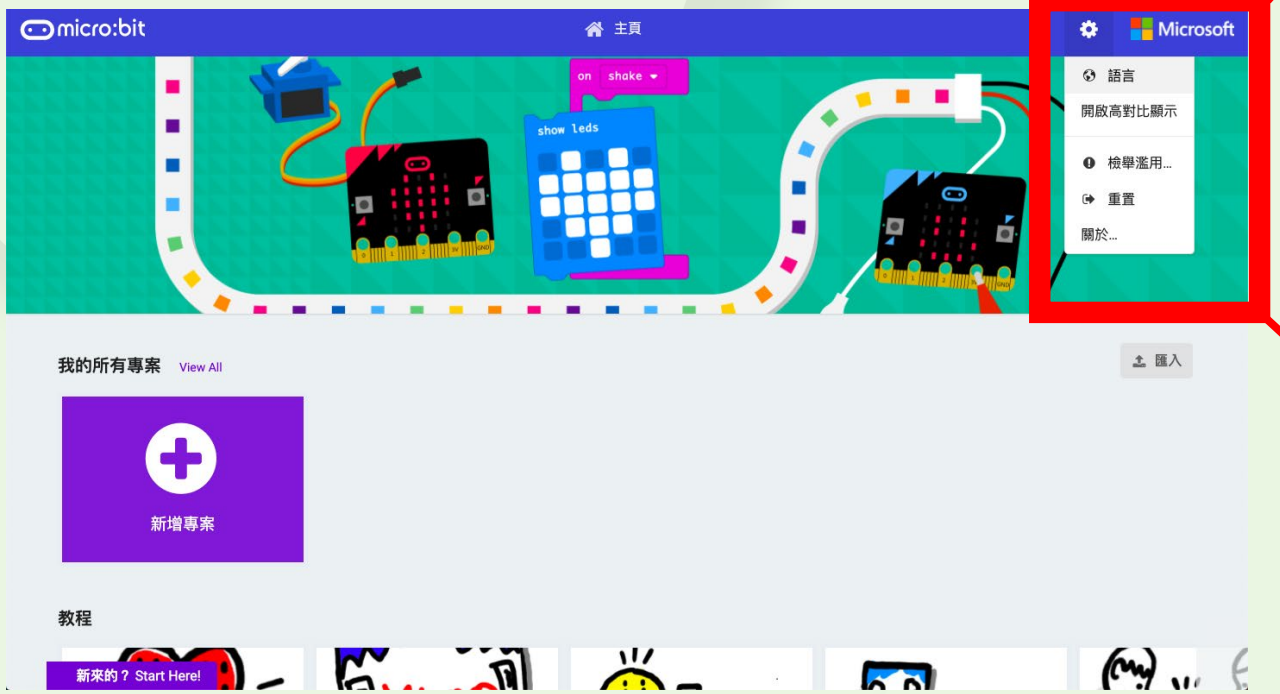
Write your own code on MakeCode

Code On MakeCode

Browse https://makecode.microbit.org/



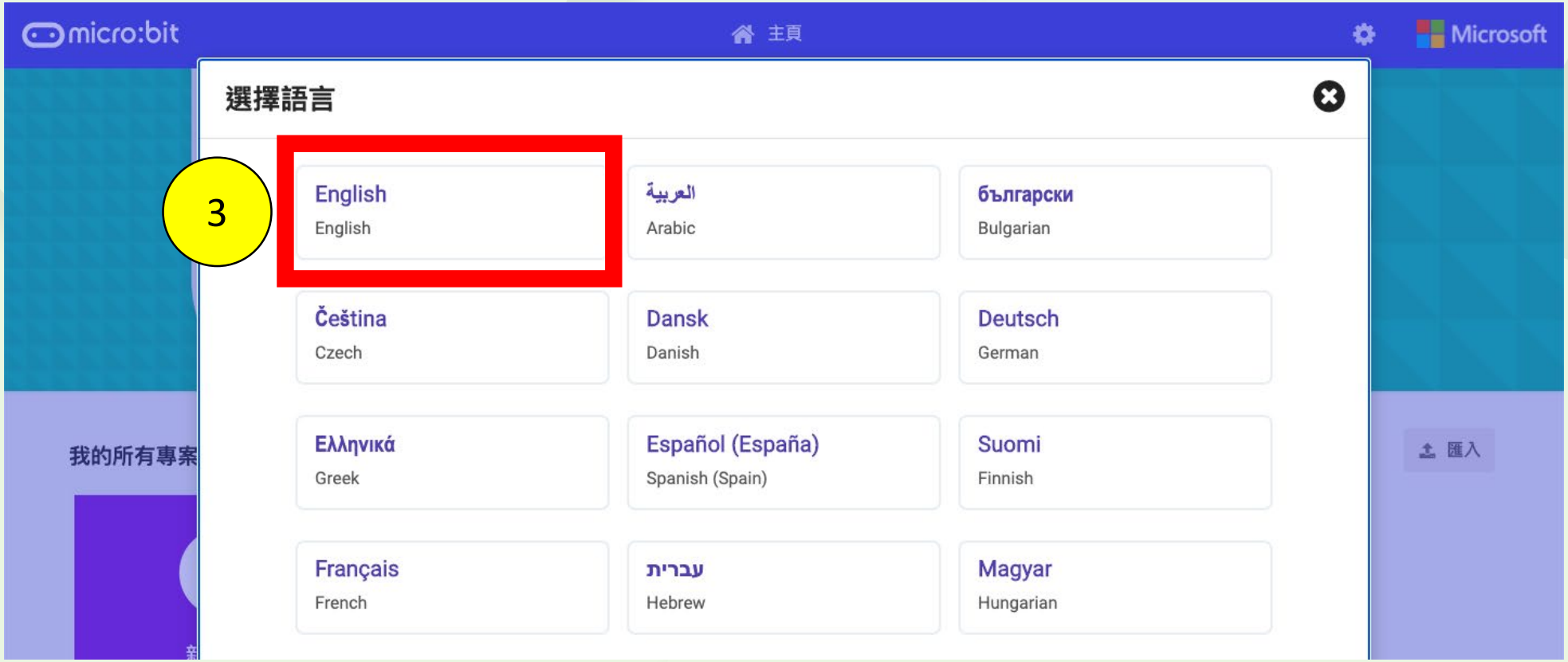
Caution
Please Set English As The Language!



1. Click ⚙

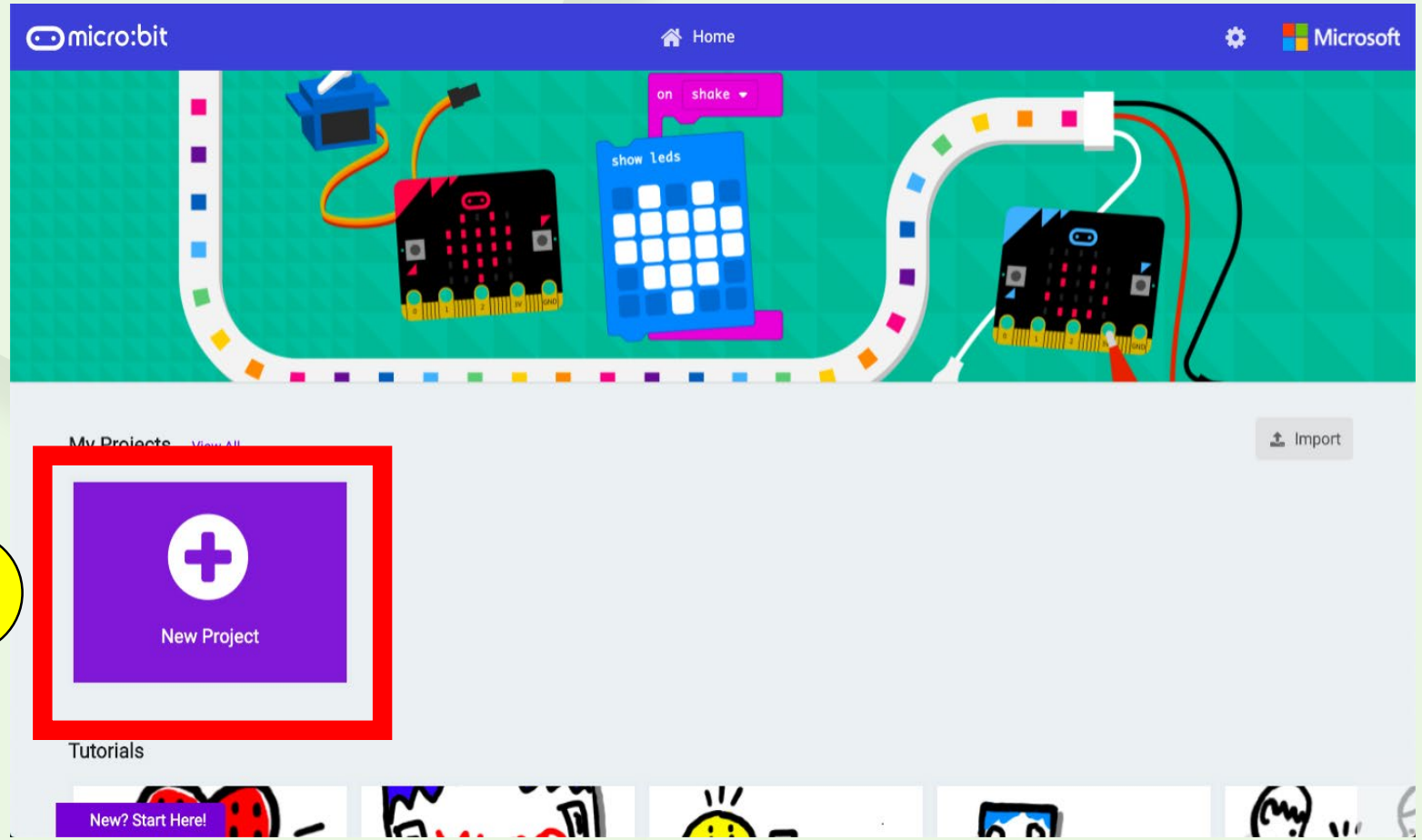
2. Click 語言

English must be set as the language, otherwise the program may fail.



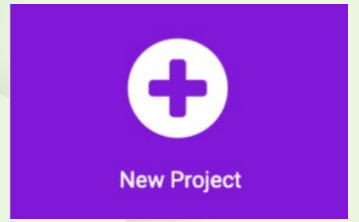
3. Click English

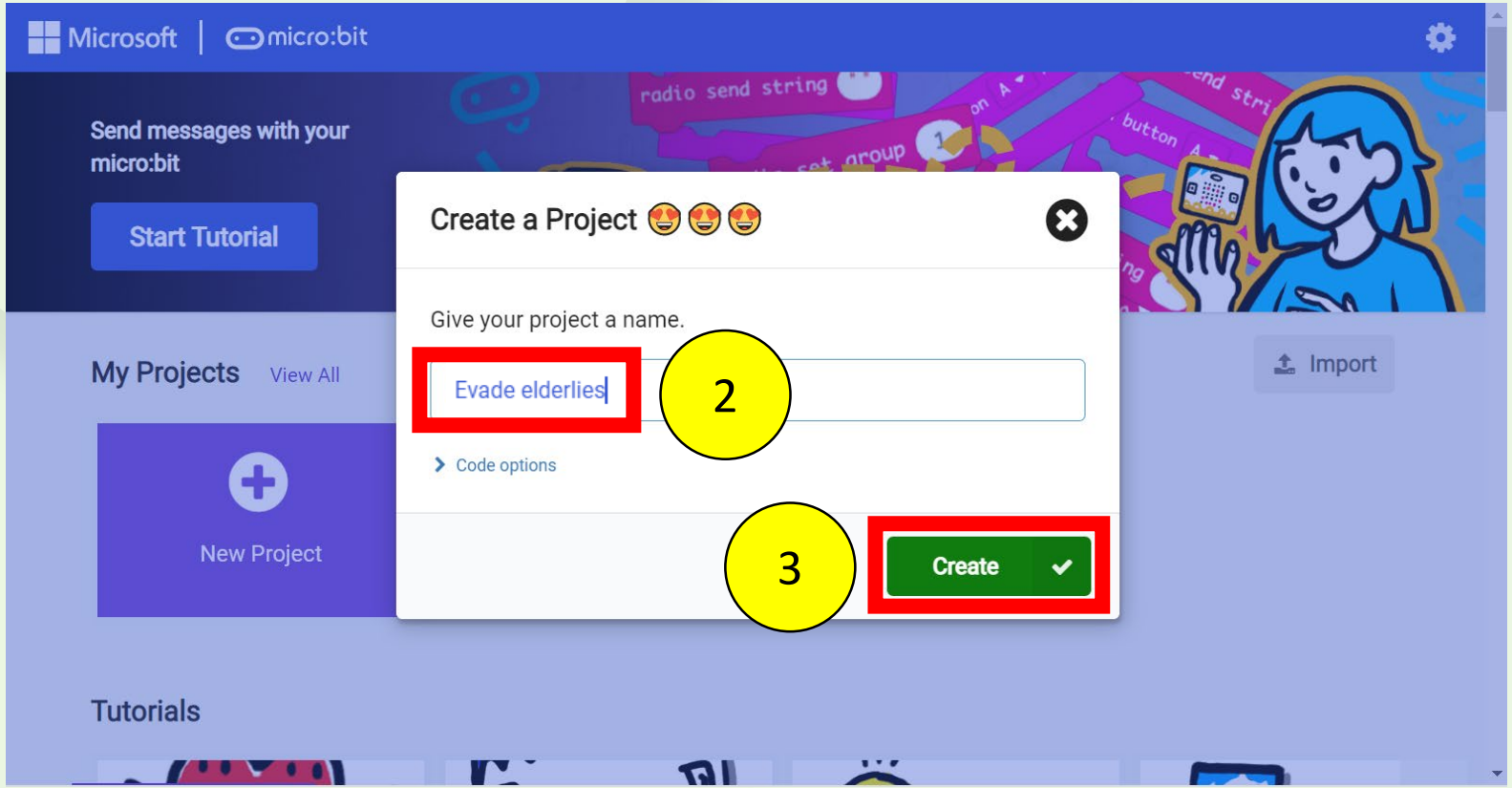
New Project



1

1. Click New Project





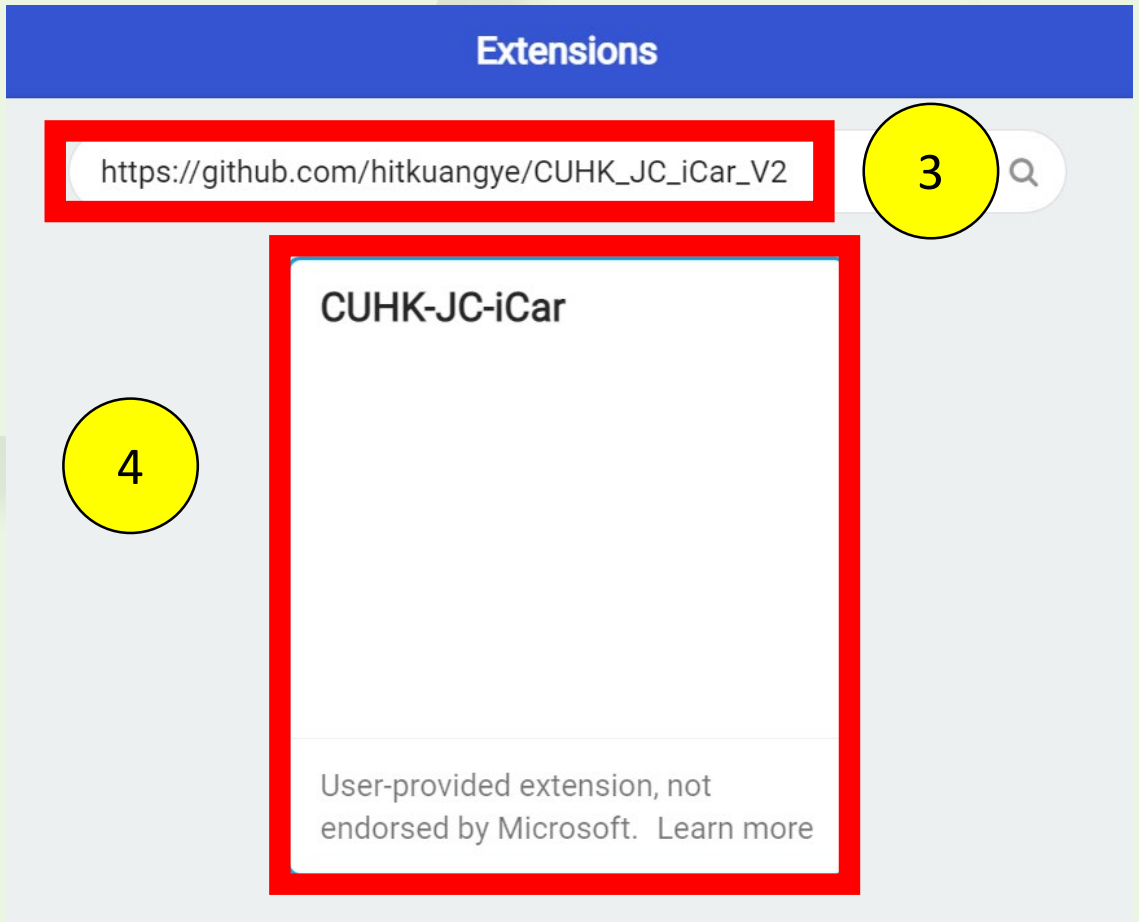
2. Enter “Evade elderlies”

3. Click Create

Prepare CUHK-JC-iCar Extension

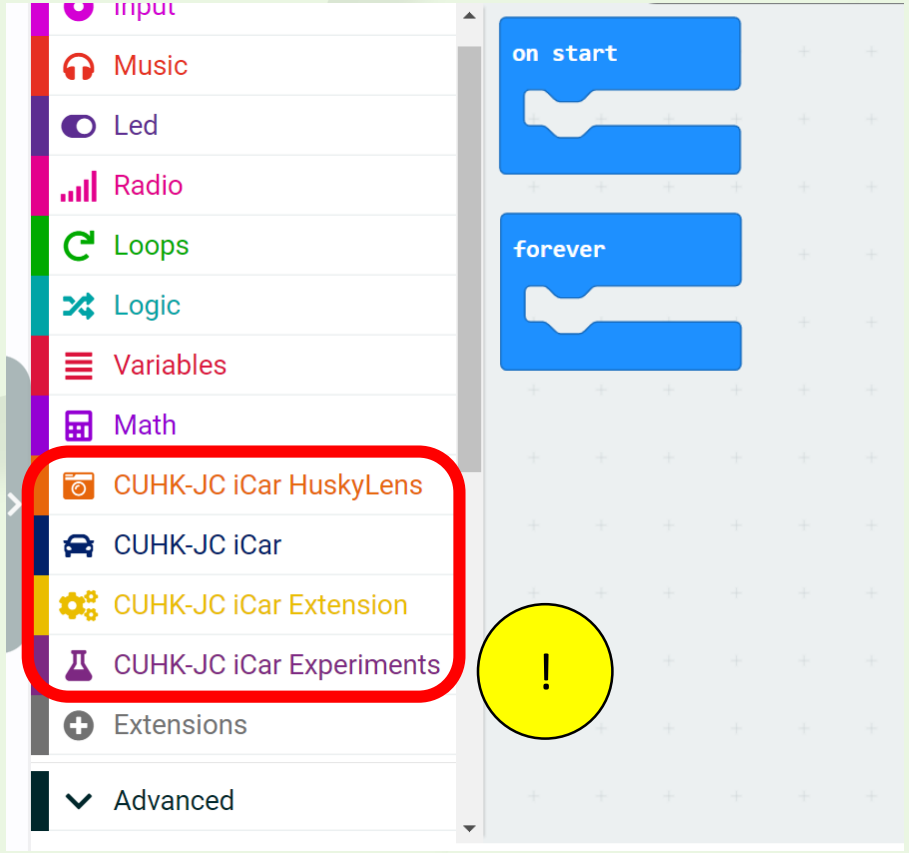
1. Click

2. Click



3. Paste the following link https://github.com/hitkuangye/CUHK_JC_iCar_V2

4. Click CUHK-JC-iCar extension



Extensions are included!

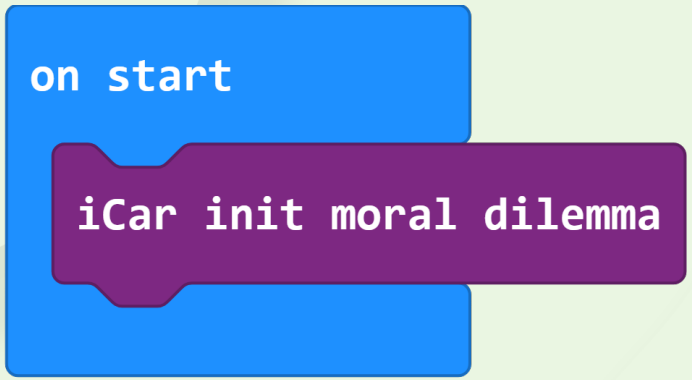
Complete the program in two ways

We prepared two options for you:

1. Use our prebuilt blocks
2. Complete the conditions by yourself

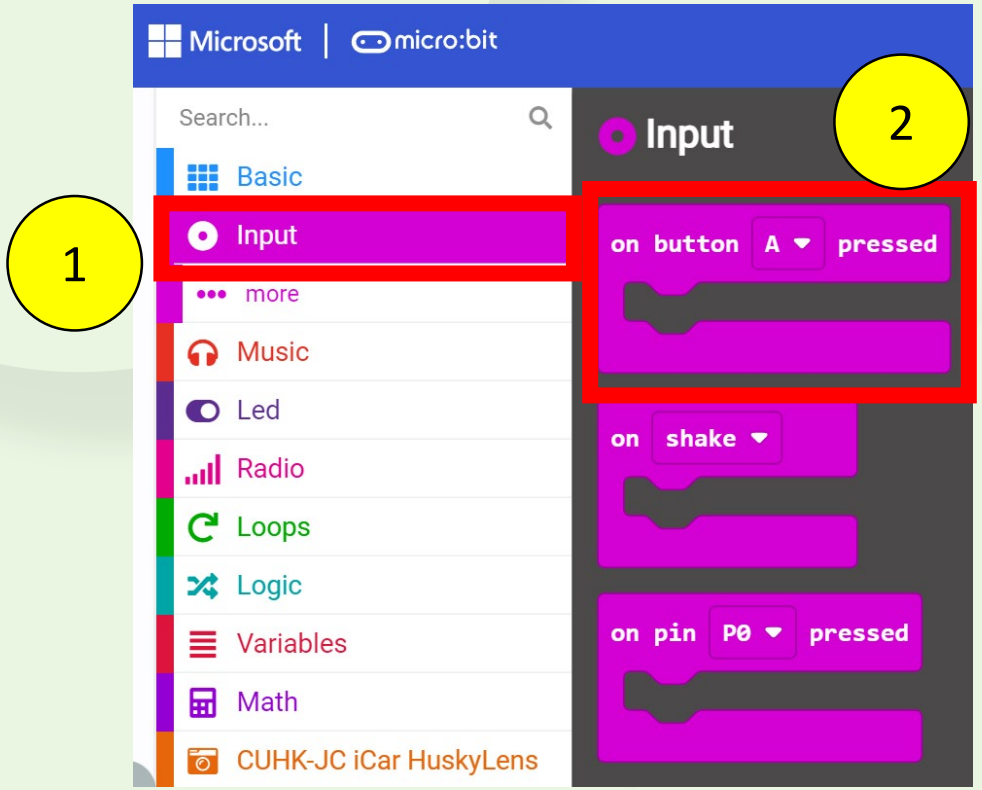
Option 1: Use Prebuilt Blocks

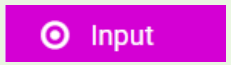
1. Click CUHK-JC iCar Experiments from the module list
2. Click `iCar init moral dilemma`



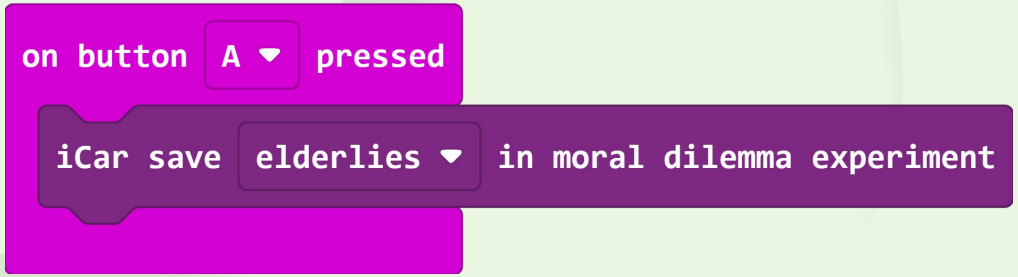
Drag the previous block into the “On Start” Block

Create on button pressed event

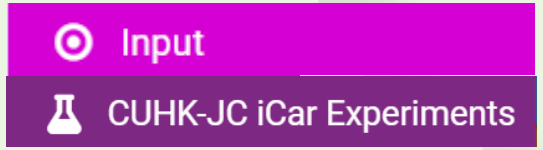


1. Click  from the module list

2. Click 



You can find the blocks from the following:



Finished!

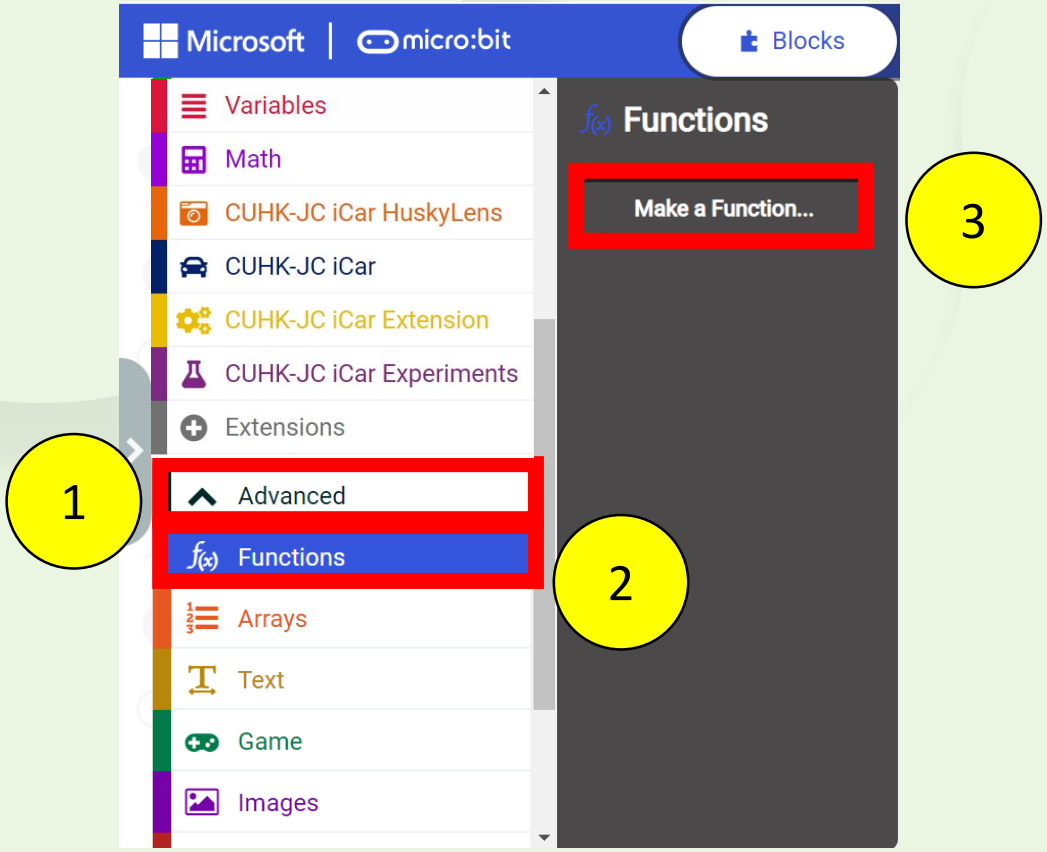
```
on start
    iCar init moral dilemma
```

```
on button A pressed
    iCar save elderlies in moral dilemma experiment
```

Option 2: Program conditions by yourself

Before we start programming, let's learn more about micro:bit!

Functions Modules



1. Scroll to the bottom of module list and click 

2. Click 

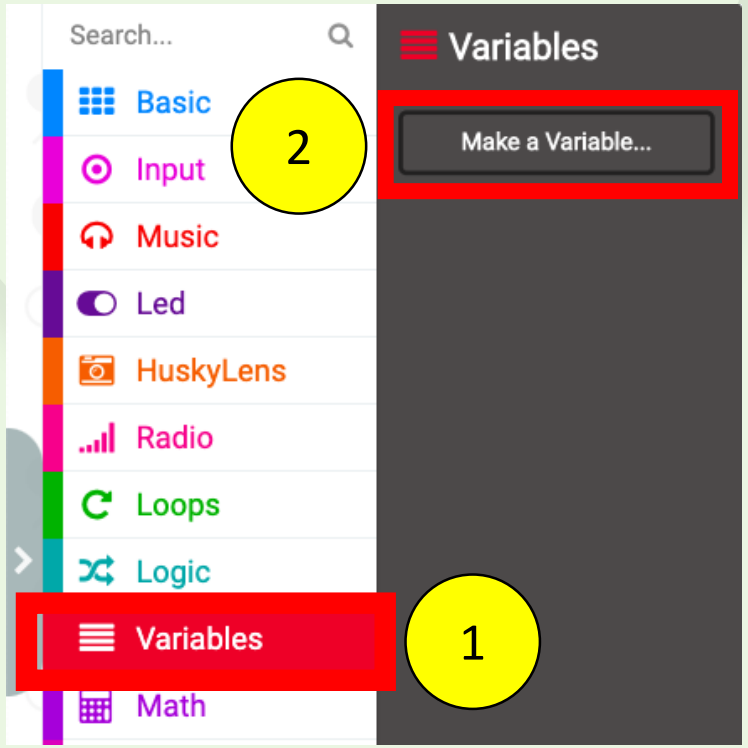
3. Click 

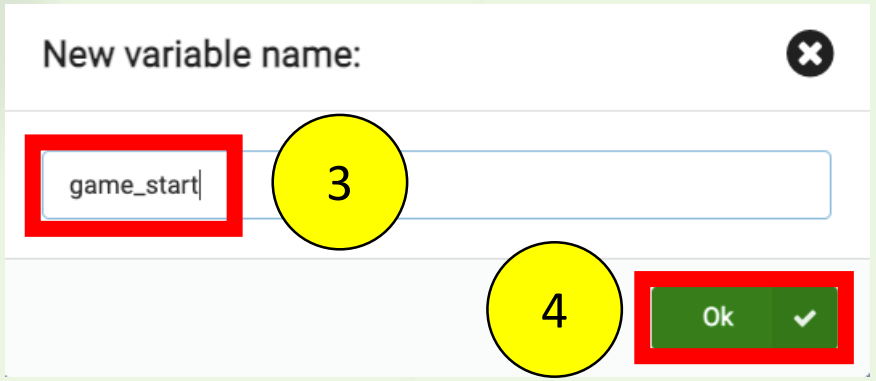
4. Name the function "Read_HuskyLens_Data"

5. Click Done

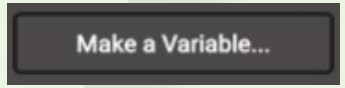
6. "Read_HuskyLens_Data" function will appear on the screen

Variables Modules





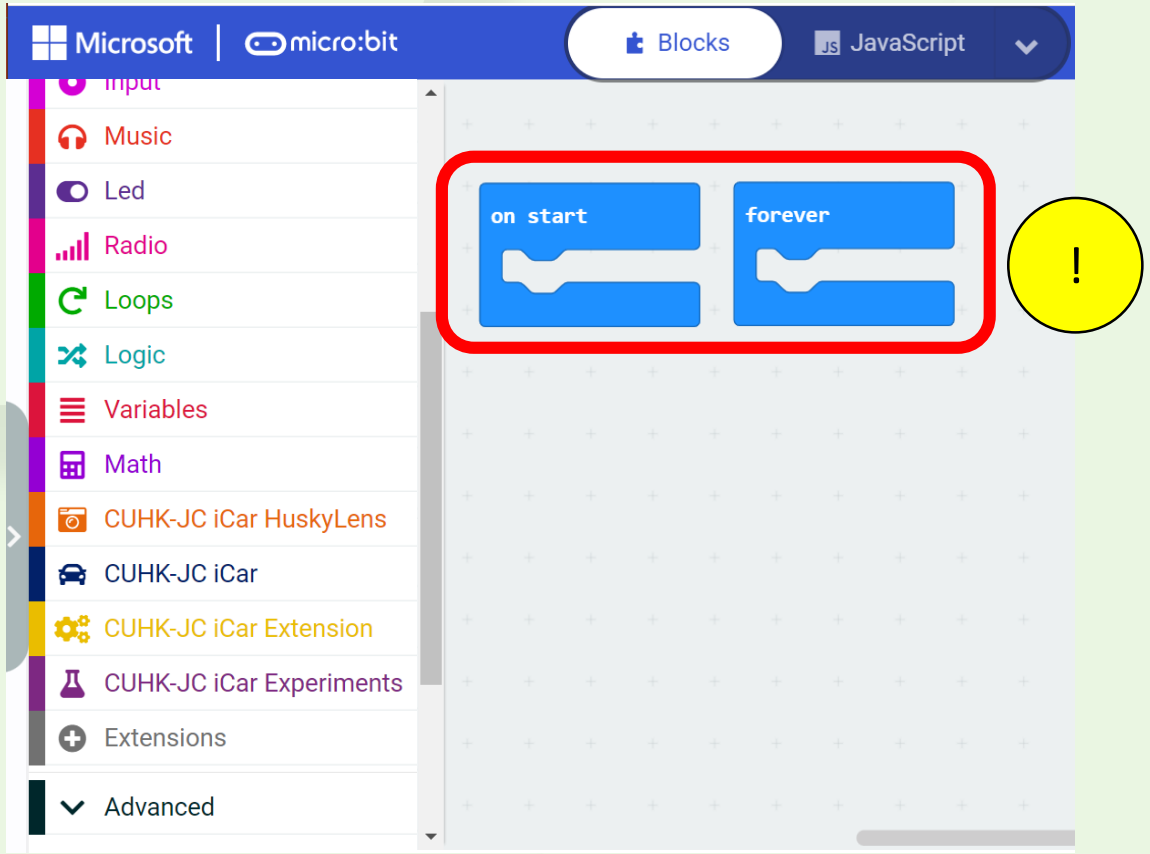
1. Click 

2. Click 

3. Name the variable “game_start"
4. Click 

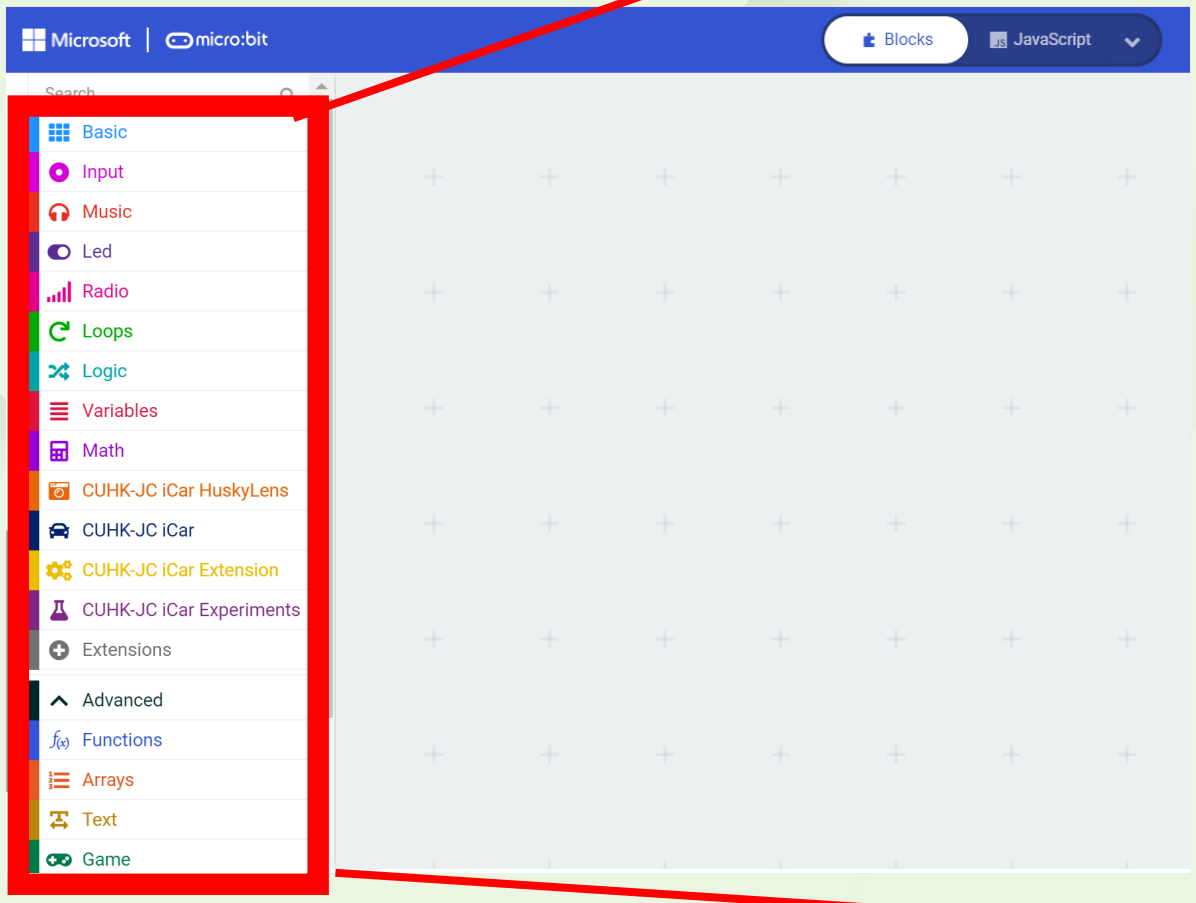
5. Programming blocks related to “game_start” will appear on the list

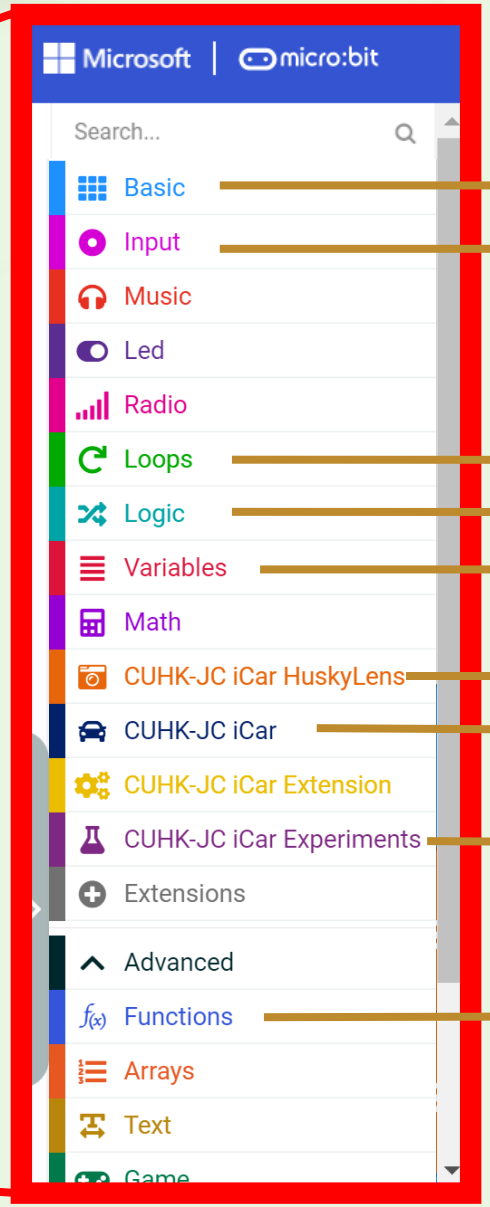
Let's start coding!

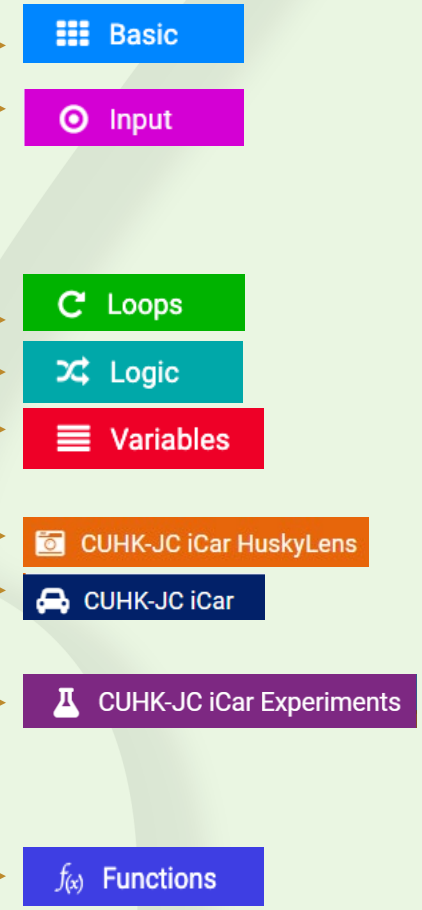


The program will pre-set "on start" and "forever" at the beginning.

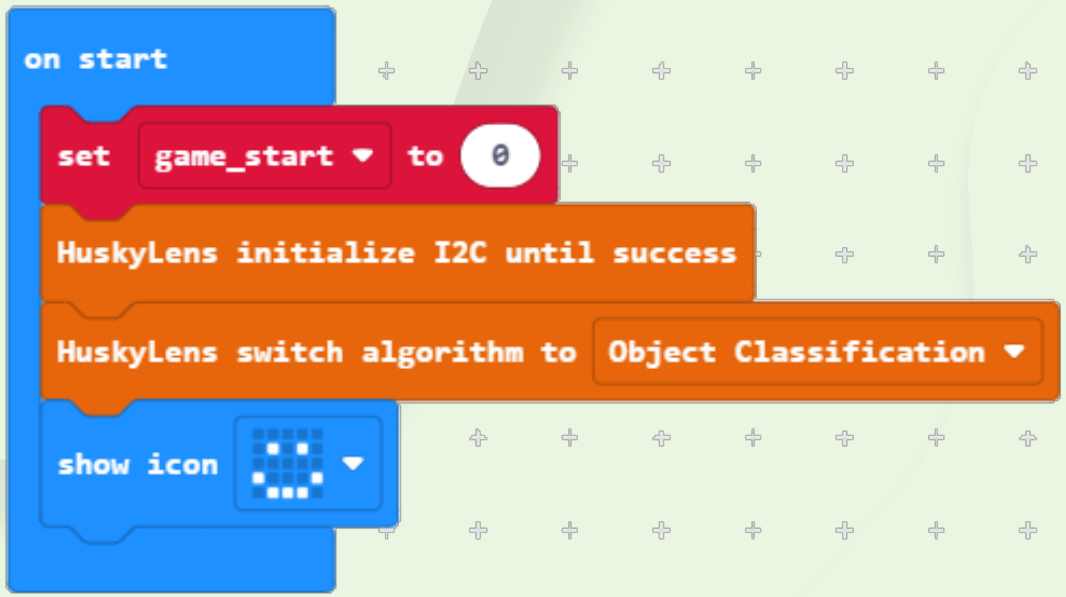
We can ignore them for now.
Please don't delete!



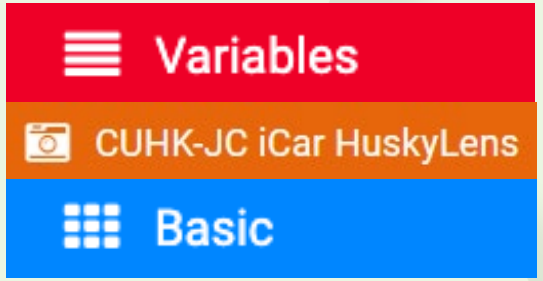


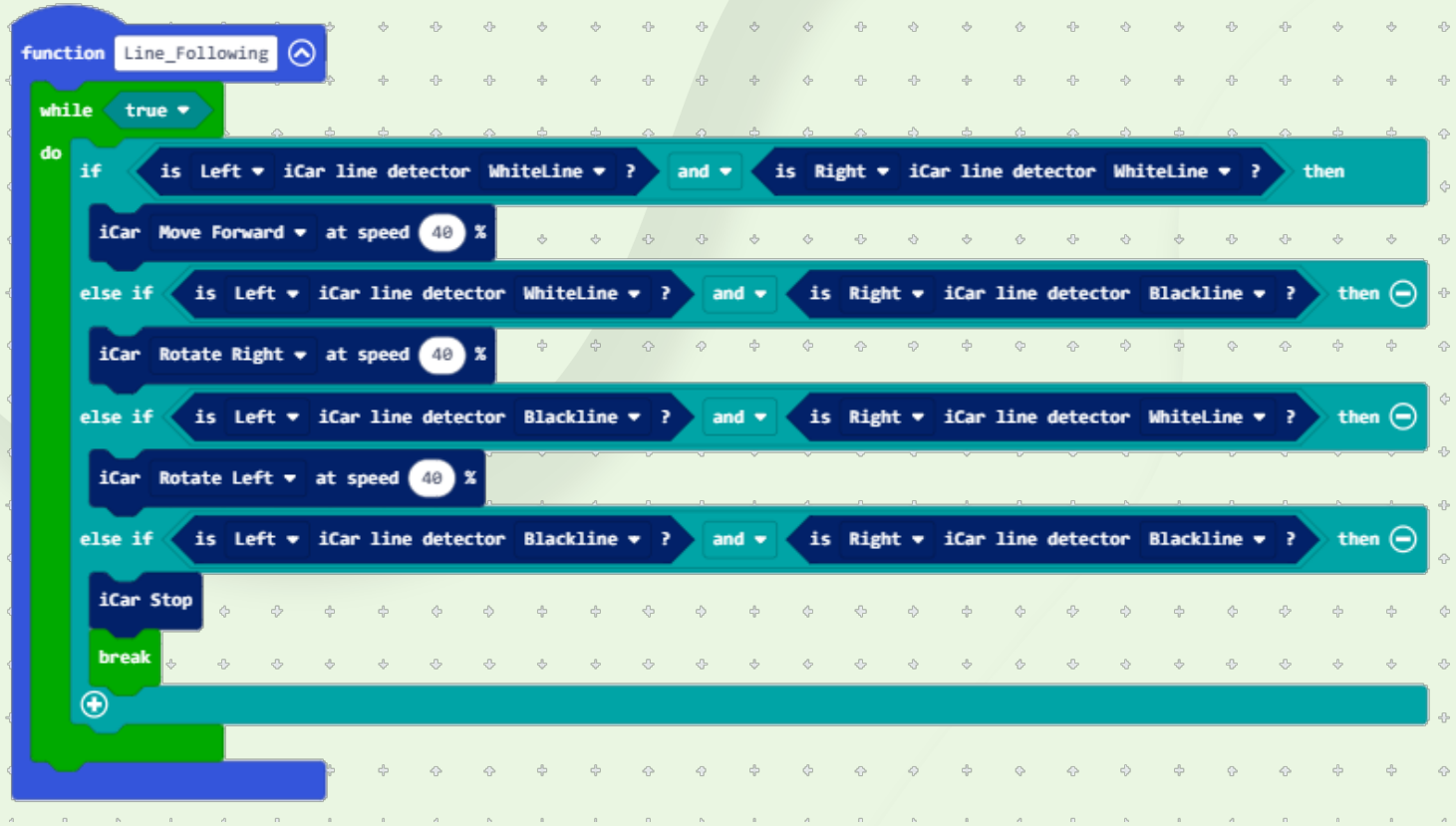


We will use the above modules to do programming.



You can find the blocks from the following:





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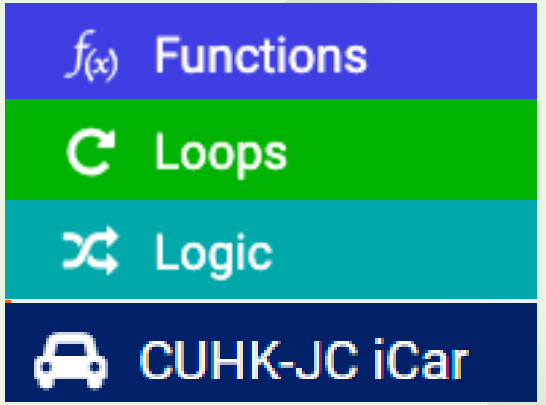

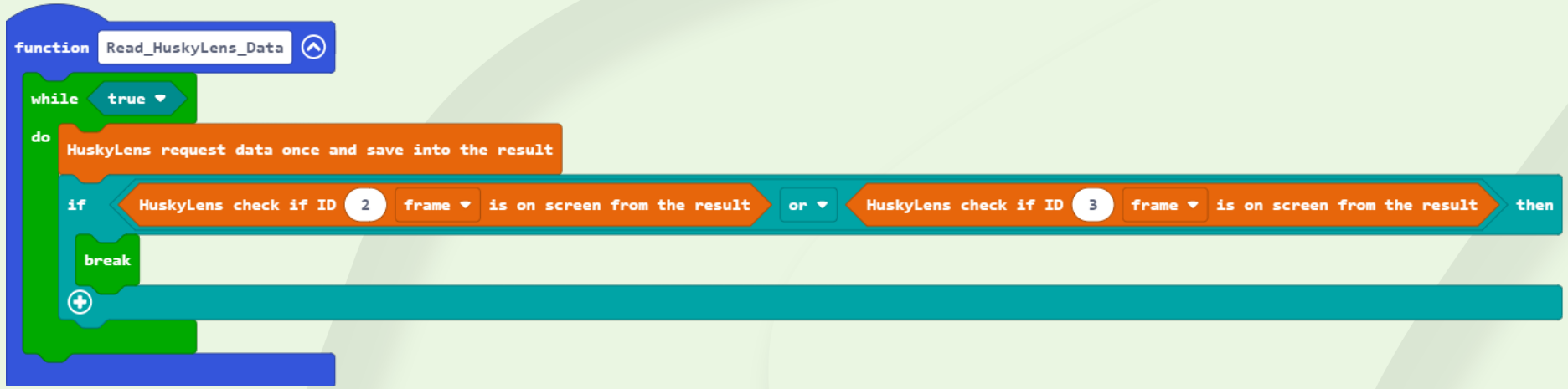

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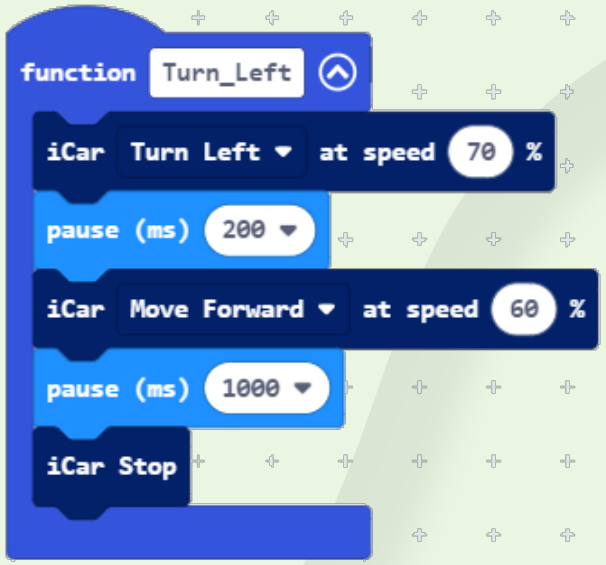

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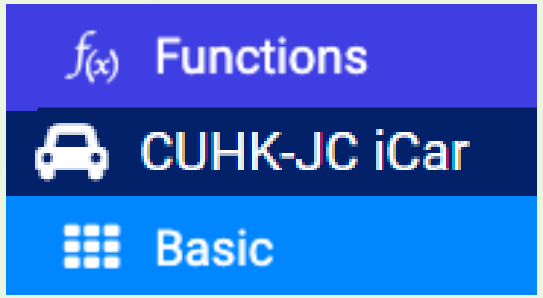
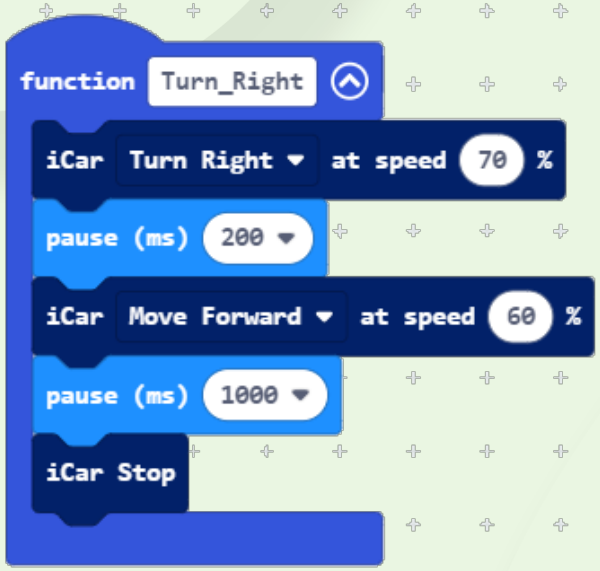
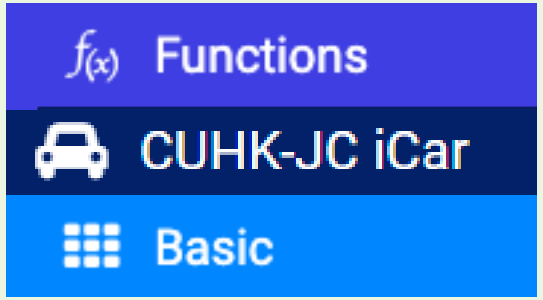
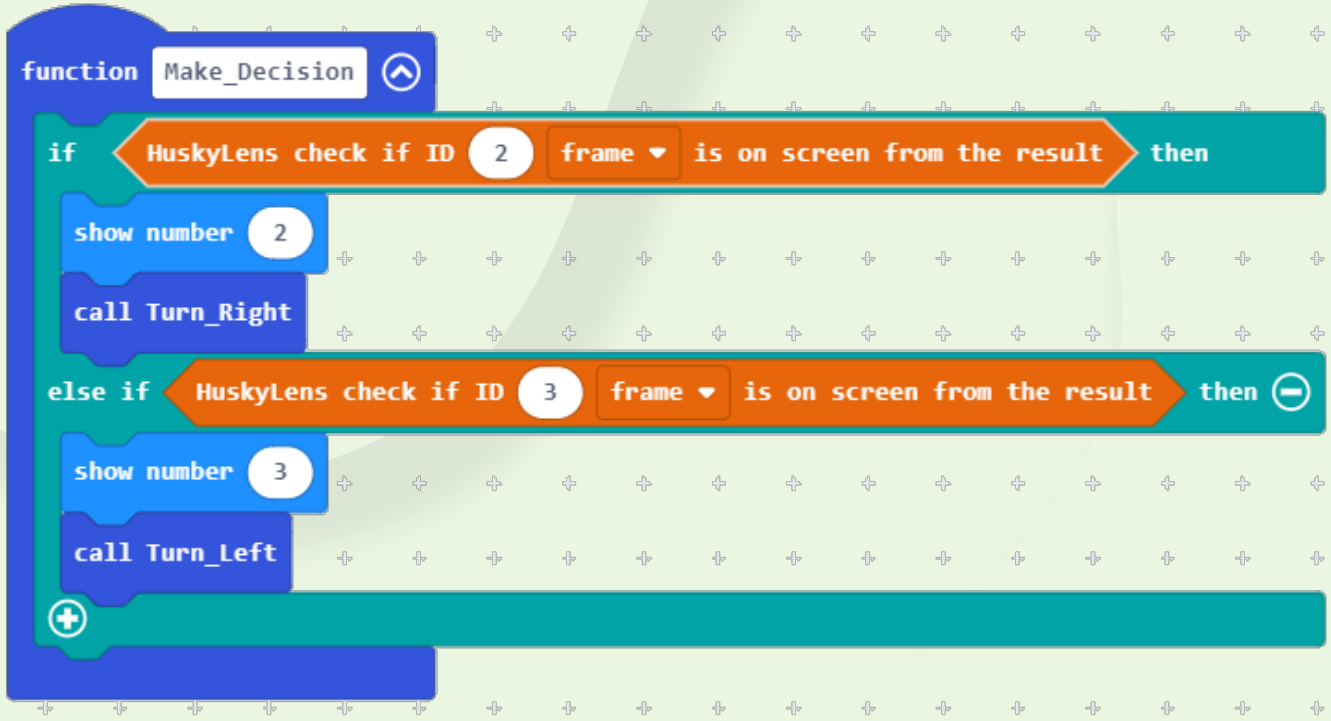




You can find the blocks from the following:





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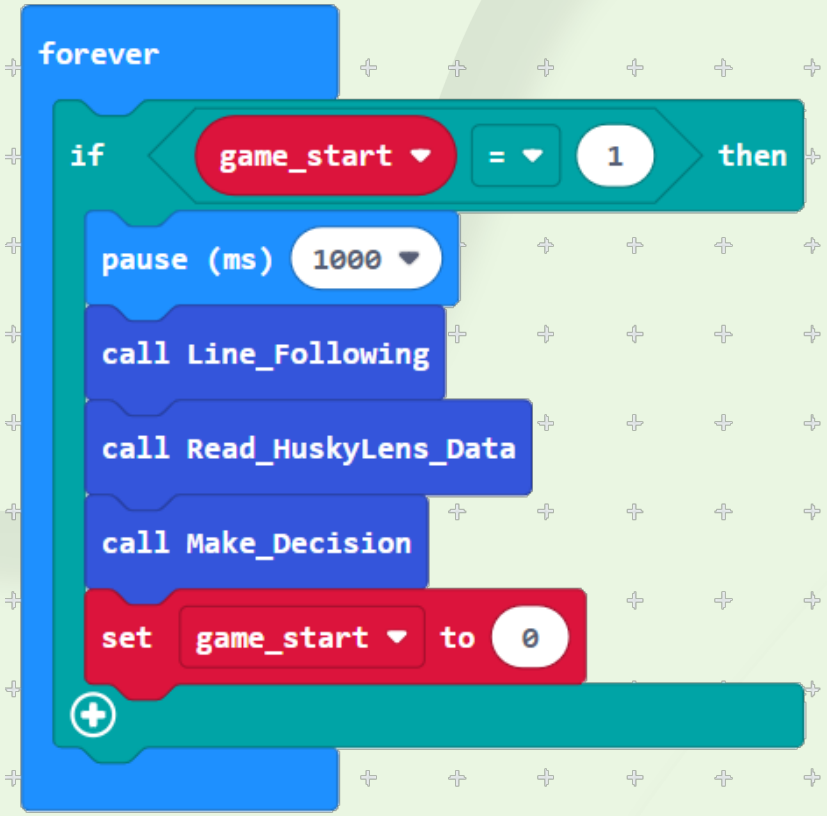
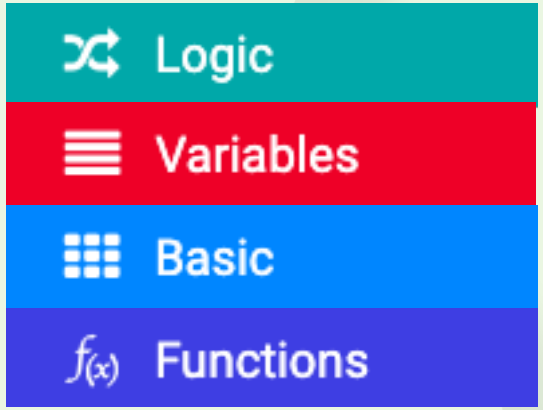
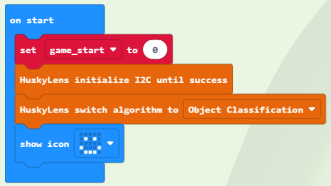
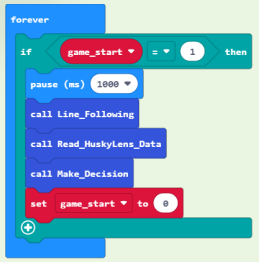


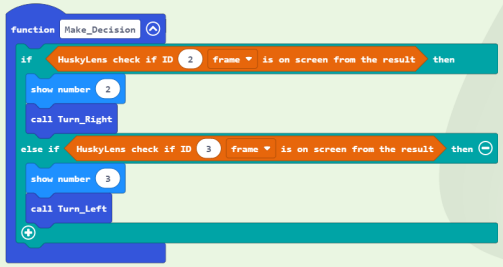
You can find the blocks from the following:

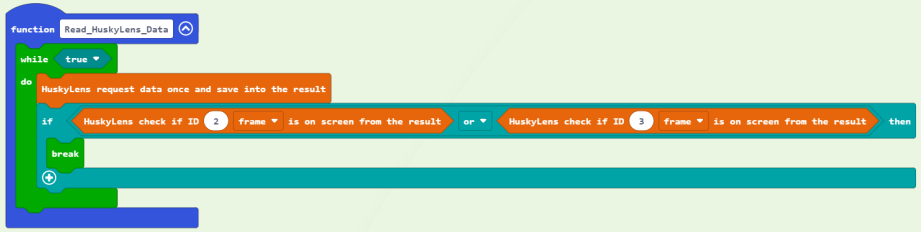


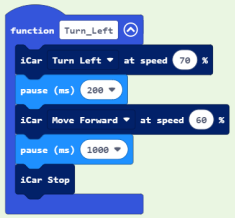
Finished!

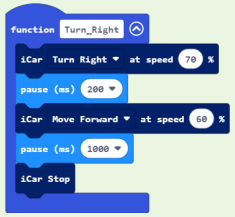




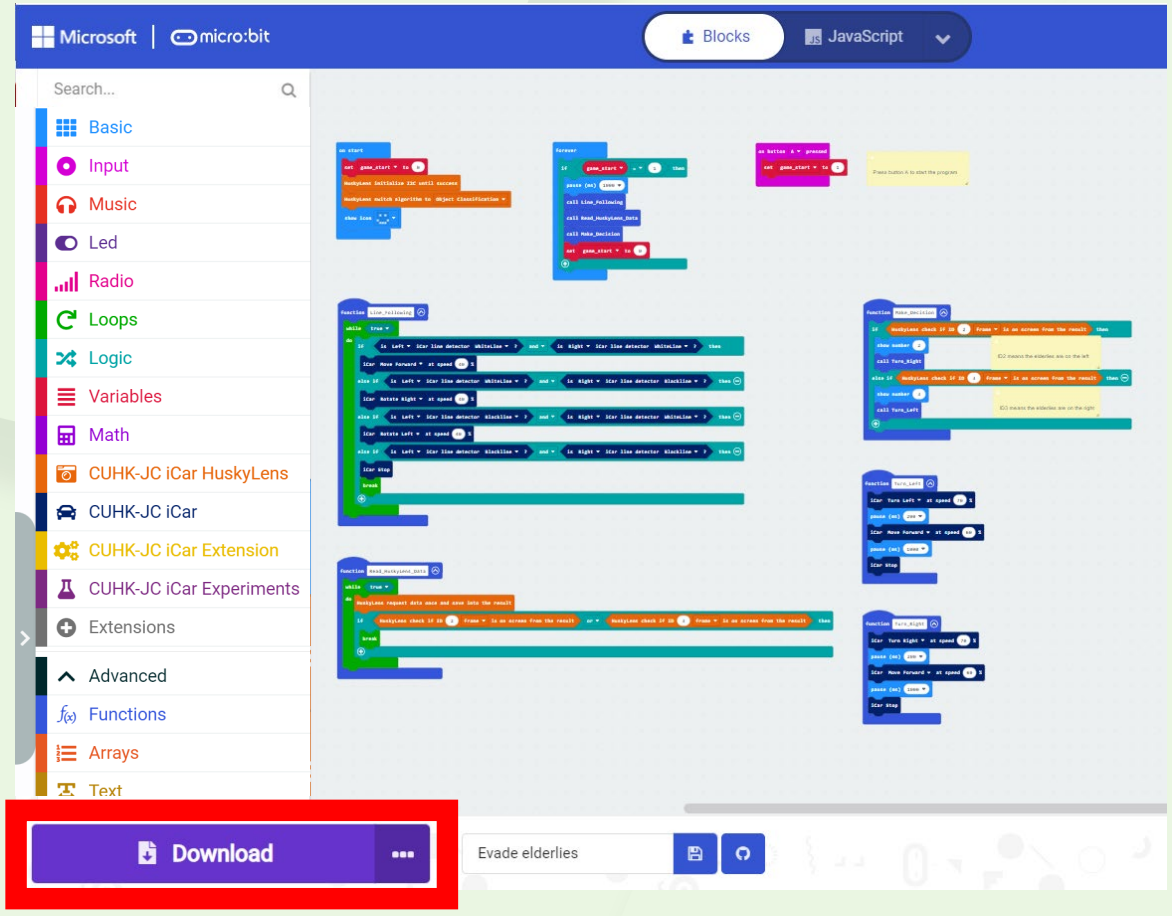






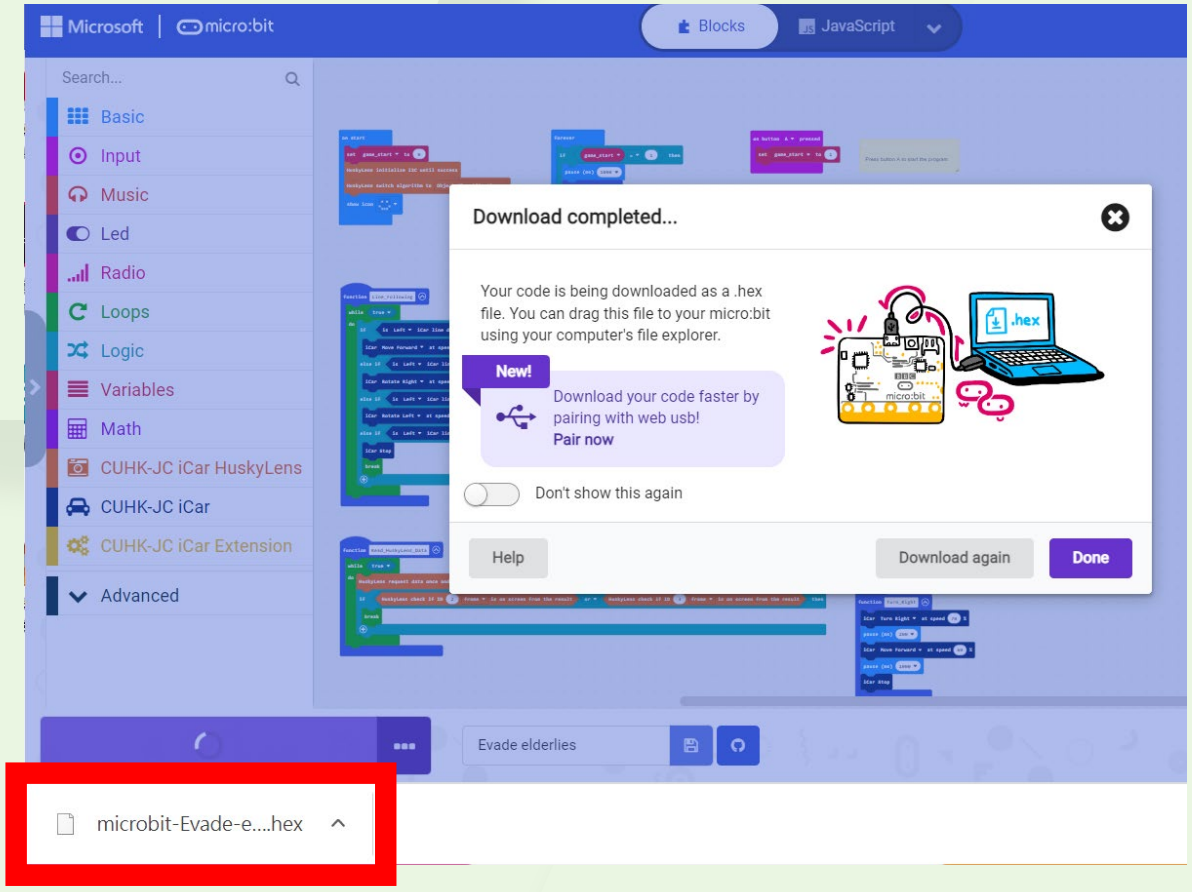


Download The Program To CUHK iCar



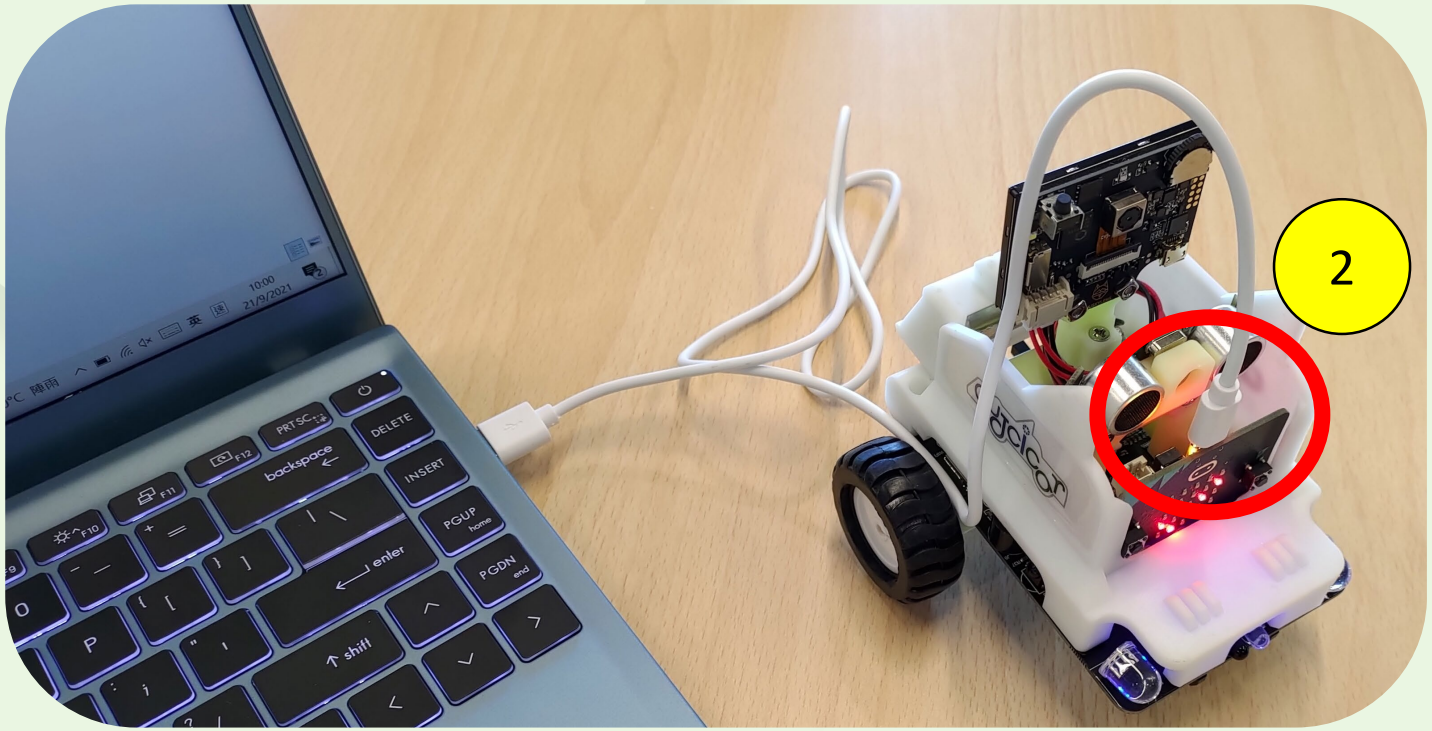
Step 1:

Click Download

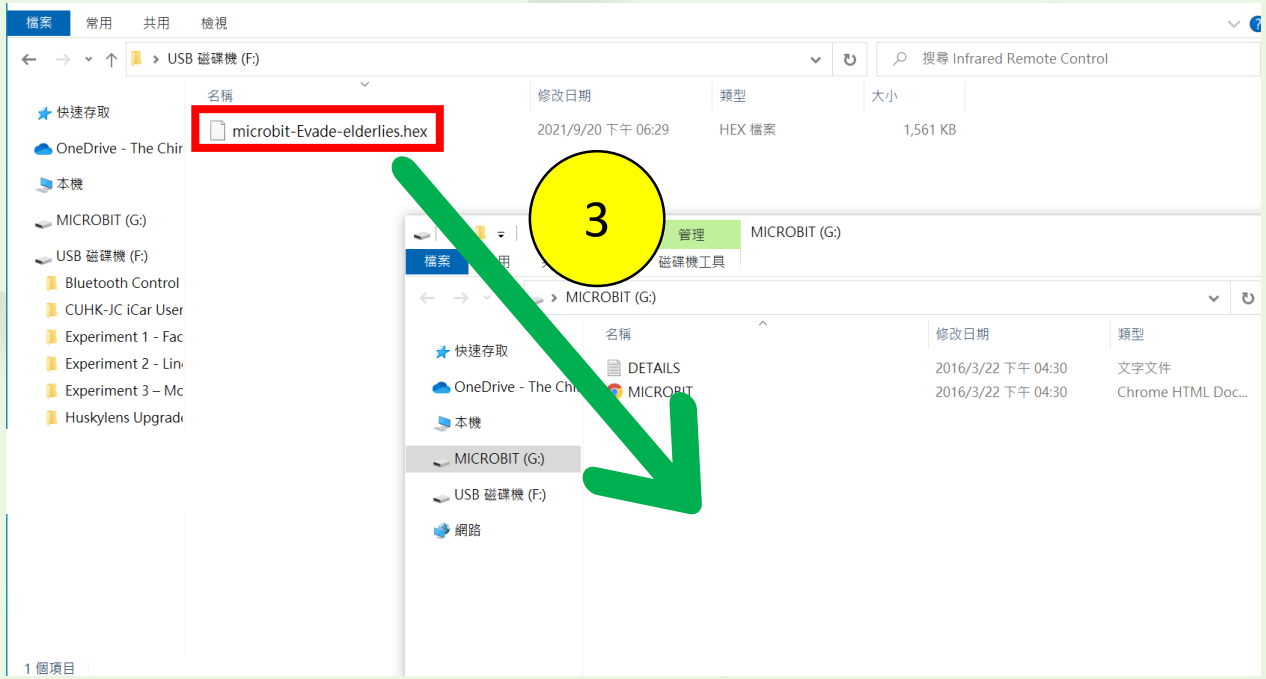


!

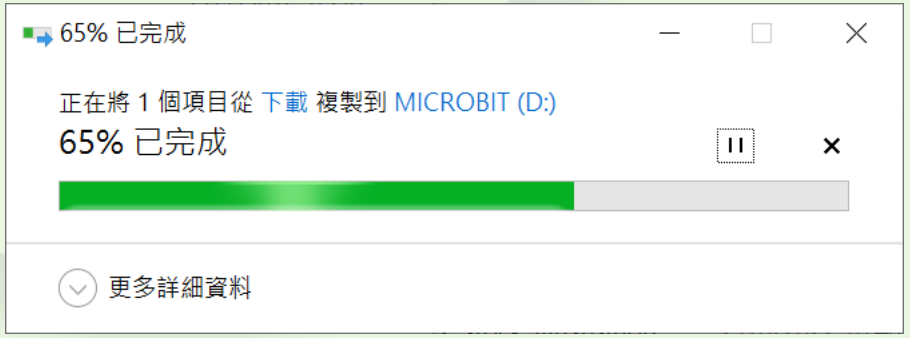
The hex file is downloaded!



Step 2:
Connect the micro:bit to computer by a micro USB cable



Step 3:
Drag the downloaded hex file into the micro:bit window



Step 4:
Wait for the completion of cloning process

Caution:

- The micro:bit window will potentially disappear after the completion
- After the completion of cloning process, the hex file will not be displayed in the micro:bit window

Step 5:
Disconnect the micro:bit from your computer

If the connection between CUHK iCar and the computer is failed:

- Restart the computer
- Try another USB port
- Change the micro USB cable

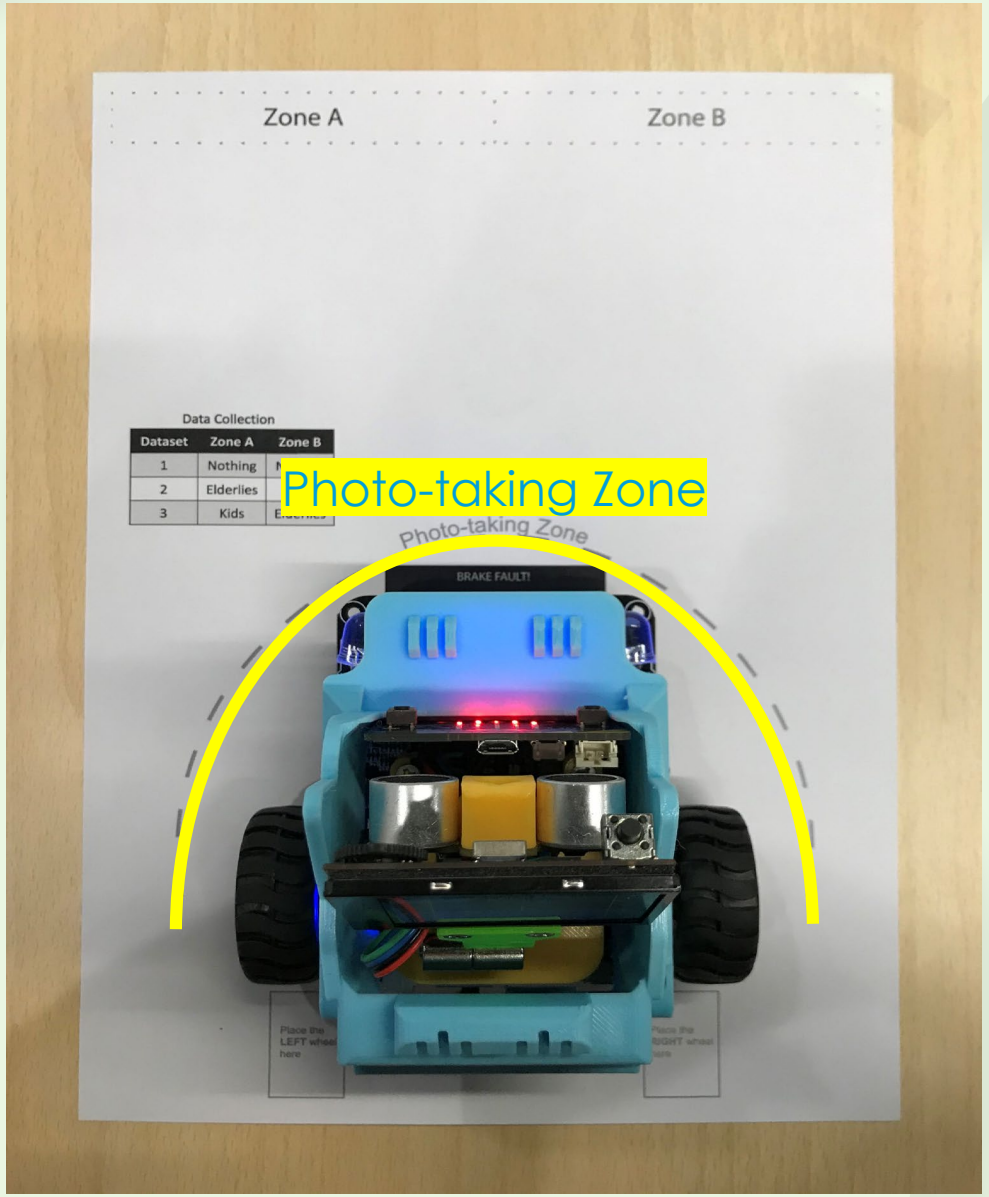
You have finished programming!

Let's start collecting data!

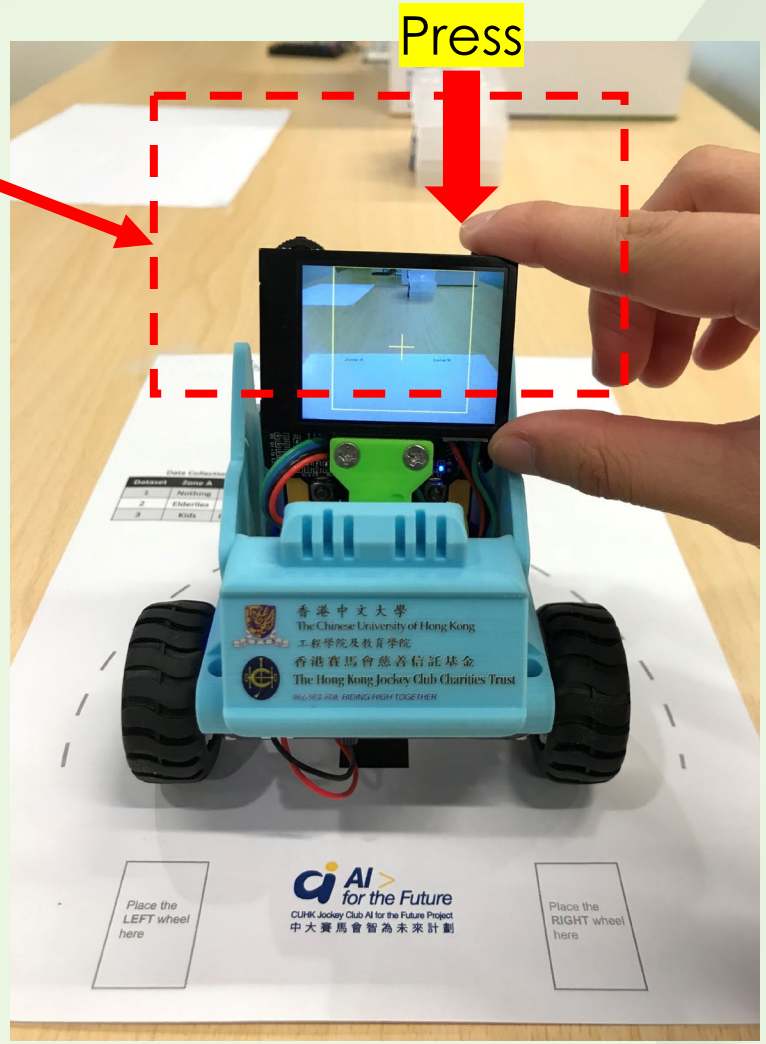
Data Collection

Step 1:

Place the track onto the table, and the CUHK iCar on the Photo-taking Zone



Dataset	Zone A	Zone B
1	**Nothing**	**Nothing**
2	Elderlies	Kids
3	Kids	Elderlies



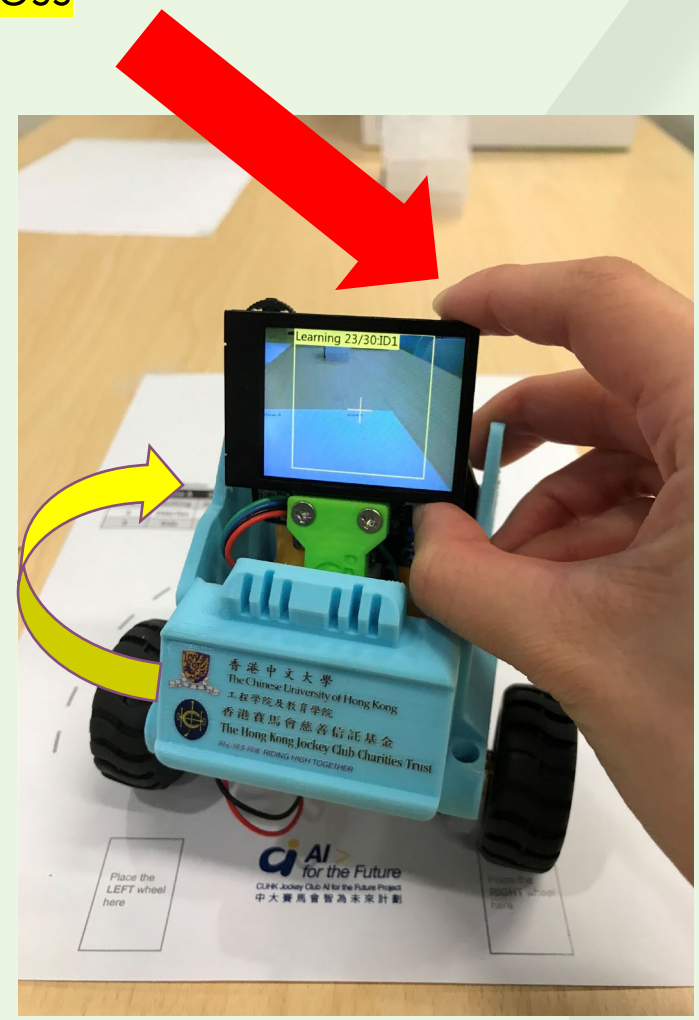
Step 2 - Collect Dataset 1:

- CUHK iCar should face forward
- Press the learning button to collect data

Tips:

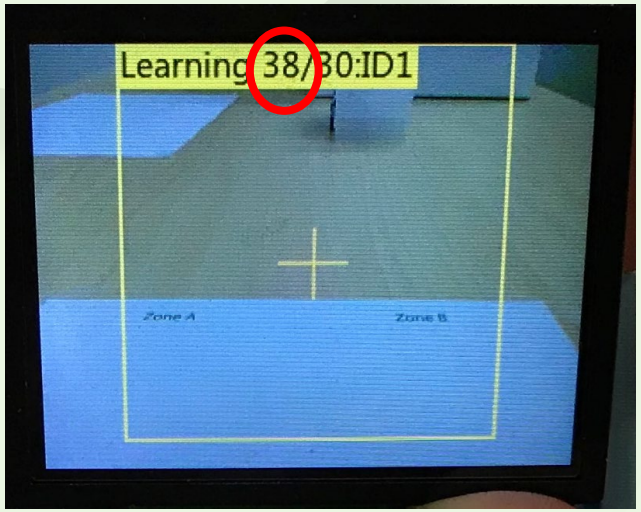
Rotate the CUHK iCar to obtain a better result

Make sure you keep pressing the button while you're rotating!



Step 3:

Release the learning button after the number reaches 30



Step 4:

Press the learning button again before the countdown ends

Dataset	Zone A	Zone B
1	Nothing	Nothing
2	**Elderlies**	**Kids**
3	Kids	Elderlies

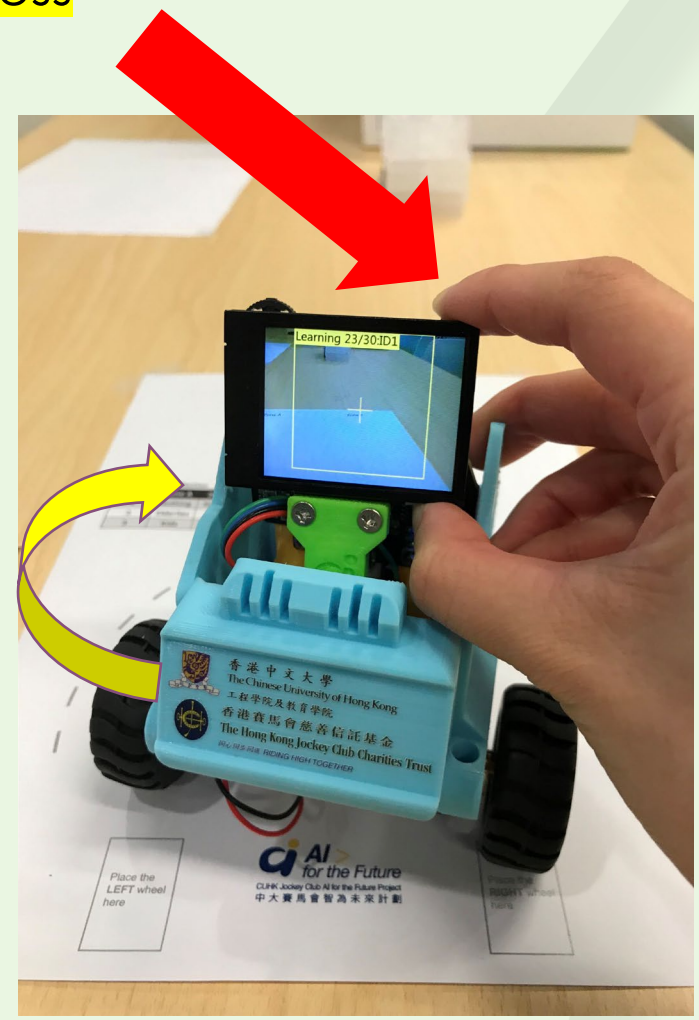
Step 5 - Collect Dataset 2:

- CUHK iCar should face forward
- Place the paper model accordingly
- Press the learning button to collect data

Tips:

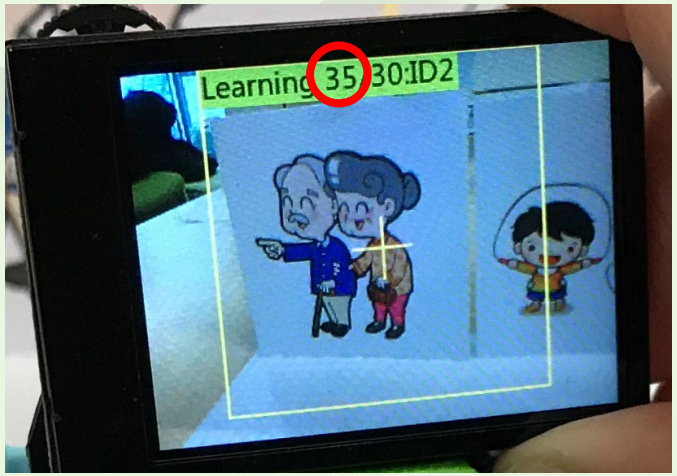
Rotate the CUHK iCar to obtain a better result

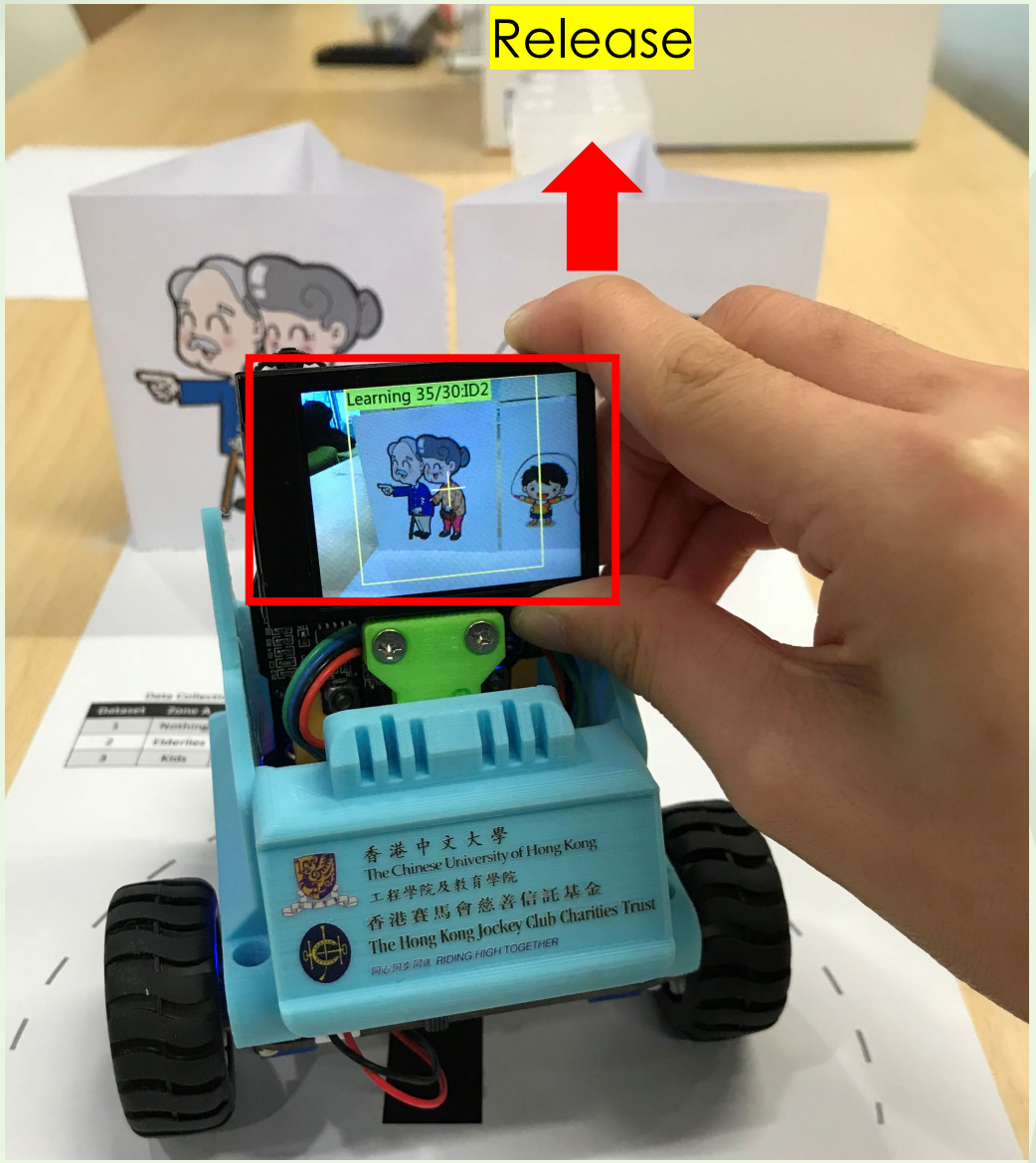
Make sure you keep pressing the button while you're rotating!



Step 6:

Release the learning button after the number reaches 30





Step 7:

Press the learning button again before the countdown ends

Dataset	Zone A	Zone B
1	Nothing	Nothing
2	Elderlies	Kids
3	**Kids**	**Elderlies**

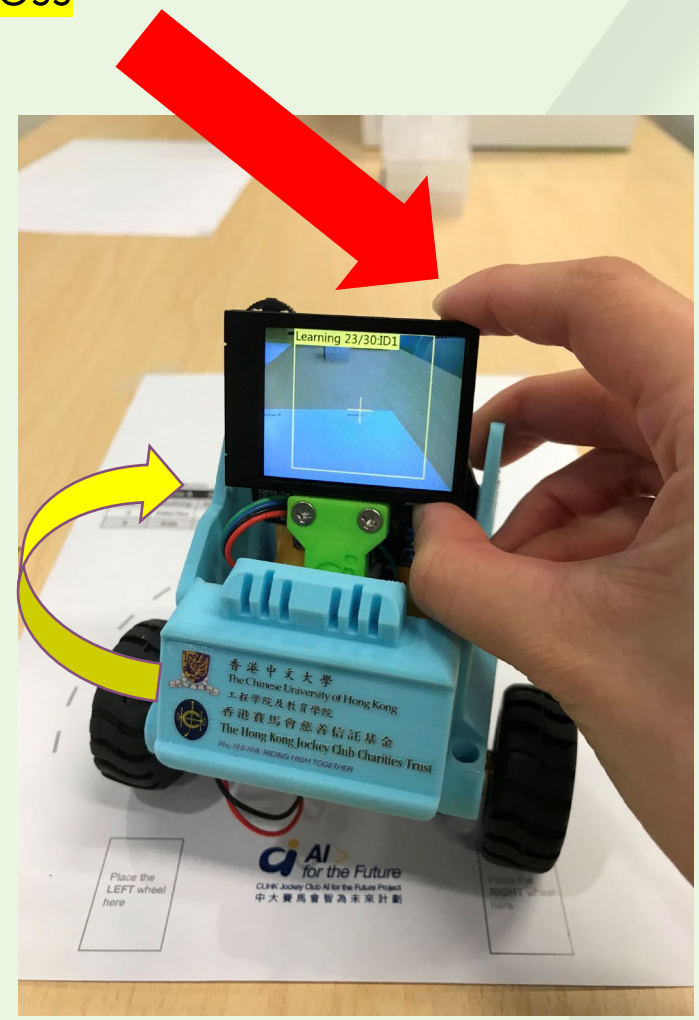
Step 8 - Collect Dataset 3:

- CUHK iCar should face forward
- Place the paper model accordingly
- Press the learning button to collect data

Tips:

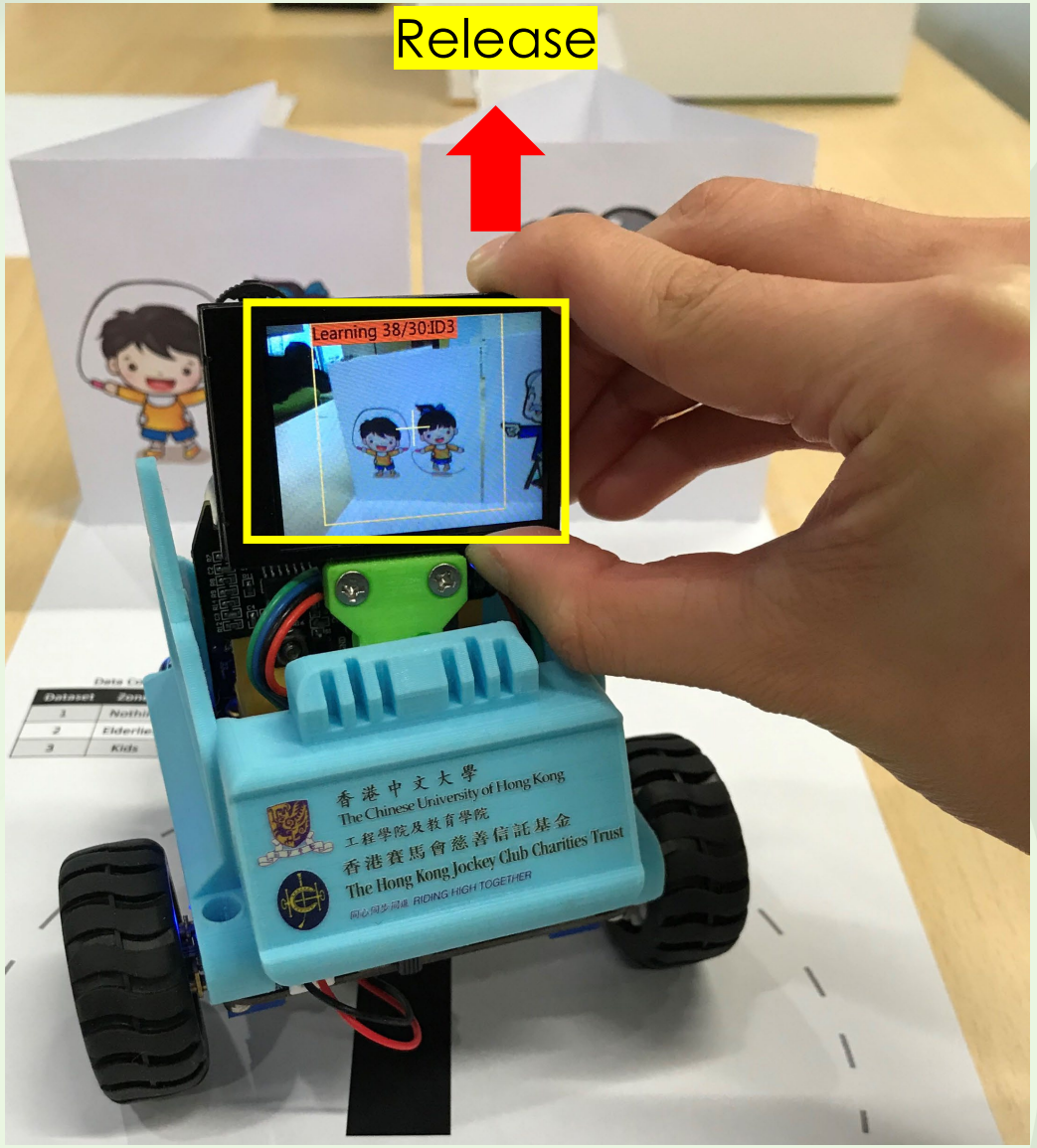
Rotate the CUHK iCar to obtain a better result

Make sure you keep pressing the button while you're rotating!



Step 9:

Release the learning button after the number reaches 30



Step 10:

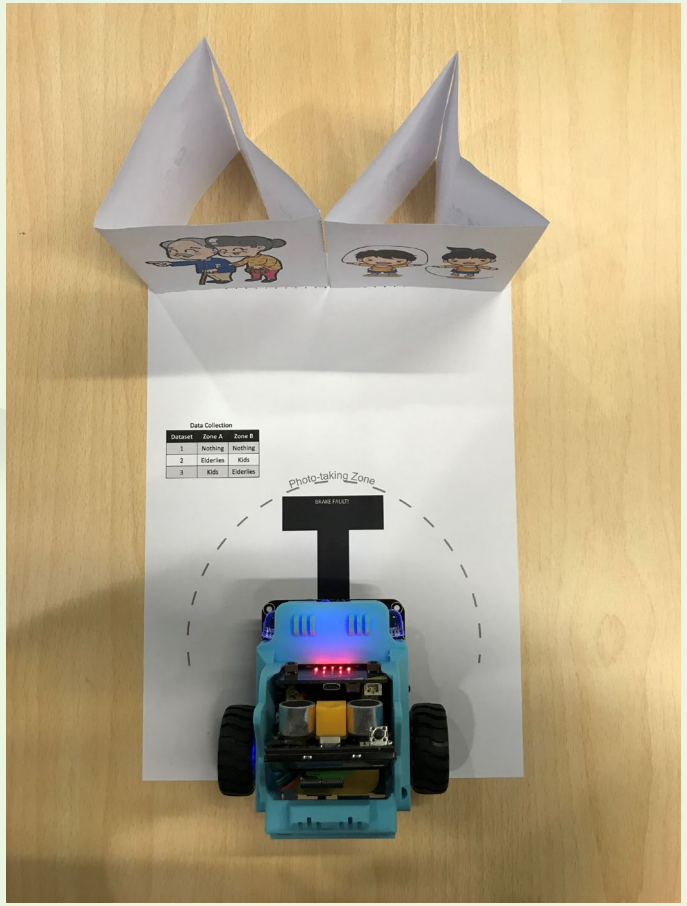
Wait for the countdown ends

You've collected all the data needed!

Let's conduct the experiment!

Step 1:

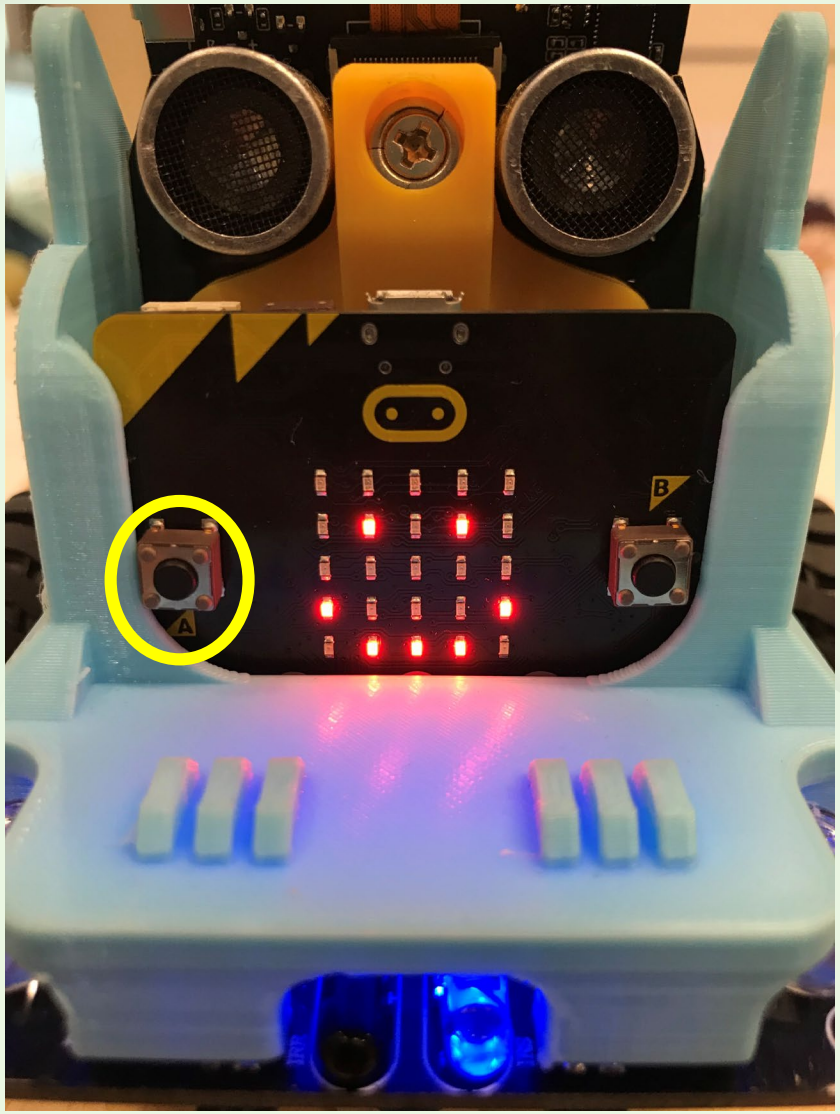
Place the paper models in the designated zones and place CUHK iCar on the starting point



Attention:
Place the two wheels according to the instructions on the paper

Step 2:

Press button A on micro:bit



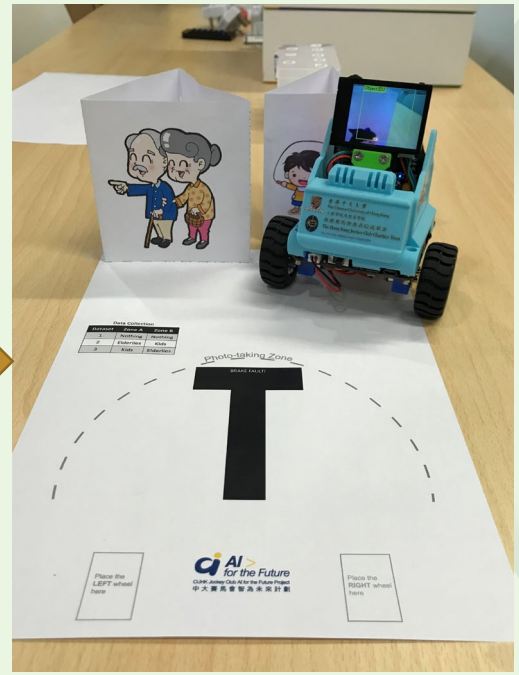
Simulation

Program: Evade Elderlies

Paper Model: Dataset 2

Place the CUHK iCar at the starting position and press button A.

CUHK iCar has trouble braking!



It will evade the elderlies.

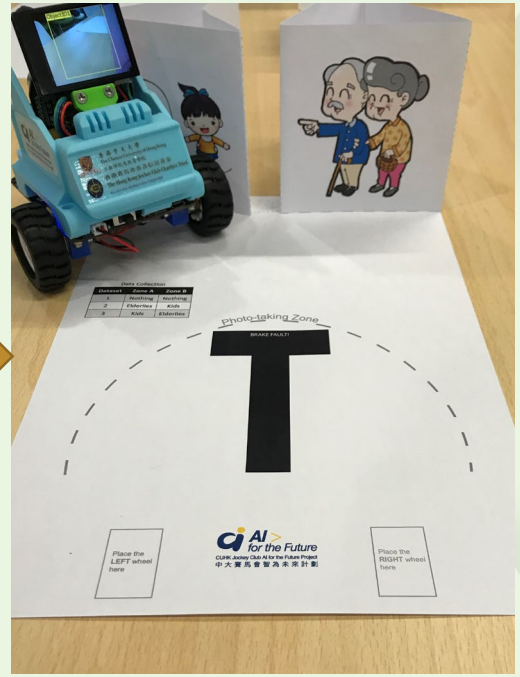
Simulation

Program: Evade Elderlies

Paper Model: Dataset 3

Place the CUHK iCar at the starting position and press button A.

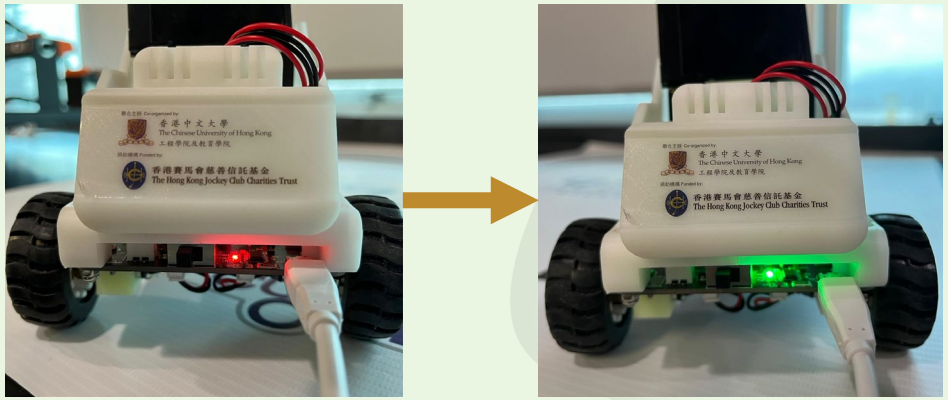
CUHK iCar has trouble braking!



It will evade the elderlies.

If CUHK iCar does not work as expected:

- Try to fully charge the CUHK iCar



- If the CUHK iCar still does not work as expected, then you can try to recollect data by pressing the learning button twice to forget the recorded data, then to recollect data. For details, please refer to the slide 40