愛動智教育系統

CUHK iCar Experiment Manual
Experiment 3: Moral Dilemma Experiment
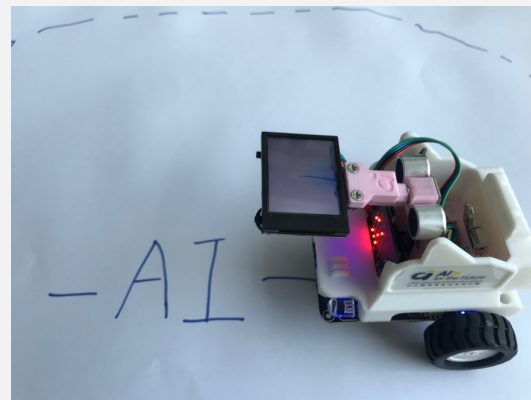
Write Your Own Code
(Random)
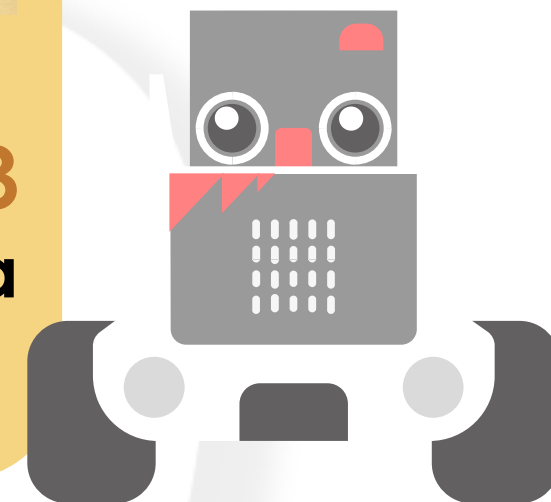
CUHK iCar

Experiment 1
Face Following
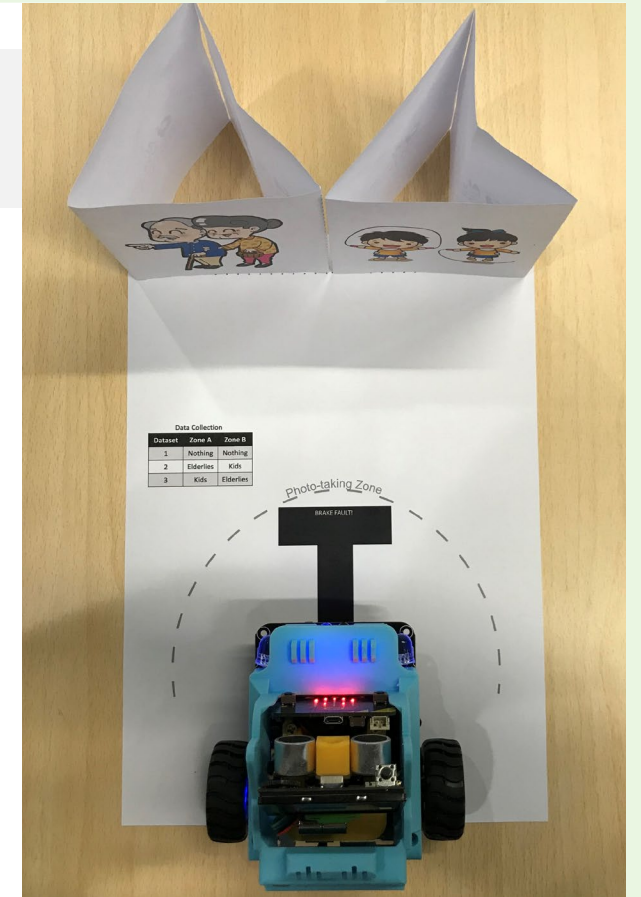

Experiment 2
Line Tracking

Experiment 3
Moral Dilemma
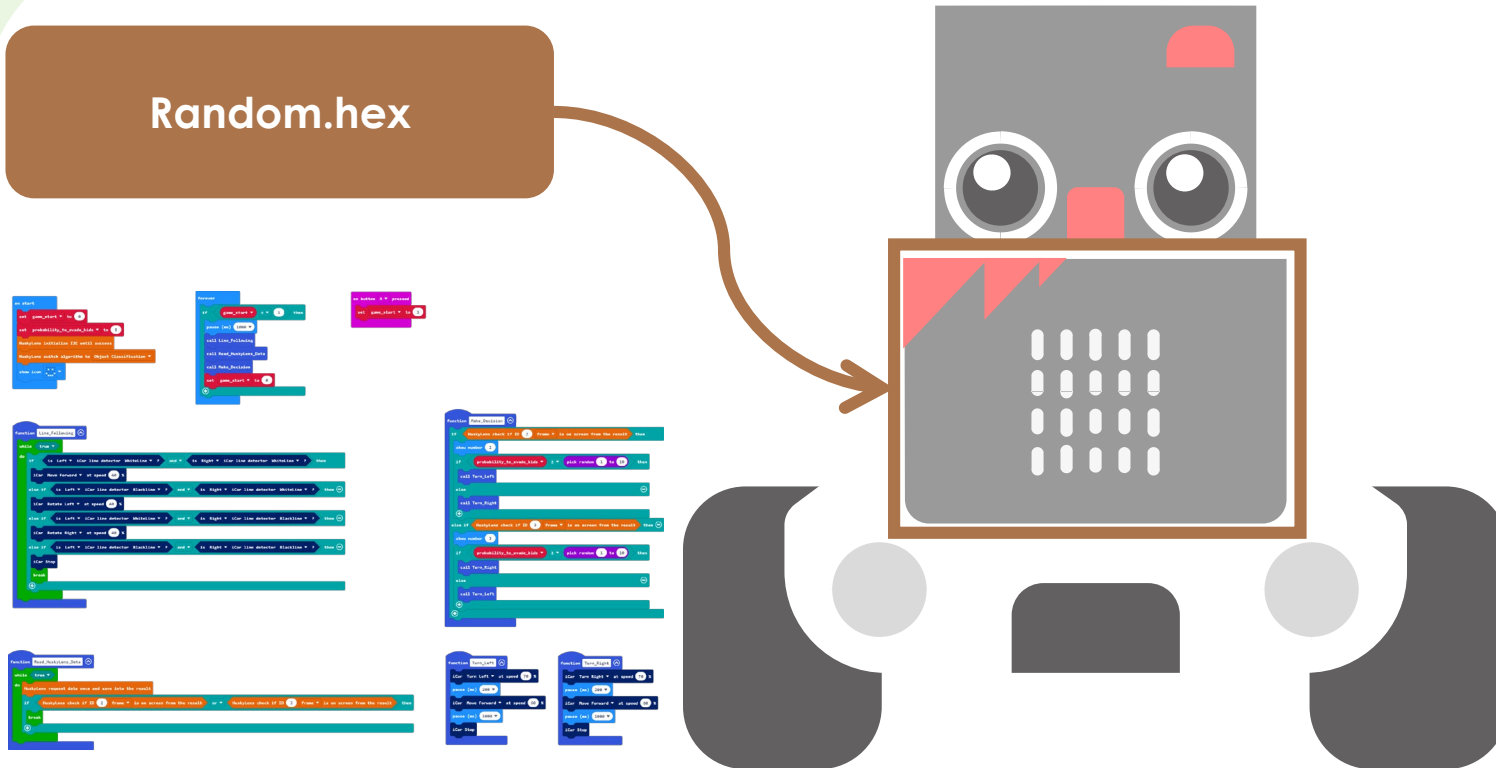
Moral Dilemma Experiment

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

Random.hex

Method 1
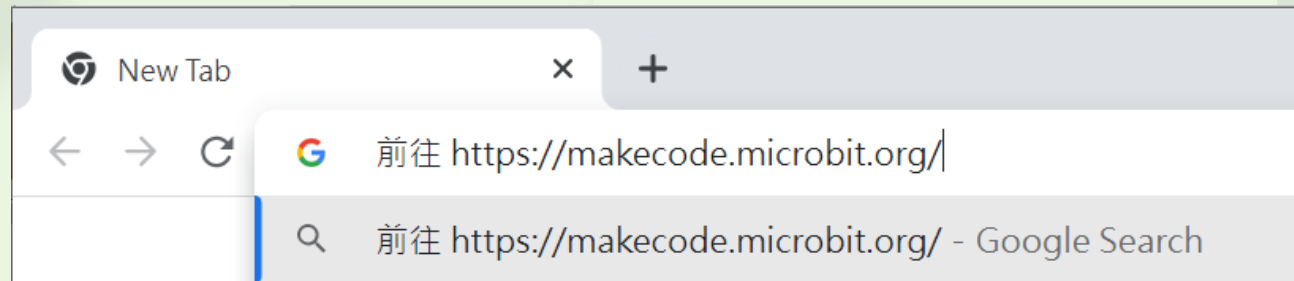
Clone the .hex to micro:bit directly

Method 2

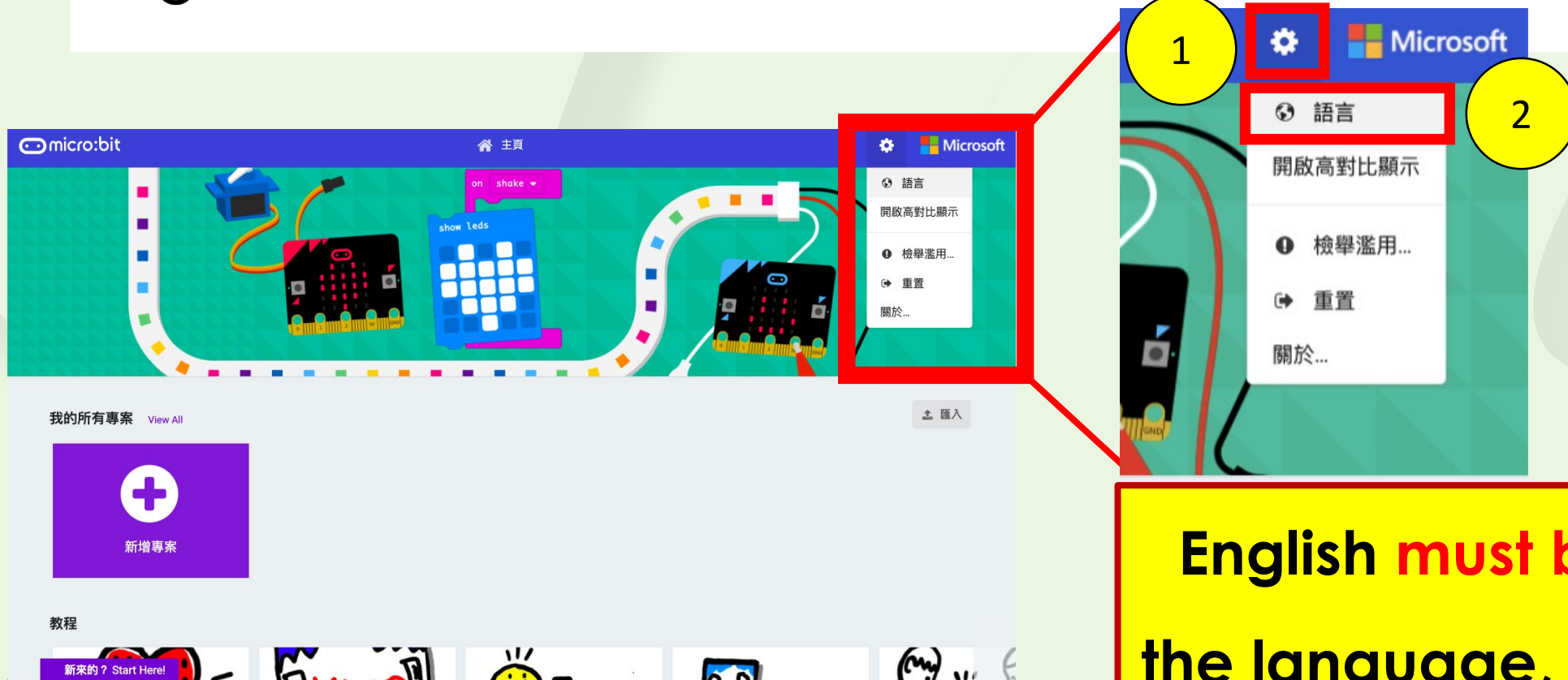Write your own code on MakeCode

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Code On MakeCode

🌐 Browse https://makecode.microbit.org/
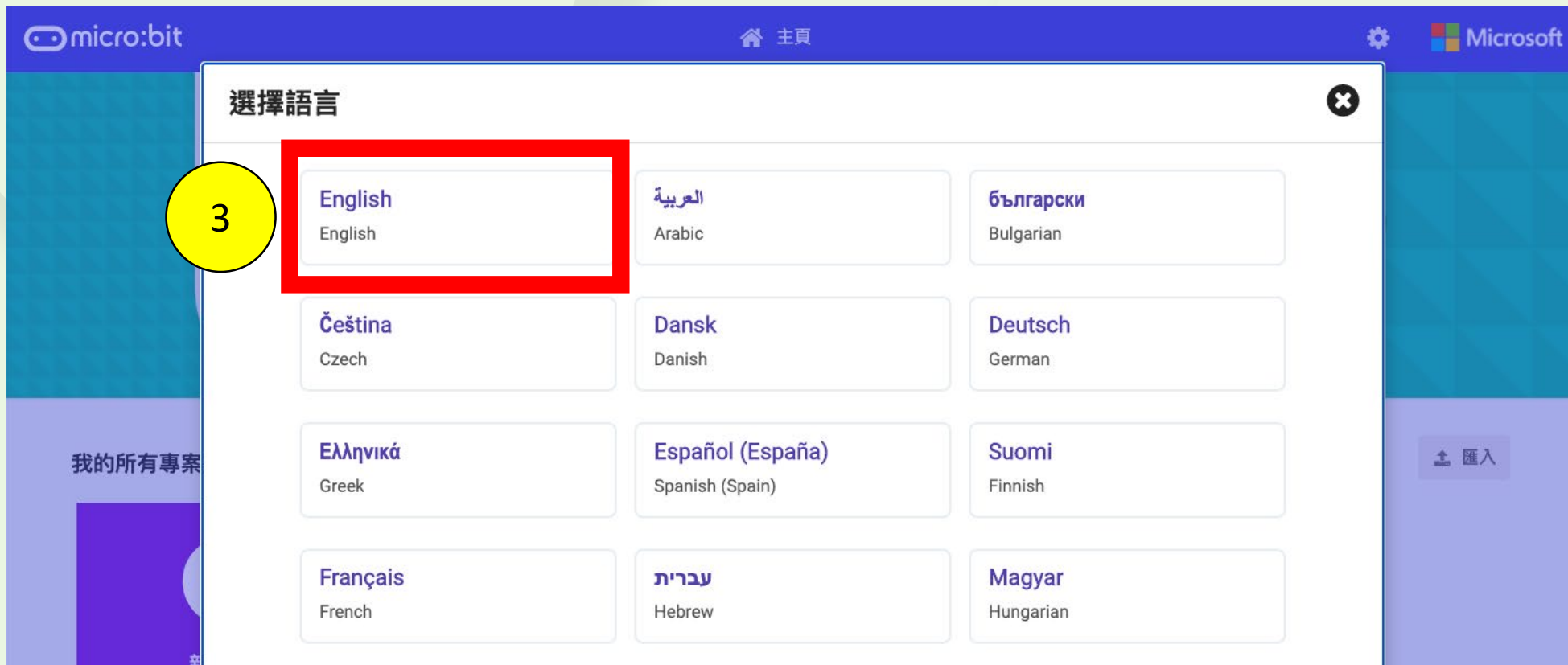
Caution
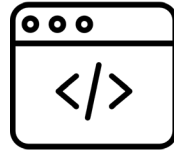# Please Set English As The Language!

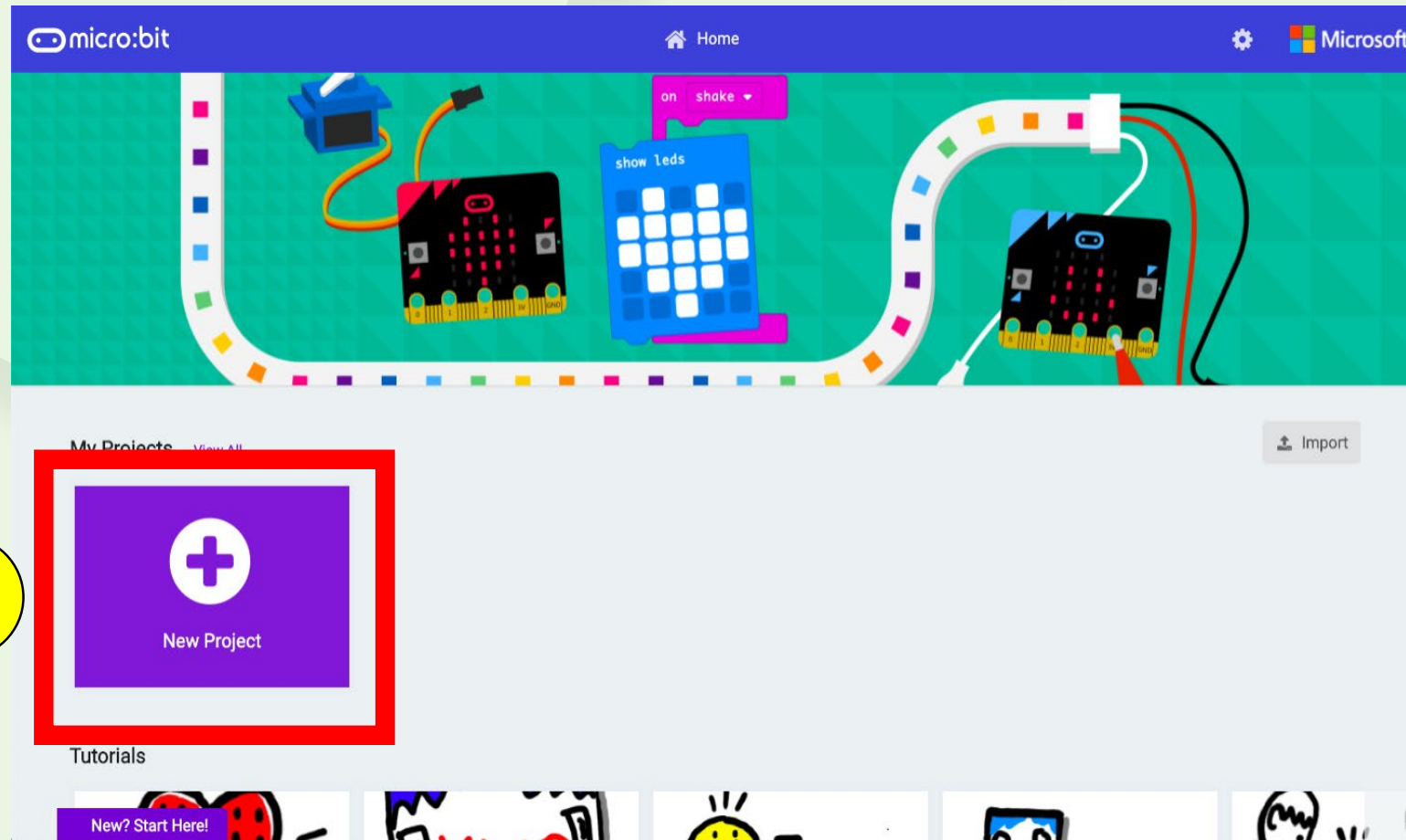1. Click ⚙

2. Click 🌐 語言

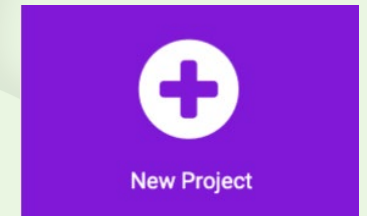**English must be set as the language, otherwise the program may fail.**
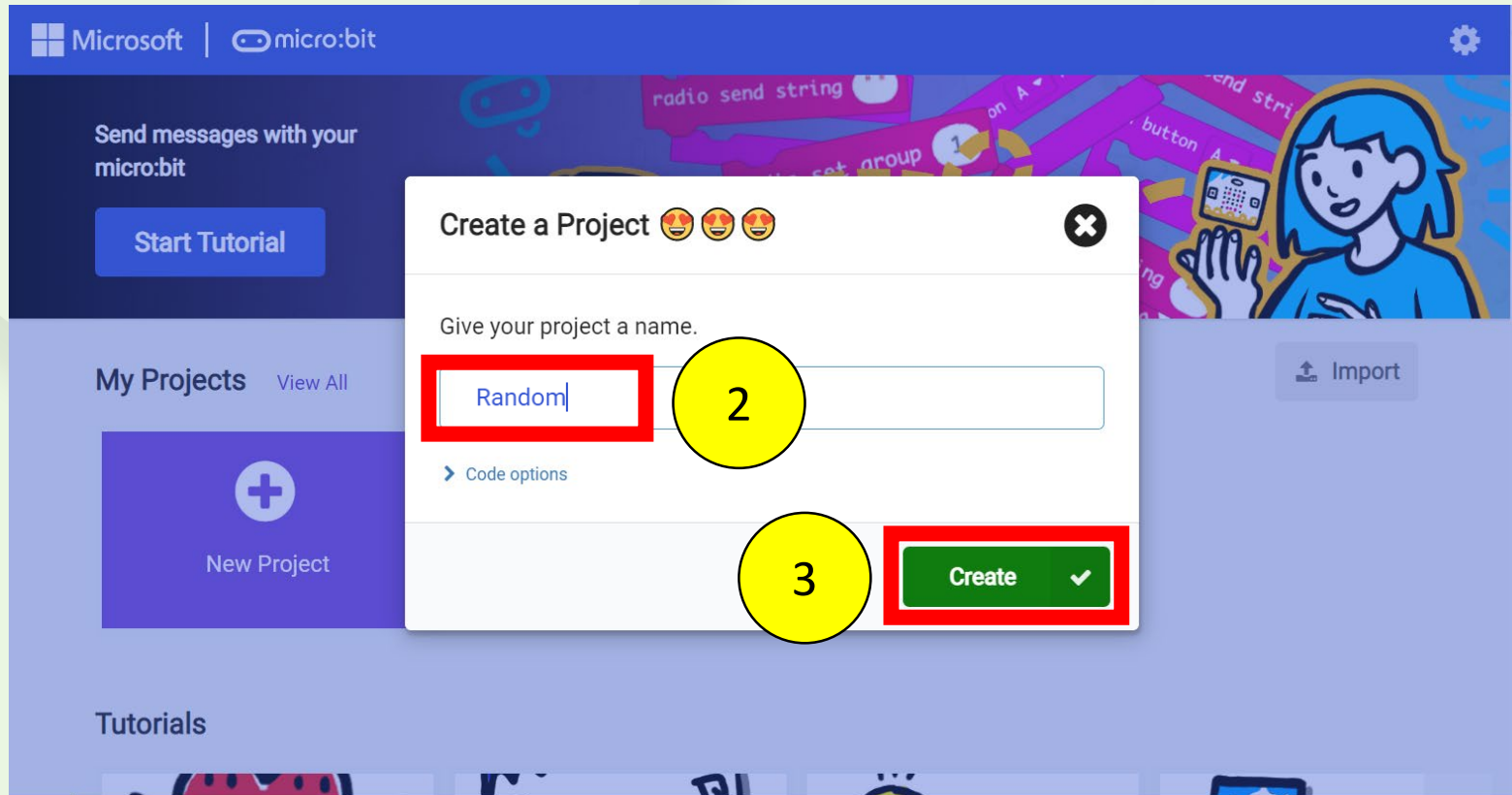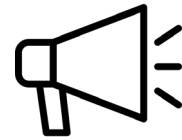
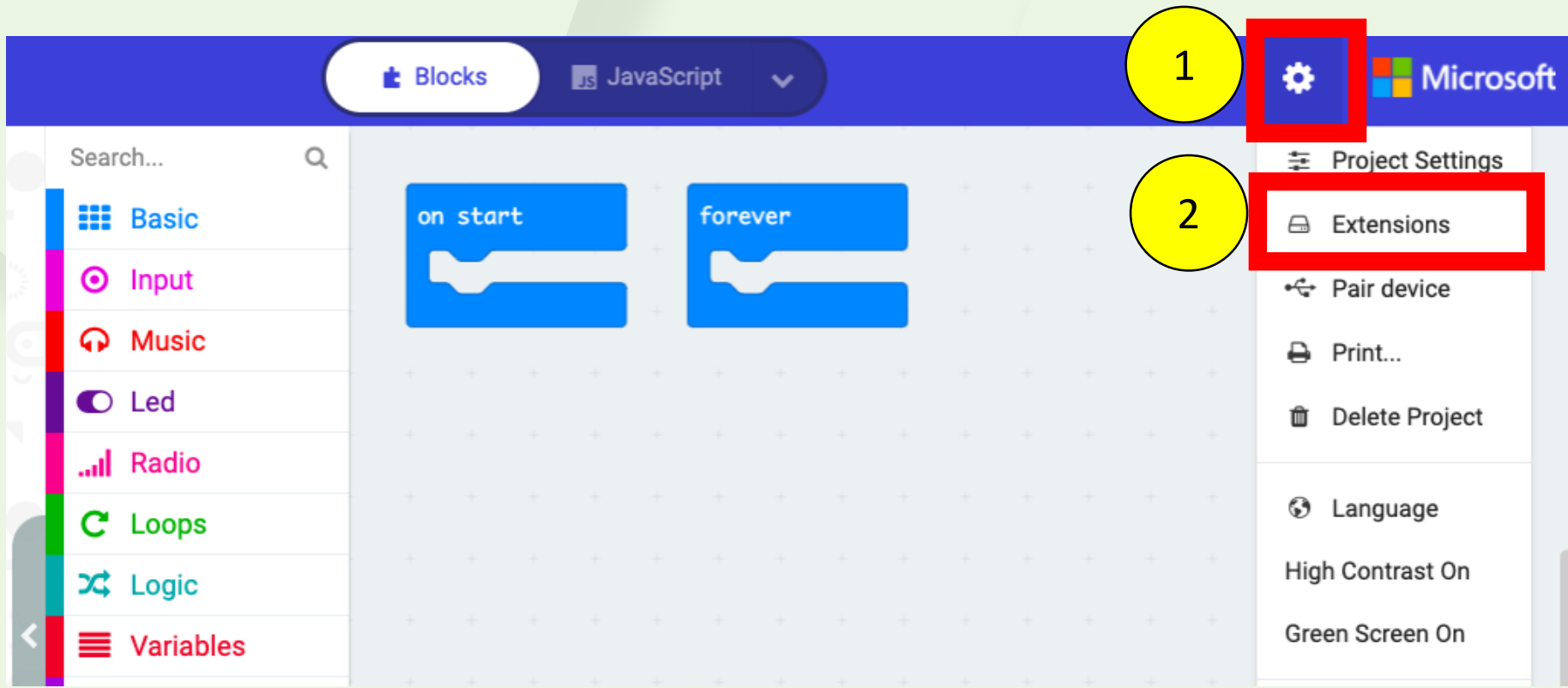3. Click English

New Project

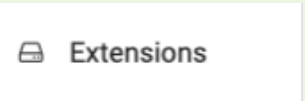1. Click New Project

2. Enter "Random"

3. Click **Create**

Prepare CUHK-JC-iCar Extension

1. Click ⚙

2. Click 🖨 Extensions

Extensions

https://github.com/hitkuangye/CUHK_JC_iCar_V2

③

CUHK-JC-iCar
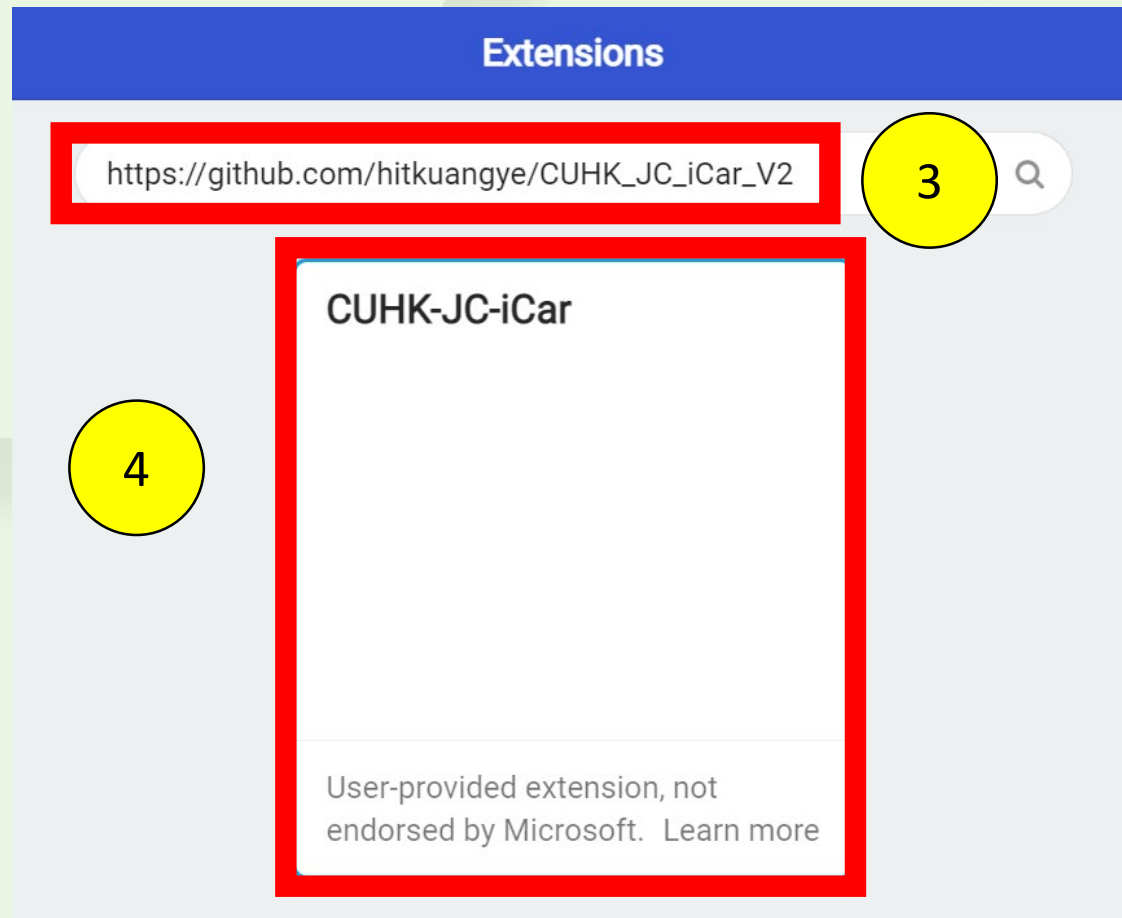
④

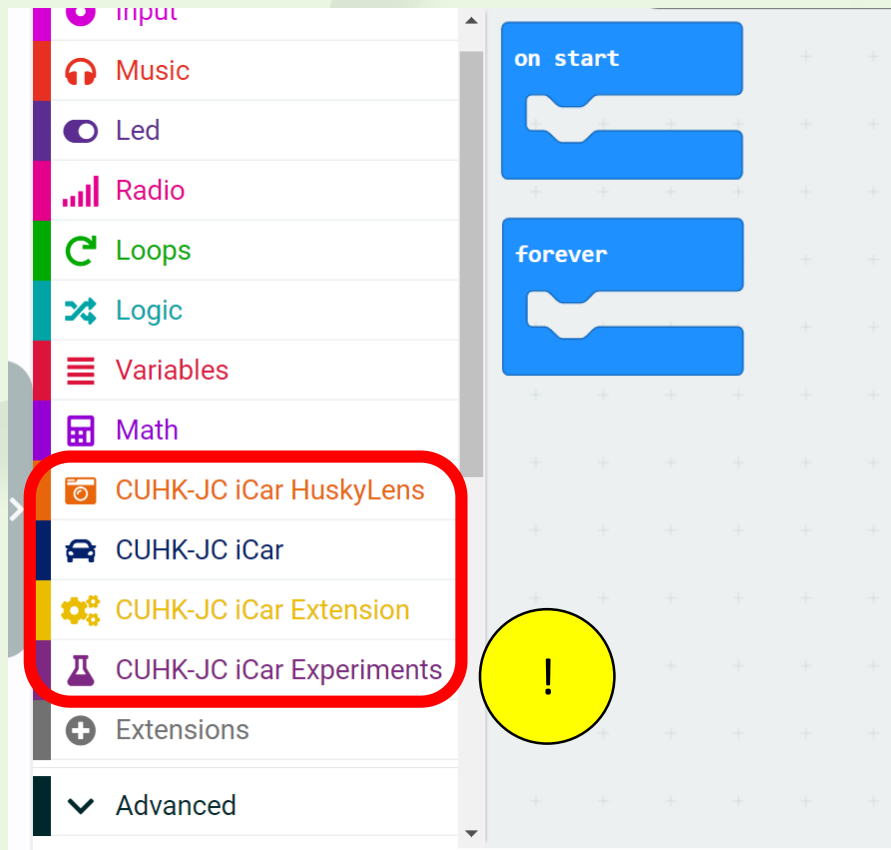User-provided extension, not endorsed by Microsoft. Learn more

3. Paste the following link
https://github.com/hitkuangye/CUHK_JC_iCar_V2
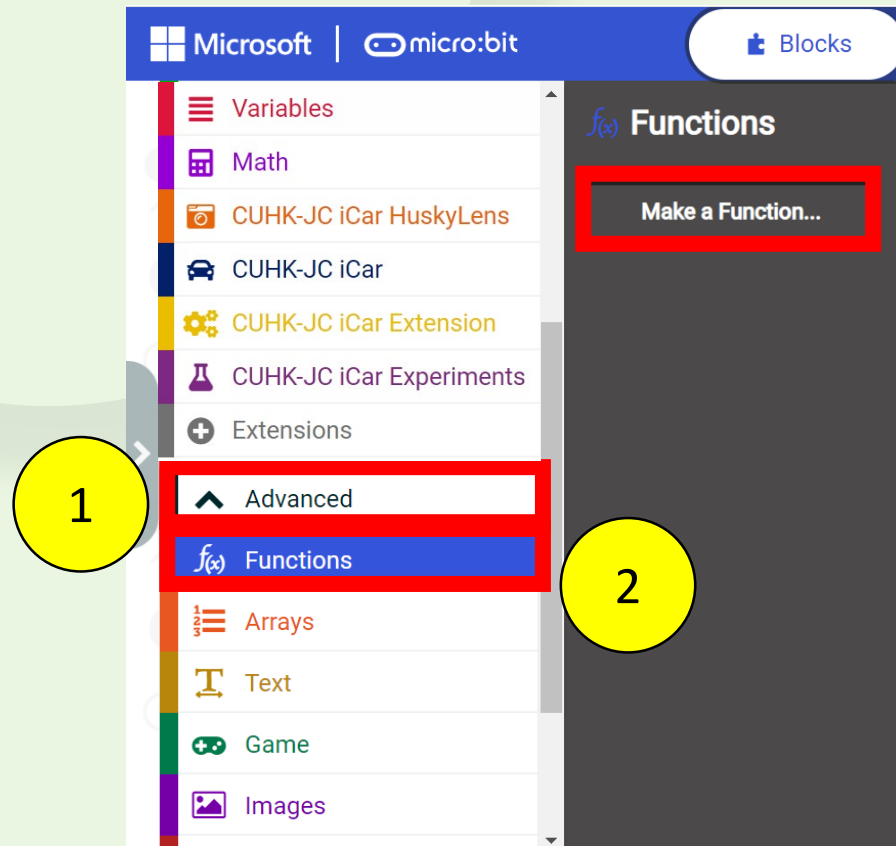
4. Click CUHK-JC-iCar extension

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Extensions are included!

Introduction To micro:bit

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

Functions Modules
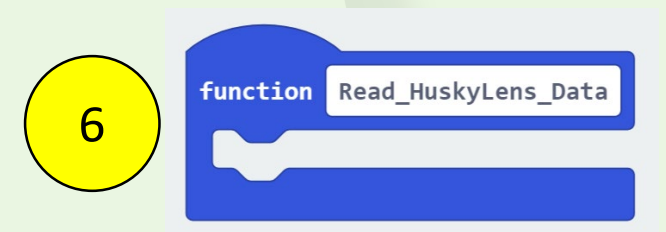

1. Scroll to the bottom of module list and click ⌃ **Advanced**

2. Click *f(x)* **Functions**

3. Click **Make a Function...**

Edit Function

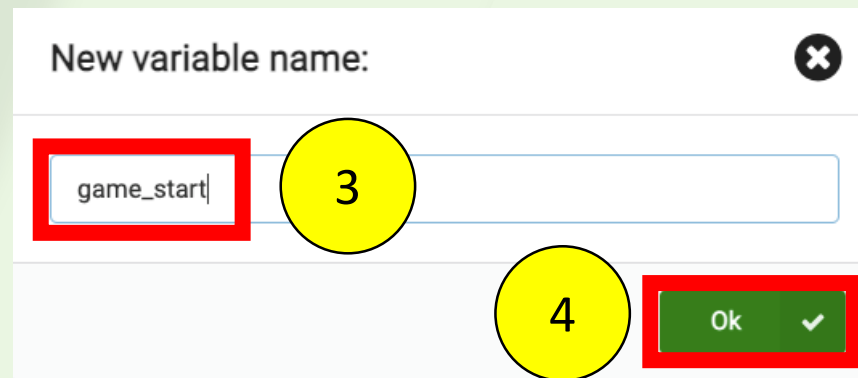Add a parameter | �ↄ Text | ⤬ Boolean | ⊞ Number | ☰ Array | ◢ LedSprite | 🖼 Image

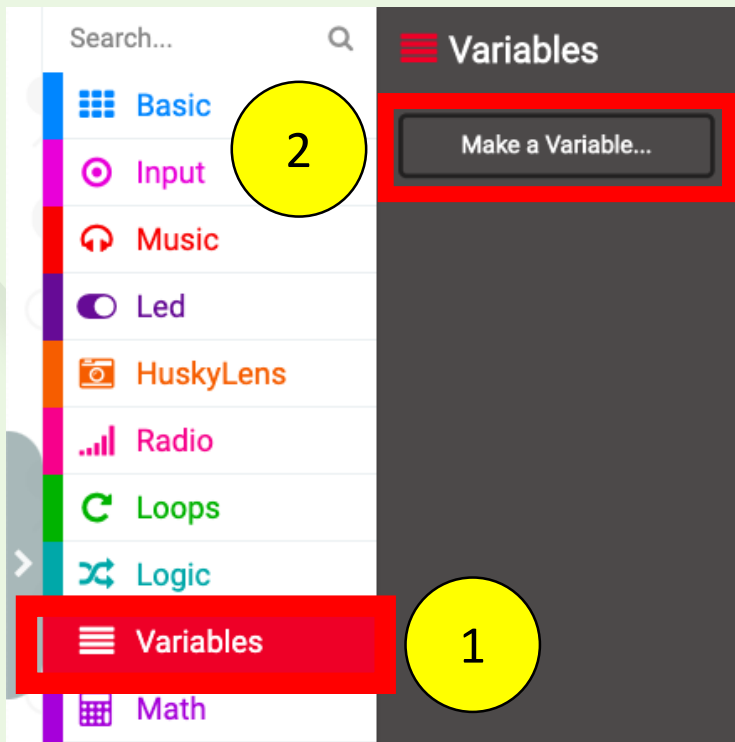function Read_HuskyLens_Data

4

5 Done ✓

4. Name the function "Read_HuskyLens_Data"
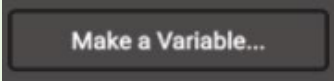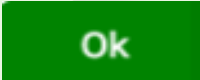
5. Click **Done**

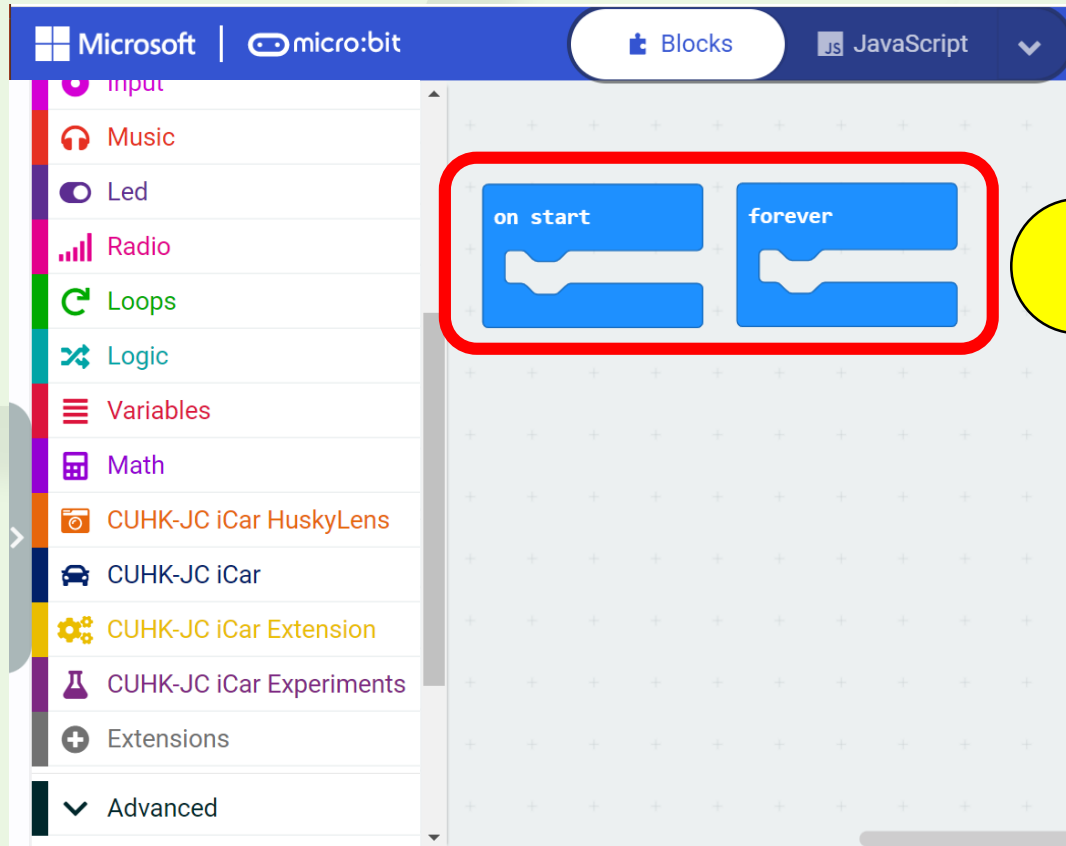6. "Read_HuskyLens_Data" function will appear on the screen

6 function Read_HuskyLens_Data

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Variables Modules

1. Click **☰ Variables**

2. Click **Make a Variable...**

3. Name the variable "game_start"

4. Click **Ok**

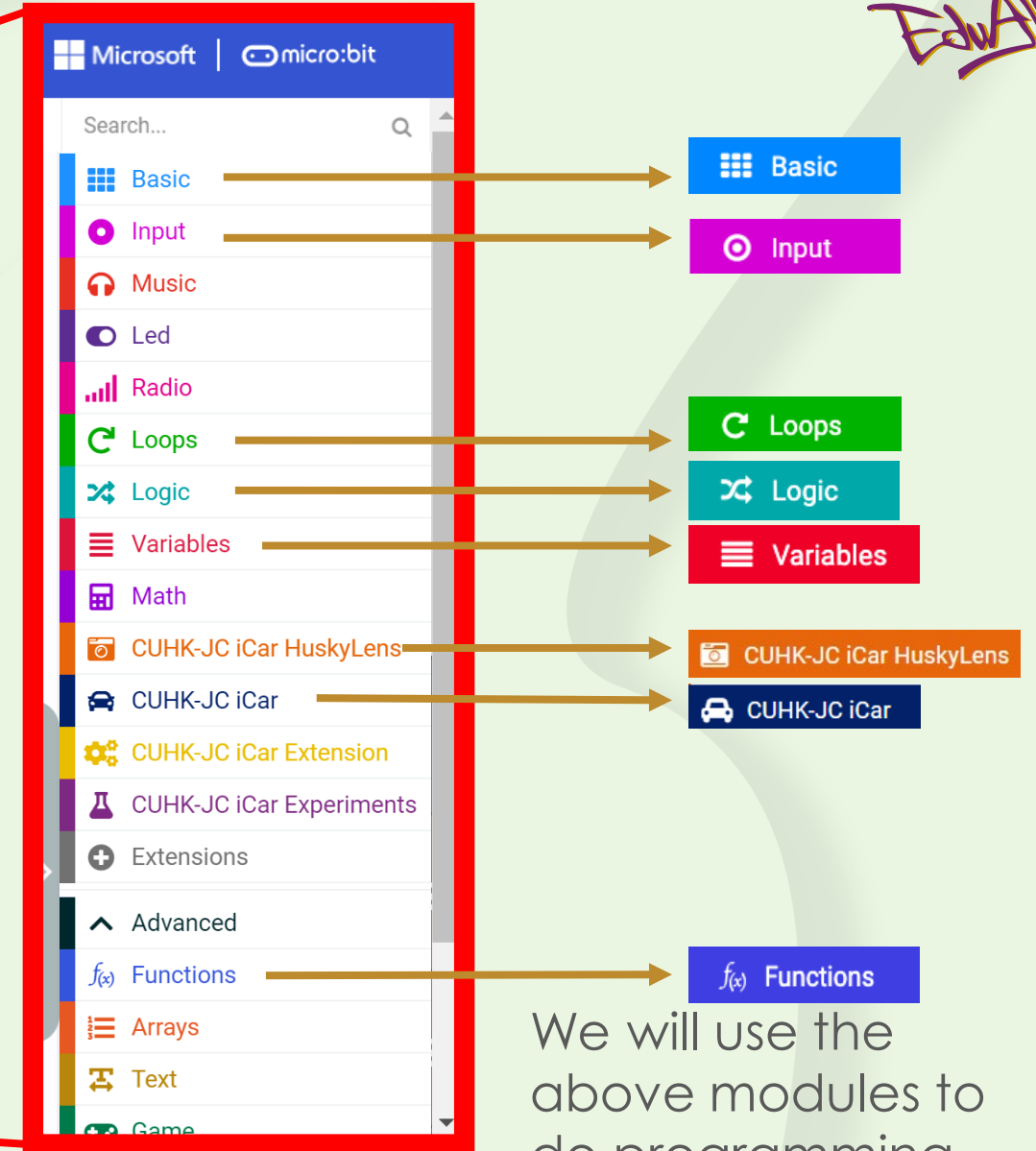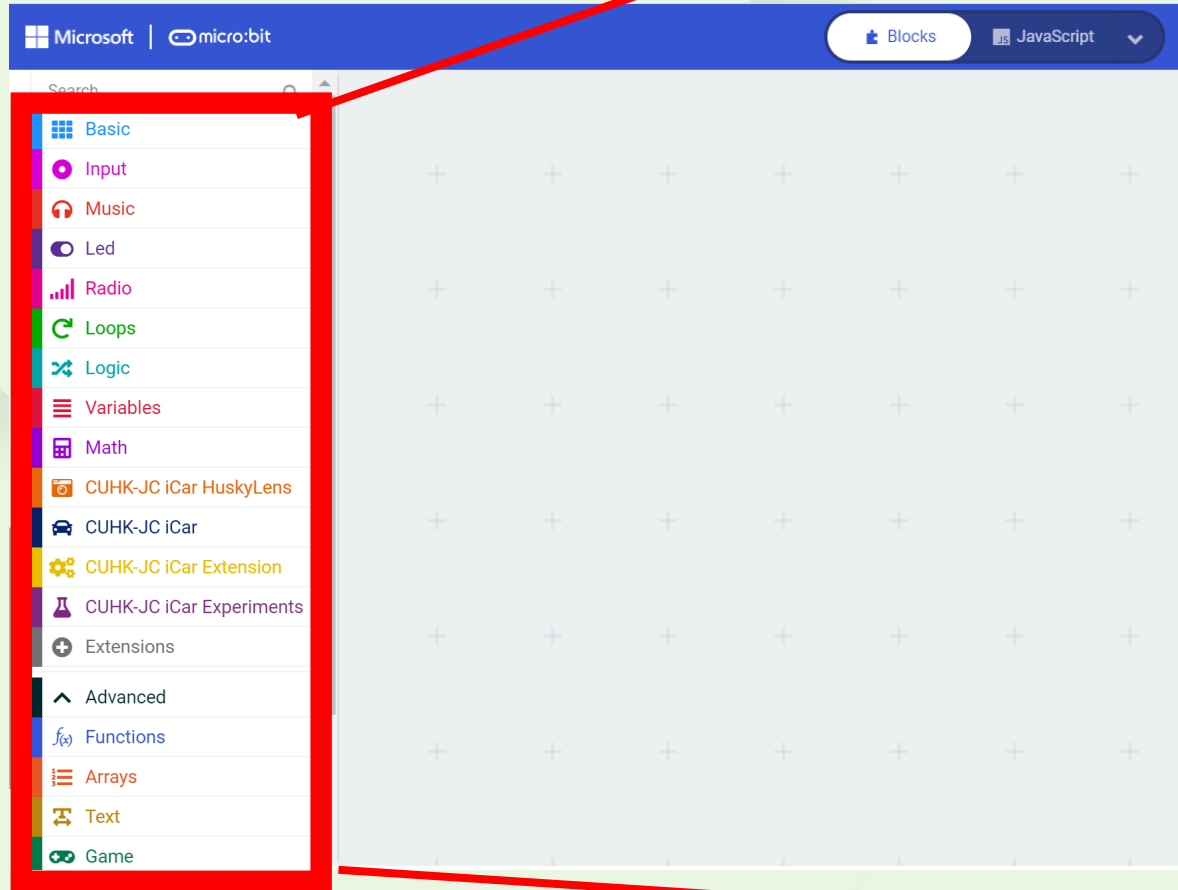5. Programming blocks related to "game_start" will appear on the list
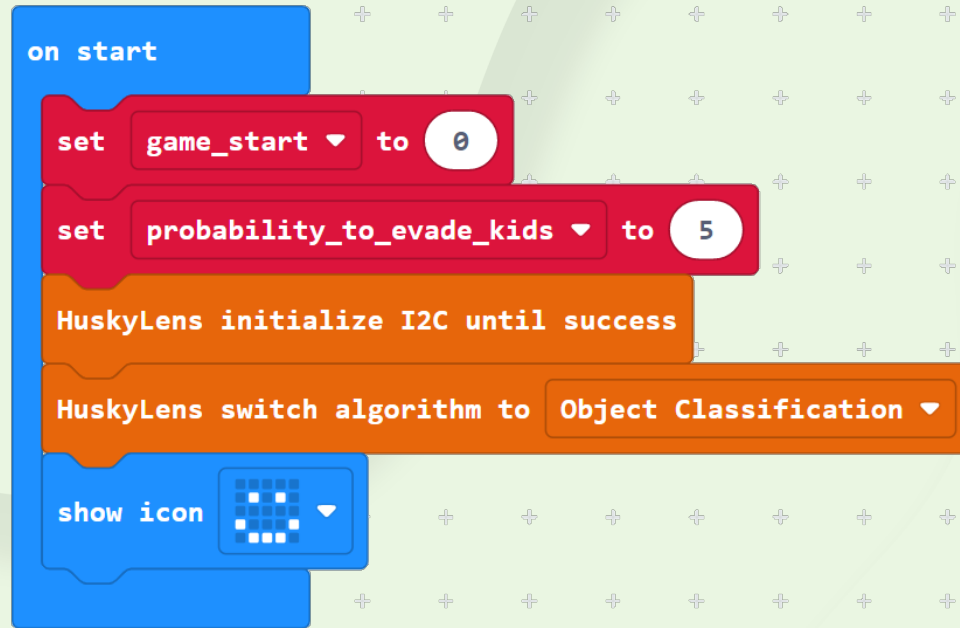
Let's start coding!

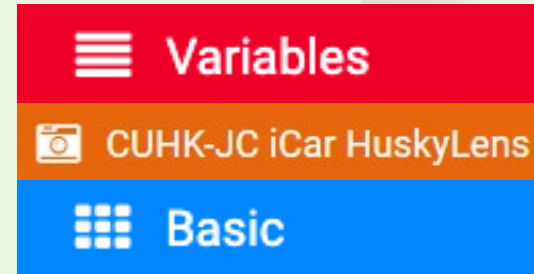The program will pre-set "on start" and "forever" at the beginning.

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

We will use the above modules to do programming.
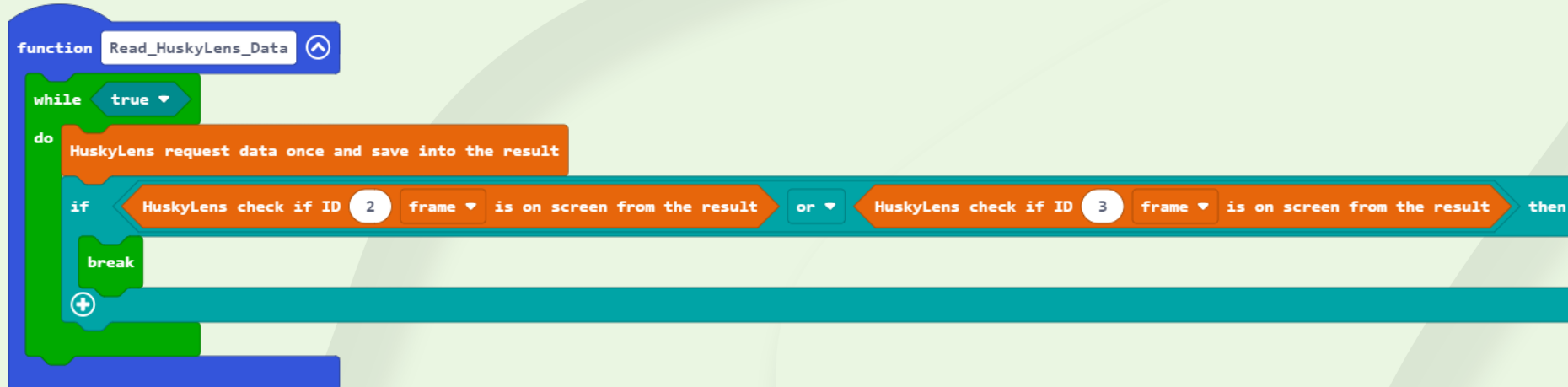
You can find the blocks from the following:

You can find the blocks from the following:

- f(x) Functions
- C Loops
- Logic
- CUHK-JC iCar

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You can find the blocks from the following:

- f(x) Functions
- Logic
- CUHK_JC_iCar_HuskyLens
- Basic
- Variables
- Math
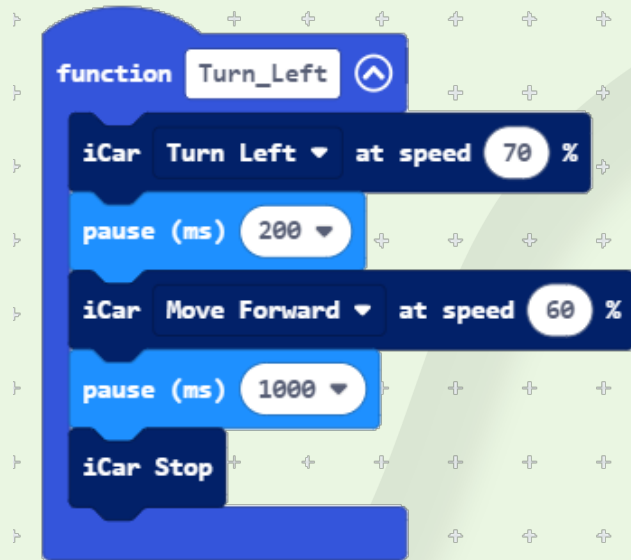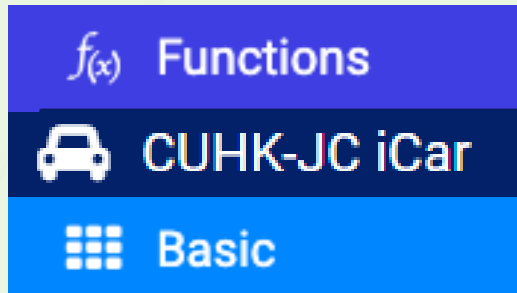
on button A ▾ pressed
set game_start ▾ to 1
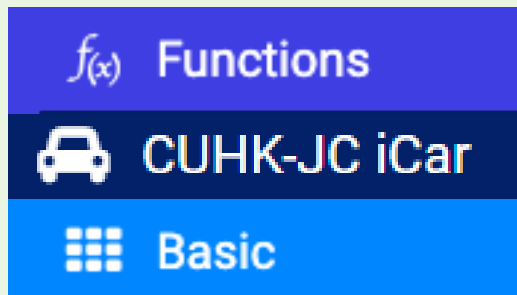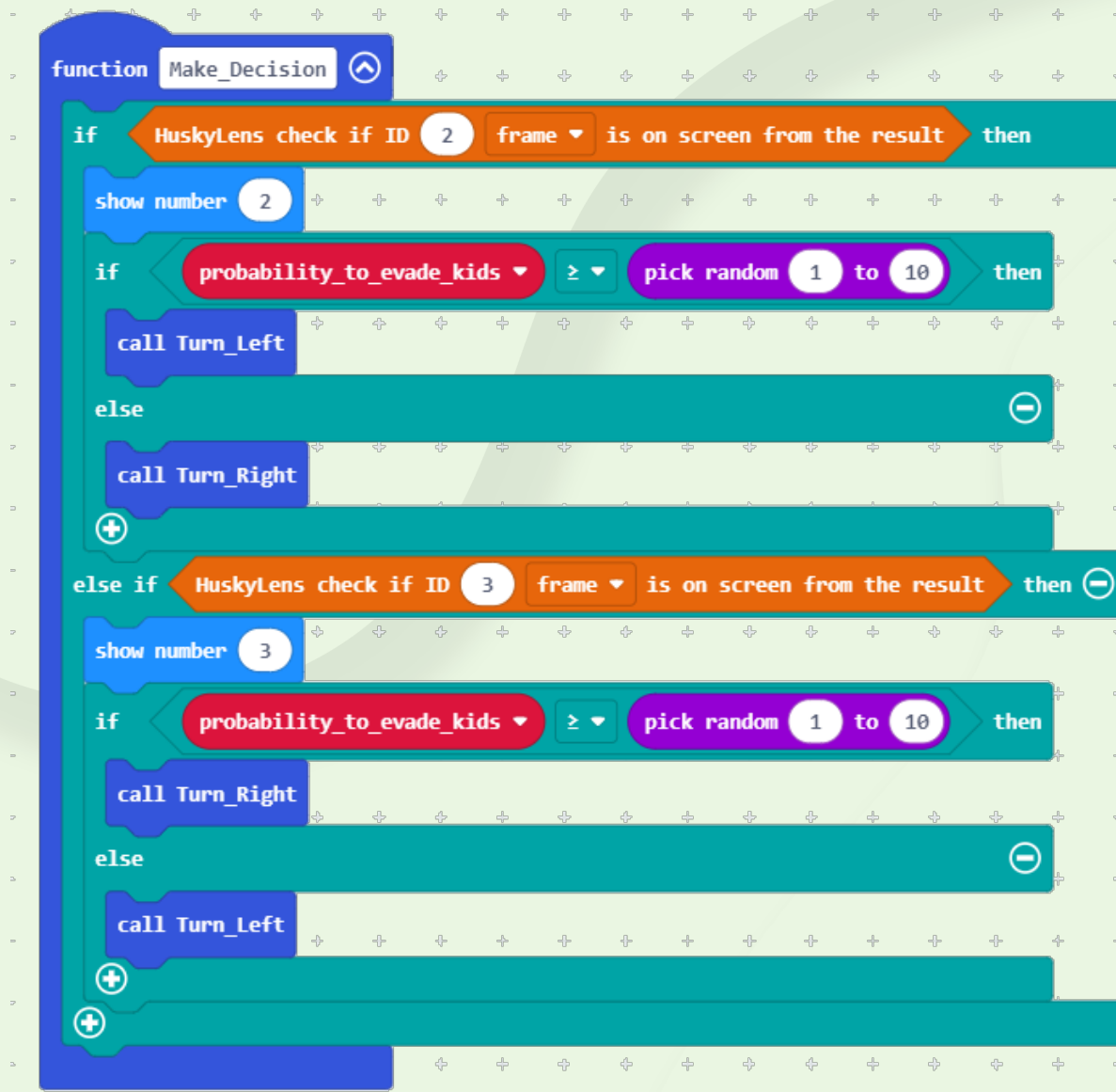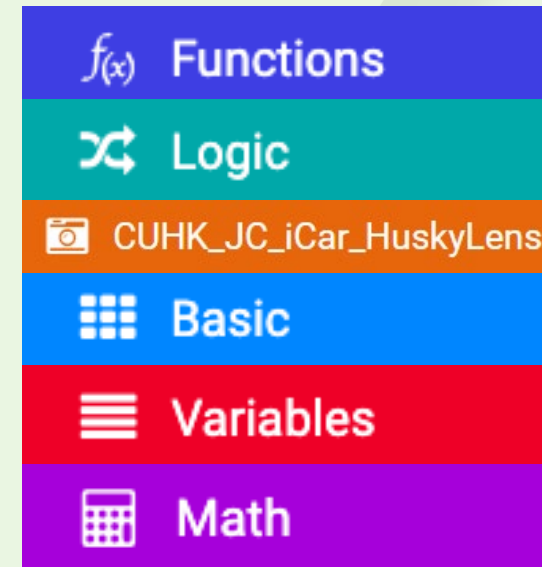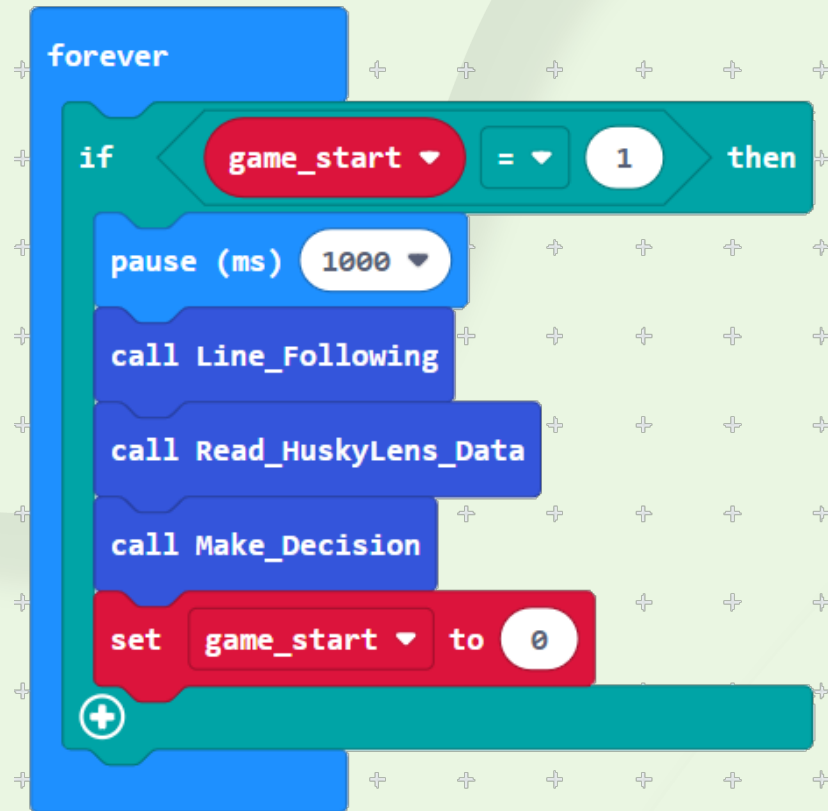
You can find the blocks from the following:

⊙ Input

☰ Variables

You can find the blocks from the following:

- Logic
- Variables
- Basic
- Functions

Finished!

Download The Program To CUHK iCar
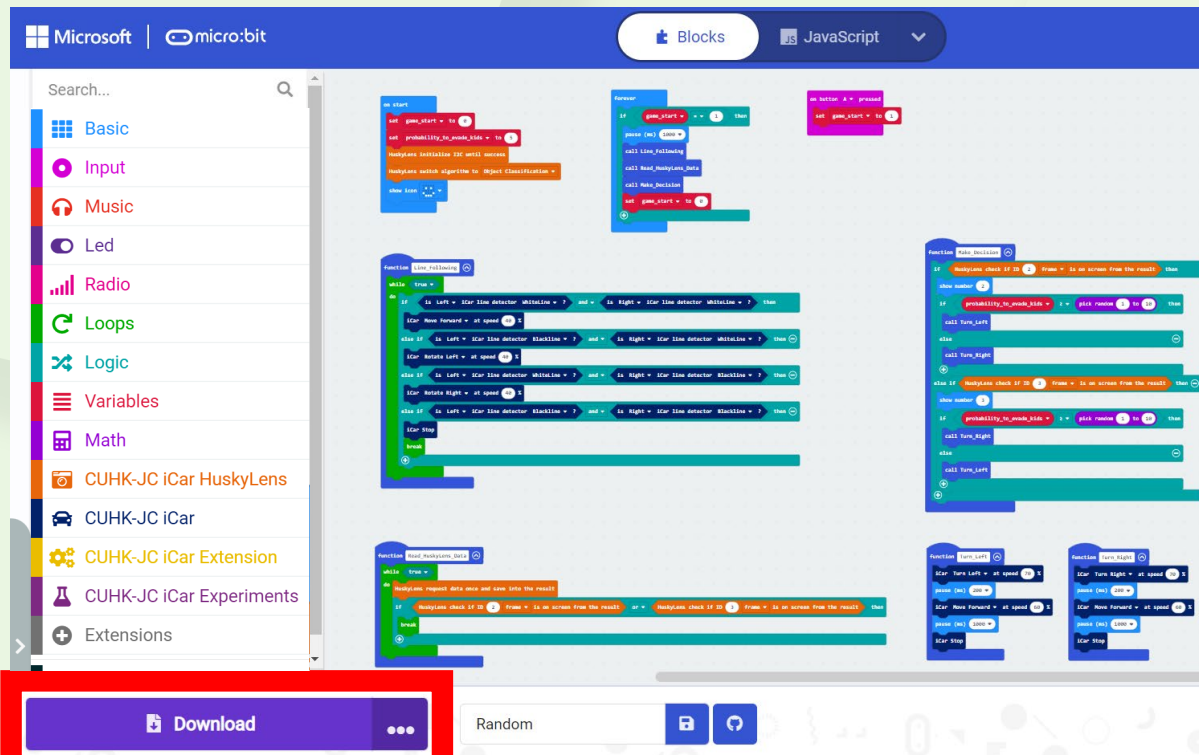
Step 1:

Click **Download**

1
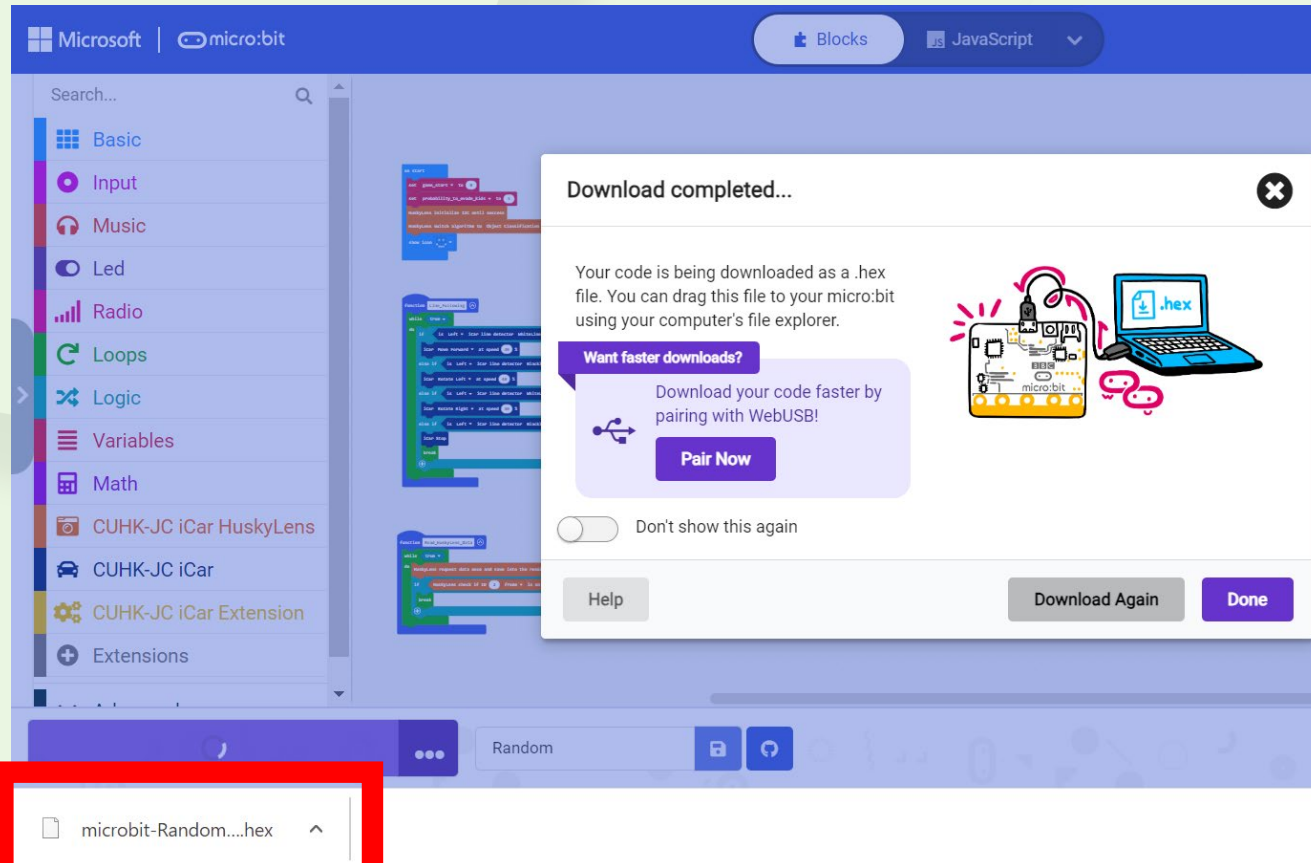
The hex file is downloaded!
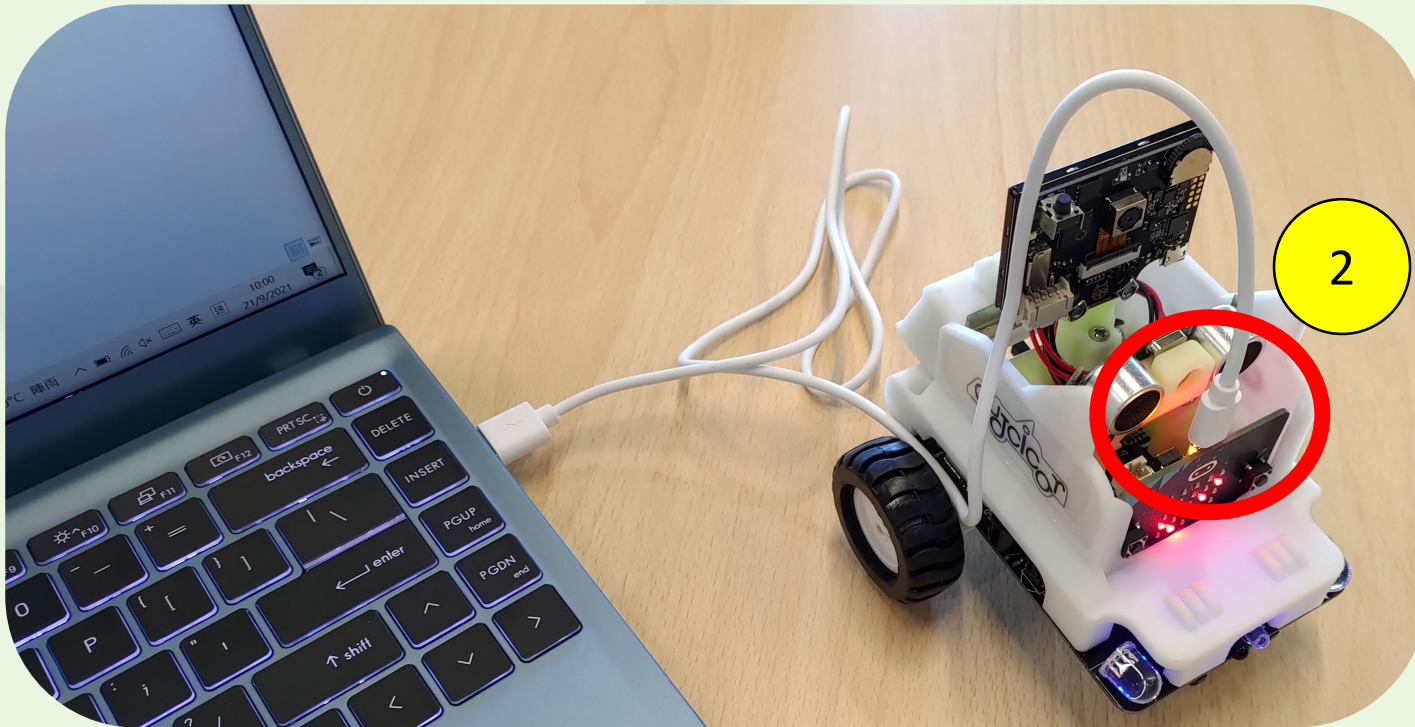
Step 2:
Connect the micro:bit to computer by a micro USB cable
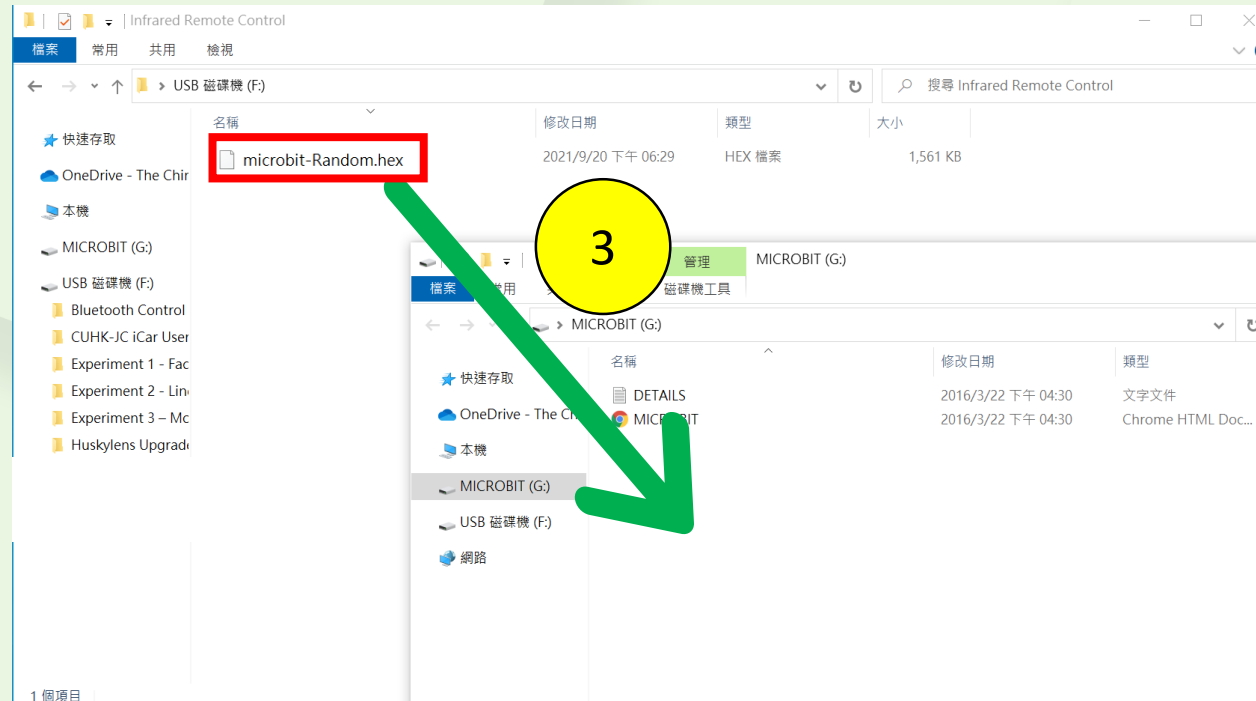
Step 3:
Drag the downloaded hex file into the micro:bit window
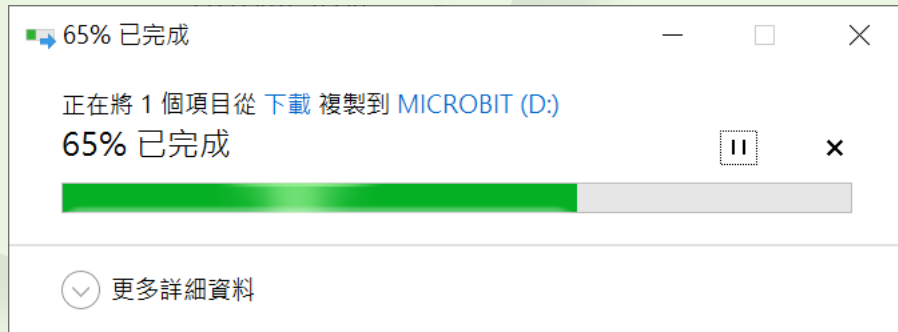
Step 4:
Wait for the completion of cloning process

<mark>Caution:</mark>

- <mark>The micro:bit window will potentially disappear after the completion</mark>

- <mark>After the completion of cloning process, the hex file will not be displayed in the micro:bit window</mark>

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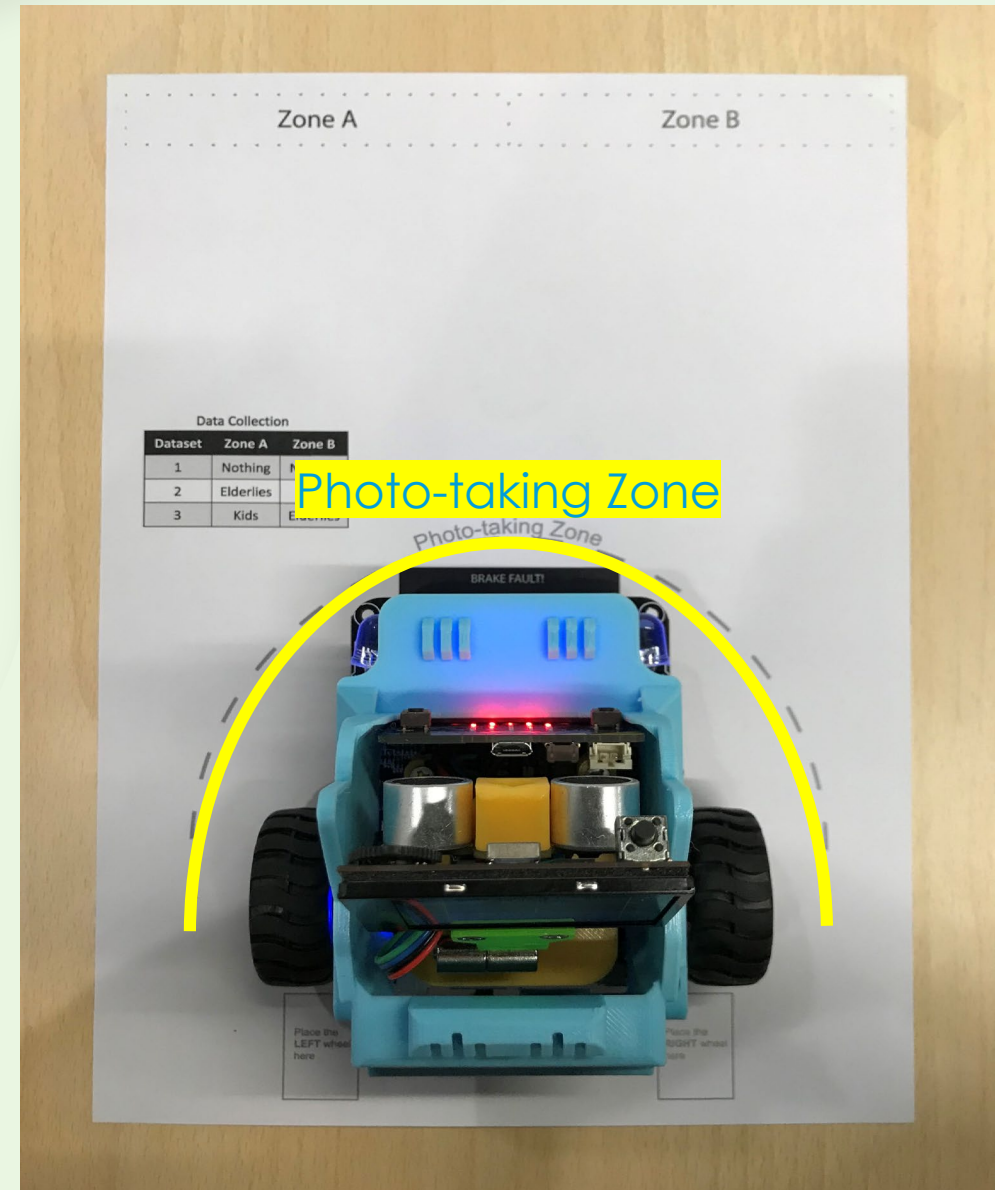
Dataset	Zone A	Zone B
1	**Nothing**	**Nothing**
2	Elderlies	Kids
3	Kids	Elderlies

Press

Step 2 - Collect Dataset 1:

- CUHK iCar should face forward

- Press the learning button to collect data
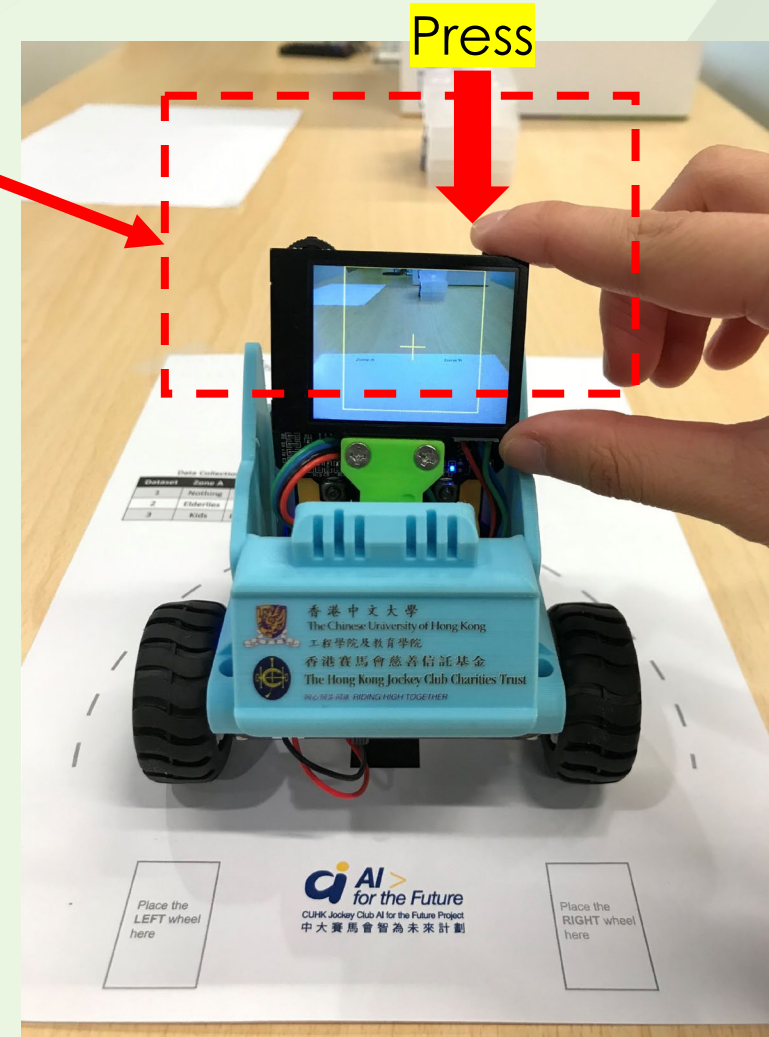
Tips:

Rotate the CUHK iCar to obtain a better result

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

Press

Step 3:

Release the learning button after the number reaches 30

Release

Step 4:

Press the learning button again <mark>before</mark> 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!

Press

Step 6:

Release the learning button after the number reaches 30

Release

Learning 35/30:ID2
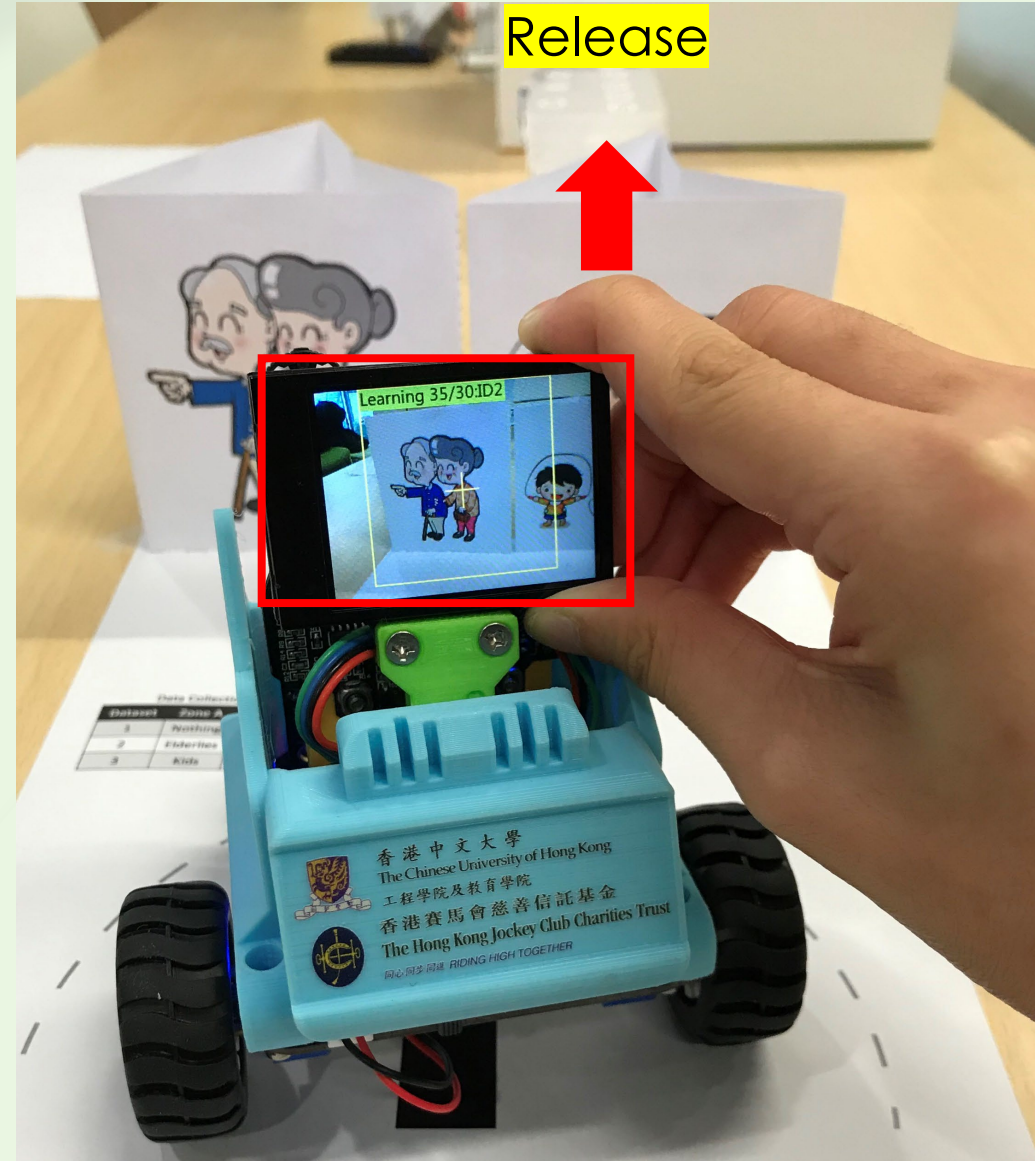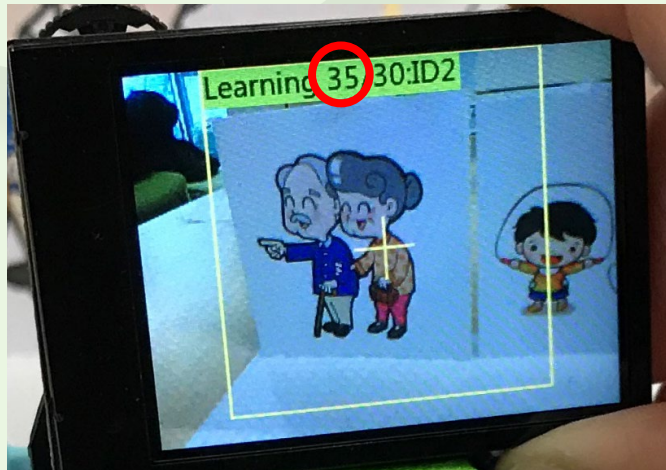
Step 7:

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

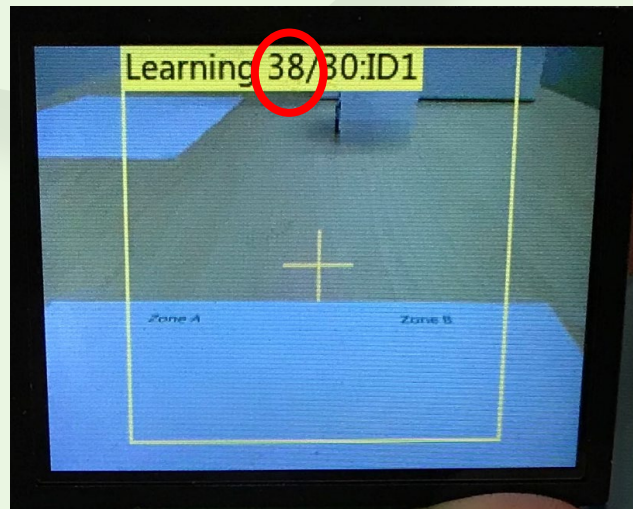Make sure you keep pressing the button while you're rotating!

Press

45

Step 9:

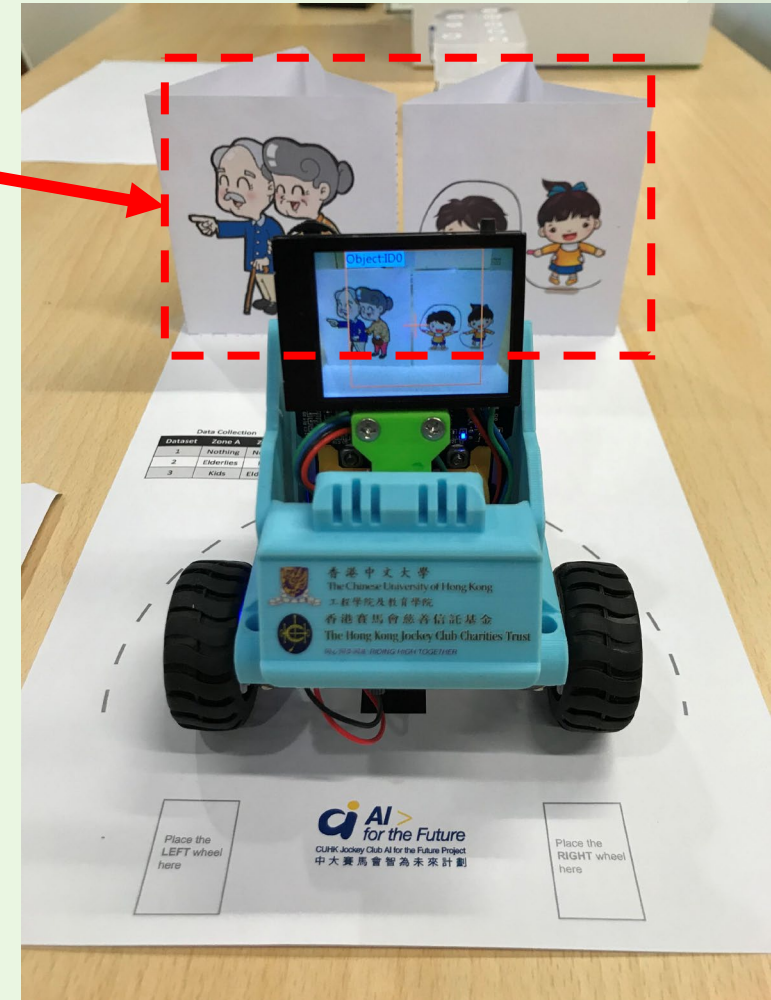Release the learning button after the number reaches 30
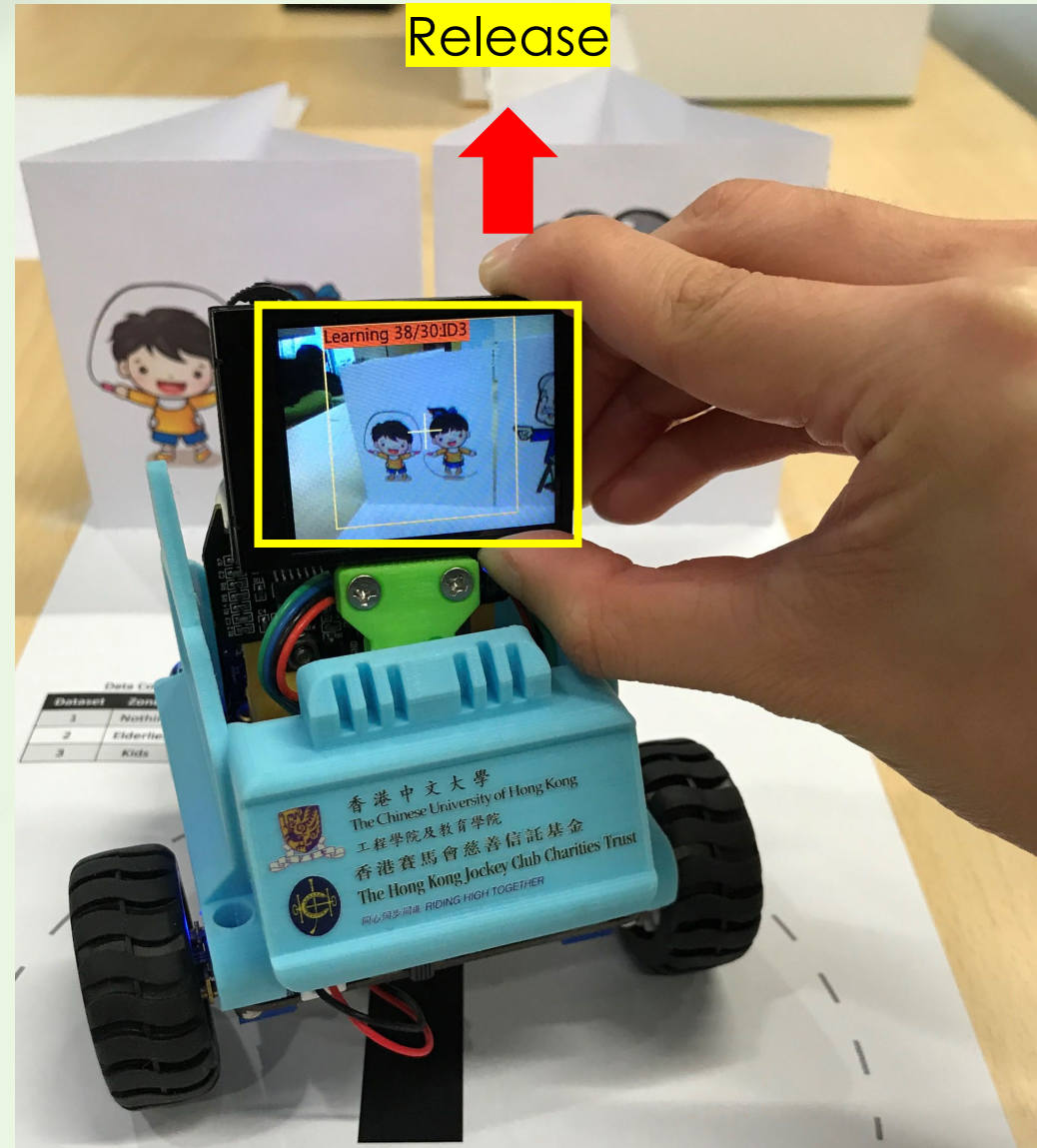
Step 10:

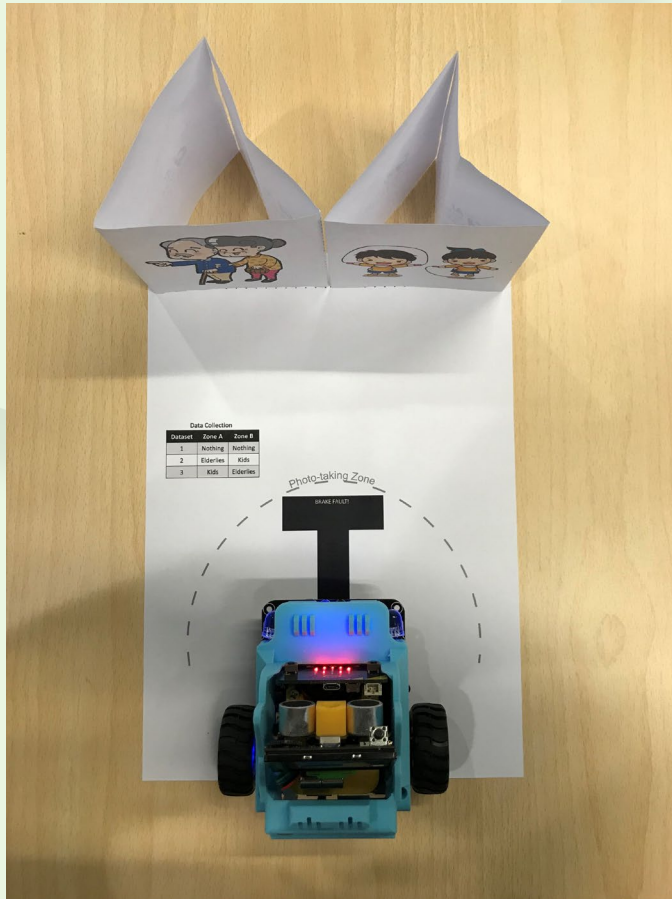<mark>Wait for the</mark>

<mark>countdown ends</mark>

You've collected all the data needed!

Let's conduct the experiment!

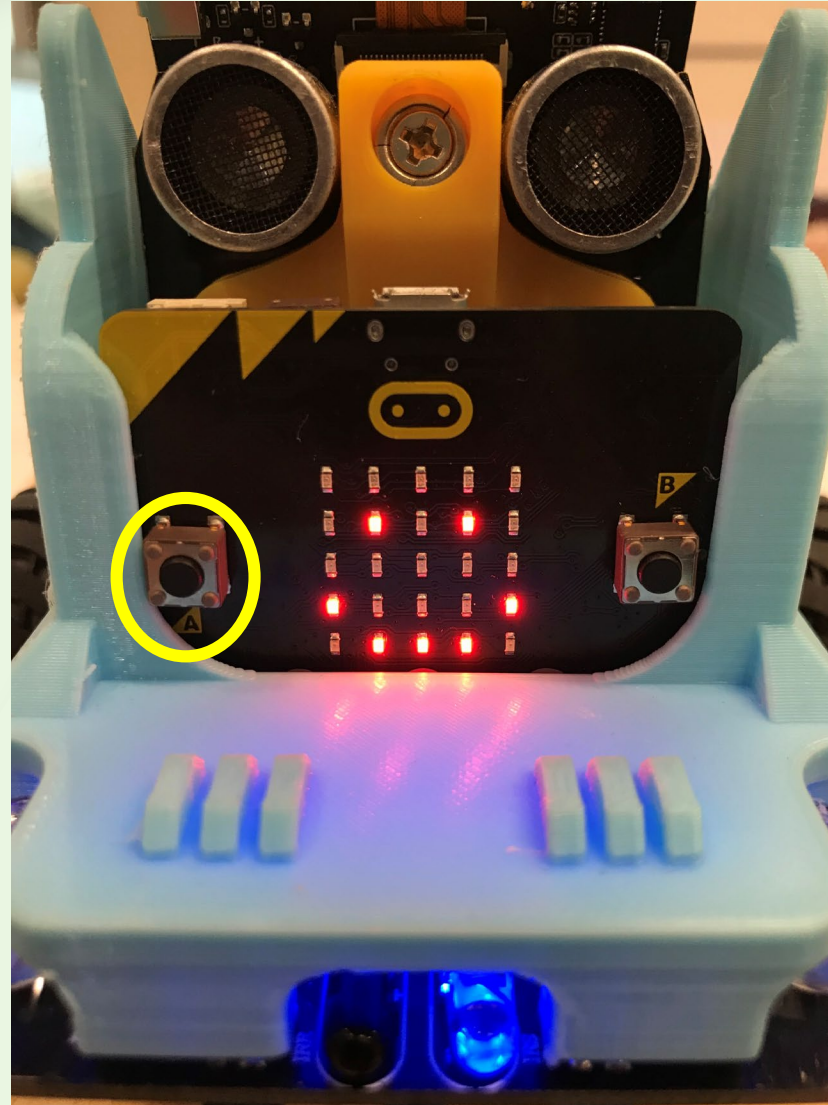# Step 1:

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: Random
Paper Model: Dataset 2

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

CUHK iCar has trouble braking!

It will decide randomly.

Simulation
Program: Random
Paper Model: Dataset 3

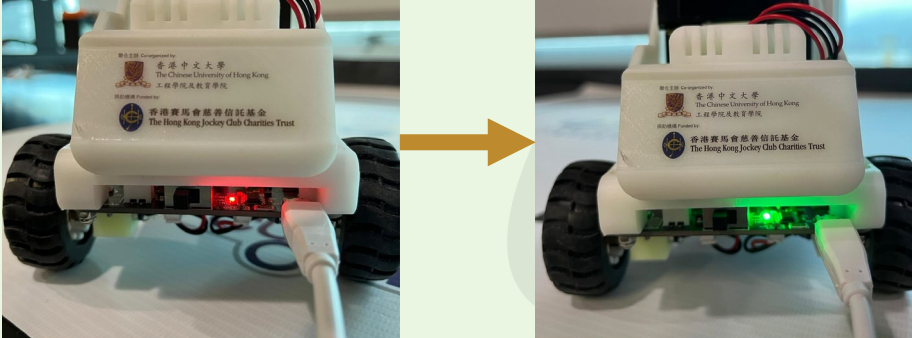Place the CUHK iCar at the starting position and press button A.

CUHK iCar has trouble braking!

It will decide randomly.

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 34