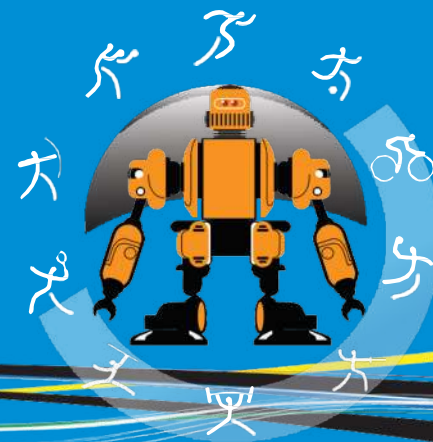


聖公會小學聯校

機械人 冬季奧運會



登山滑雪賽

高小組

競賽模型車製作、場地設置製作及程式編寫指南

版本：2026 年 10 月 30 日



聯合主辦



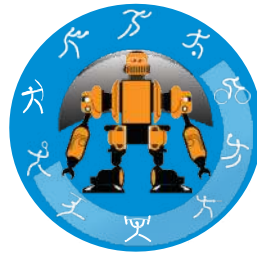
聖公會基福小學





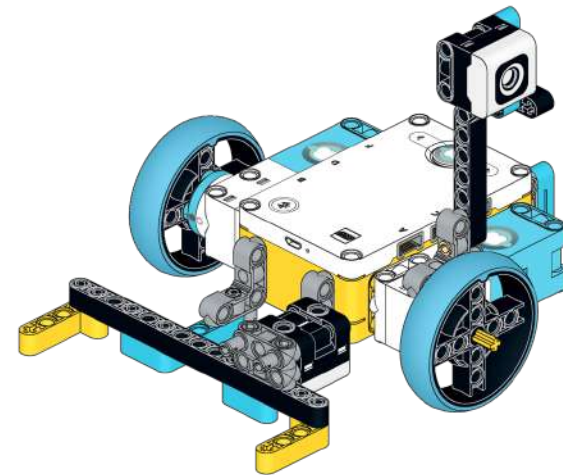
內容

- A. 競賽模型車製作
- B. 場地設置製作
- C. 程式編寫指南

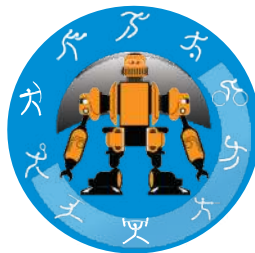


A. 競賽模型車製作 (機械人 A)

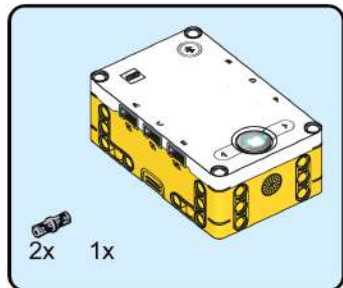
製作競賽機械人 A



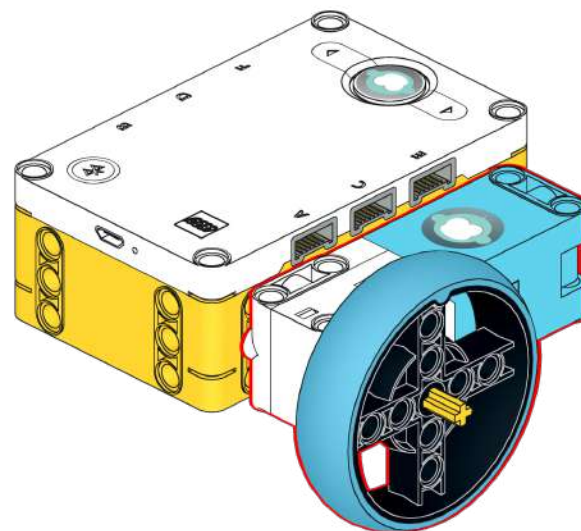
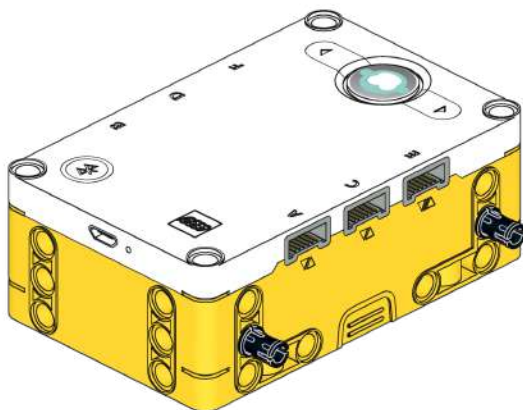
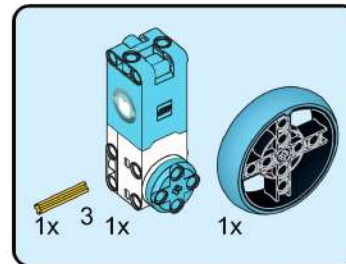
A. 競賽模型車製作 (機械人 A)



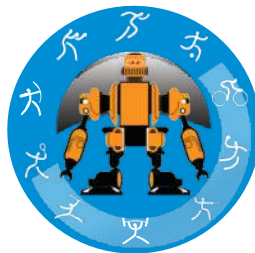
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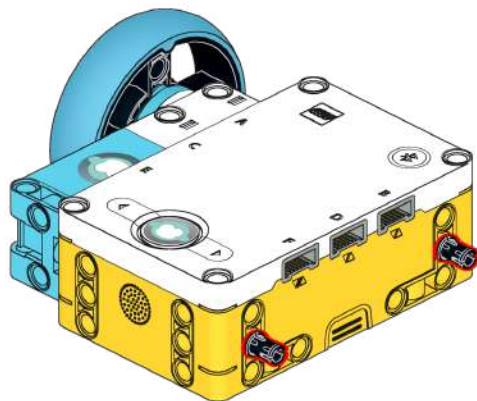
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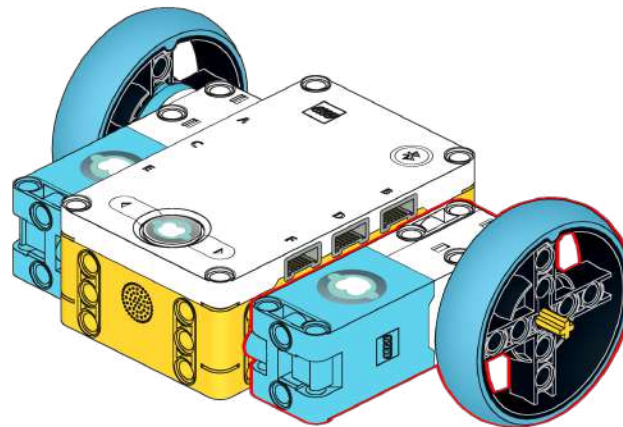
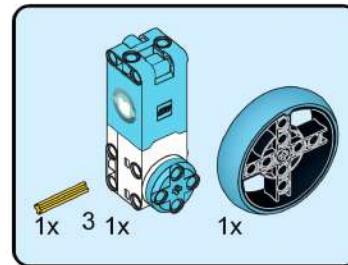
A. 競賽模型車製作 (機械人 A)



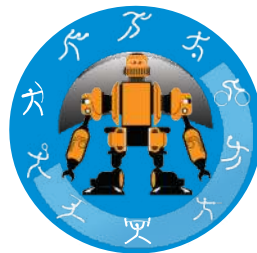
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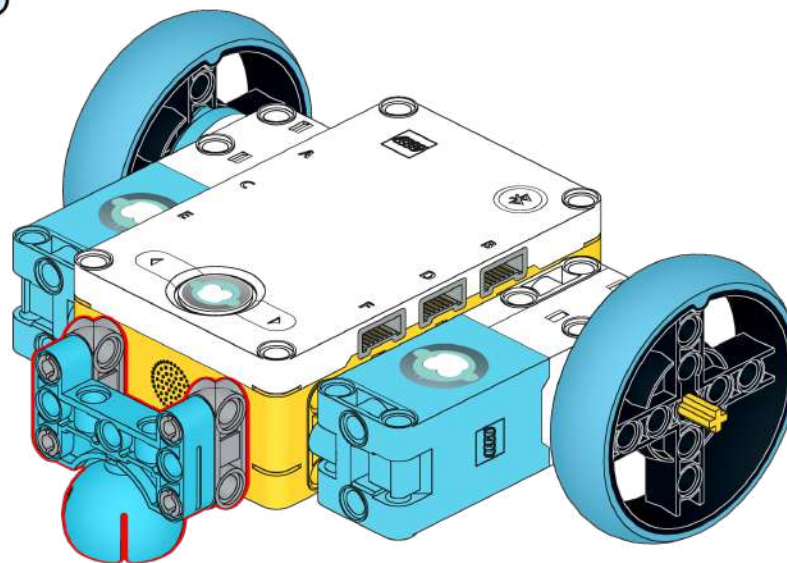
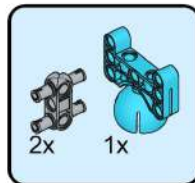
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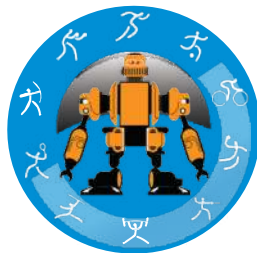
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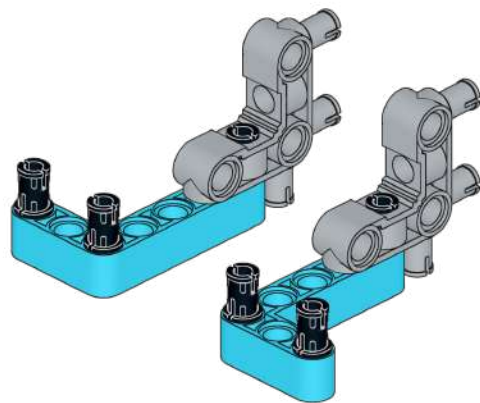
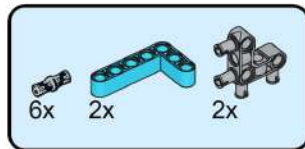
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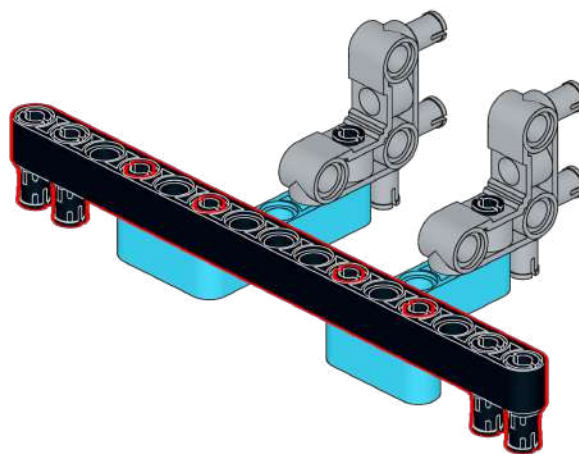
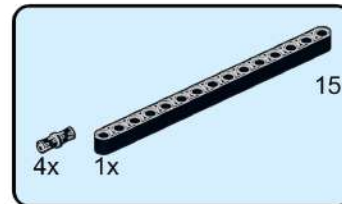
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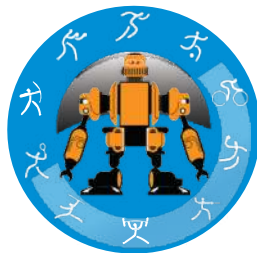
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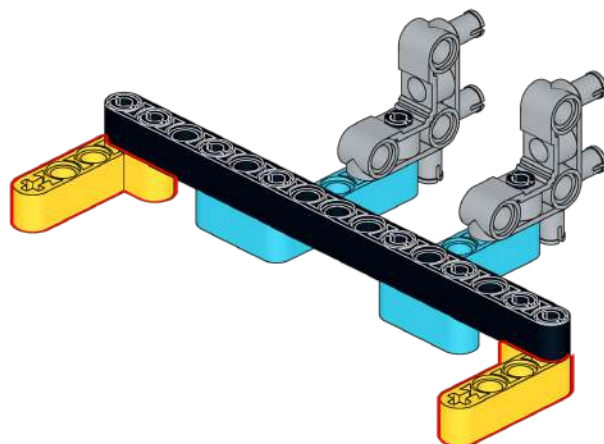
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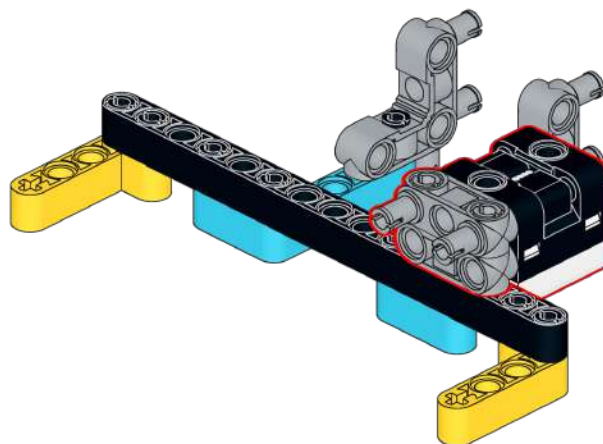
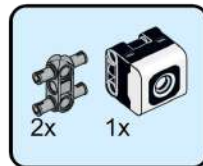
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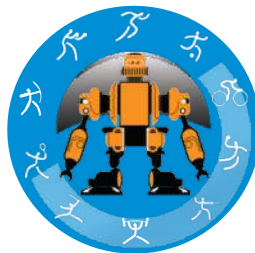
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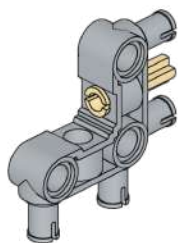
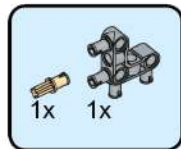
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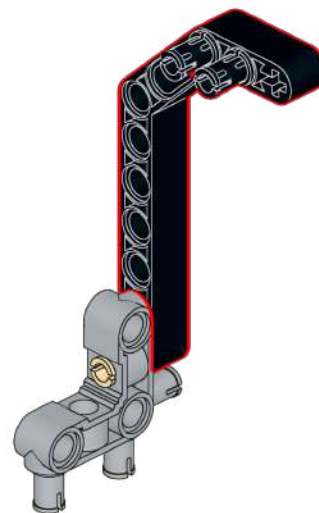
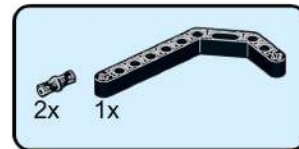
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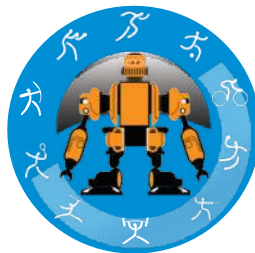
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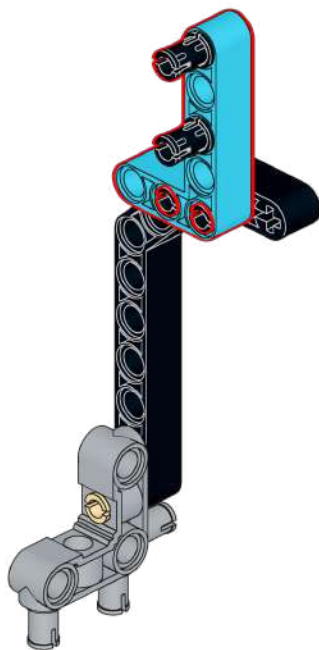
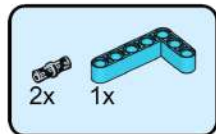
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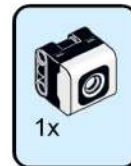
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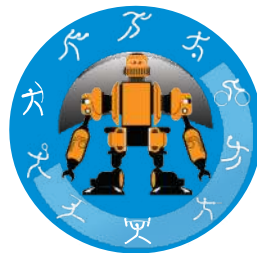
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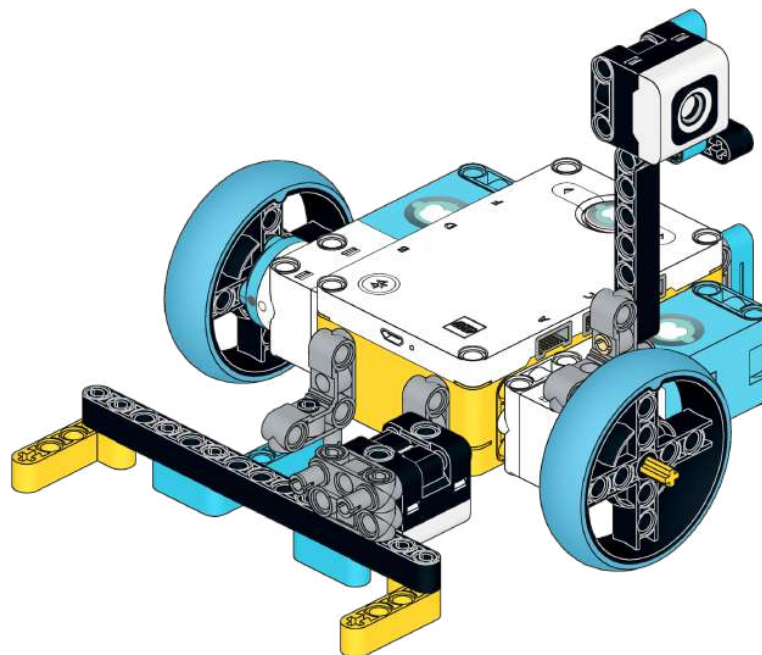
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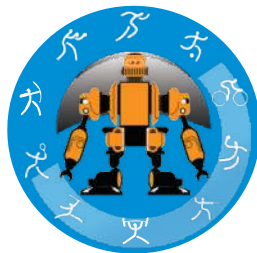
A. 競賽模型車製作 (機械人 A)



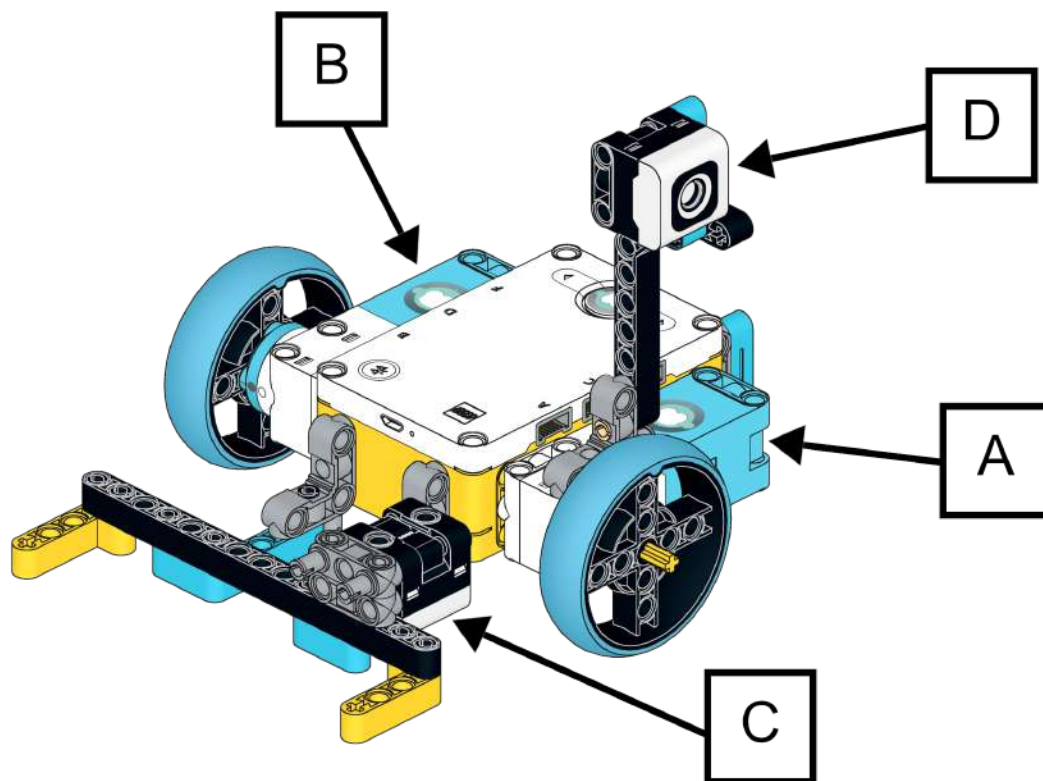
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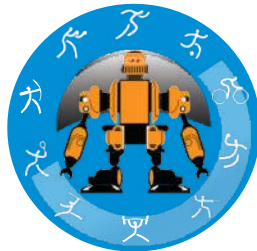


A. 競賽模型車製作 (機械人 A)



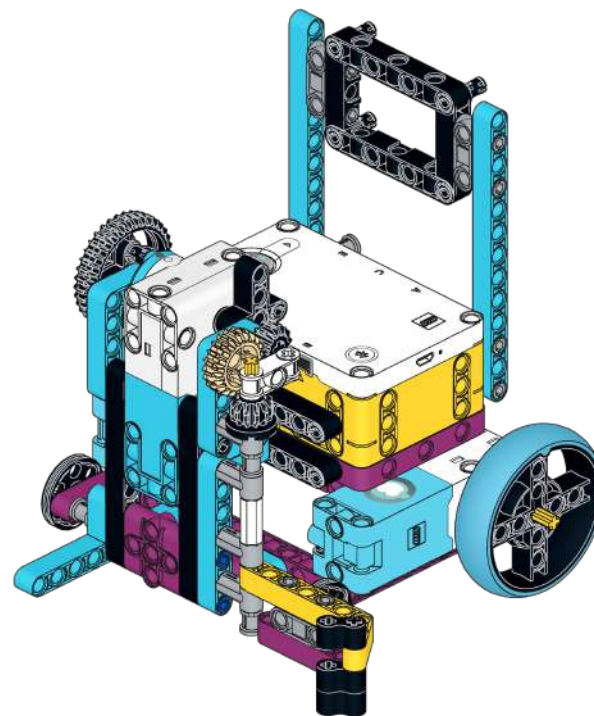
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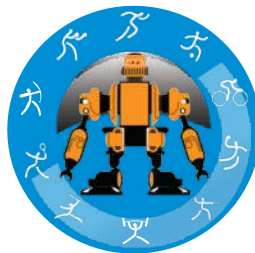


A. 競賽模型車製作 (機械人 B)

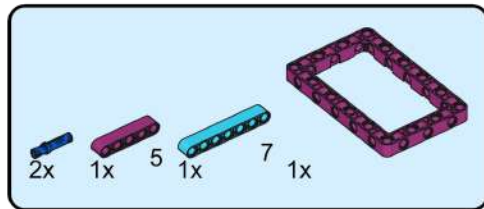
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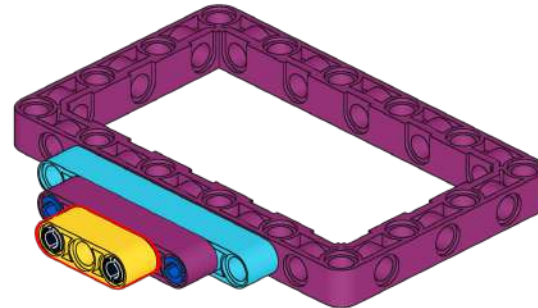
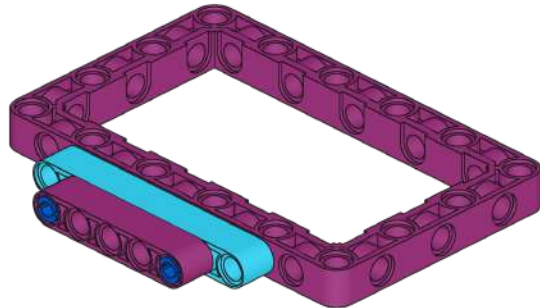
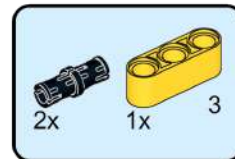
A. 競賽模型車製作 (機械人 B)



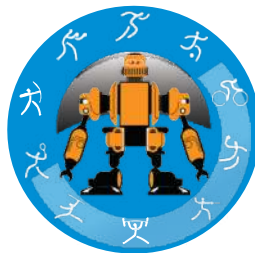
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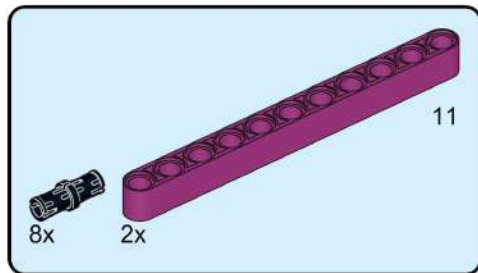
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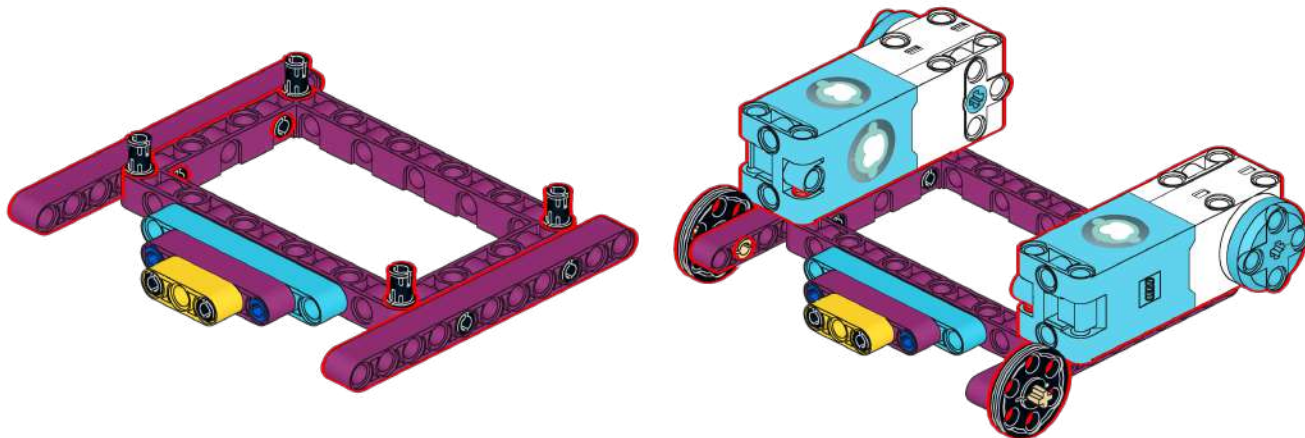
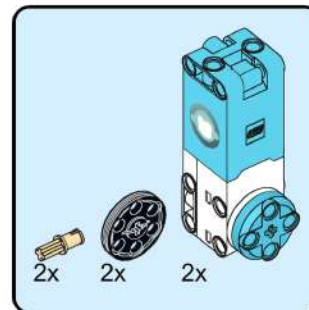
A. 競賽模型車製作 (機械人 B)



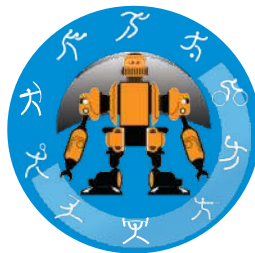
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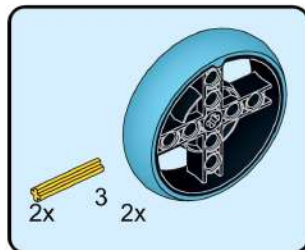
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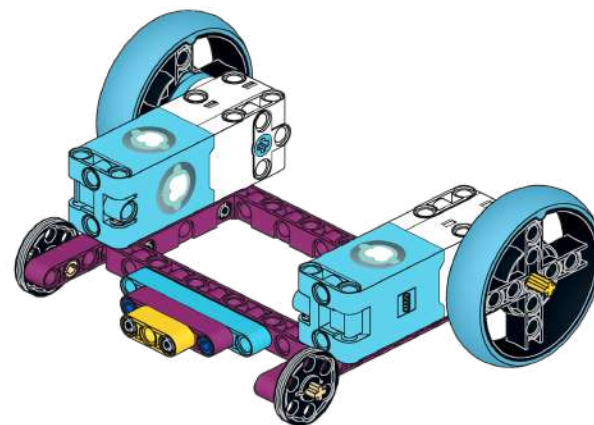
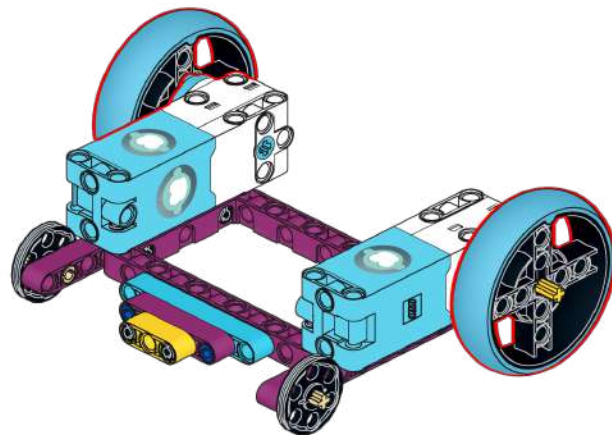
A. 競賽模型車製作 (機械人 B)



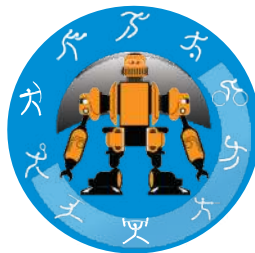
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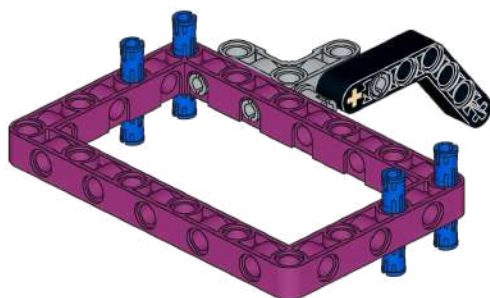
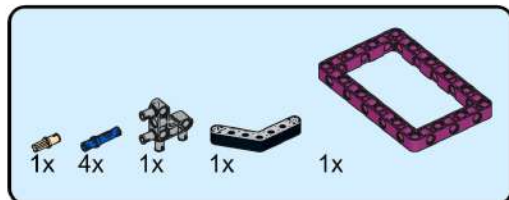
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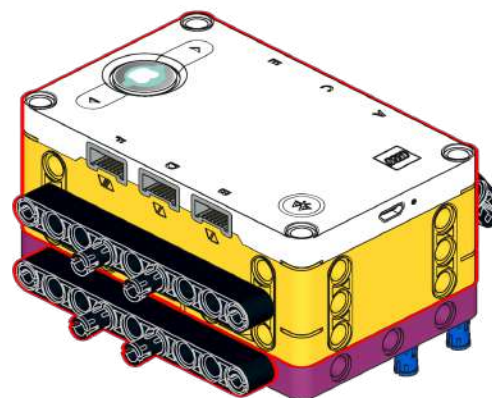
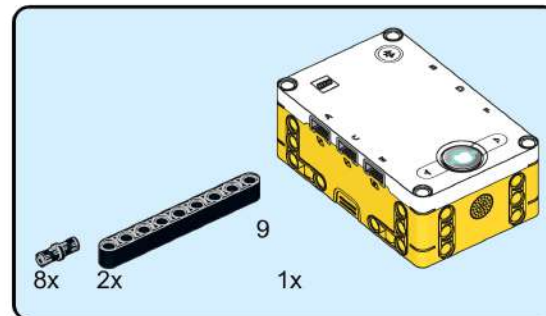
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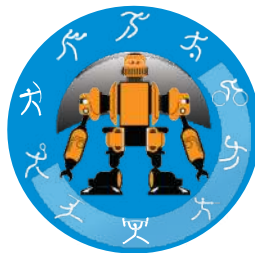
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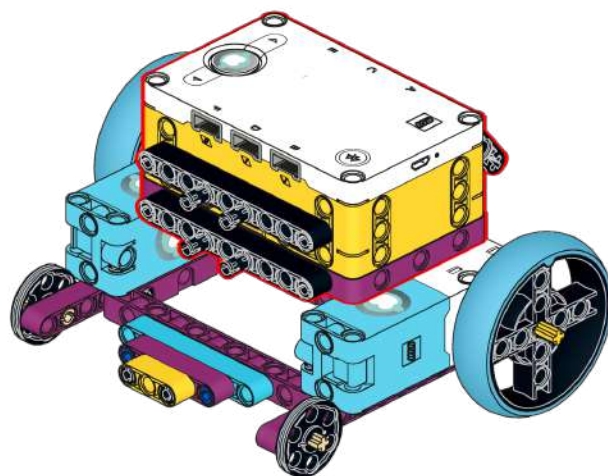
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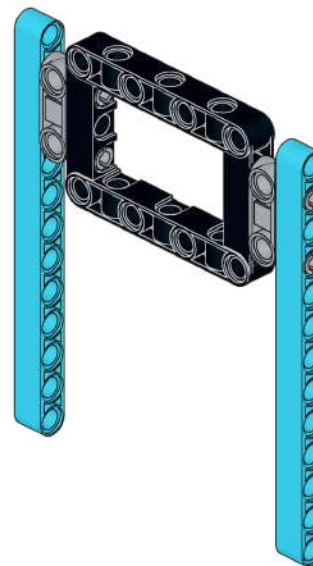
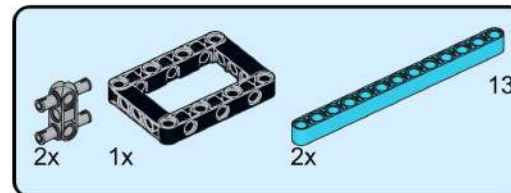
A. 競賽模型車製作 (機械人 B)



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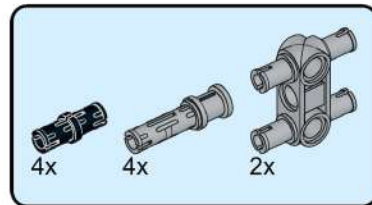
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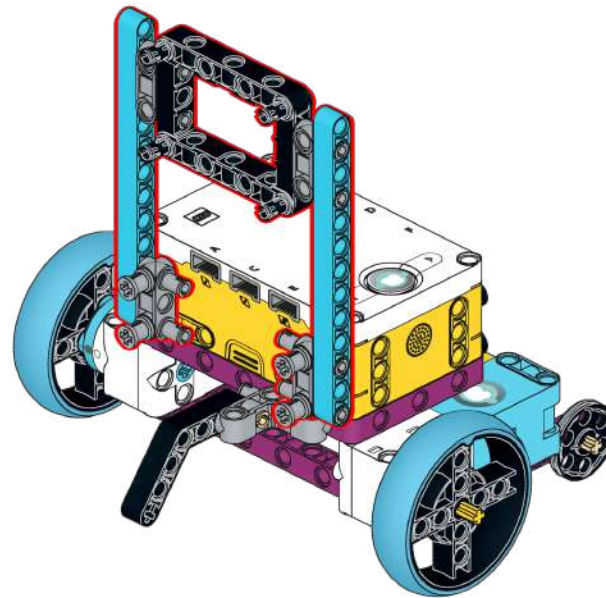
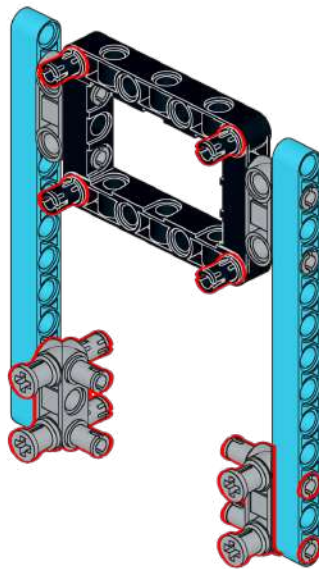
A. 競賽模型車製作 (機械人 B)



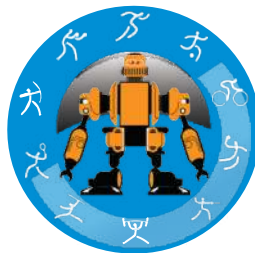
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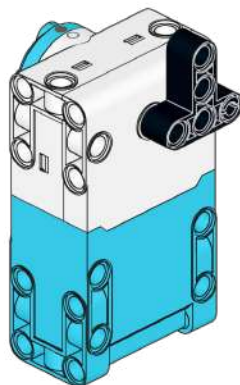
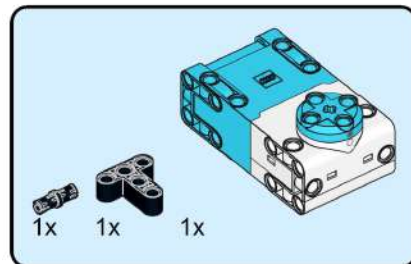
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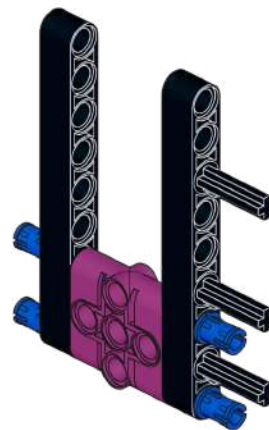
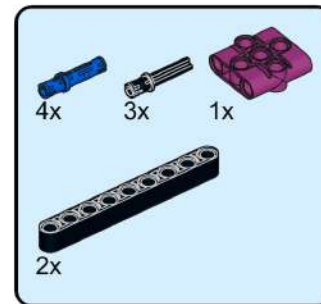
A. 競賽模型車製作 (機械人 B)



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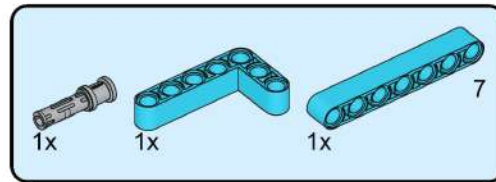
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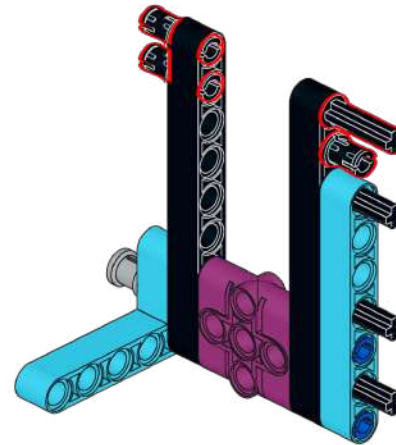
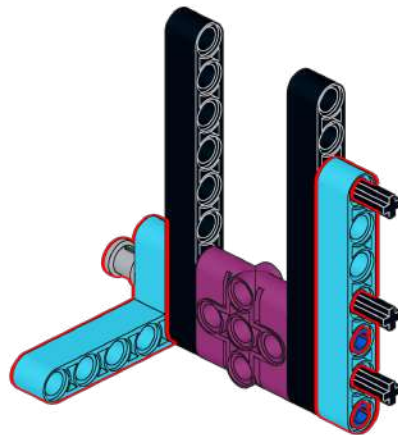
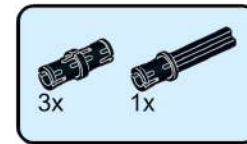
A. 競賽模型車製作 (機械人 B)



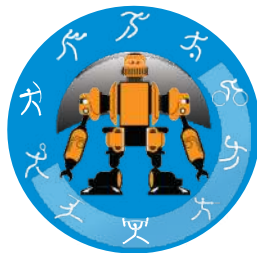
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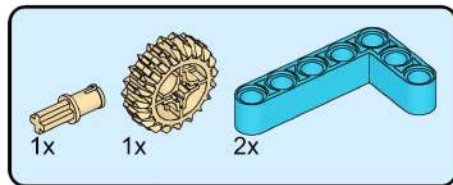
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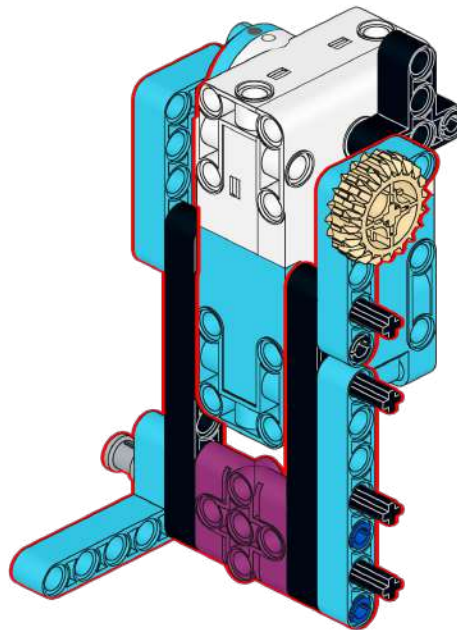
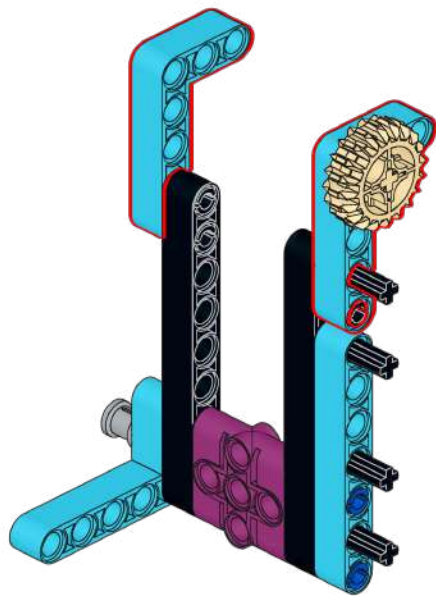
A. 競賽模型車製作 (機械人 B)



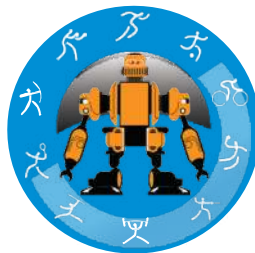
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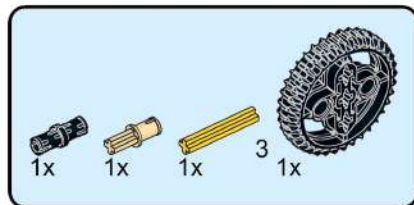
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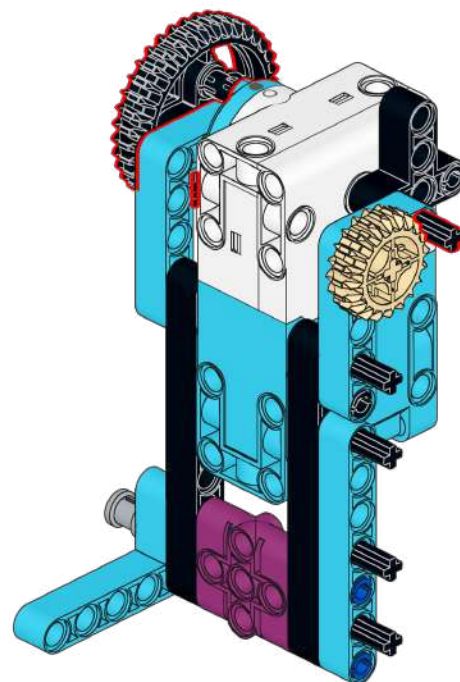
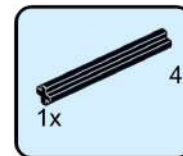
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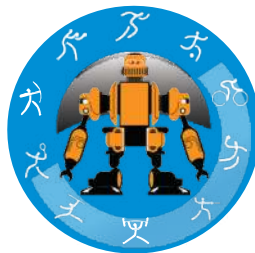
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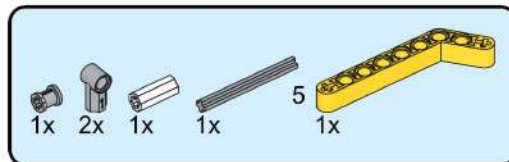
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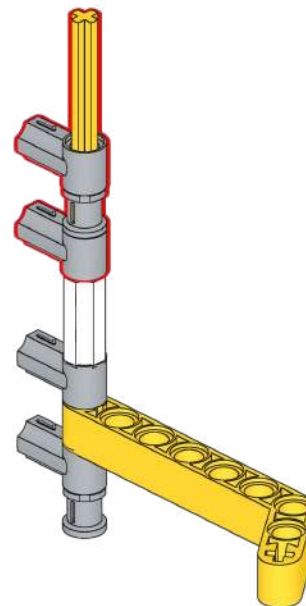
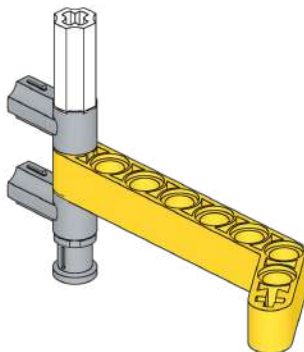
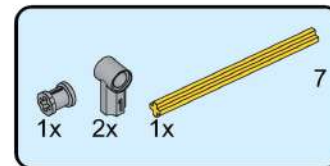
A. 競賽模型車製作 (機械人 B)



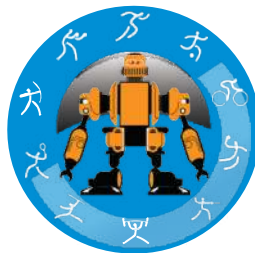
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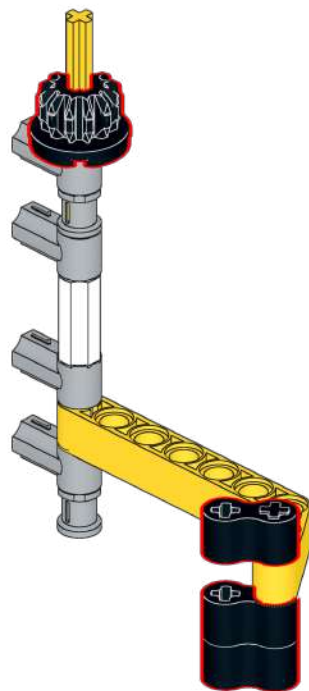
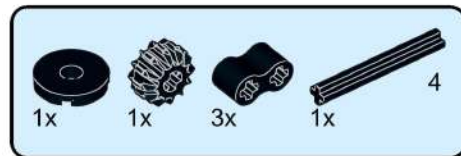
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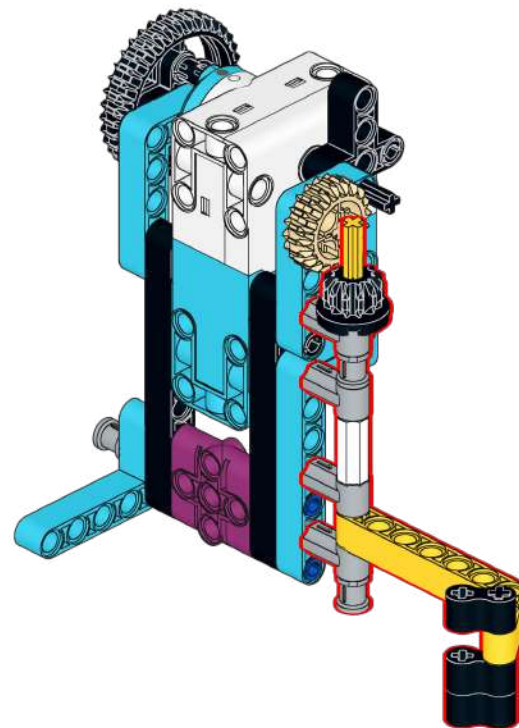
A. 競賽模型車製作 (機械人 B)



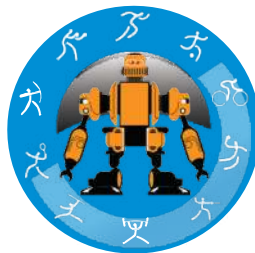
23



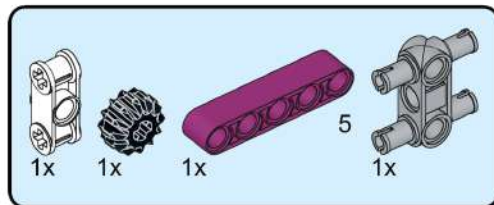
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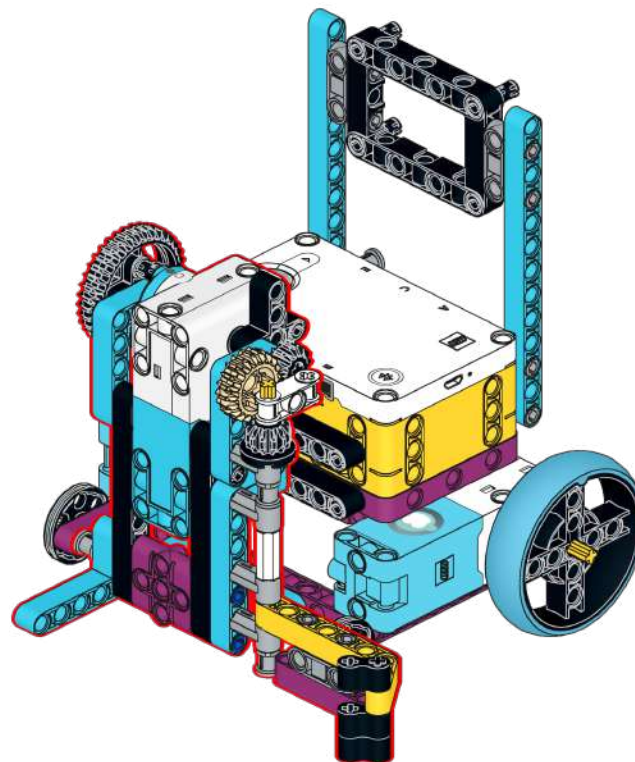
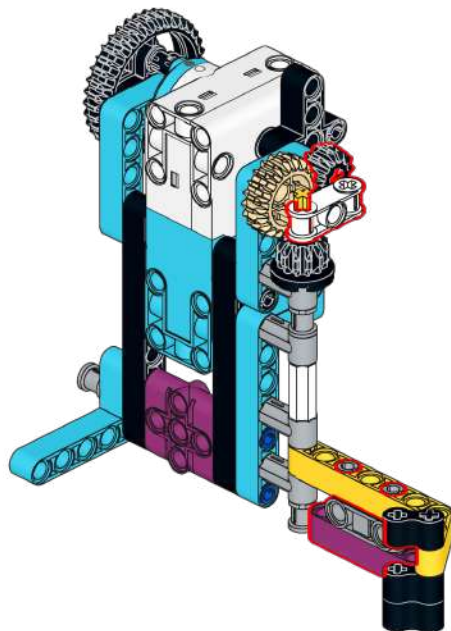
A. 競賽模型車製作 (機械人 B)



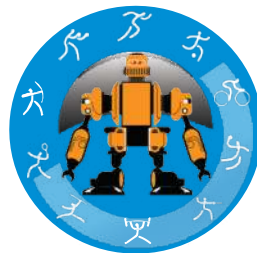
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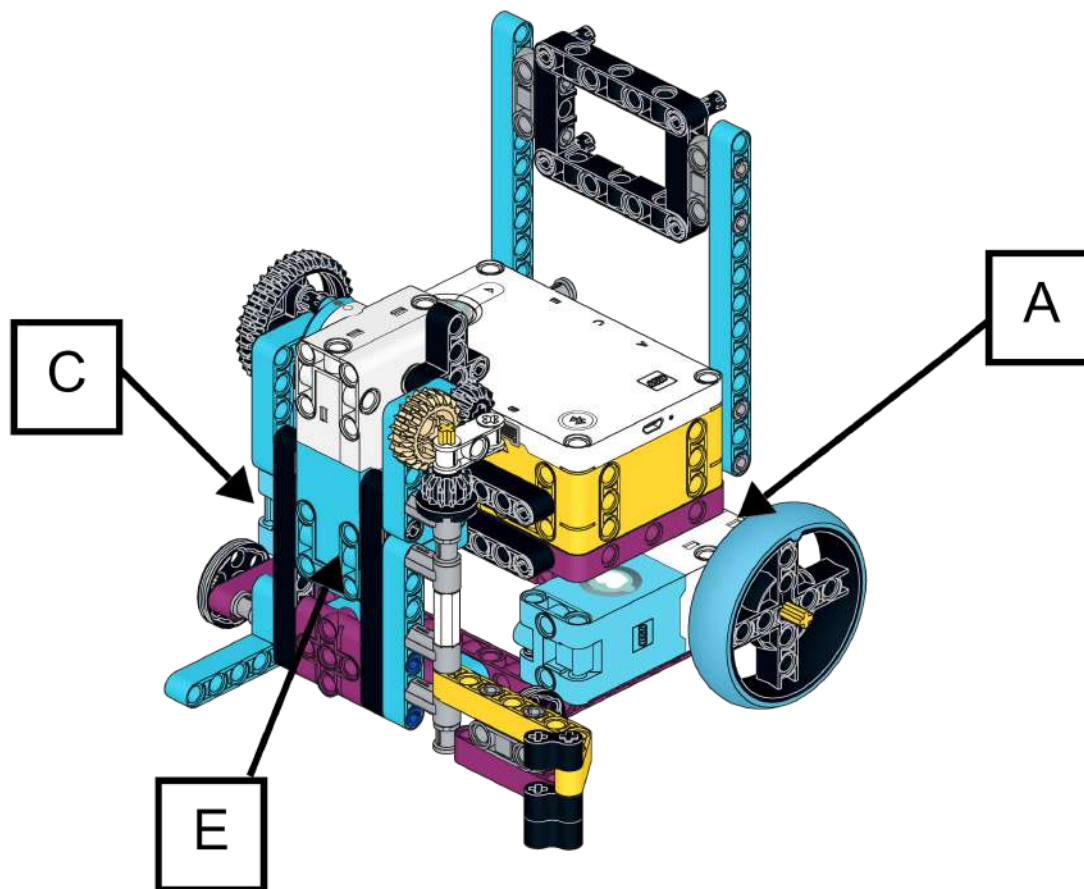
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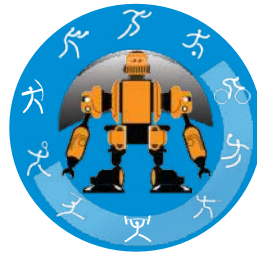


A. 競賽模型車製作 (機械人 B)



27

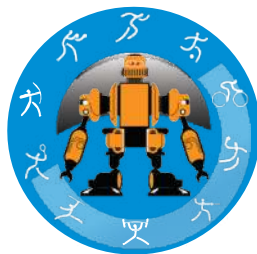




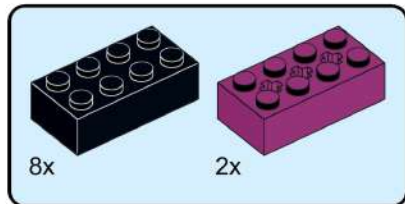
B. 場地設置製作

場地設置製作

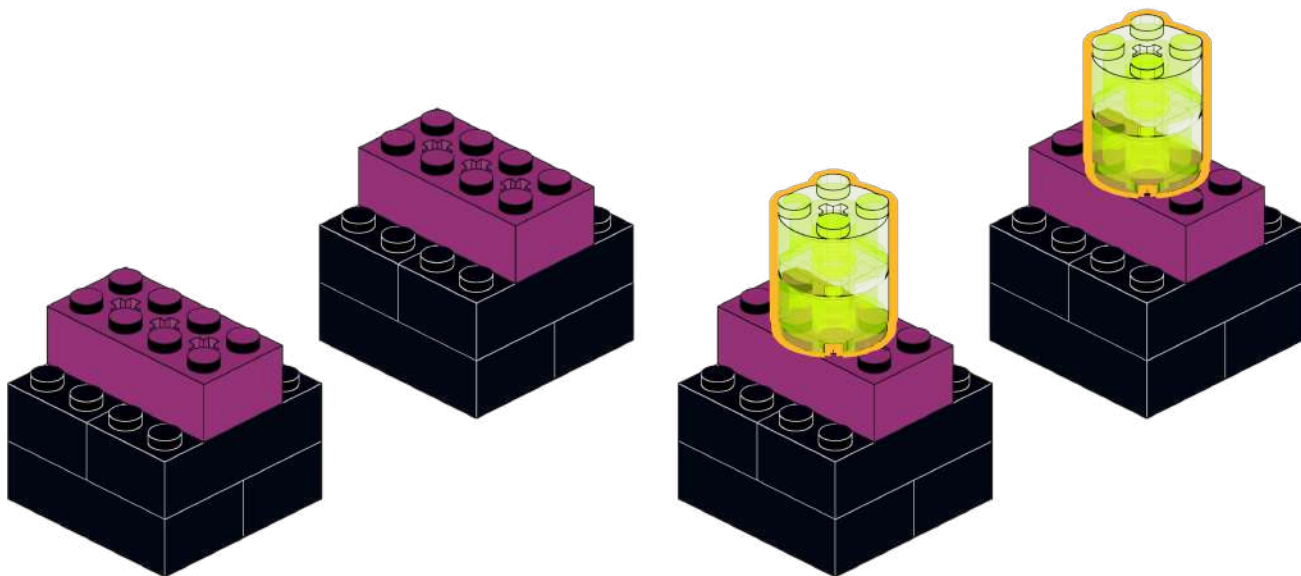
B. 場地設置製作



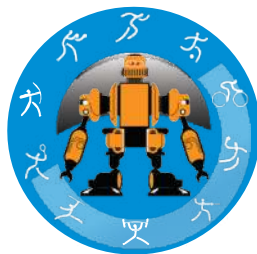
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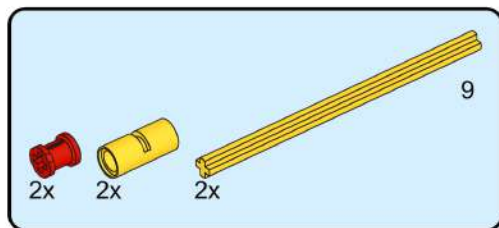
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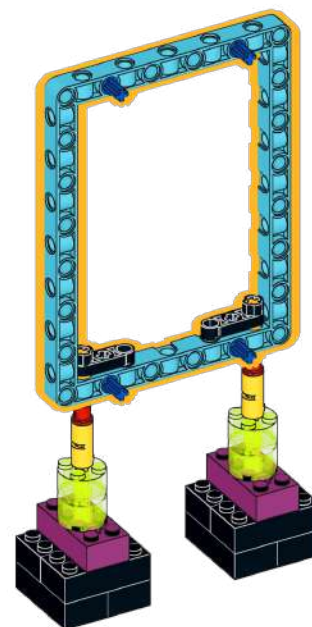
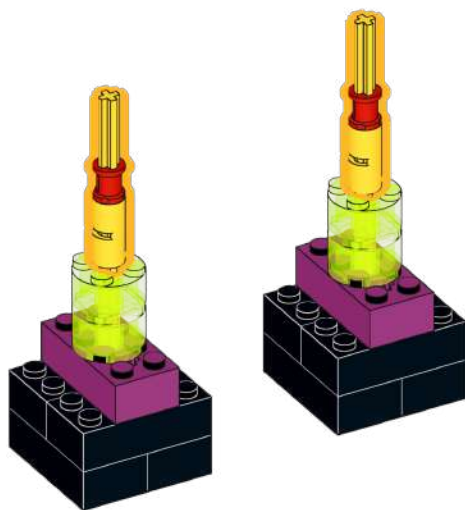
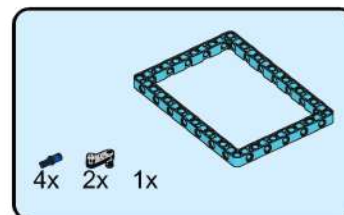
B. 場地設置製作



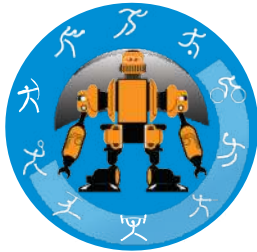
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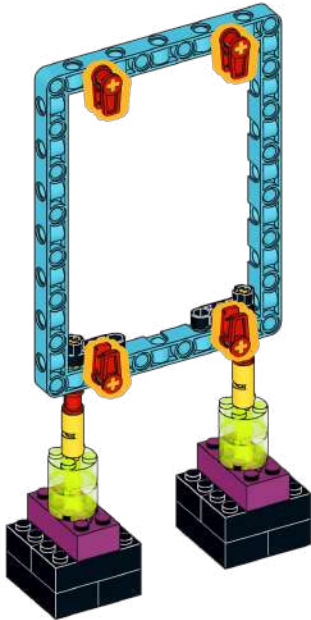
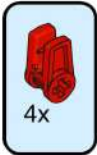
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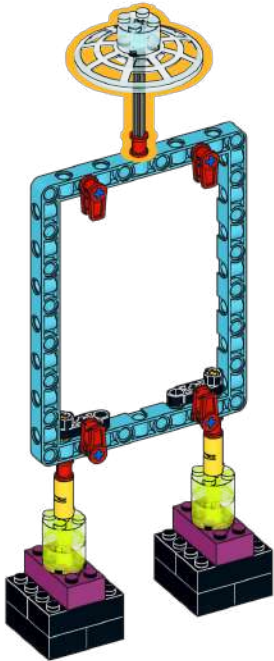
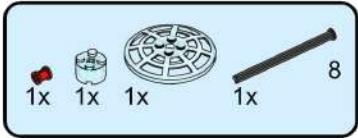
B. 場地設置製作



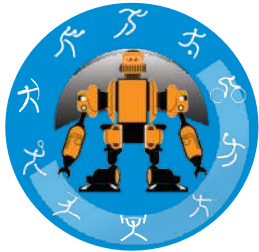
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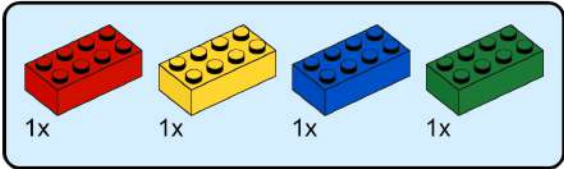
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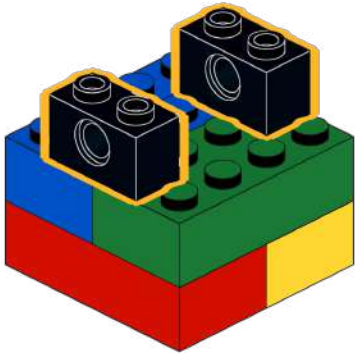
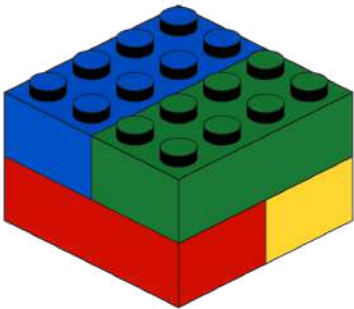
B. 場地設置製作



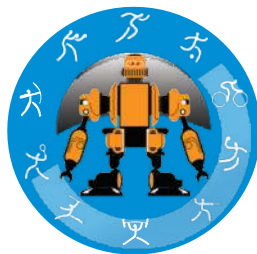
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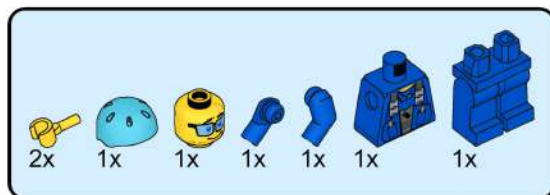
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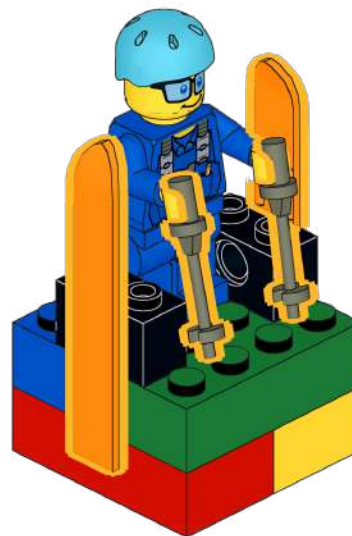
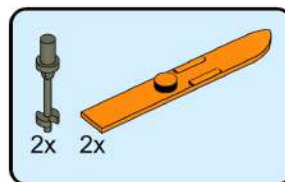
B. 場地設置製作



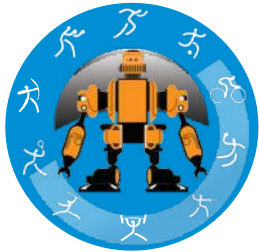
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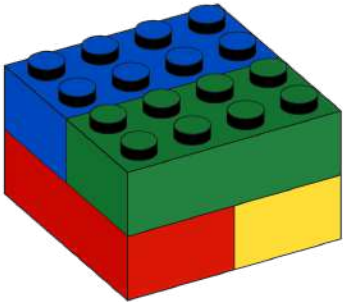
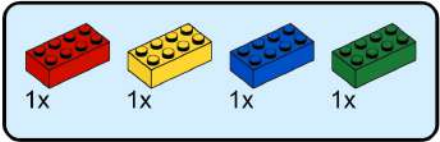
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B. 場地設置製作

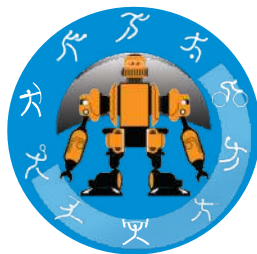


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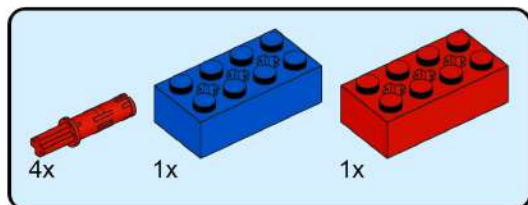


x2

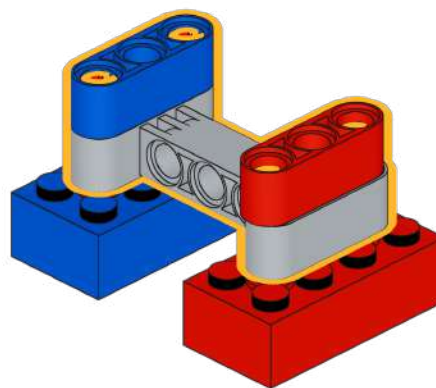
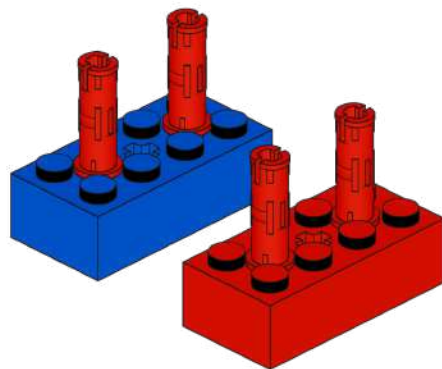
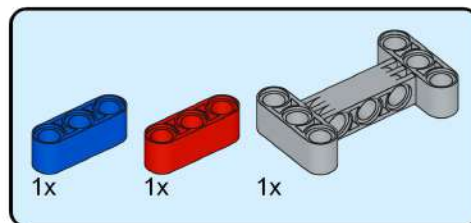
B. 場地設置製作



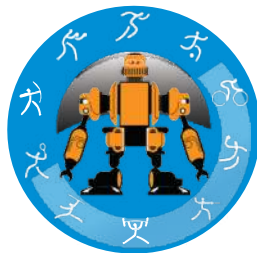
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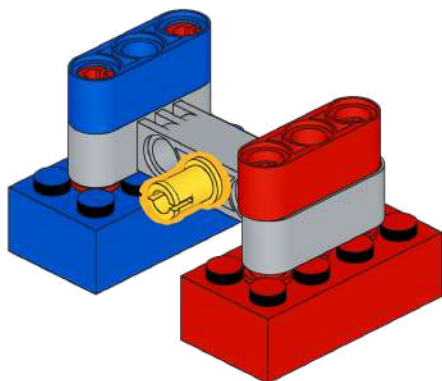
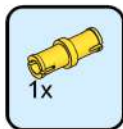
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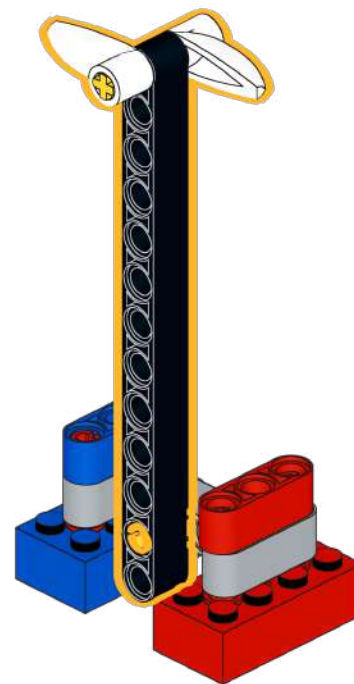
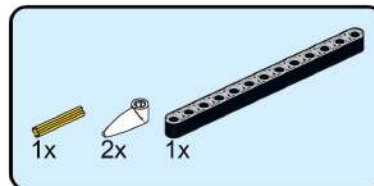
B. 場地設置製作



3

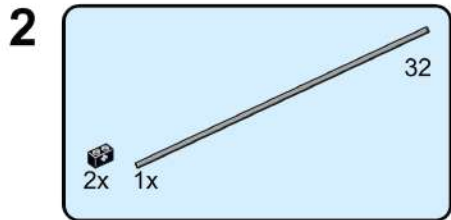
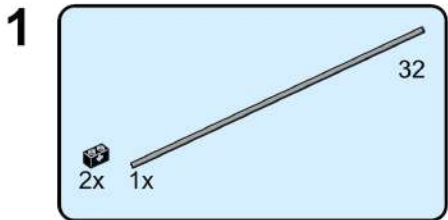
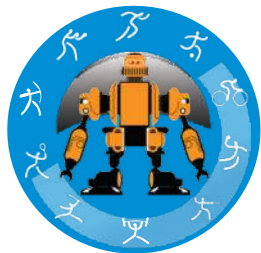


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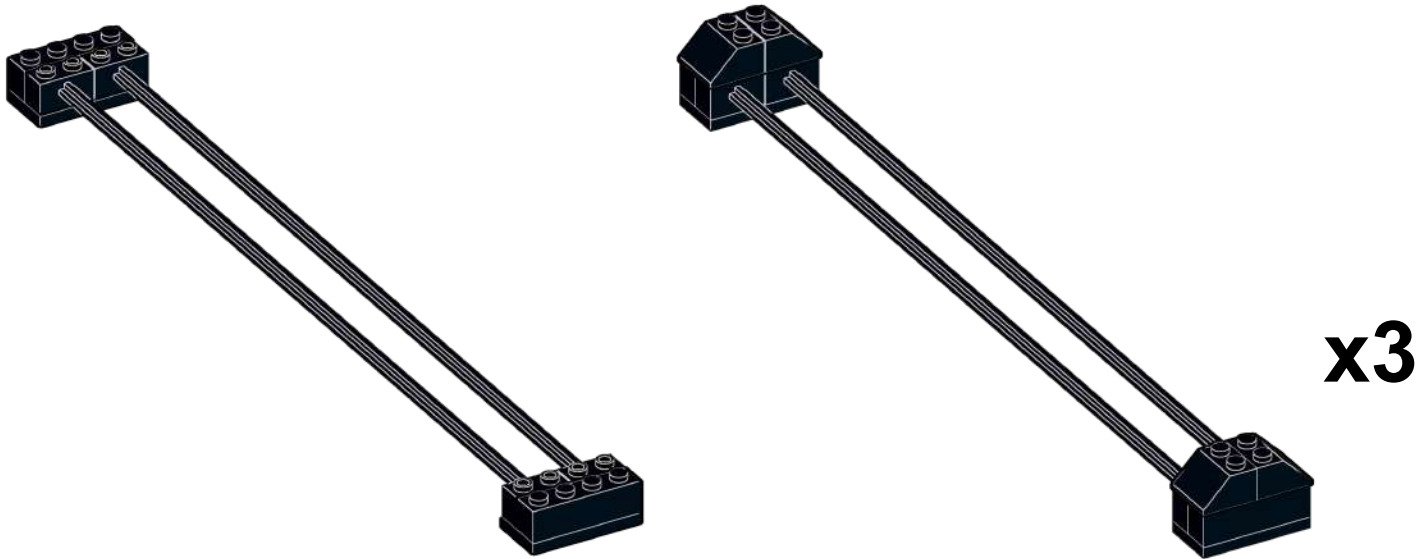
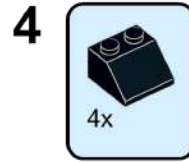
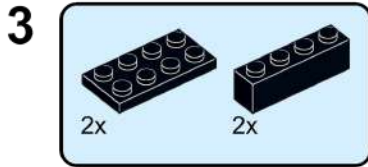
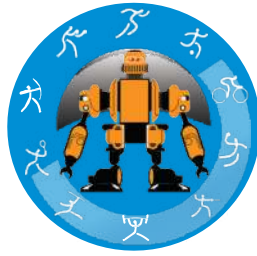


x3

B. 場地設置製作



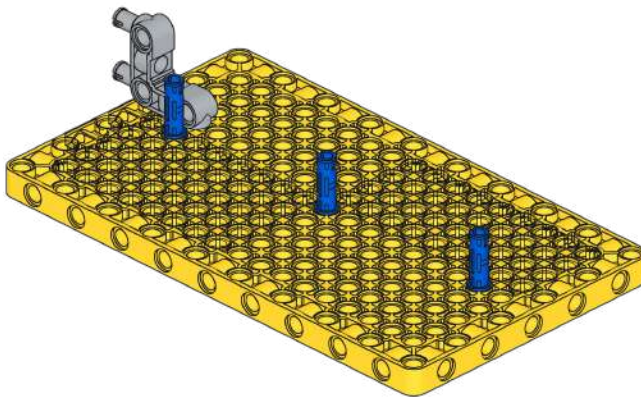
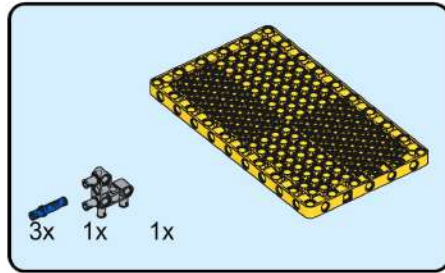
B. 場地設置製作



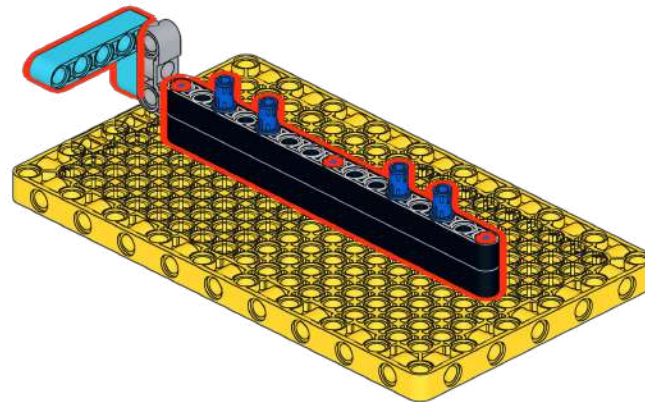
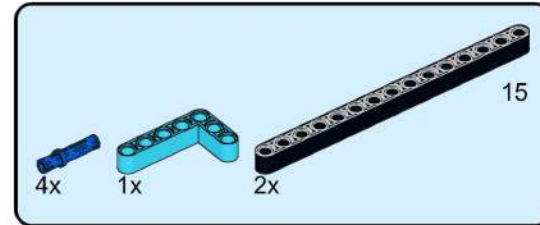
B. 場地設置製作



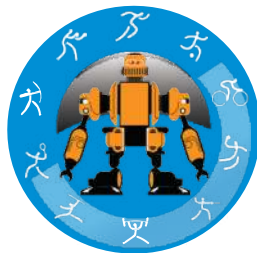
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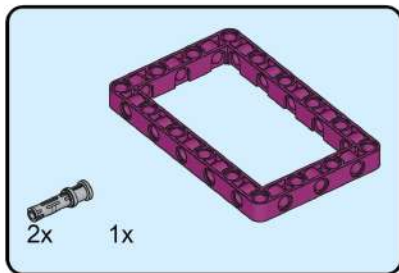
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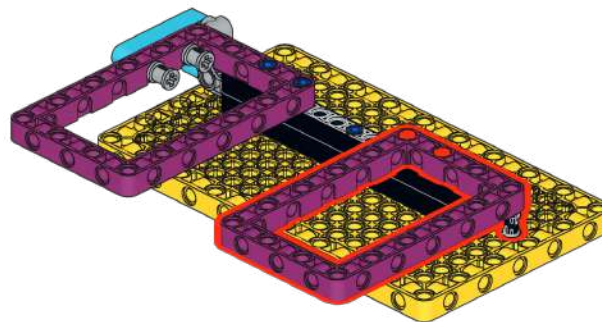
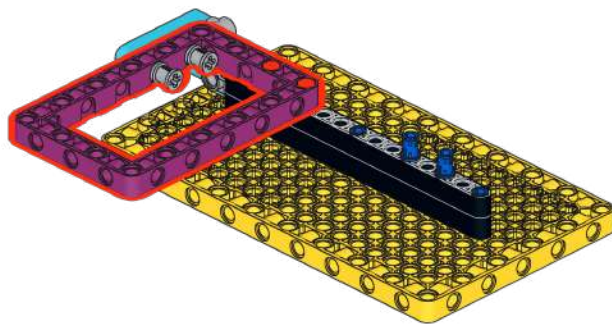
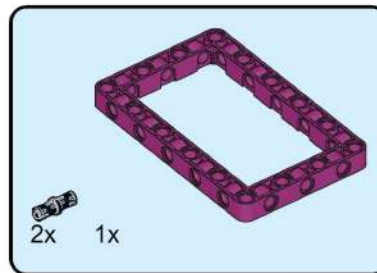
B. 場地設置製作



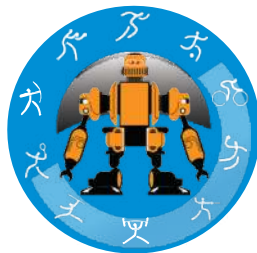
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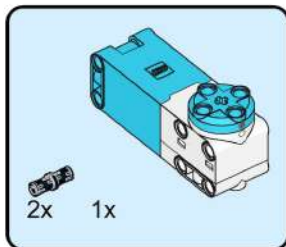
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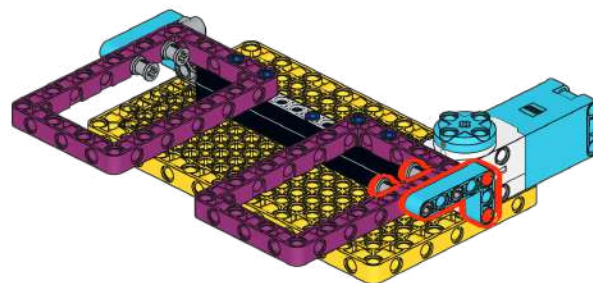
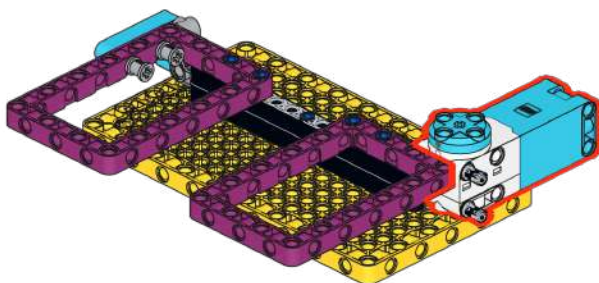
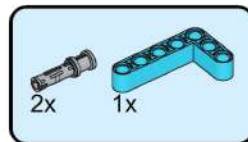
B. 場地設置製作



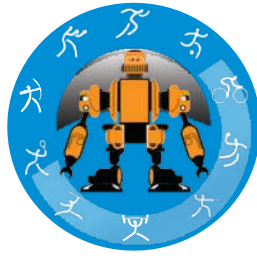
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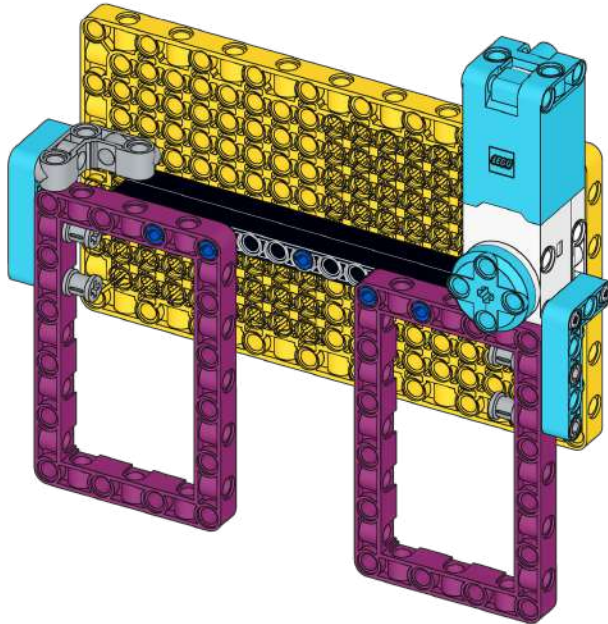
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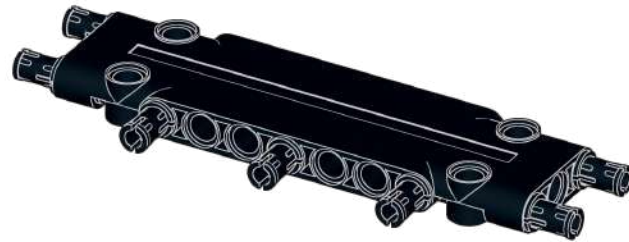
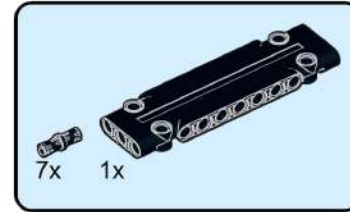
B. 場地設置製作



7



8



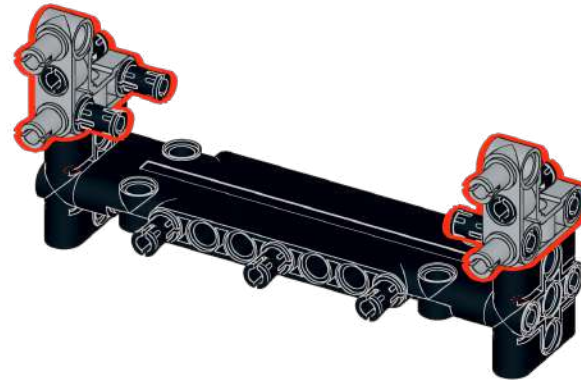
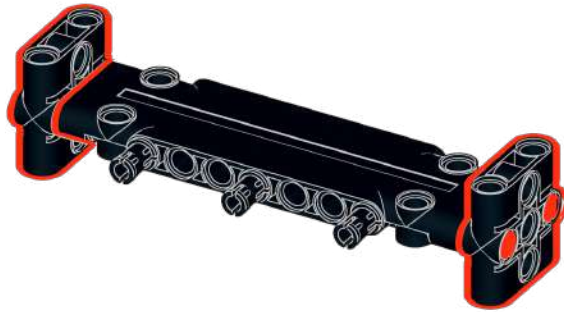
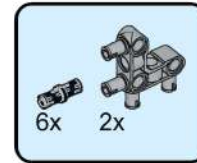
B. 場地設置製作



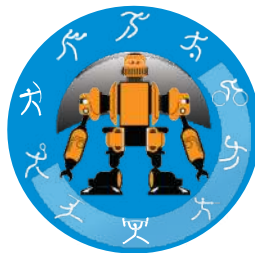
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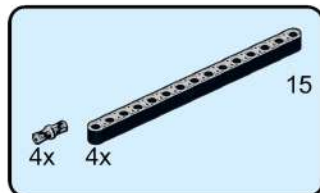
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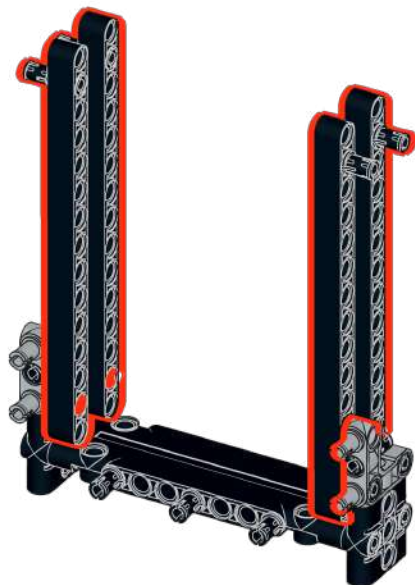
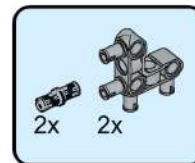
B. 場地設置製作



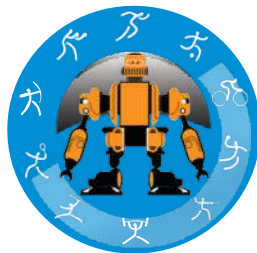
11



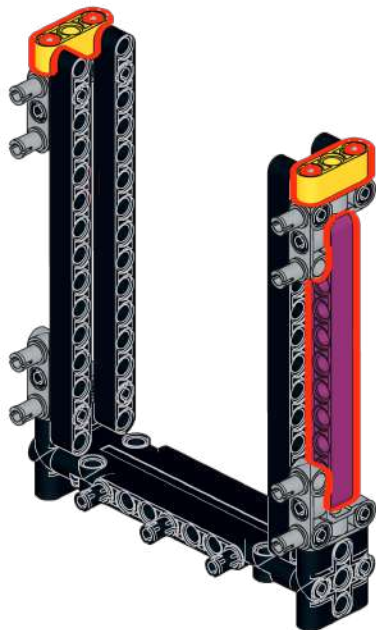
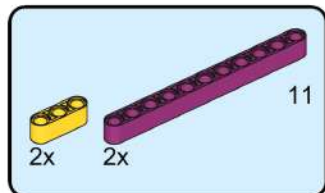
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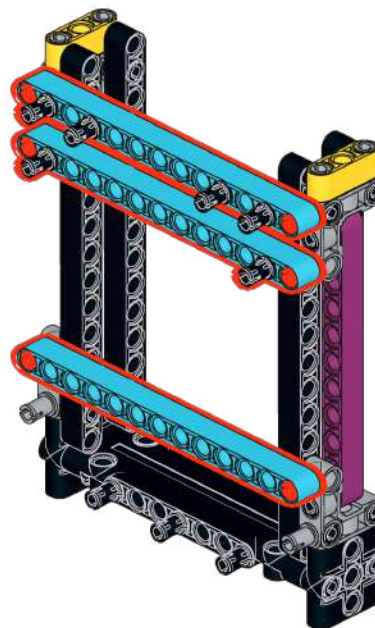
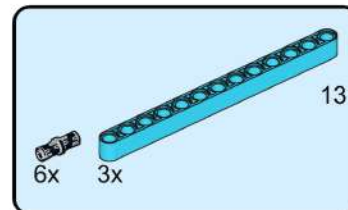
B. 場地設置製作



13



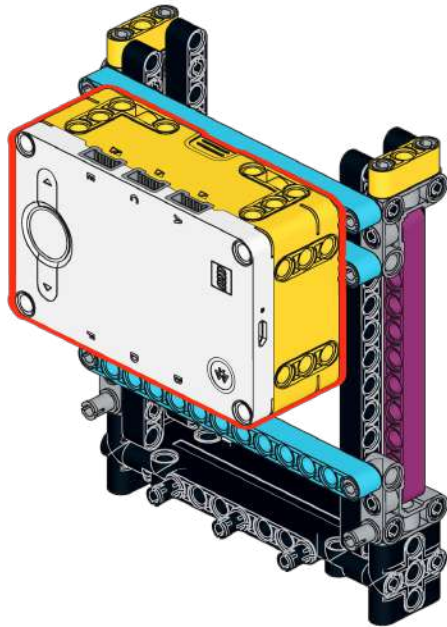
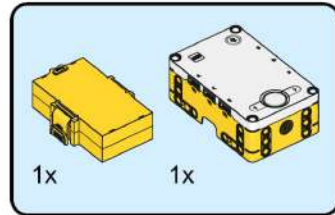
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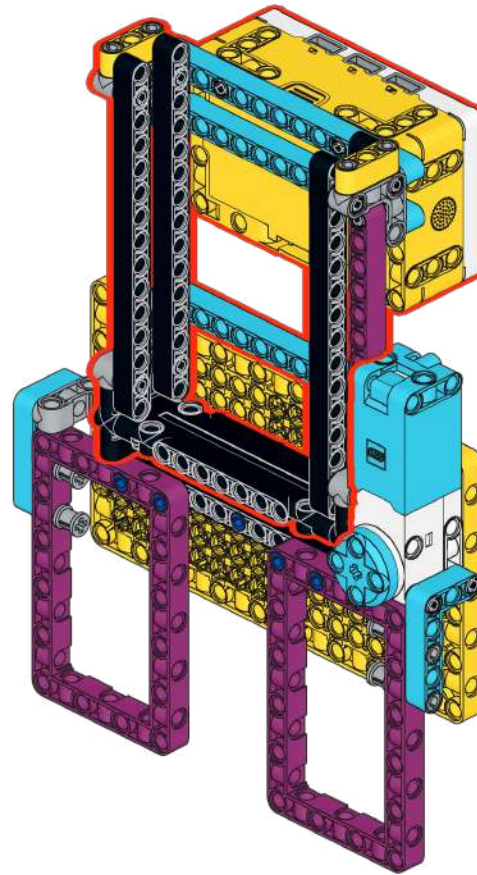
B. 場地設置製作



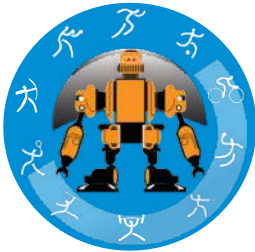
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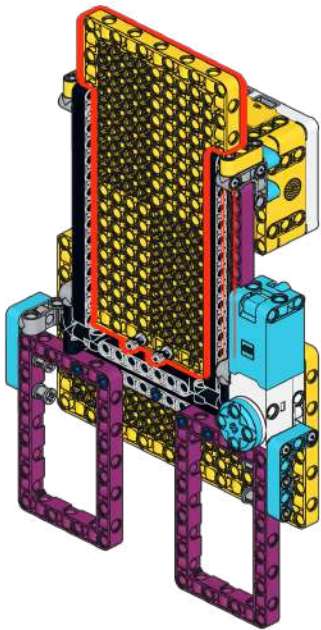
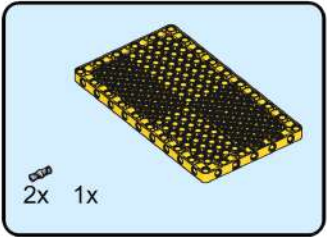
16



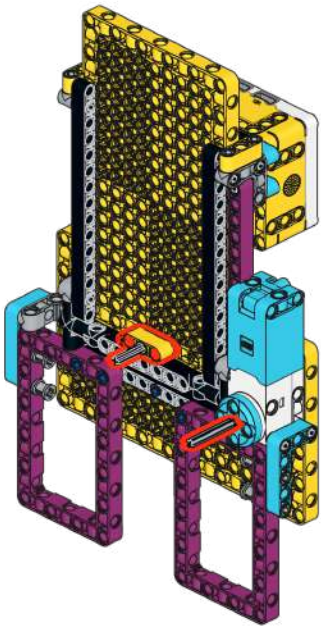
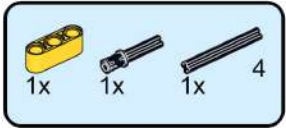
B. 場地設置製作



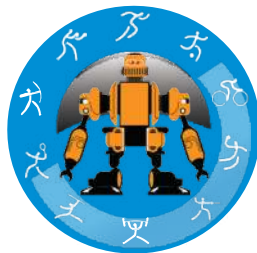
17



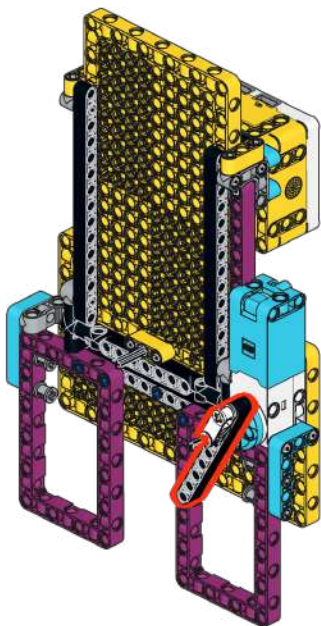
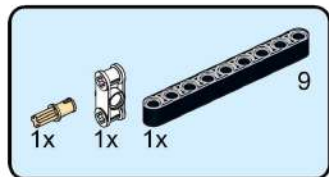
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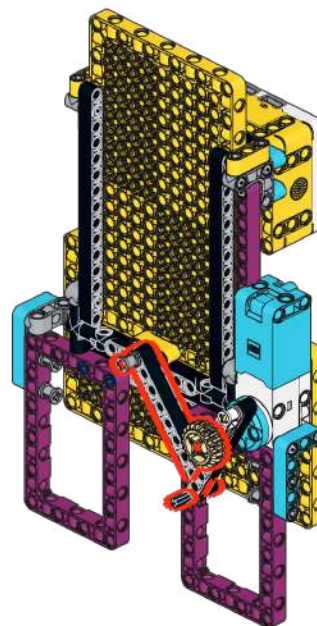
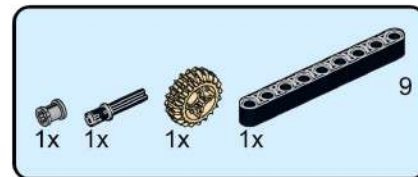
B. 場地設置製作



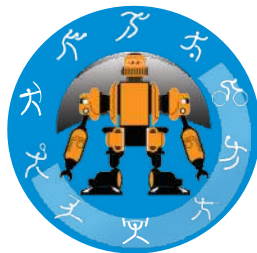
19



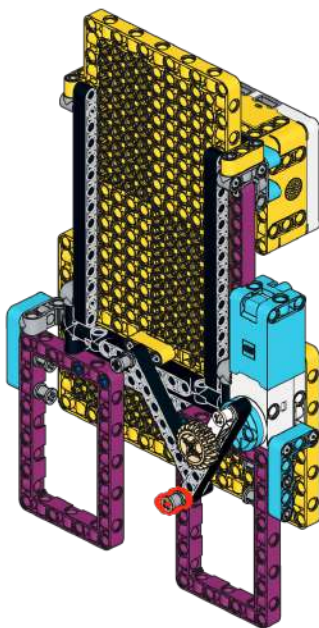
20



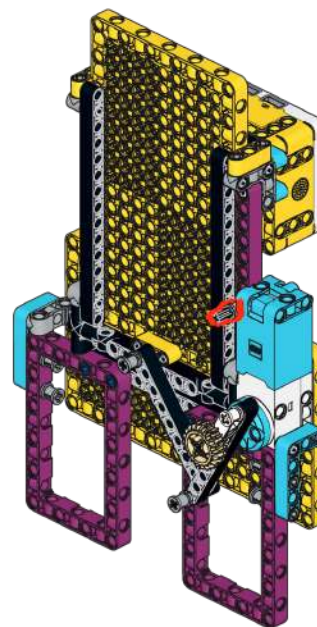
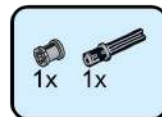
B. 場地設置製作



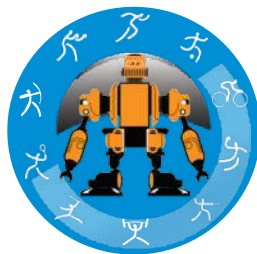
21



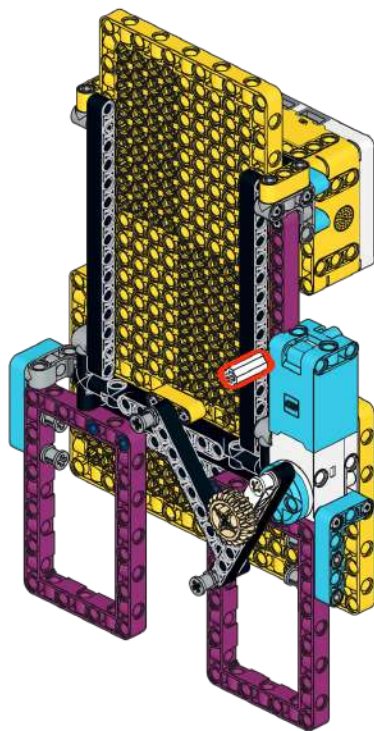
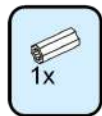
22



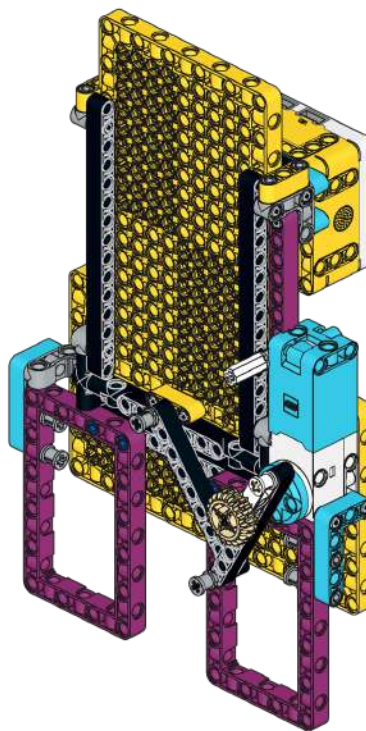
B. 場地設置製作



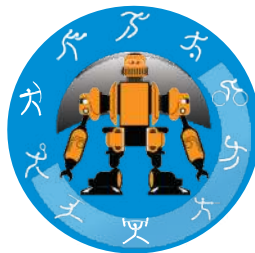
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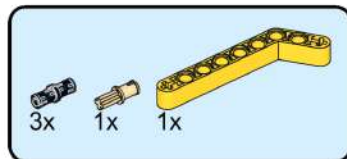
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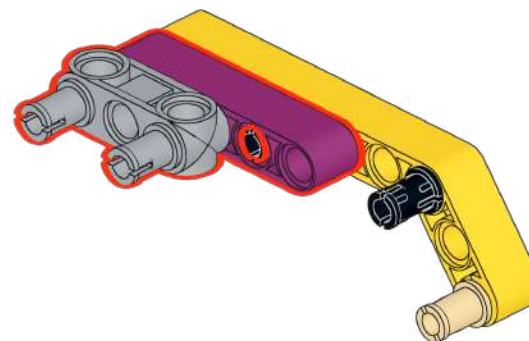
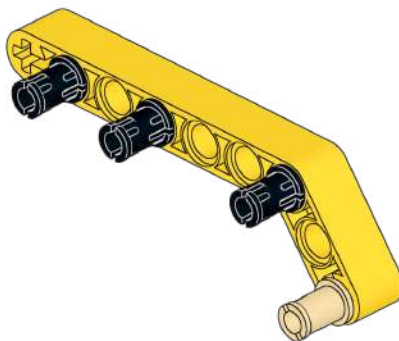
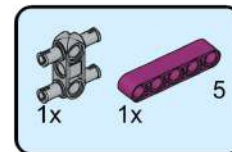
B. 場地設置製作



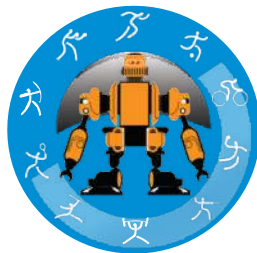
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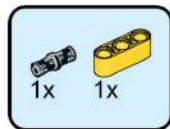
26



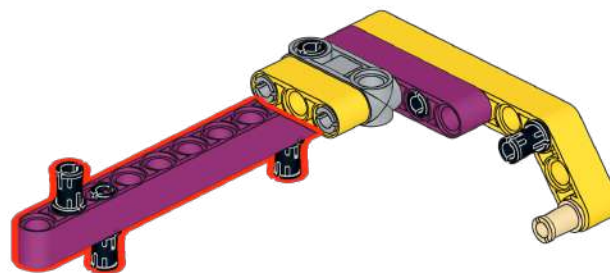
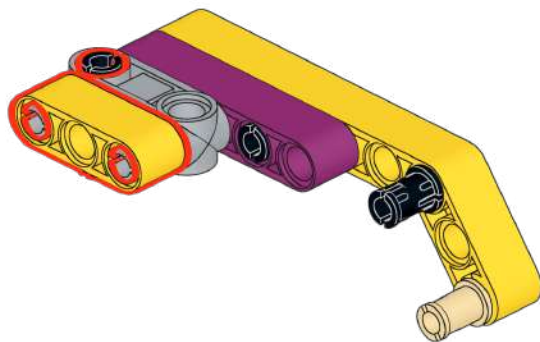
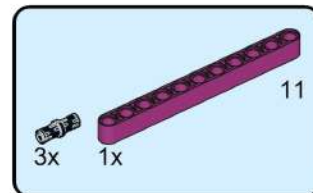
B. 場地設置製作



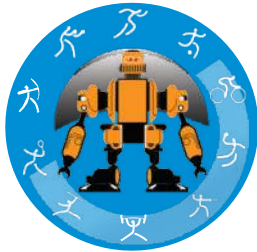
27



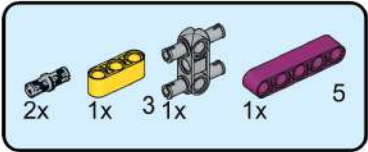
28



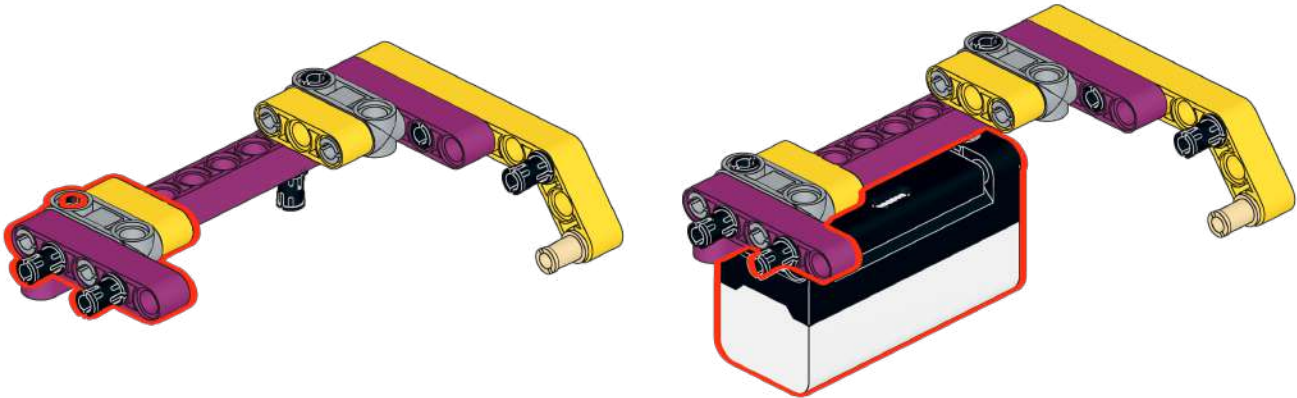
B. 場地設置製作



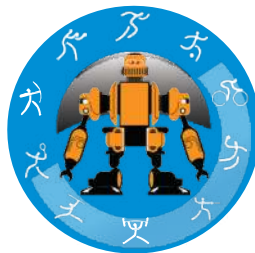
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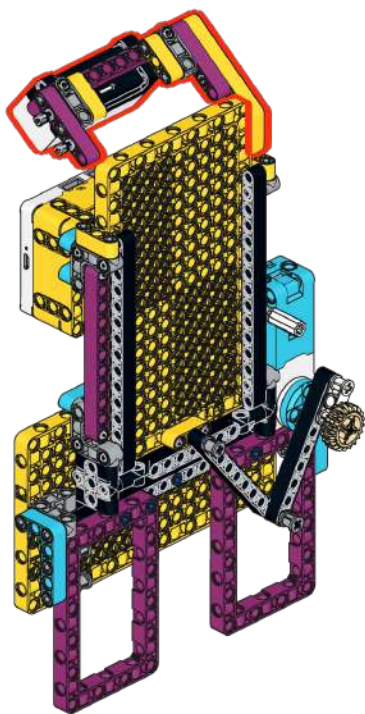
30



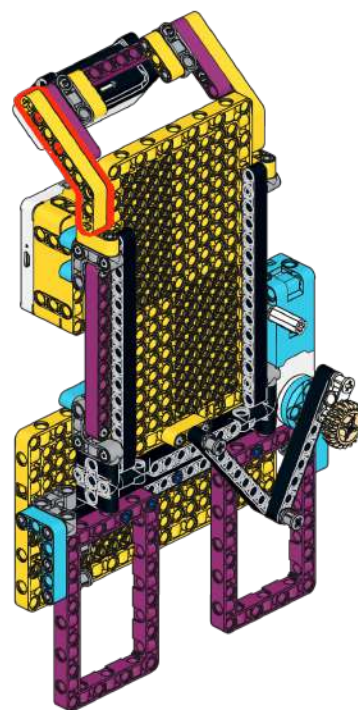
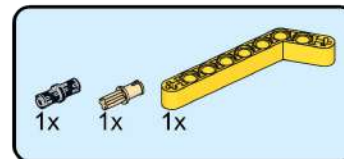
B. 場地設置製作



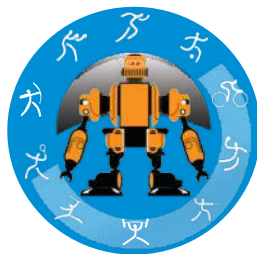
31



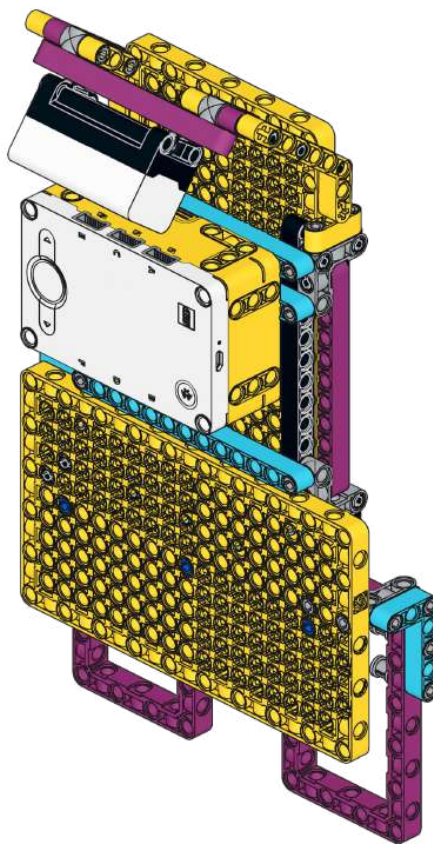
32

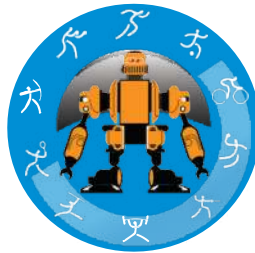


B. 場地設置製作



33

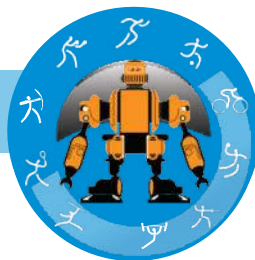




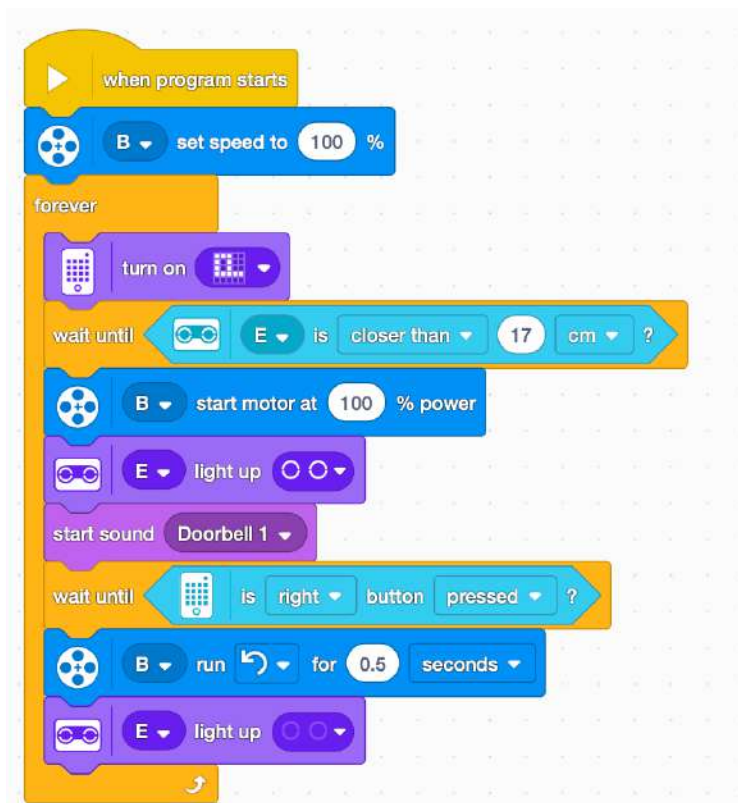
C. 程式編寫指南

程式編寫指南

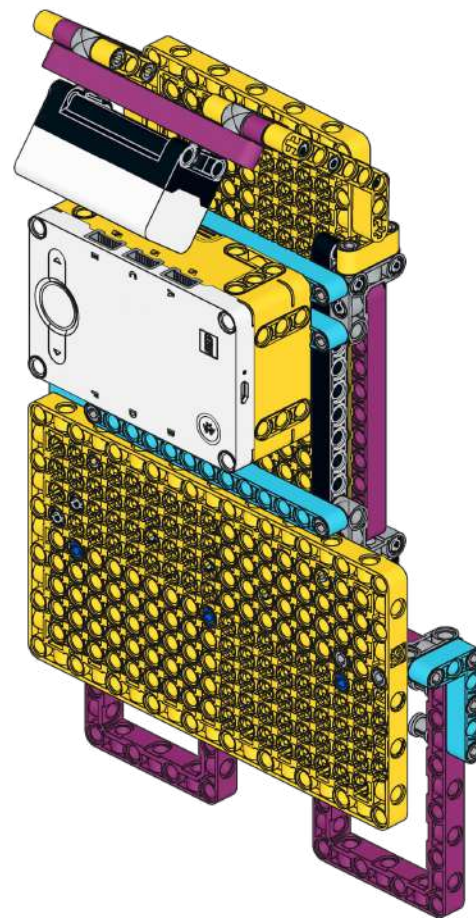
C. 程式編寫指南



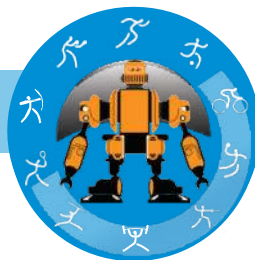
1. 編程示範 (SPIKE) — AI 智能識別裝置的程式 (場地裝置)



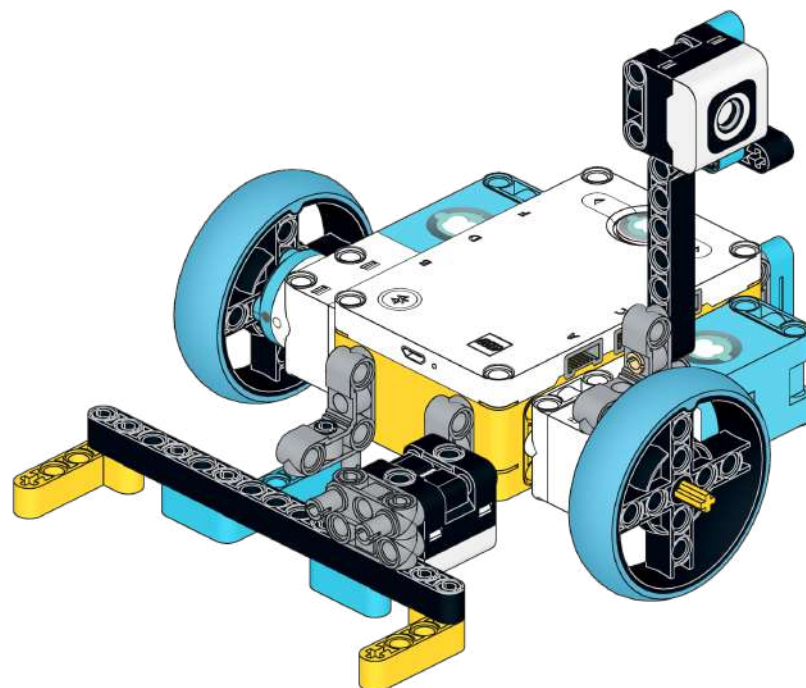
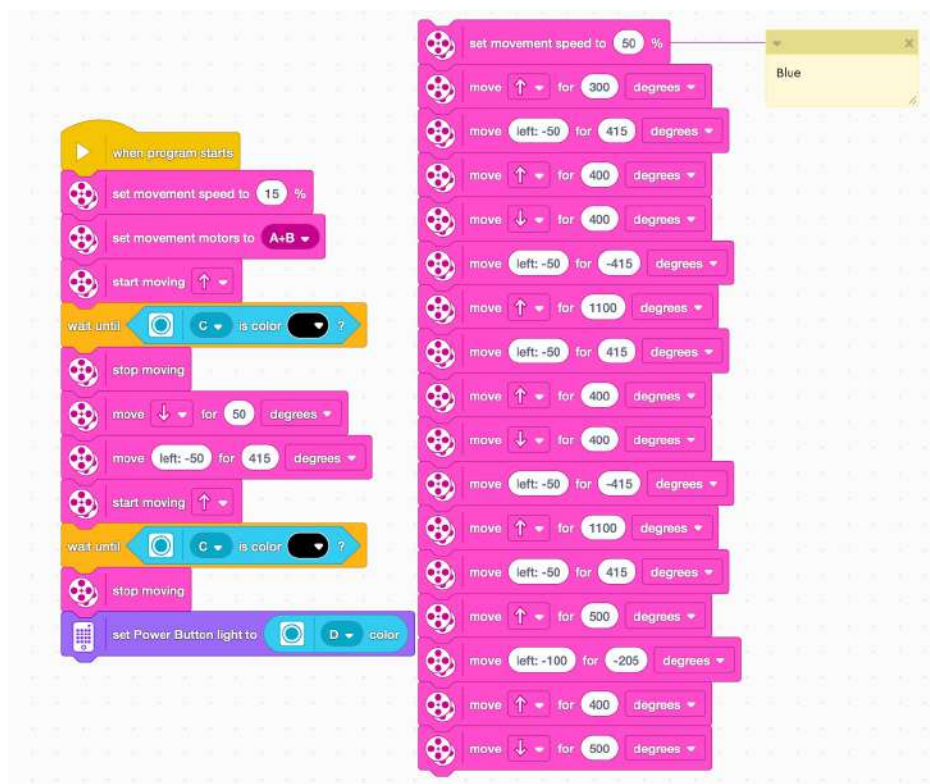
AI 智能識別裝置的程式



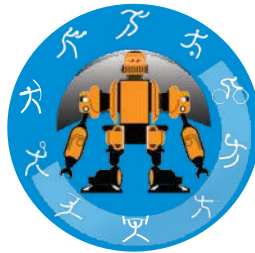
C. 程式編寫指南



2. 編程示範 (SPIKE) — 競賽機械人 A



競賽機械人 A 的程式 (如抽中藍色 QR Code)

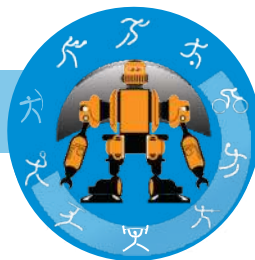


C. 程式編寫指南

競賽機械人 B 的控制方法

(i) 使用 LEGO® Mindstorms® Inventor 的控制方法

C. 程式編寫指南 (LEGO® Mindstorms® Inventor)



1. 編寫競賽機械人 B 的應用程序及控制方法

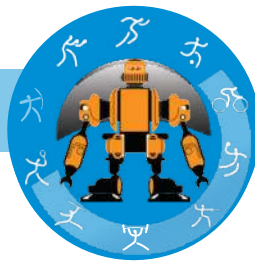
- 1.1 開啟 APP STORE，輸入並下載 LEGO® Mindstorms® Inventor。
- 1.2 開啟 iPad / 電腦藍牙。
- 1.3 先按住 SHARE 按鈕，同時按住 PS 按鈕，直到光條開始閃爍。
- 1.4 然後從藍牙裝置清單中選擇控制器「DUALSHOCK 4 Wireless Controller」。
- 1.5 配對完成後，光條將會閃爍，接著指示燈將會亮起。
- 1.6 預先與 iPad / 電腦配對好的手掣，下次連接藍牙時只需按下 PS 按鈕便可。



SHARE按鈕

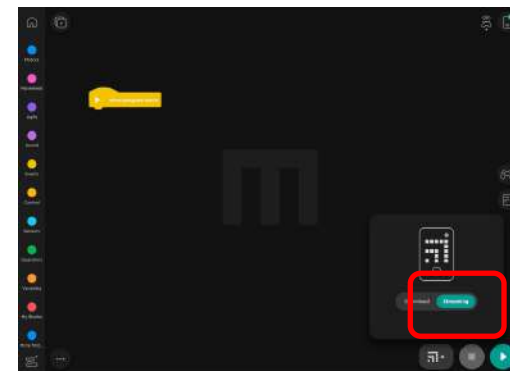
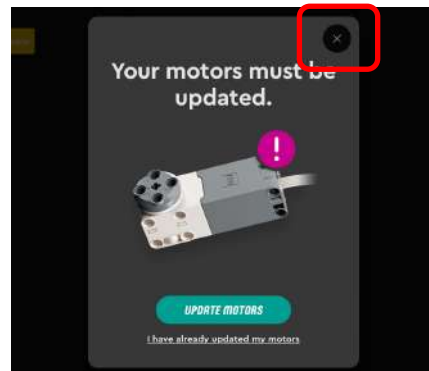
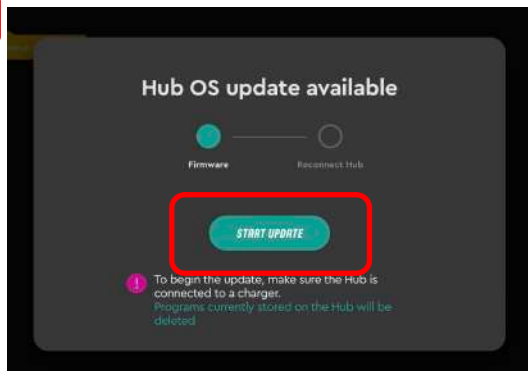
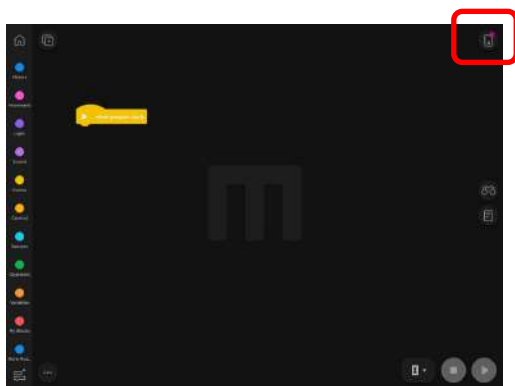


C. 程式編寫指南 (LEGO® Mindstorms® Inventor)

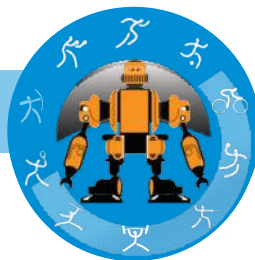


2. 連接「SPIKE™ Prime」到 iPad / 電腦

- 2.1 開啟 LEGO® Mindstorms® Inventor 至編程畫面。
- 2.2 按下編程畫面右上角的標示來進入連接畫面。
- 2.3 按照連接次序來連接「SPIKE™ Prime 智能盒子」。
- 2.4 將「SPIKE™ Prime 智能盒子」接上電源並進行更新。
- 2.5 更新後，會顯示「摩打更新」，退出並不需要更新。
- 2.6 進入「串流模式」並開始編程。

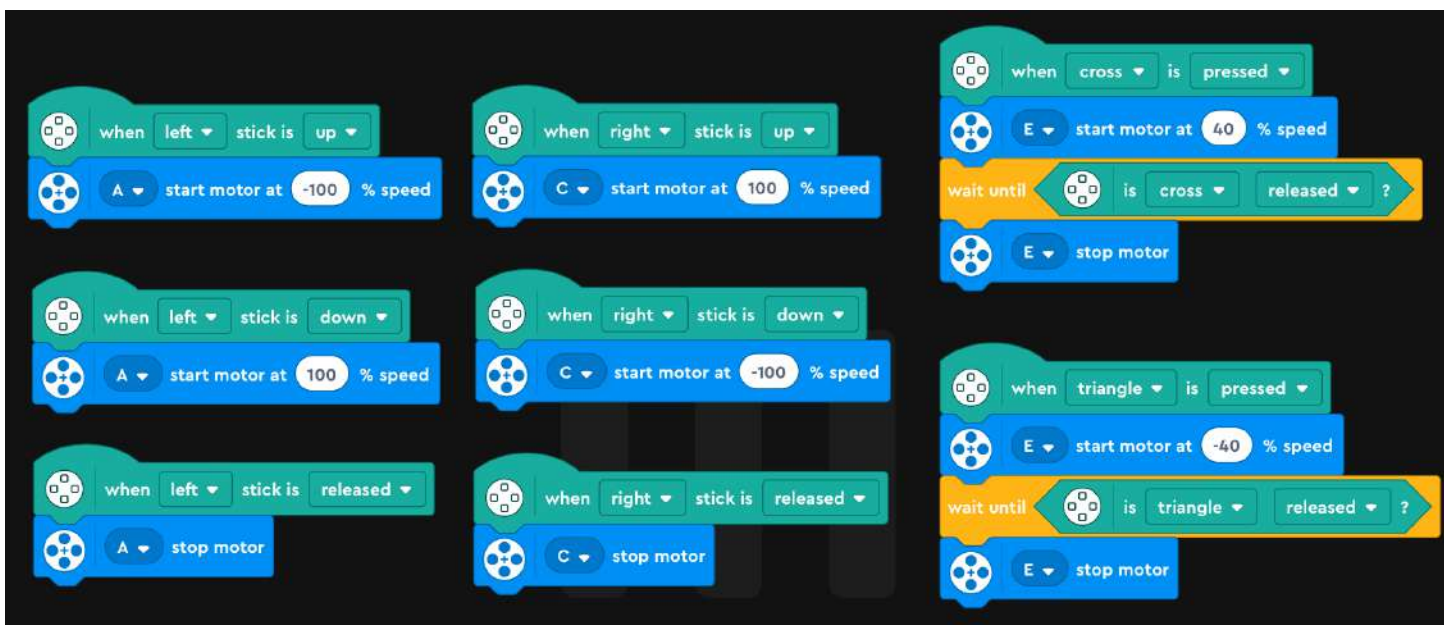


C. 程式編寫指南 (LEGO® Mindstorms® Inventor)

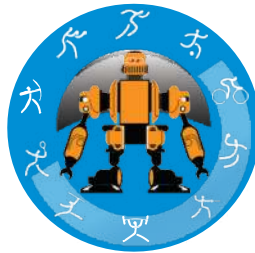


3. 編程示範

3.1 完成以下編程後使用「串流模式」開始競賽機械人 B。



競賽機械人 B 的程式

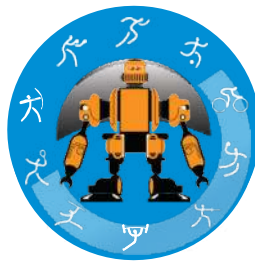


C. 程式編寫指南 (藍牙遙控傳送器)

競賽機械人 B 的控制方法

(ii) 使用藍牙遙控傳送器的控制方法

C. 程式編寫指南（藍牙遙控傳送器）

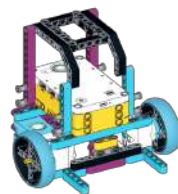


1. 開始前的準備

1.1 開始前先預備好以下物品。



-電腦-



-競賽機械人 B-



-Type C 數據線-



-藍牙遙控傳送器-

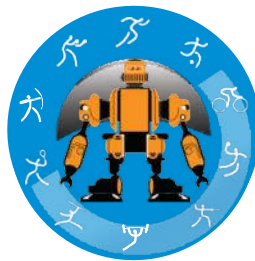


-PS4 controller-



-SPIKE cable-

C. 程式編寫指南（藍牙遙控傳送器）

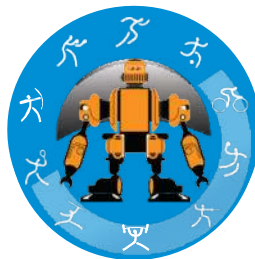


1. 開始前的準備

1.2 用 4 支黑針把「藍牙遙控傳送器」如圖裝在機械人上。



C. 程式編寫指南（藍牙遙控傳送器）



2. 激活藍牙遙控傳送器

- 2.1 使用 TYPE C 數據線把藍牙遙控傳送器與電腦連接起來，傳送器的紅色 LED 燈會亮起。
- 2.2 請使用 Microsoft Edge 瀏覽器打開網址 <https://firmware.antonsmindstorms.com/>。
- 2.3 選擇 Bluepad32 for Spike and Pybricks (20240825)，然後按「Connect」。



Microsoft Edge
瀏覽器

LMS-ESP32 installer

Select your firmware

- ☐ MicroPython v1.24 uartremote+pupremote
- ☐ BluePad32 UartRemote for LMS micropython projects
- ☒ BluePad32 for Spike3 and Pybricks (20240817)

Connect

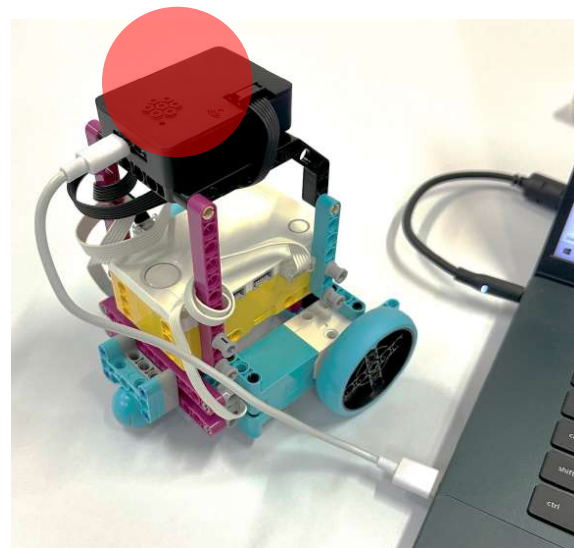
For examples of the BluePad32 or PUPRemote, see [PUPRemote Github](#) >

For source code of the Bluepad32 firmware see [Bluepad32 github](#).

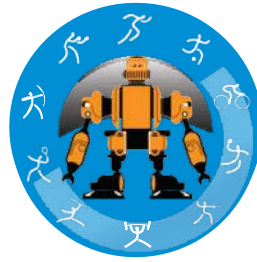
The following firmware only works on LMS-ESP32 version 1 and supports LVGL. A new version will be released soon.

- ☐ LMS-ESP32v1: MicroPython v1.19 with ulab+lvgl+uartremote

[LMS-ESP32](#) — Installer powered by [ESP Web Tools](#).

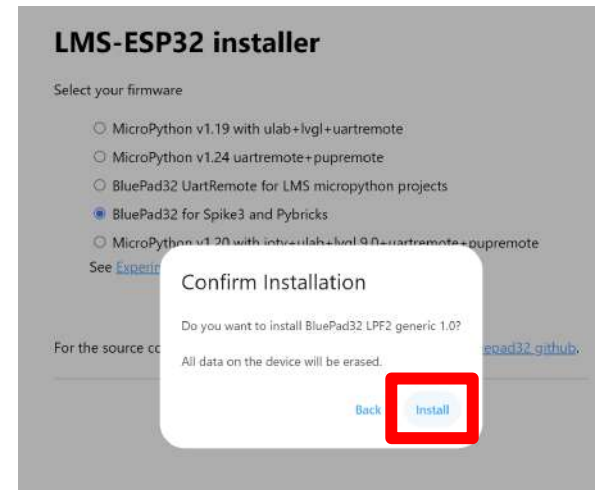
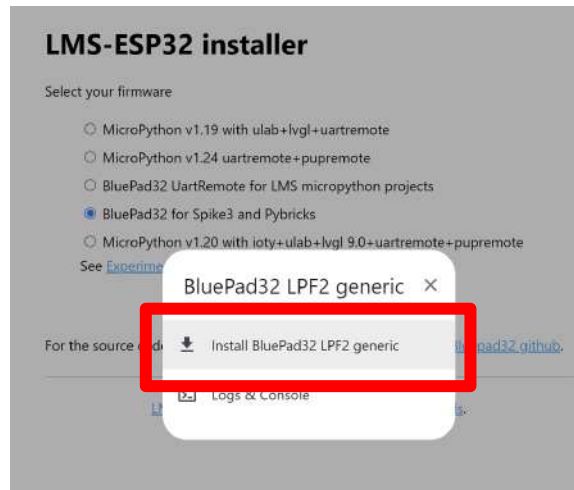


C. 程式編寫指南（藍牙遙控傳送器）

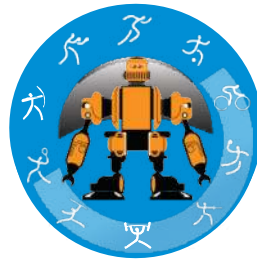


2. 激活藍牙遙控傳送器

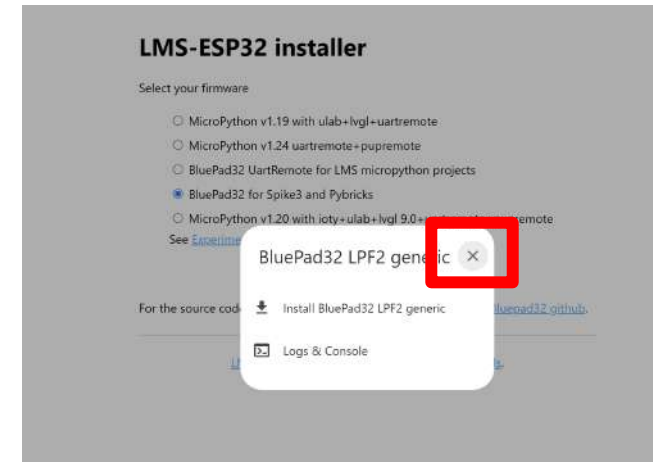
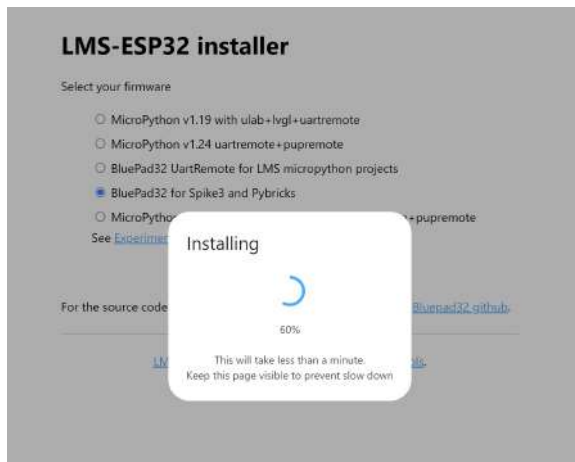
2.4 按以下順序安裝。(若未成功搜尋到，請試連接電腦的其他USB插口。)



C. 程式編寫指南（藍牙遙控傳送器）

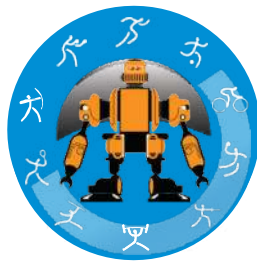


2. 激活藍牙遙控傳送器



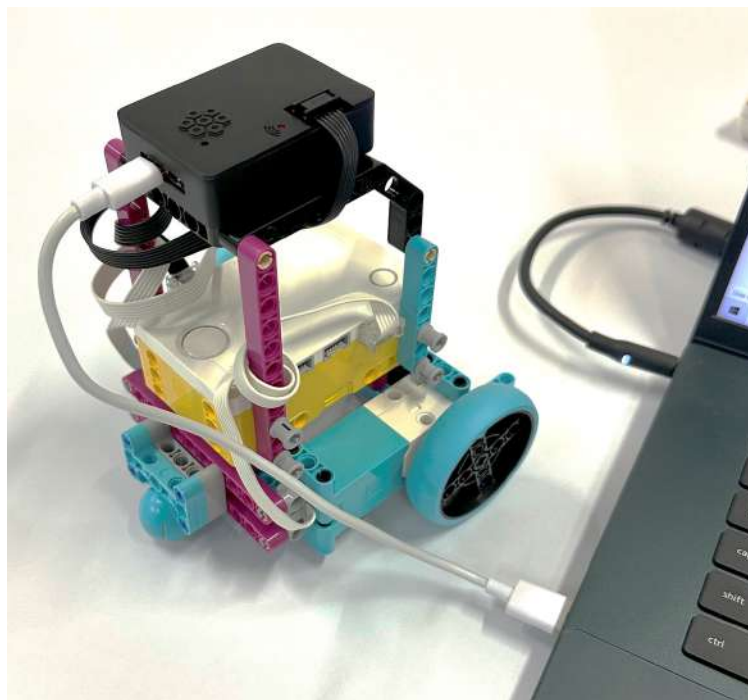
激活成功

C. 程式編寫指南（藍牙遙控傳送器）

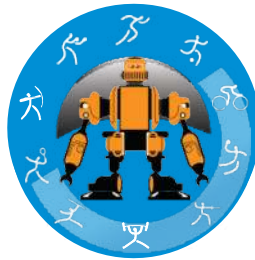


2. 激活藍牙遙控傳送器

2.5 請繼續保持電腦連接著藍牙遙控傳送器。

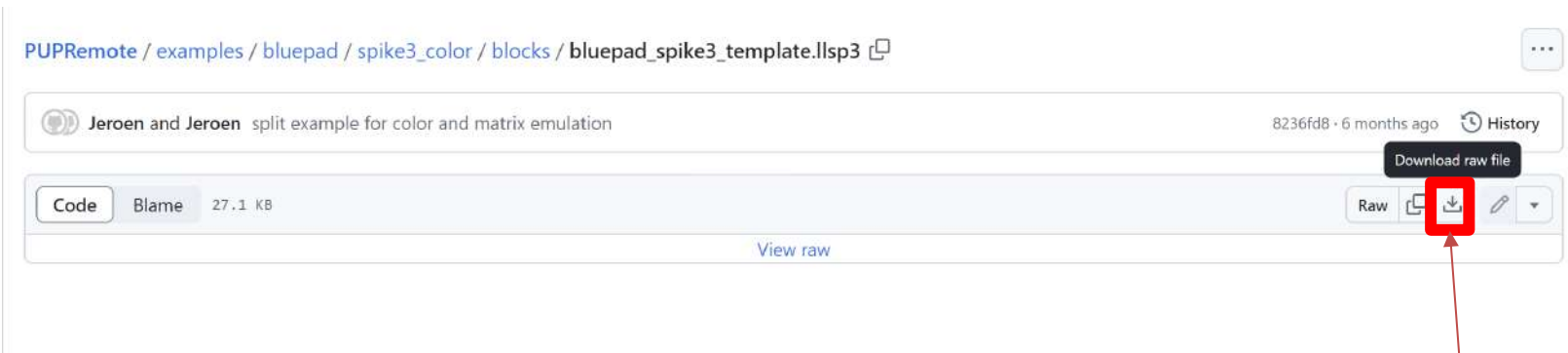


C. 程式編寫指南（藍牙遙控傳送器）



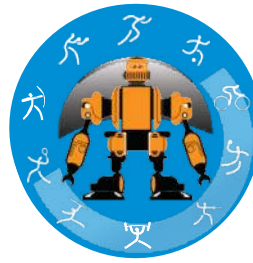
3. 下載應用程式

3.1 請到以下網址下載遙控程序<http://bit.ly/3YYR4QE>。



按此下載

C. 程式編寫指南（藍牙遙控傳送器）

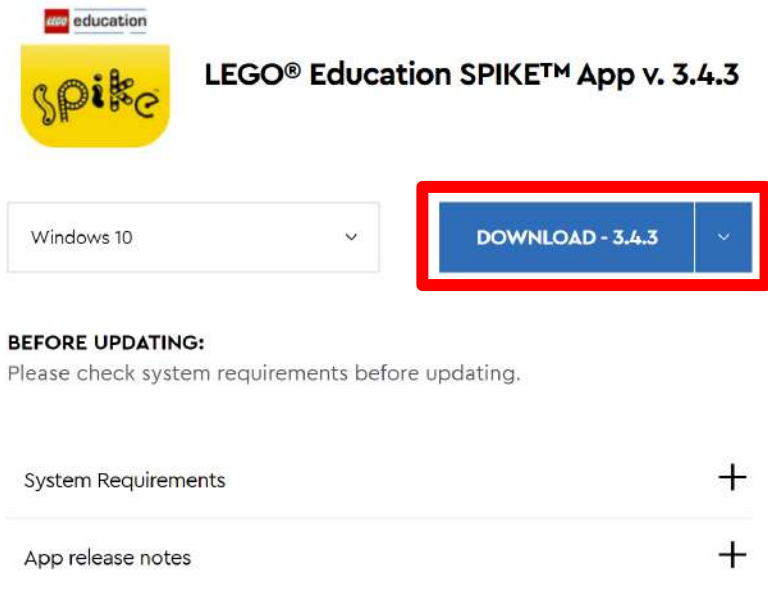


3. 下載應用程式

3.2 下載並安裝最新版本的 SPIKE APP™ 到電腦內，請進入 <https://education.lego.com/en-us/downloads/spike-app/software/>。或開啟 APP STORE，輸入並下載 SPIKE APP™。



APP STORE

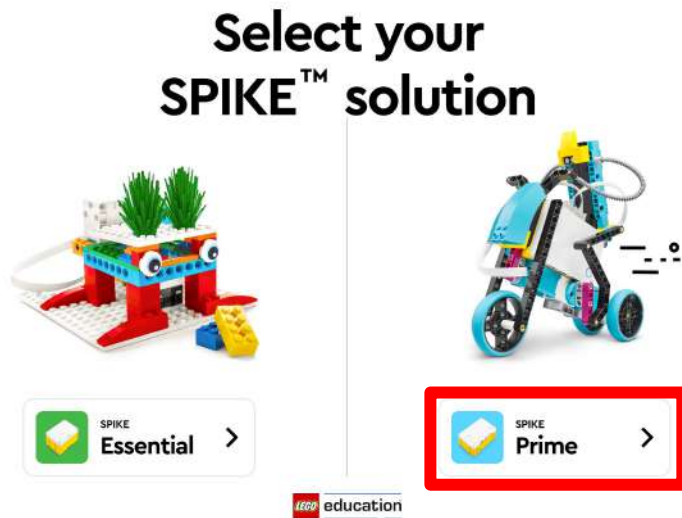


C. 程式編寫指南（藍牙遙控傳送器）

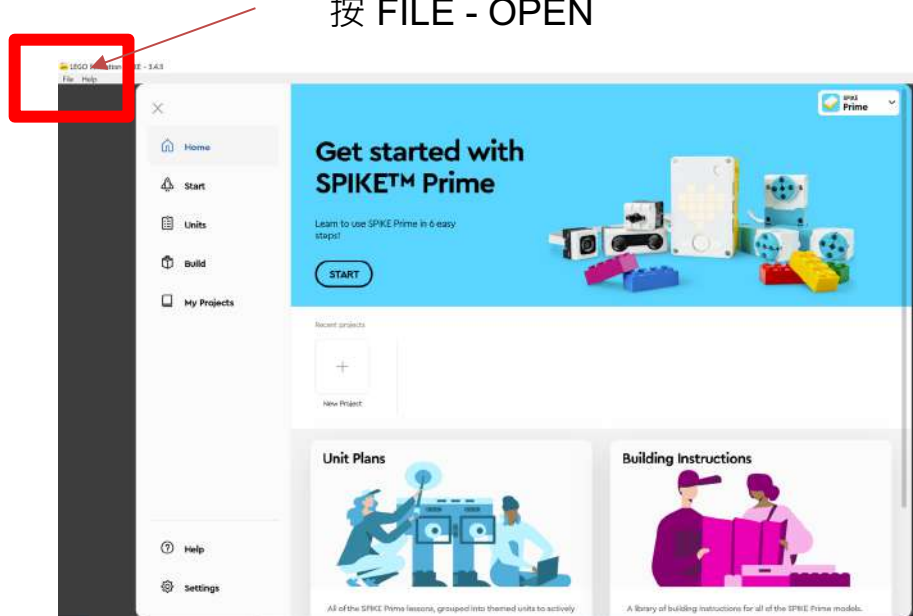


3. 下載應用程式

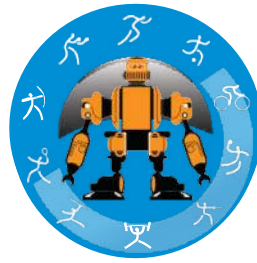
3.3 打開 SPIKE APP™，按以下步驟開啟遙控程式。



按 FILE - OPEN

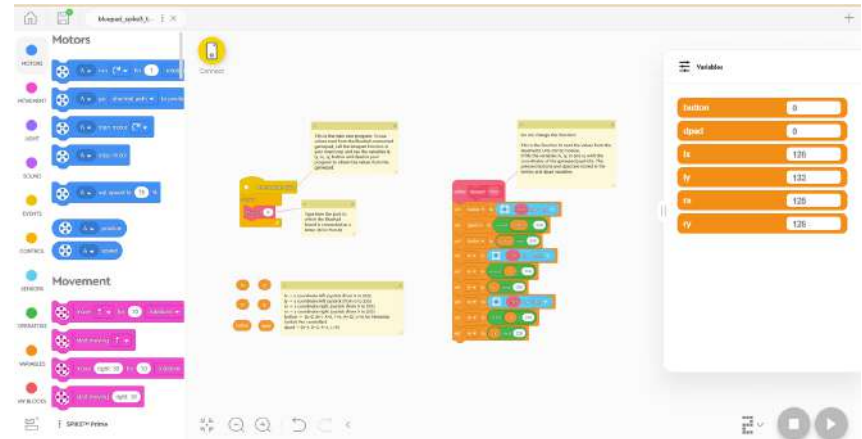
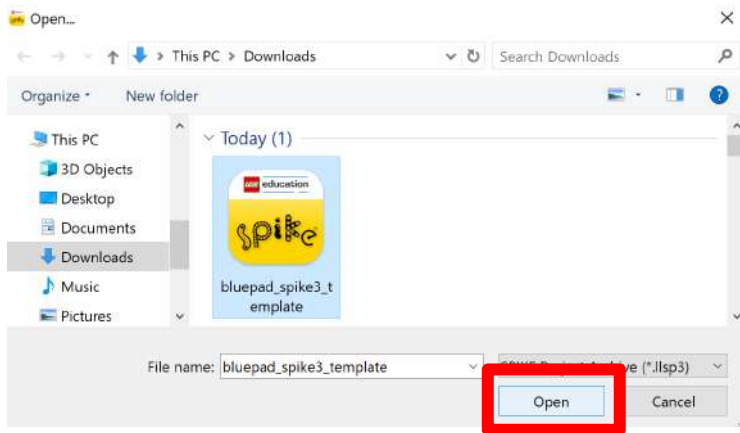


C. 程式編寫指南（藍牙遙控傳送器）

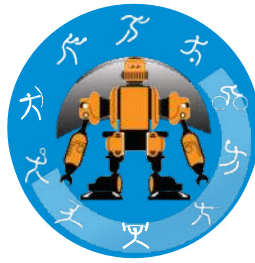


3. 下載應用程式

3.4 打開 SPIKE APP™，按以下步驟開啟遙控程式。

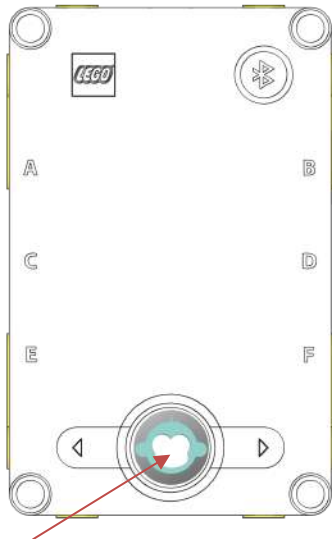


C. 程式編寫指南（藍牙遙控傳送器）

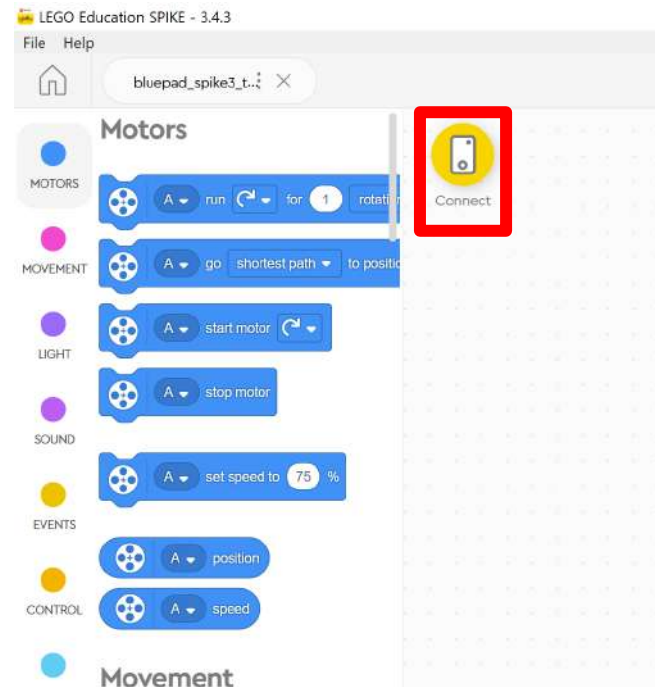


3. 下載應用程式

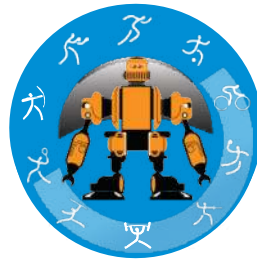
3.5 按下 SPIKE 主機的 HOME 鍵兩秒開啟電源，然後按下程序內的 Connect，依照裡面的指示更新 SPIKE 主機。



HOME 鍵

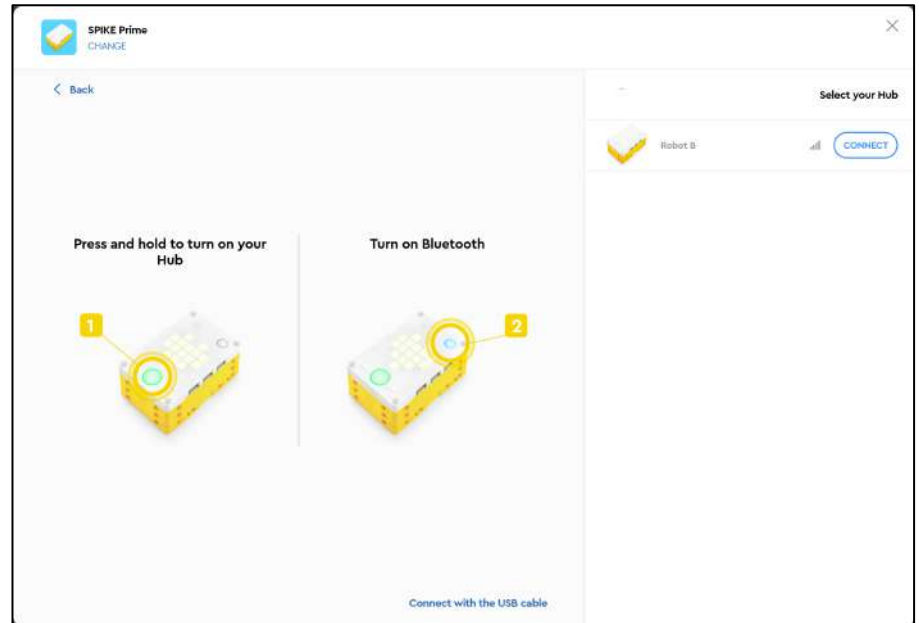
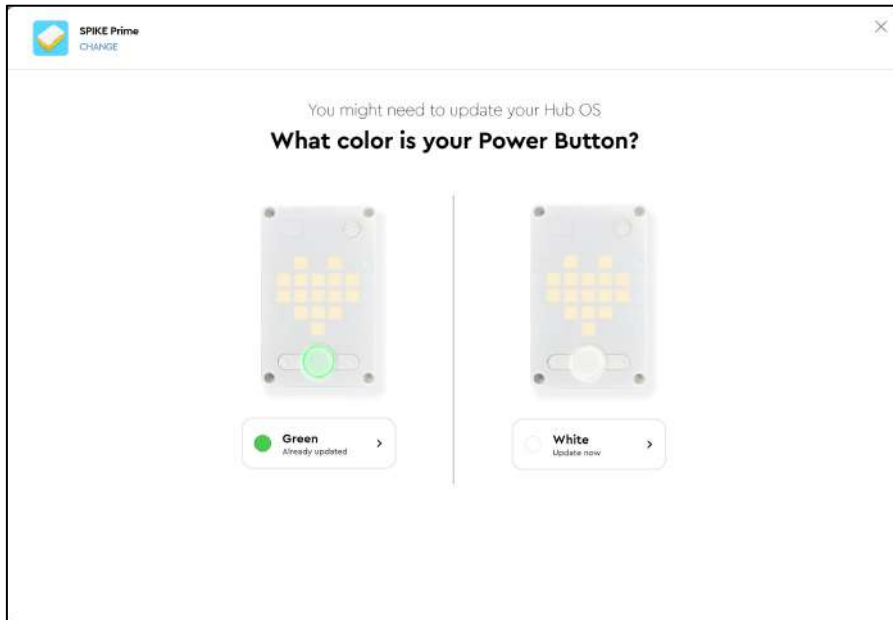


C. 程式編寫指南（藍牙遙控傳送器）

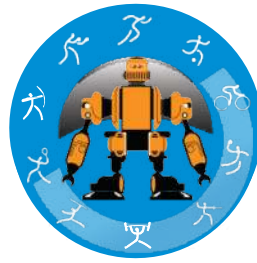


3. 下載應用程式

3.6 SPIKE 主機以藍牙連線。（若程序要求更新 SPIKE 主機，請按其程序完成更新步驟後重新以藍牙連線。）

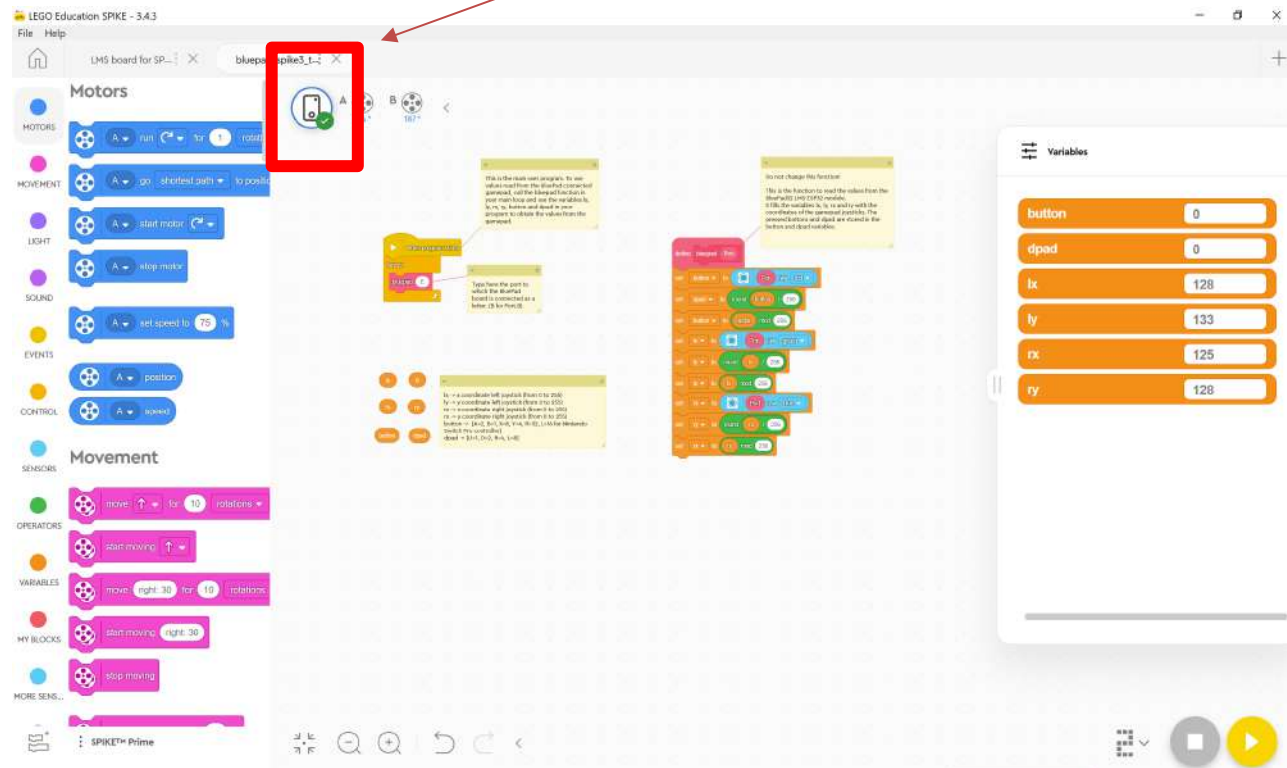


C. 程式編寫指南（藍牙遙控傳送器）

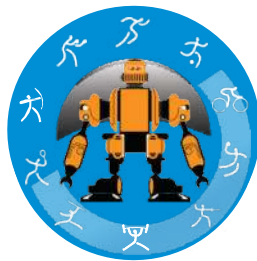


3. 下載應用程式

綠燈表示連接成功



C. 程式編寫指南（藍牙遙控傳送器）



3. 下載應用程式

3.7 先斷開電腦與藍牙遙控傳送器的 TYPE C 數據線，然後把藍牙遙控傳送器連接到 SPIKE 主機的 PORT B。

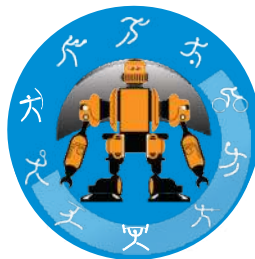


連接 PORT B

藍牙遙控傳送器連接成功

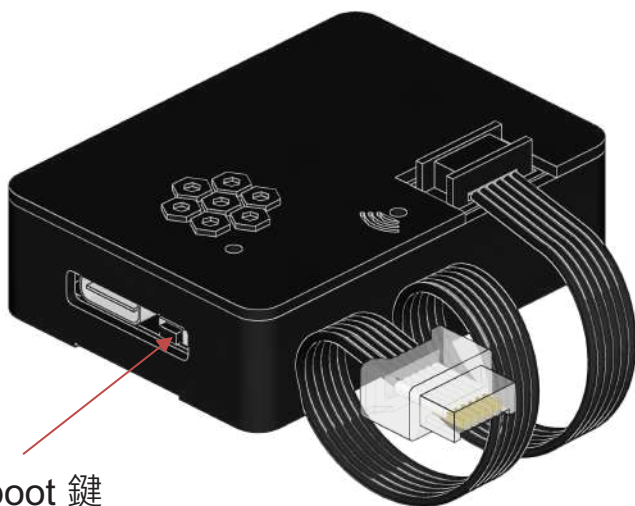


C. 程式編寫指南（藍牙遙控傳送器）



3. 下載應用程式

3.8 若 SPIKE 程序未有顯示藍牙遙控傳送器連接成功的圖標，請按下藍牙遙控傳送器的 reboot 鍵然後放開，等待 5 秒後若仍未顯示則重覆此步驟或檢查連接線。

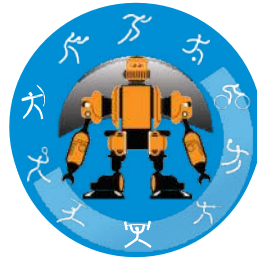


Reboot 鍵

藍牙遙控傳送器連接成功



C. 程式編寫指南（藍牙遙控傳送器）



4. 藍牙連接藍牙遙控傳送器到遙控手掣

4.1 因藍牙遙控傳送器連接到 SPIKE 主機的 PORT B，所以把程序內此位置改成 B。

LEGO Education SPIKE - 3.4.3

File Help

bluepad_spike3_t... X

Motors

- MOTORS: A run for 1 rotations
- MOVEMENT: A go shortest path to position
- LIGHT: A start motor
- LIGHT: A stop motor
- SOUND: A set speed to 75 %
- EVENTS: A position
- CONTROL: A speed

Movement

- OPERATORS: move for 10 rotations
- OPERATORS: start moving

when program starts

forever

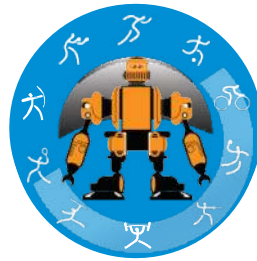
bluepad B

This is the main user program. To get values read from the bluepad connected gamepad, call the bluepad function in your main loop and assign variables lx, ly, rx, ry button assigned in your program to obtain the values from the gamepad.

Type here the port to which the bluepad board is connected as a letter, B for Port B

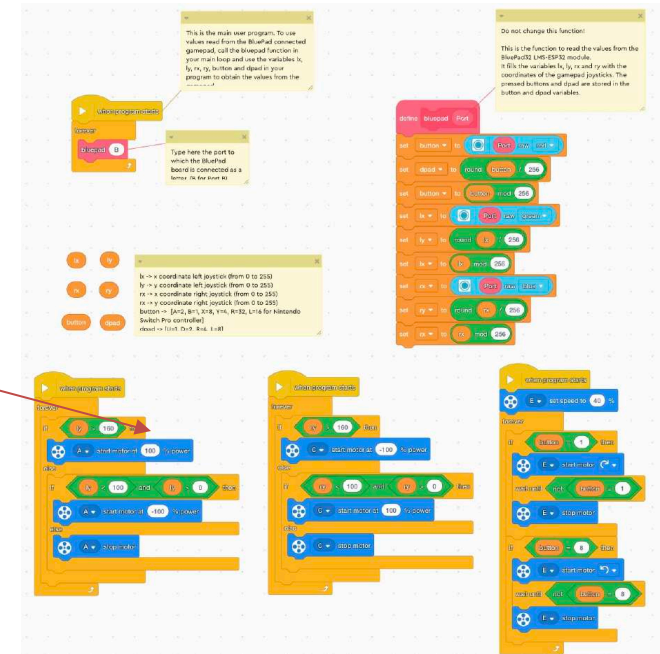
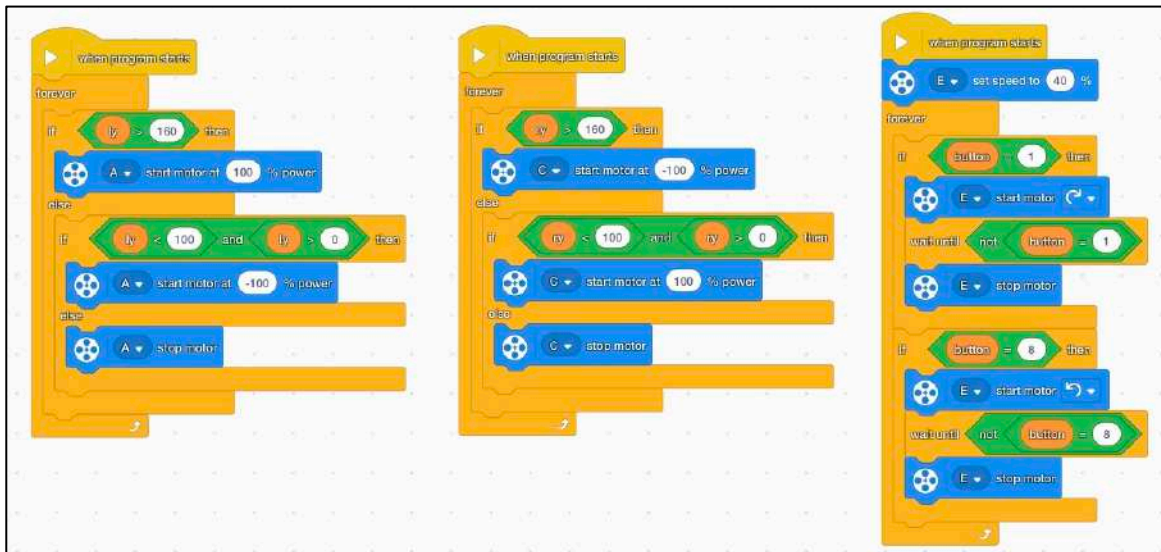
lx -> x coordinate left joystick (from 0 to 255)
ly -> y coordinate left joystick (from 0 to 255)
rx -> x coordinate right joystick (from 0 to 255)
ry -> y coordinate right joystick (from 0 to 255)
button -> {A=1, B=2, X=3, Y=4, B=5, L=6 for Nintendo Switch Pro controller}
dpad -> {U=1, D=2, R=4, L=8}

C. 程式編寫指南 (藍牙遙控傳送器)

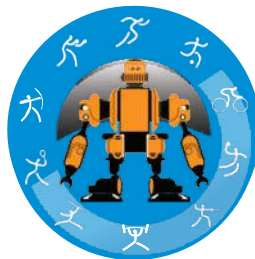


4. 藍牙連接藍牙遙控傳送器到遙控手掣

4.2 自行編寫以下的內容加到控制程序內。



C. 程式編寫指南（藍牙遙控傳送器）



4. 藍牙連接藍牙遙控傳送器到遙控手掣

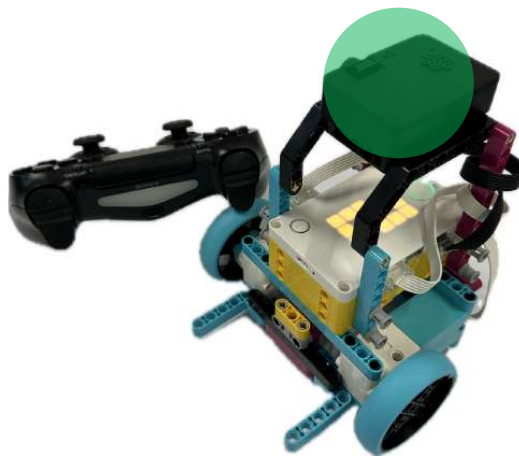
- 4.3 在遙控手掣上先按住 **SHARE** 按鈕，一秒後同時按住 **PS** 按鈕，直到手掣的光條開始閃爍（重覆的連續 2 下閃爍），當遙控手掣亮藍燈，而藍牙遙控傳送器亦由綠燈轉成藍燈，代表連接成功。

SHARE

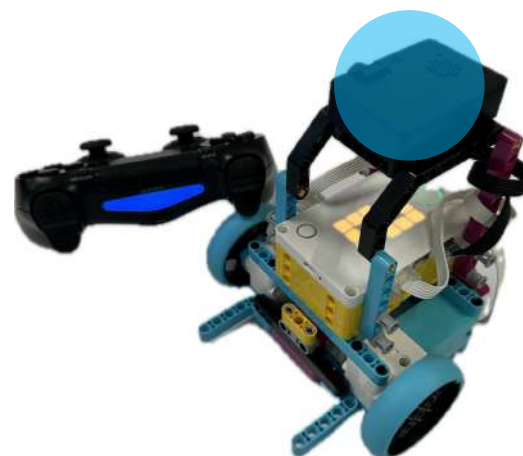


PS

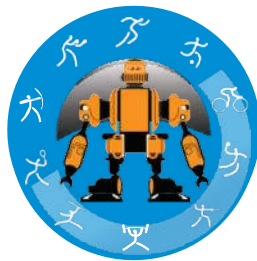
綠燈（未連接）



藍燈（成功連接）

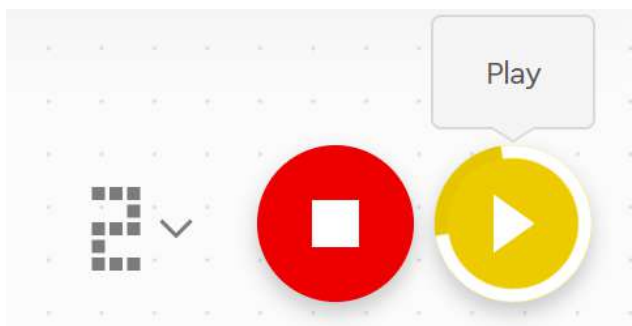


C. 程式編寫指南（藍牙遙控傳送器）



4. 藍牙連接藍牙遙控傳送器到遙控手掣

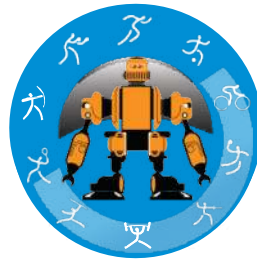
4.4 按下 SPIKE 程式的 PLAY 執执行程序，操作遙控手掣的搖桿即可控制機械人移動。



左邊搖桿

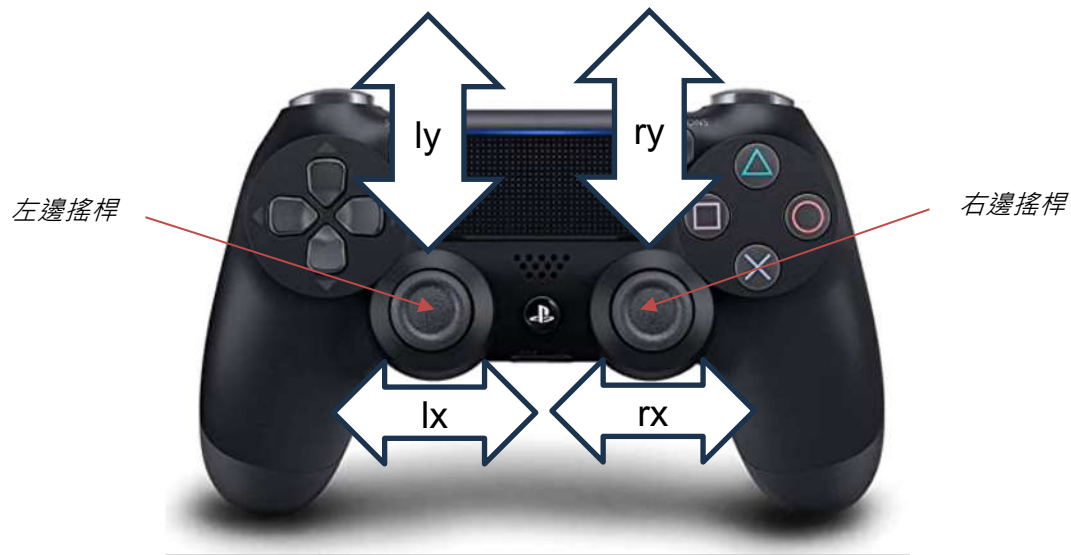
右邊搖桿

C. 程式編寫指南（藍牙遙控傳送器）



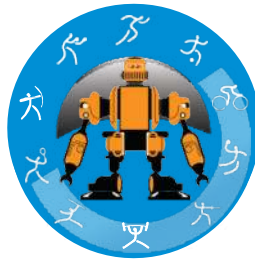
5. 其他資料

5.1 lx 和 rx 由左至右顯示的數值是由 1 到 256 · ly 和 ry 由上至下顯示的數值也是由 1 到 256 。



Variables	
button	0
dpad	0
lx	129
ly	127
rx	130
ry	128

C. 程式編寫指南（藍牙遙控傳送器）



5. 其他資料

5.2 Button 與 Dpad 上的鍵被按下時的對應數值會如下圖顯示。

5.3 只要 SPIKE 主機內有遙控程序，可在與電腦在斷開連接的狀態下執行程式去操作機械人。

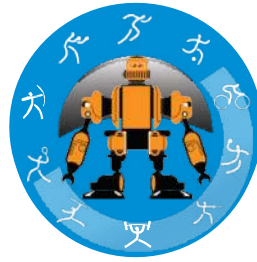
5.4 一旦 SPIKE 主機或藍牙遙控傳送器被重啟，遙控手掣就需要重新連接。

5.5 若需要同時連接多對遙控手掣及藍牙遙控傳送器時，必需分開不同時間連接。



Variables	
button	0
dpad	0
lx	129
ly	127
rx	130
ry	128

C. 程式編寫指南 (藍牙遙控傳送器)



5. 其他資料



Variables	
button	0
dpad	0
lx	129
ly	127
rx	130
ry	128