

INDUSTRY ROBOTICS

第四單元 機器人動起來(一) 電風扇製作

機器人 X 程式設計

學習目標

1. 認識日常科技產品的基本運作概念
2. 依據特定步驟製作風扇機構
3. 程式設計工具的基本應用
4. 運用序列化指令完成任務



4.
INDUSTRY

A teal robotic arm with three joints, each featuring a gear icon, is positioned on the left side of the slide. The background is dark blue with faint, larger gear patterns. The arm's end effector is a gripper holding a white gear.

在這單元我們將學到：

- ◆ 能搭建風扇機構
- ◆ 能知道動力與結構的關係
- ◆ 能使風扇執行轉動功能

4.
INDUSTRY

活動一 小小電風扇

想想看：

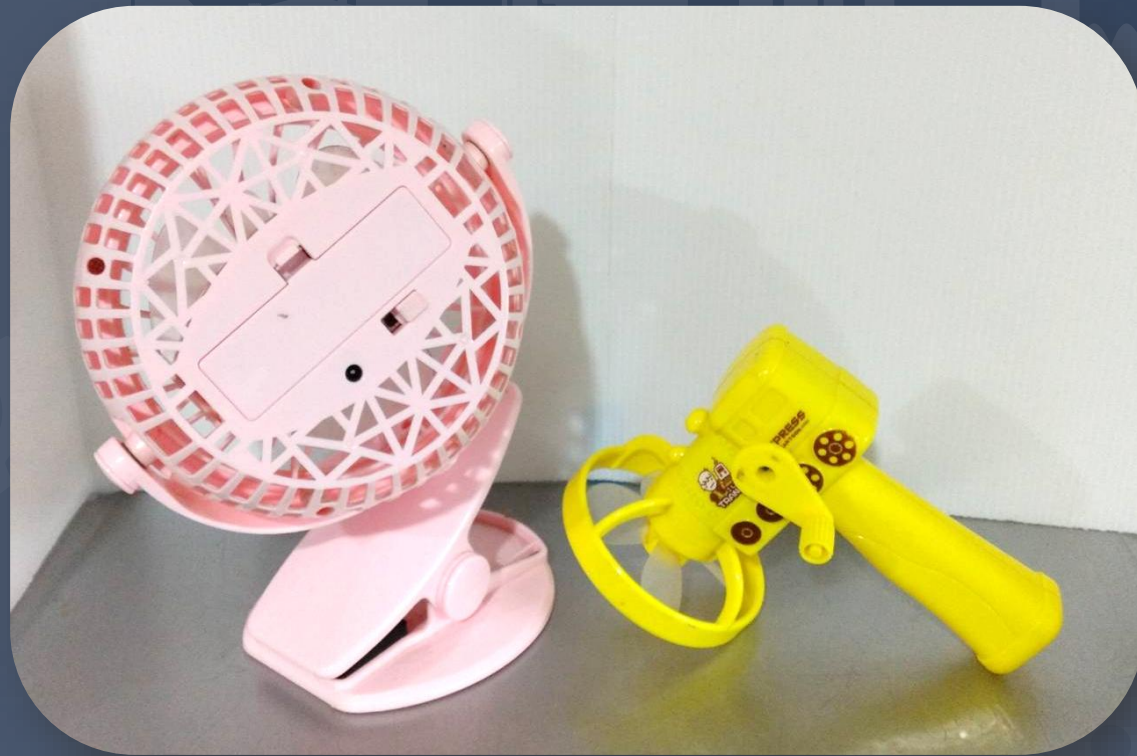
手搖風扇和電風扇有什麼不一樣

手搖風扇：

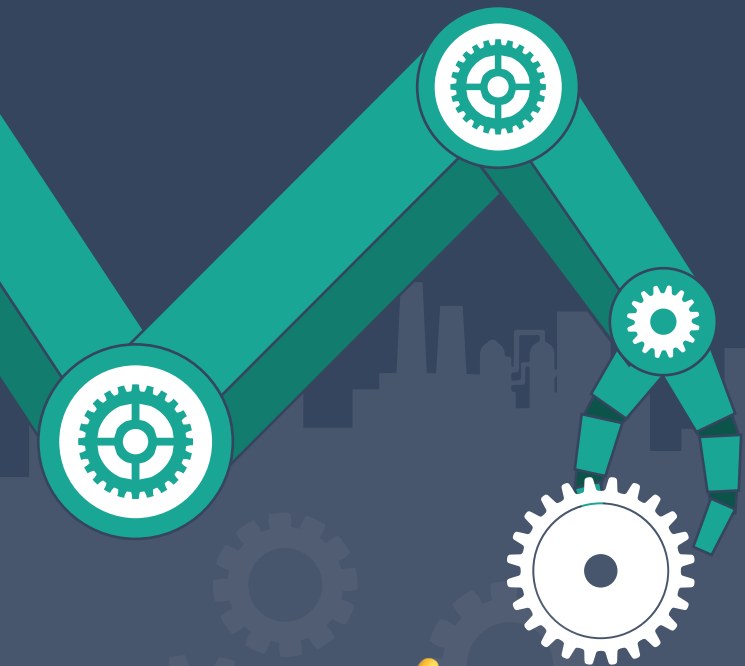
- ✓ 搖久手很痠
- ✓ 不能固定風量

電風扇：

- ✓ 節省人力
- ✓ 風量可以固定，不會忽大忽小



活動一 小小電風扇



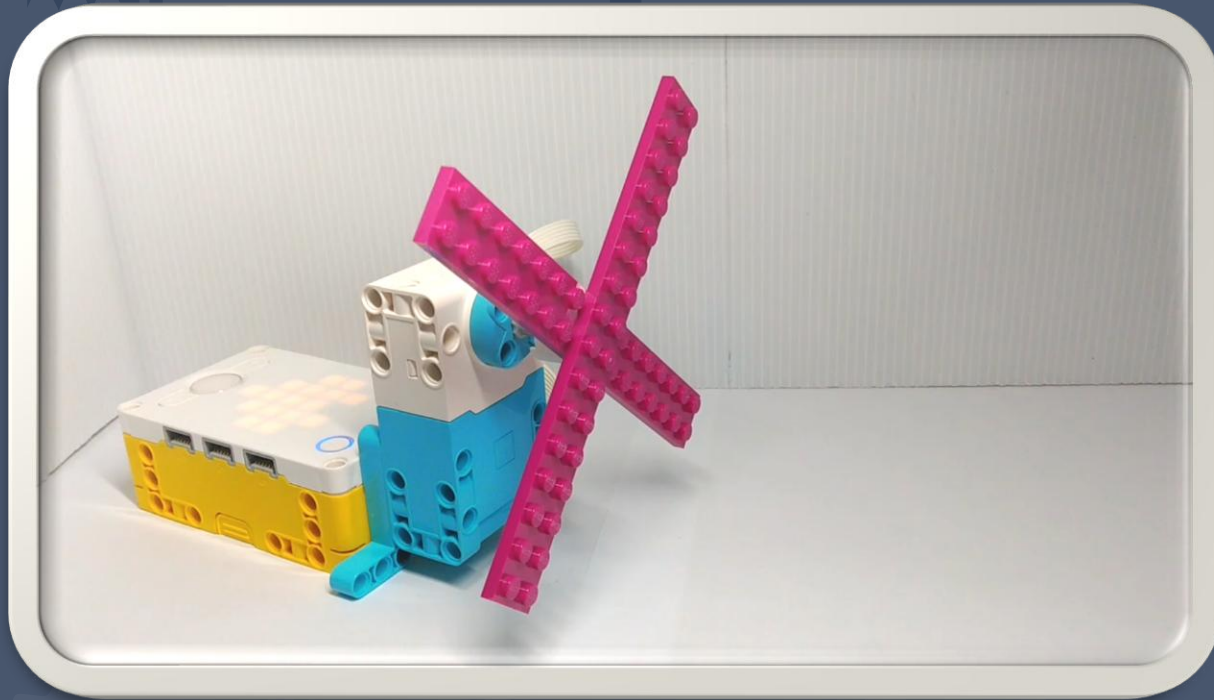
請觀察 🖐️

- 電風扇是如何轉動的？
 - ✓ 有馬達帶動風扇轉動
 - ✓ 馬達需要電力驅動
 - ✓ 電力透過電線連接插座，或是裝上電池給電。



組立時間。

製作一個簡易小風扇



觀看範例

引導學生觀察風扇如何改變速度



今天加上馬達與電池
一起來製作「電」風扇



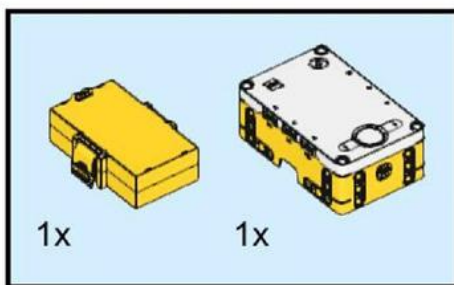
中華機器人科技教育學會

Chinese Association for Robot and Educational Technology

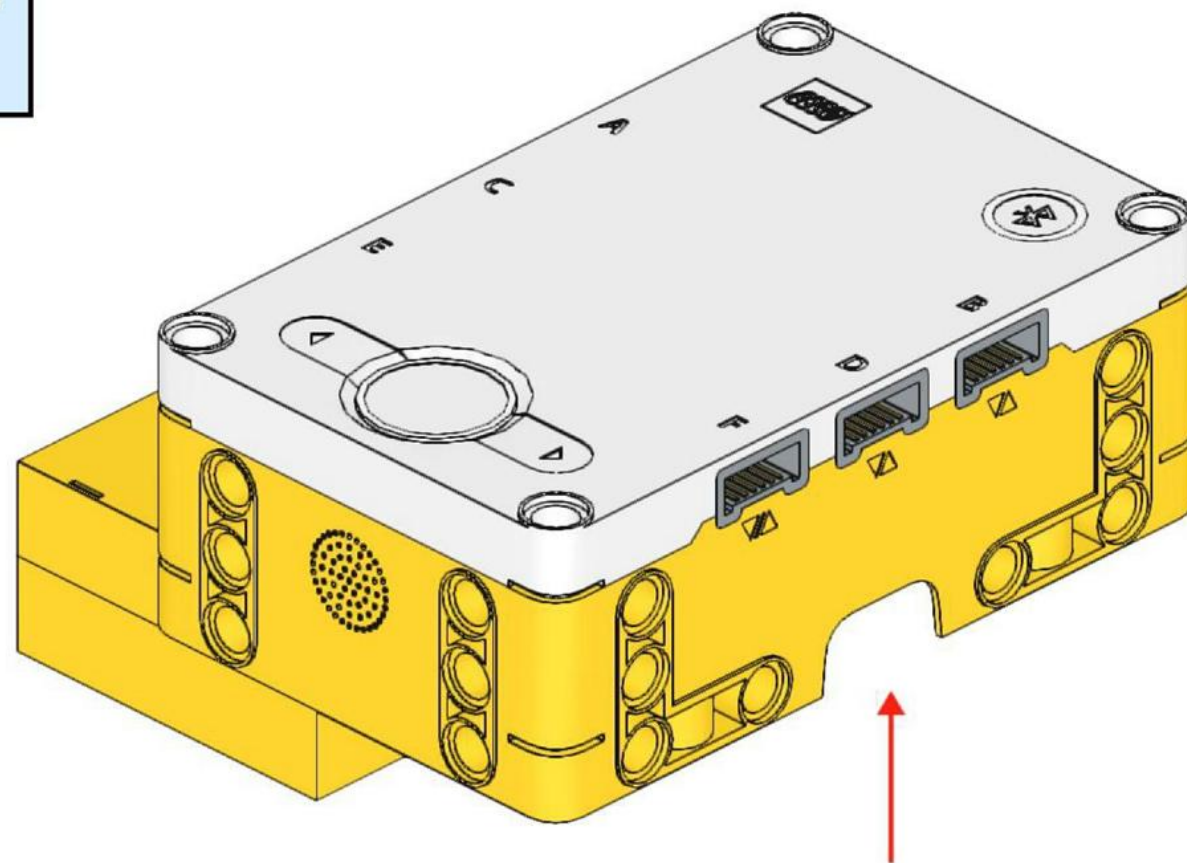


SPIKE

小小電風扇

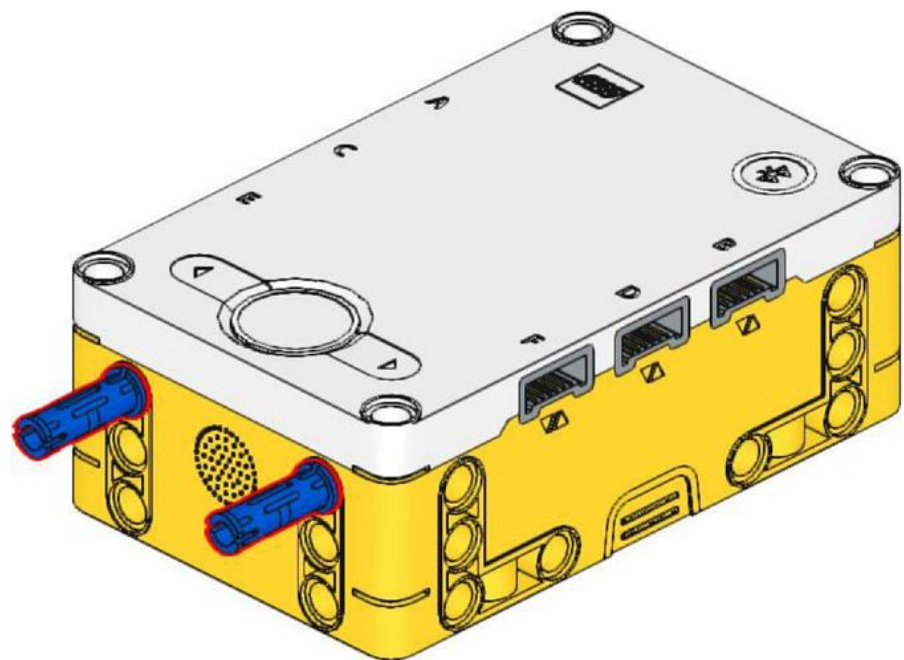


1



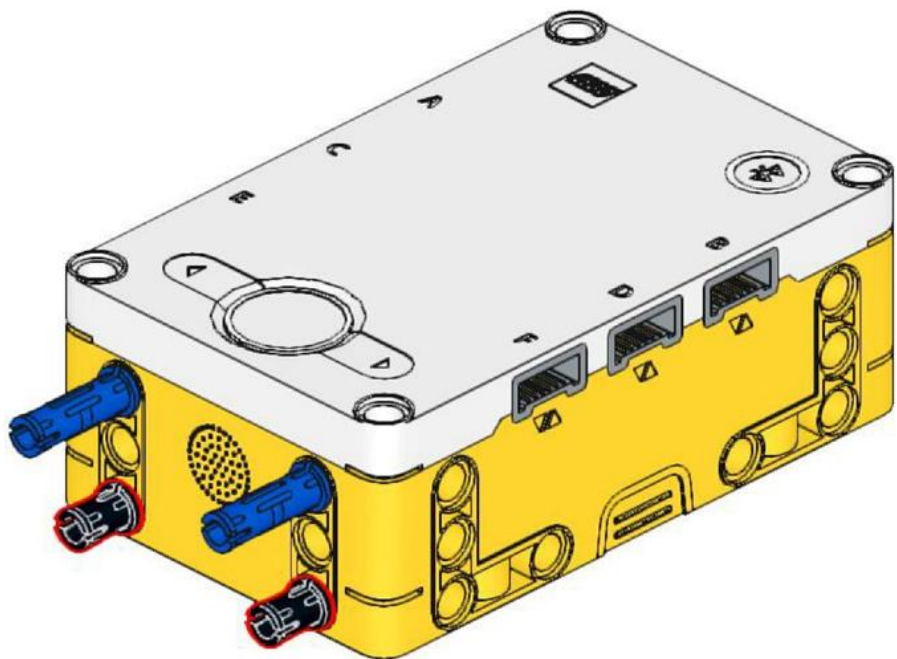


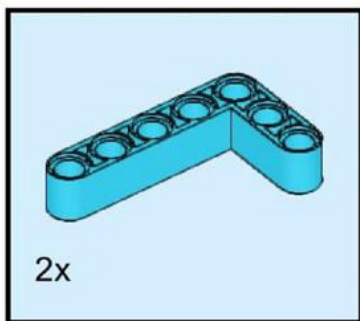
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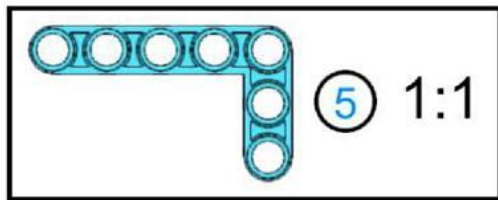
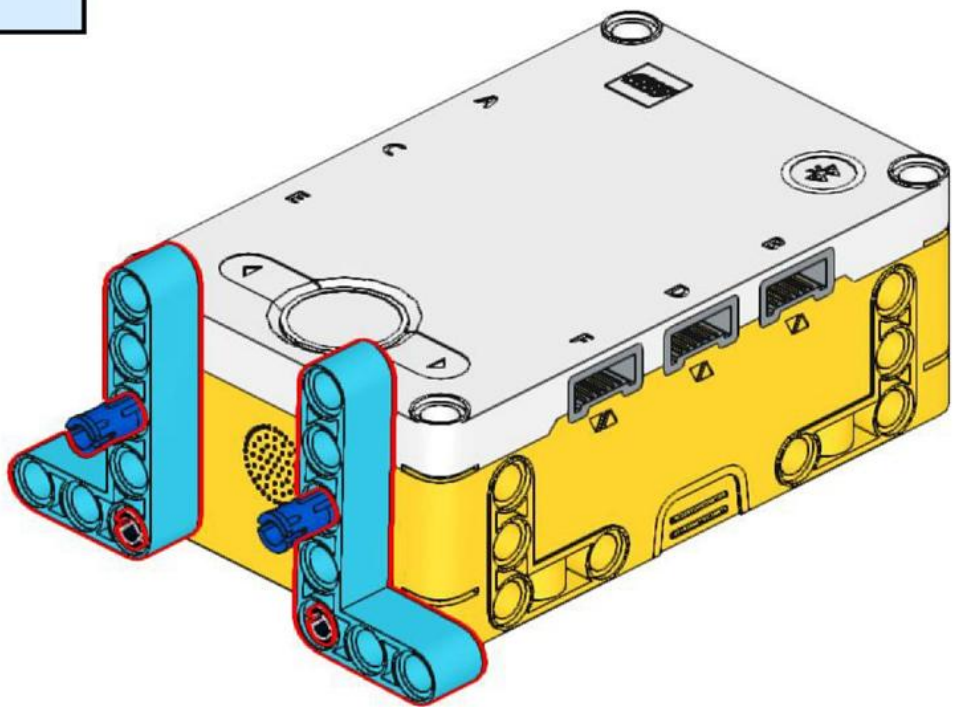


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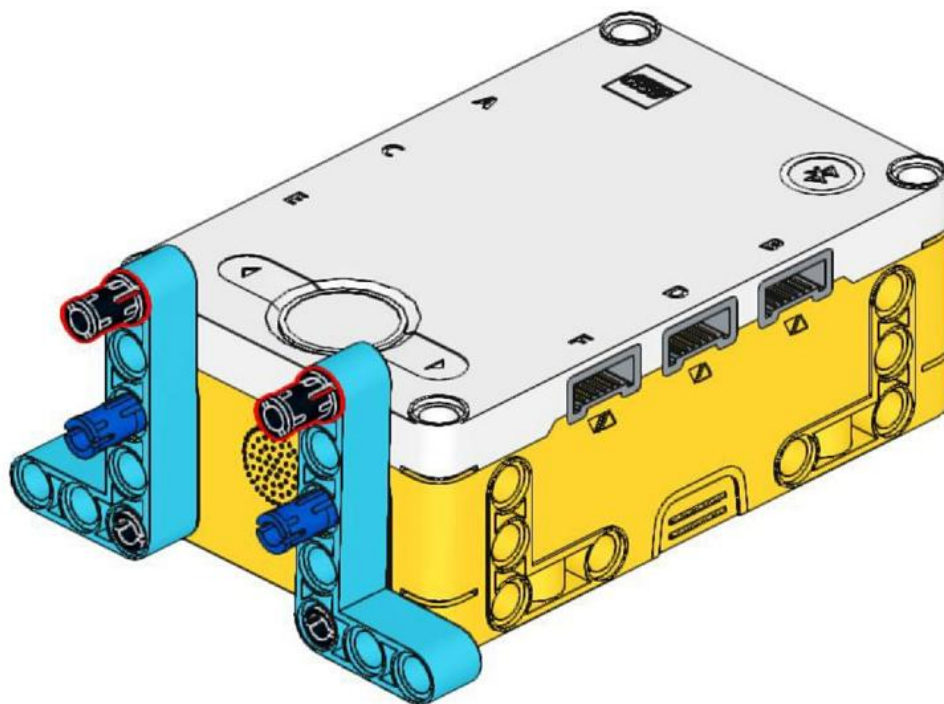


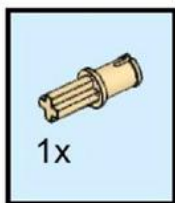
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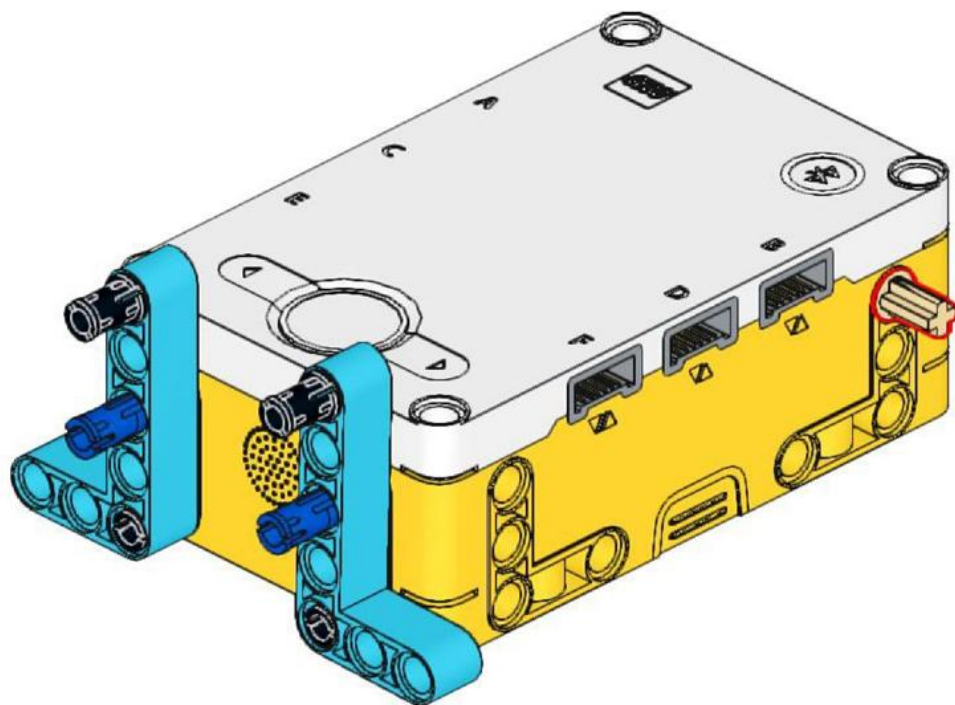


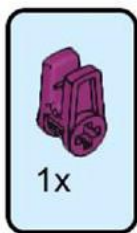
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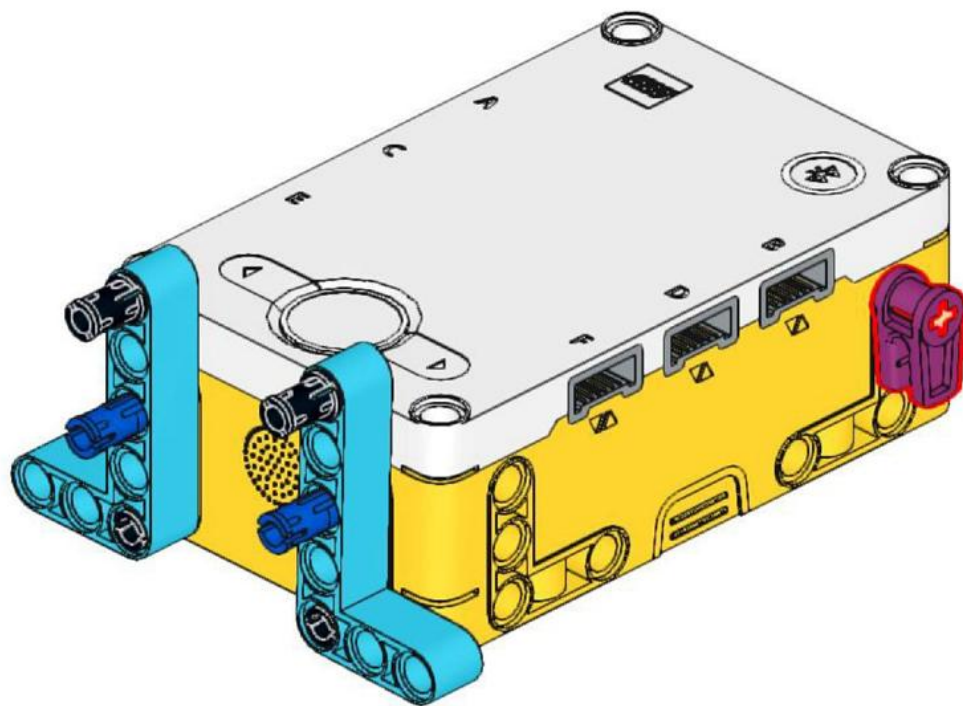


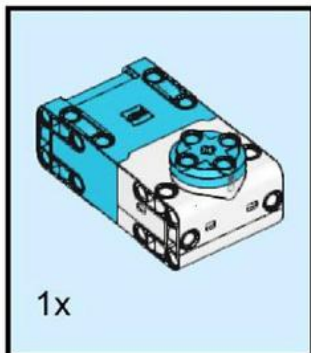
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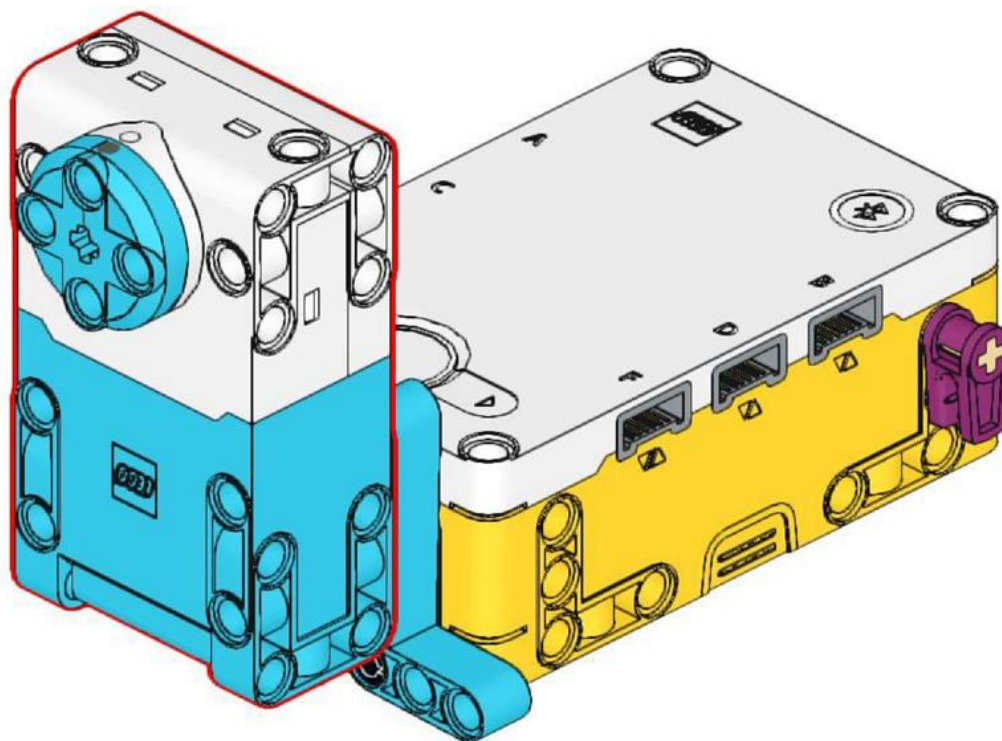


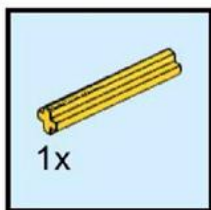
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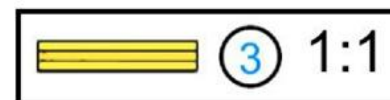
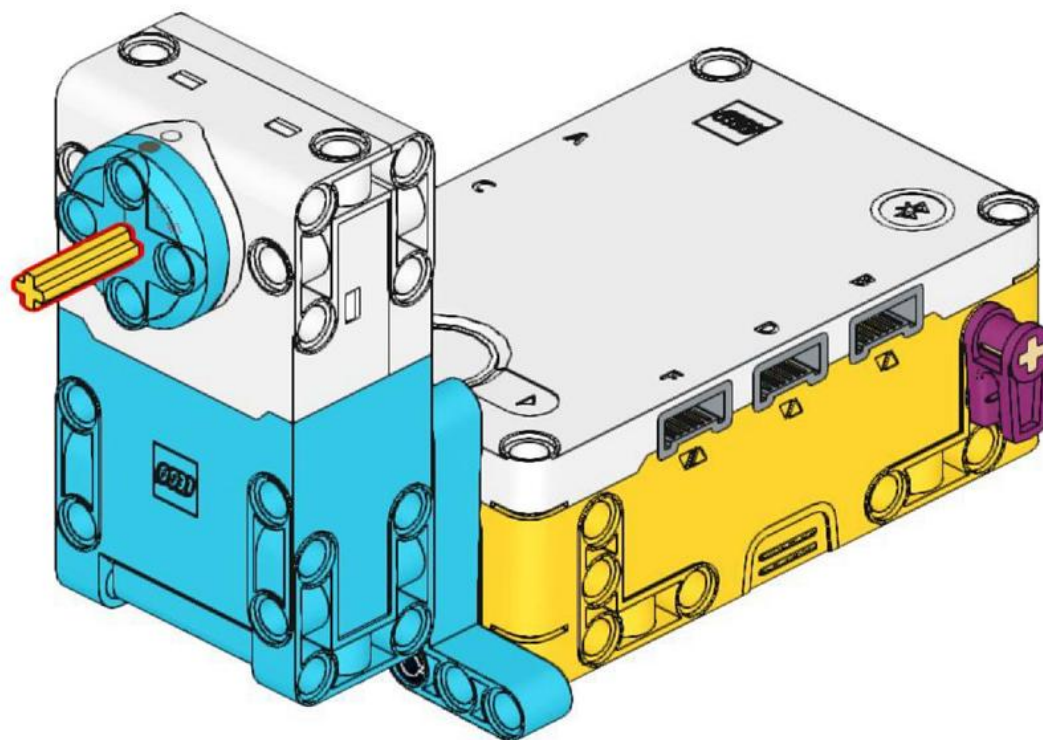


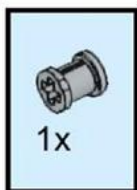
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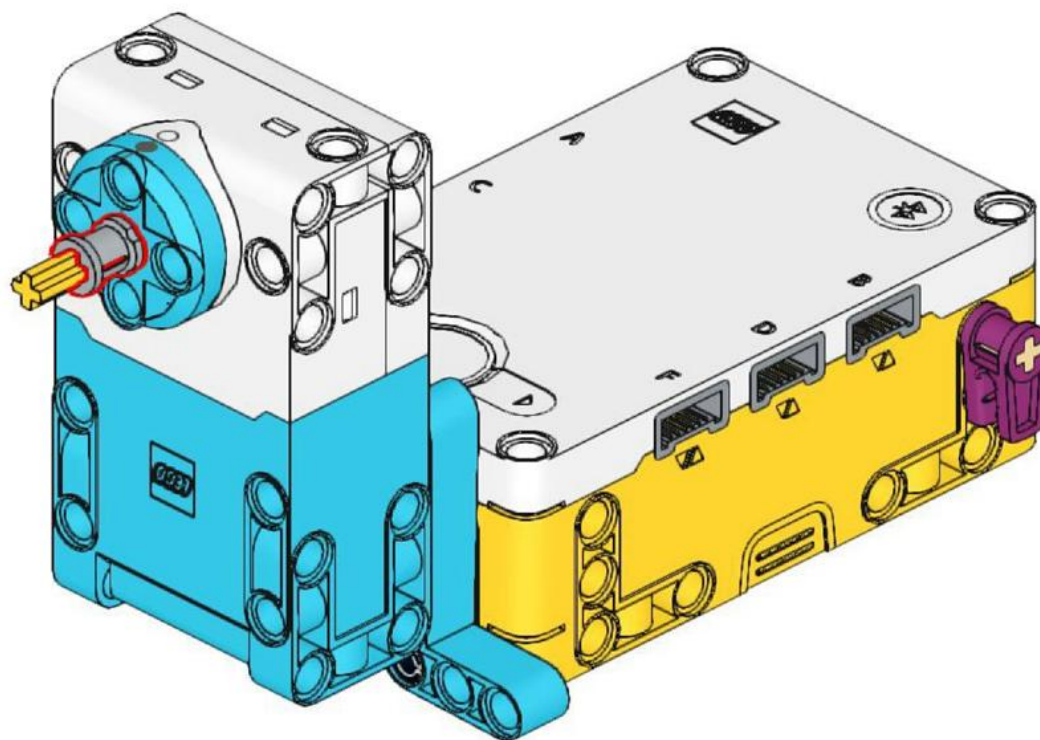


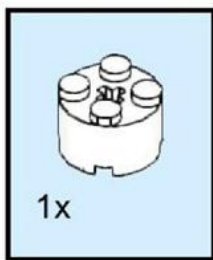
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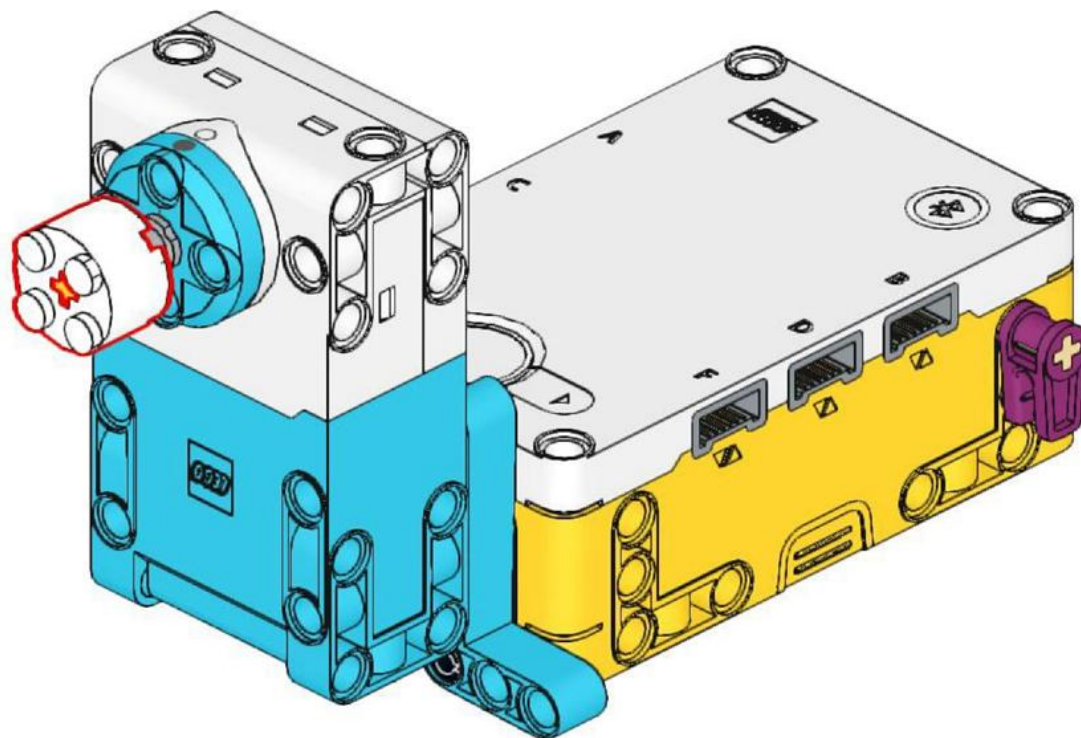


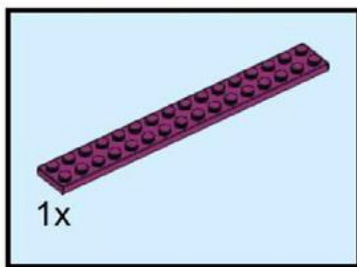
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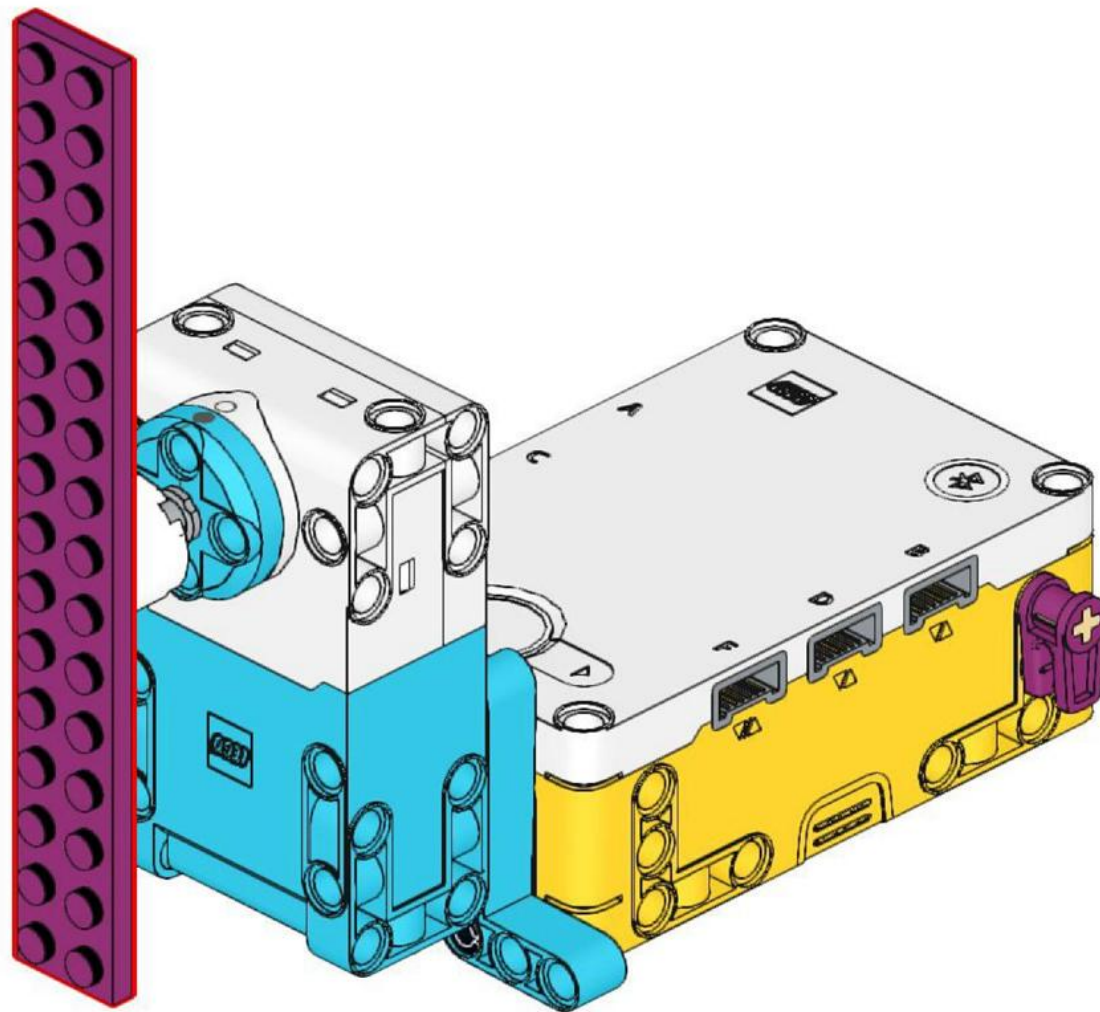


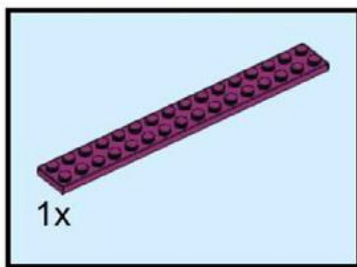
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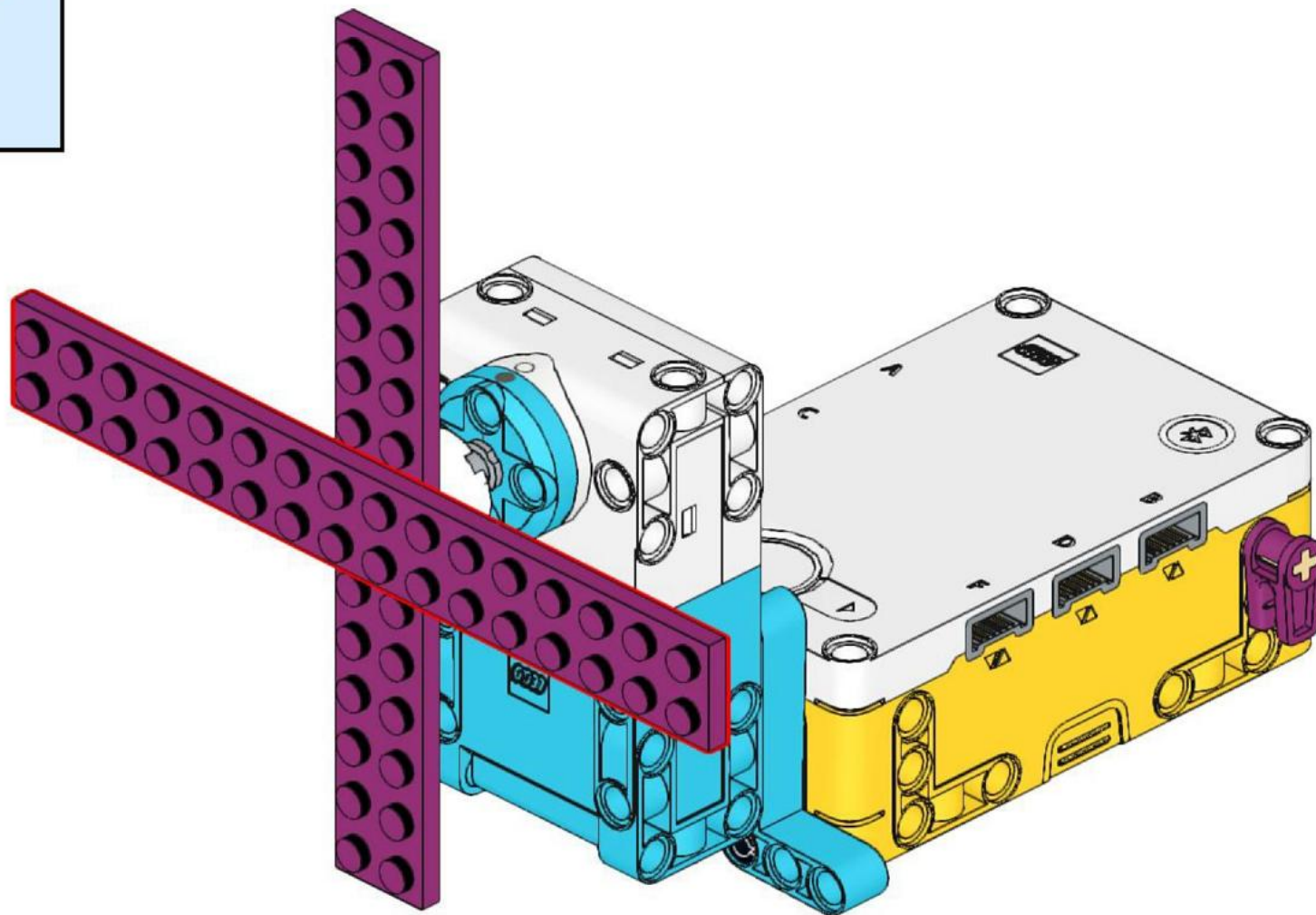


12





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動力與結構的關係

實驗時間.

分別用兩種零件(黃色十字軸 / 黑色十字插鞘)

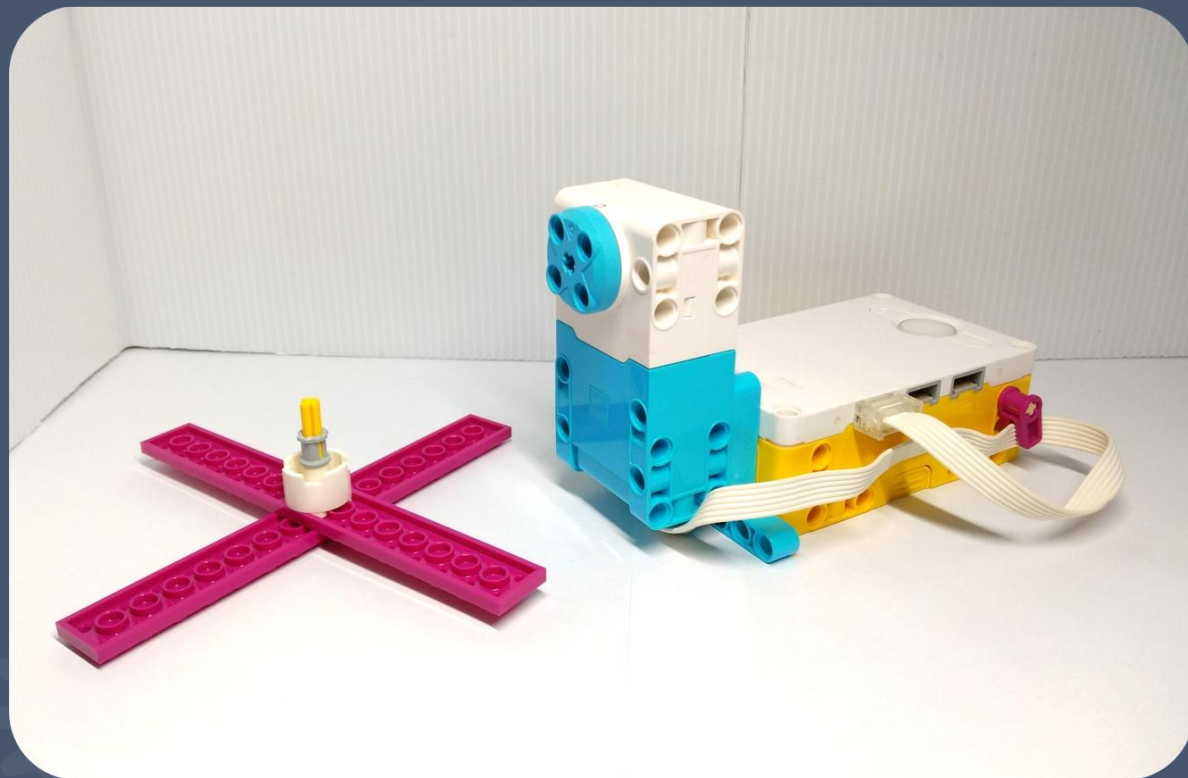
作為風扇軸心用手轉動

觀察有什麼不一樣？

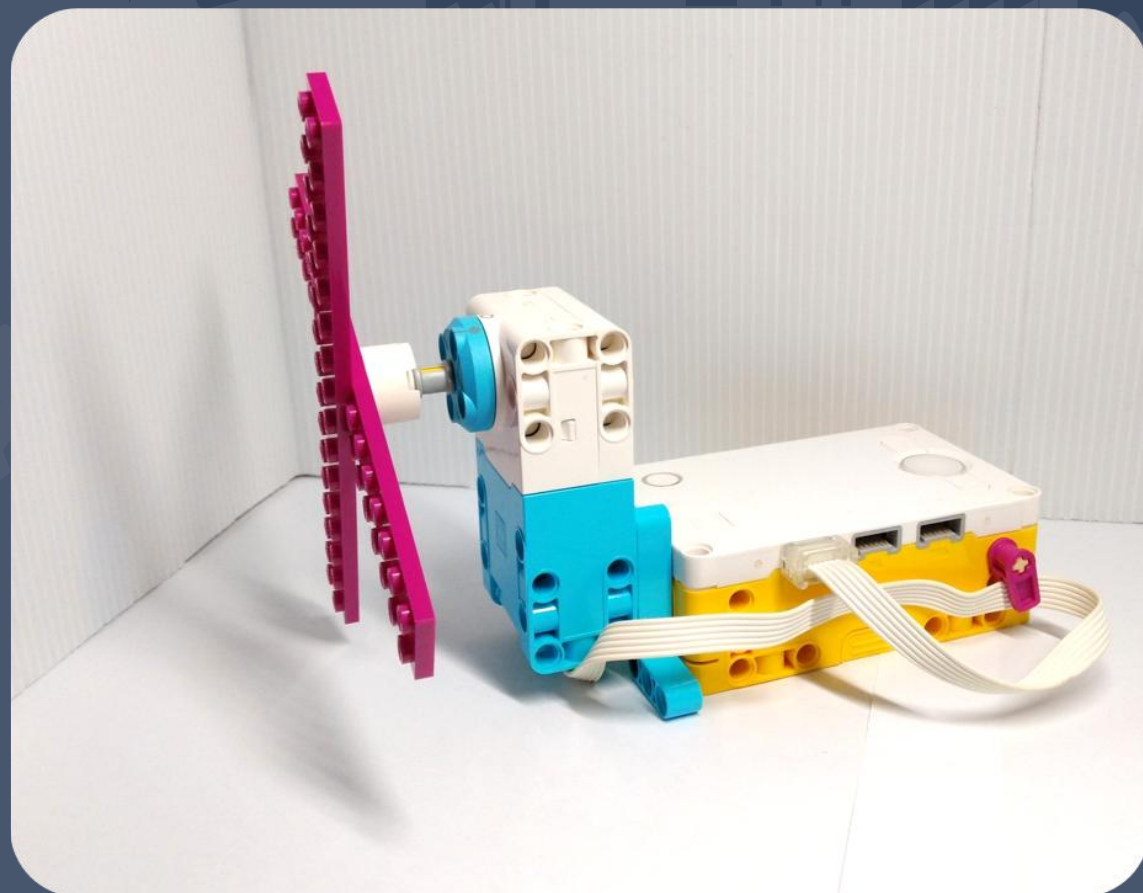


組立時間.

完成簡易小風扇



07

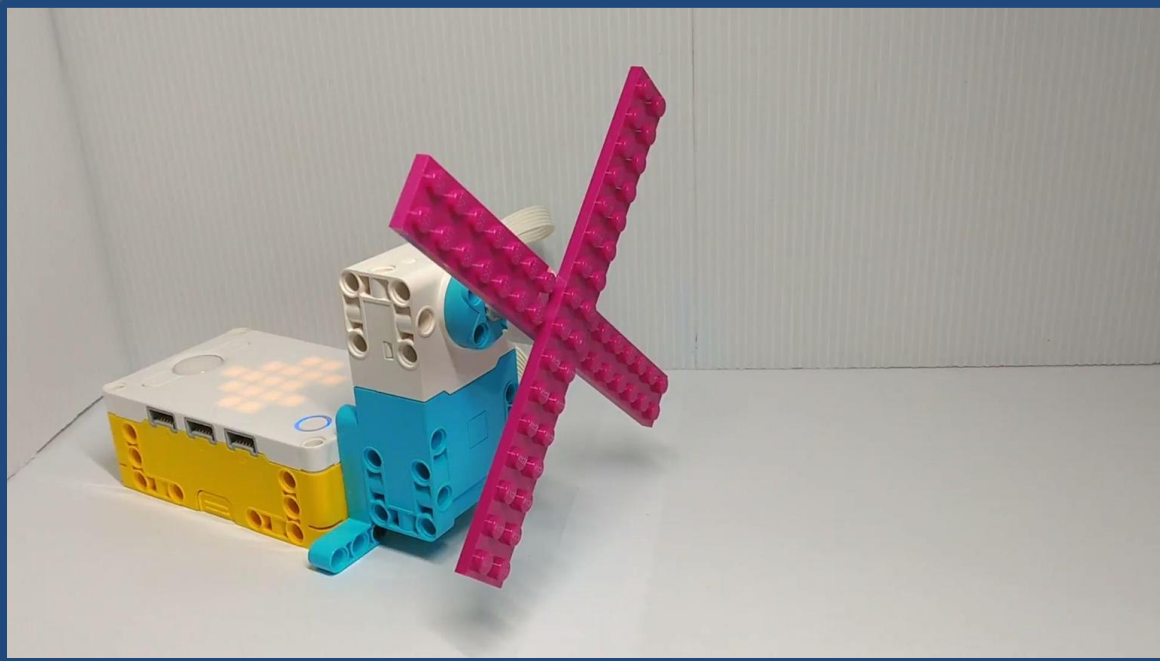


08

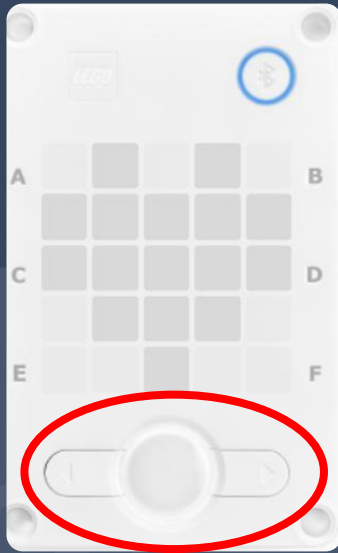
機電控制-愛心模式

透過主機按鈕啟動風扇

觀看操作方式



1. 按中間鍵選擇愛心模式
2. 按左鍵馬達左轉；右鍵右轉
3. 當馬達正在轉動時，按左 / 右鍵
改變轉速，每按一下+或-10%功率。



撰寫程式控制

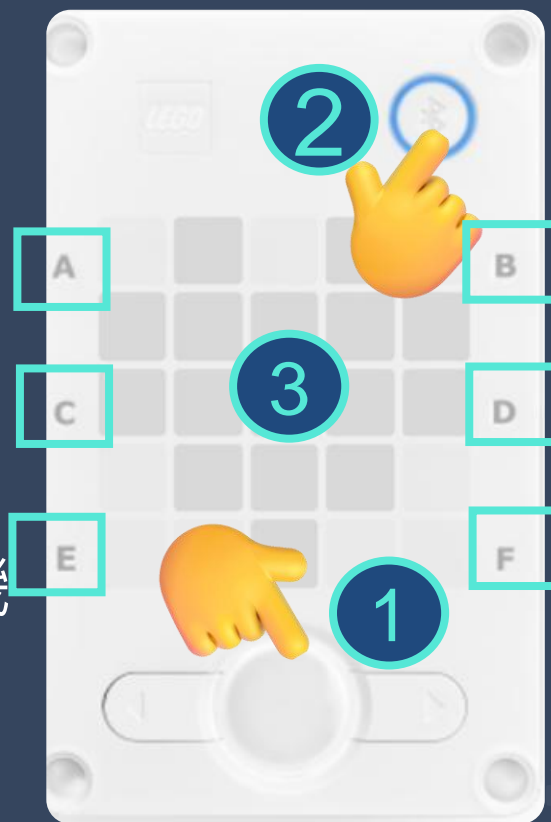
設備連線

- USB傳輸線：筆電 / 桌機



- 藍芽連線：平板、筆電 / 桌機
(桌機需加裝藍芽設備)

主機介紹

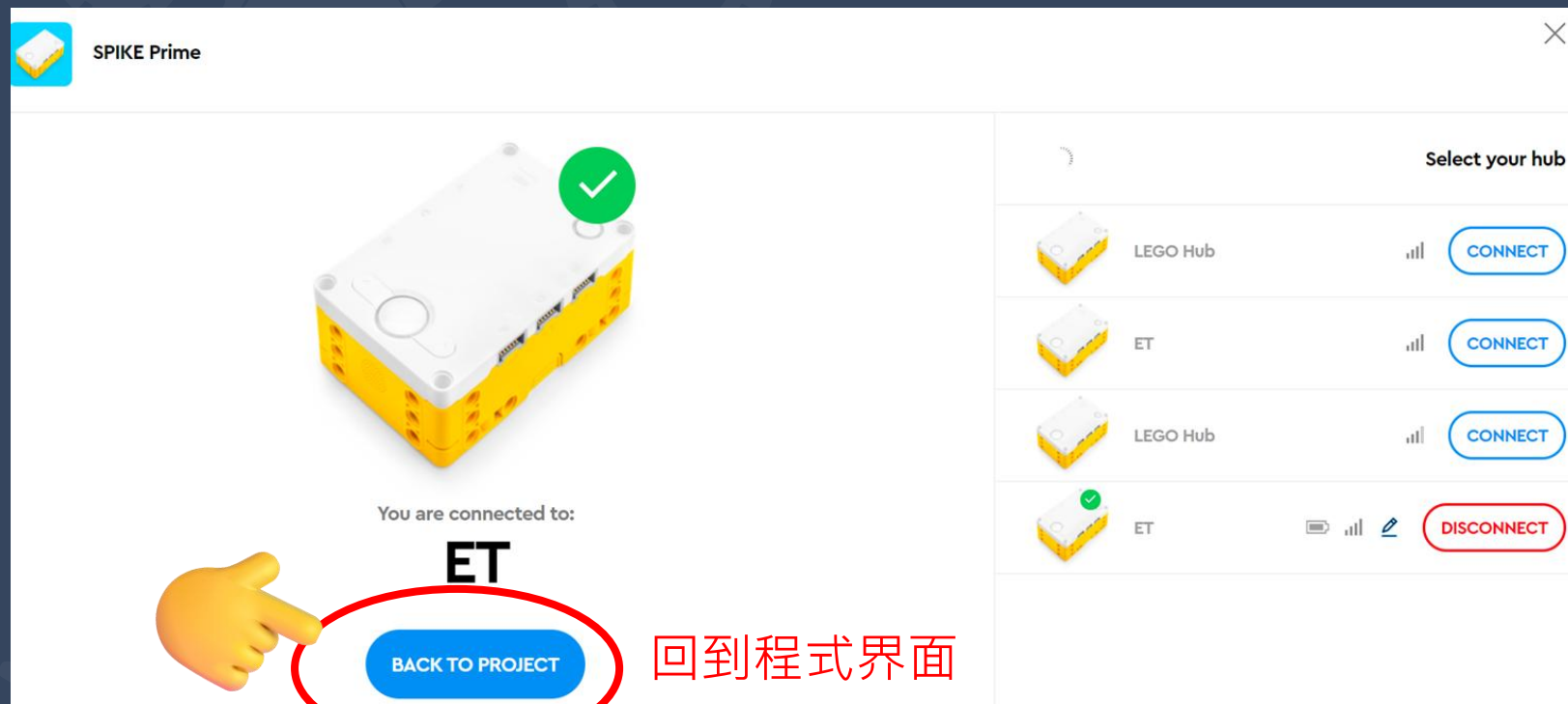


- ① 長按開關機
短按程式執行 / 停止
 - ② 藍芽連線按鈕
配對成功後
亮藍圈
 - ③ 程式選項(愛心、0-19)
可存取20筆程式
- A-F輸出/入端
□

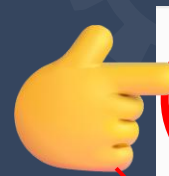
撰寫程式控制

主機與設備連線

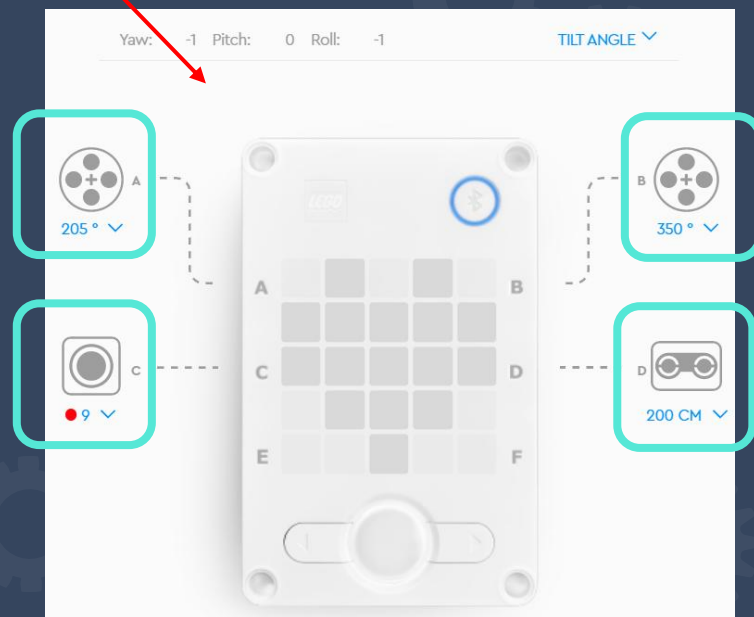
? USB連線



回到程式界面



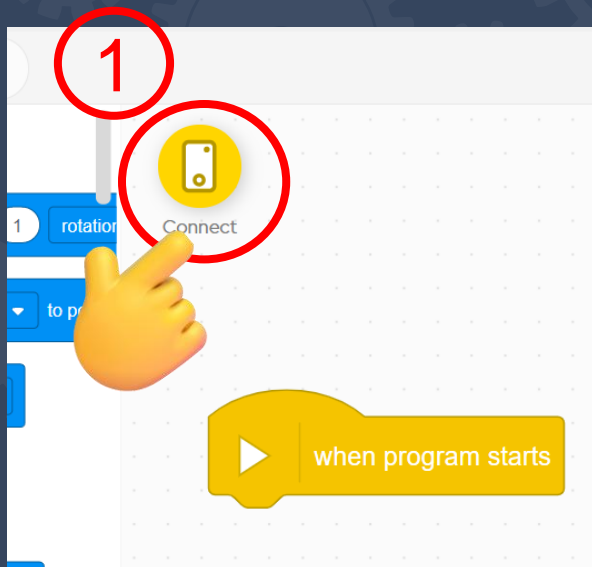
主機端口接上其它馬達或感應器時會顯示其狀態



撰寫程式控制

主機與設備連線

藍芽連線



撰寫程式控制

The image displays the LEGO Education SPIKE 2.0.6 software interface. A yellow hand icon points to the 'MOTORS' category in the left sidebar, which is highlighted with a red box. The main workspace shows a list of motor-related blocks under the 'Motors' heading, including 'run', 'go shortest path to position', 'start motor', and 'stop motor'. Below this, there are blocks for 'set speed to 75 %', 'position', and 'speed'. The 'Movement' category is also visible at the bottom. To the left of the main interface, a custom block is shown with two motor-related functions: 'set speed to 50 %' and 'start motor'.

LEGO Education SPIKE - 2.0.6

File Help

Project 7

Motors

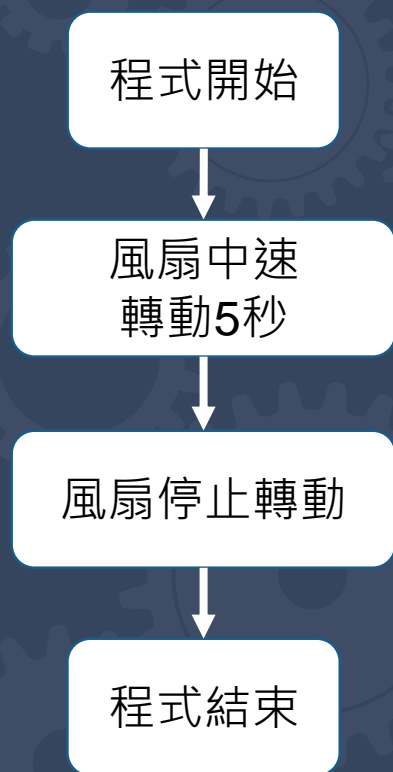
- MOTORS**
- MOVEMENT**
- LIGHT**
- SOUND**
- EVENTS**
- CONTROL**
- SENSORS**
- Movement**
- OPERATORS**
- All Products**

Custom Block:

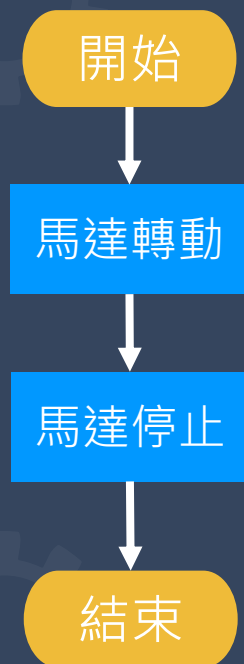
- A set speed to 50 %
- A start motor

撰寫程式控制

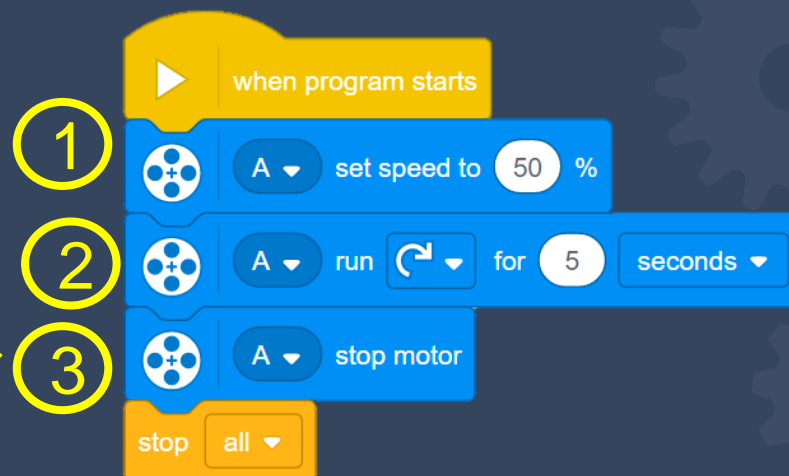
機構動作設計



程式流程圖



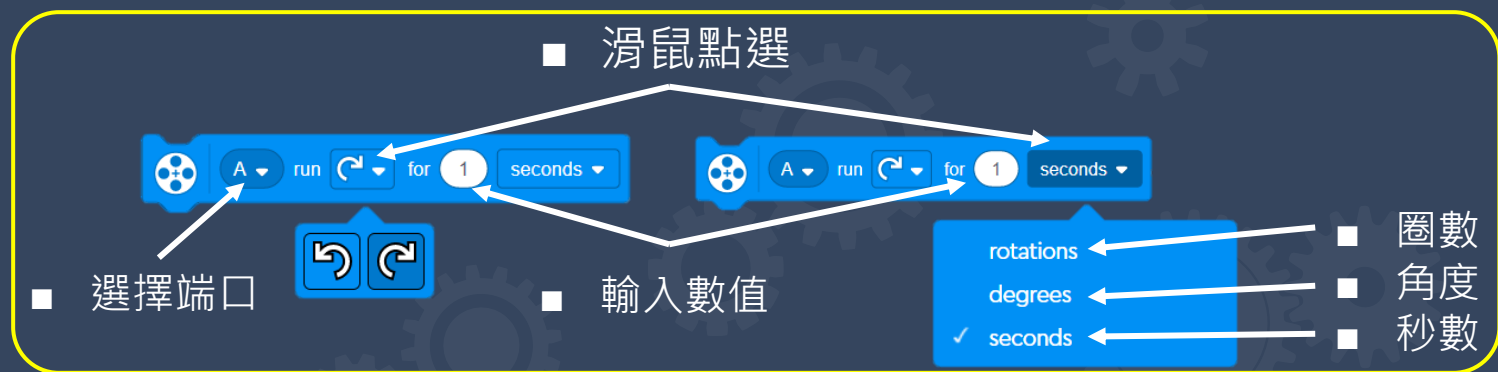
程式寫法



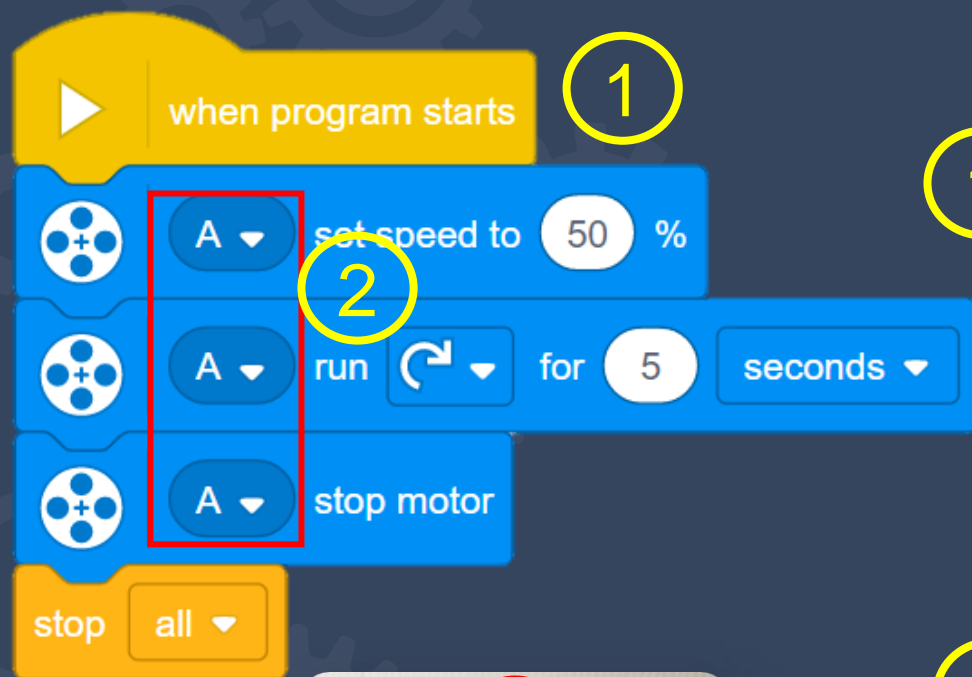
① A端口馬達速度設為50%

② A端口馬達順時針，旋轉5秒

③ A端口馬達停止



學生常見問題

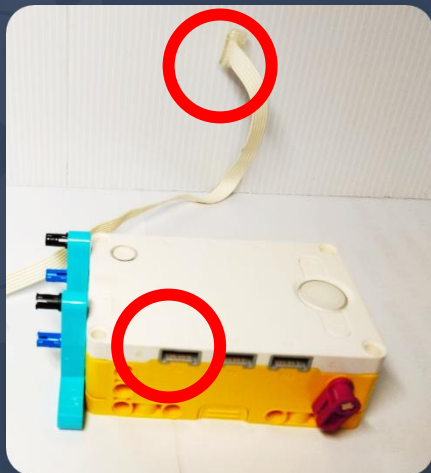


① 速度功率最大表現值為100%，學生會寫出大於100的數值，需特別說明：100%代表「全速」，火力已全開。因此即使填入200%，表現的狀態仍然是100%。

② 數據線實際插入的主機端口，與程式選取的端口不同，機構不作動。

③ 忘記插好端口之數據線，導致機構不作動。

③



活動二 涼涼電風扇



觀察葉片特別的地方

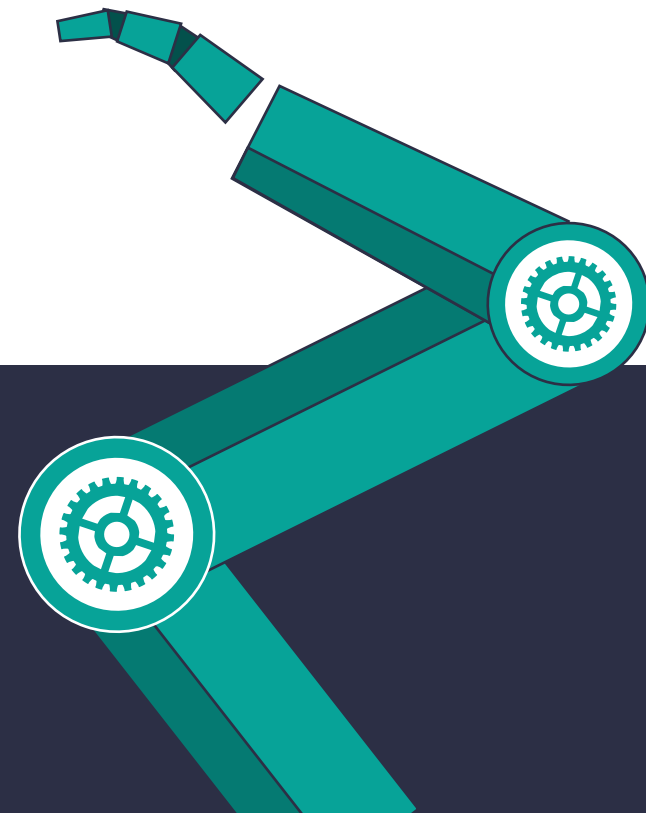
改良風扇葉片

製作一個有涼涼風的電風扇！

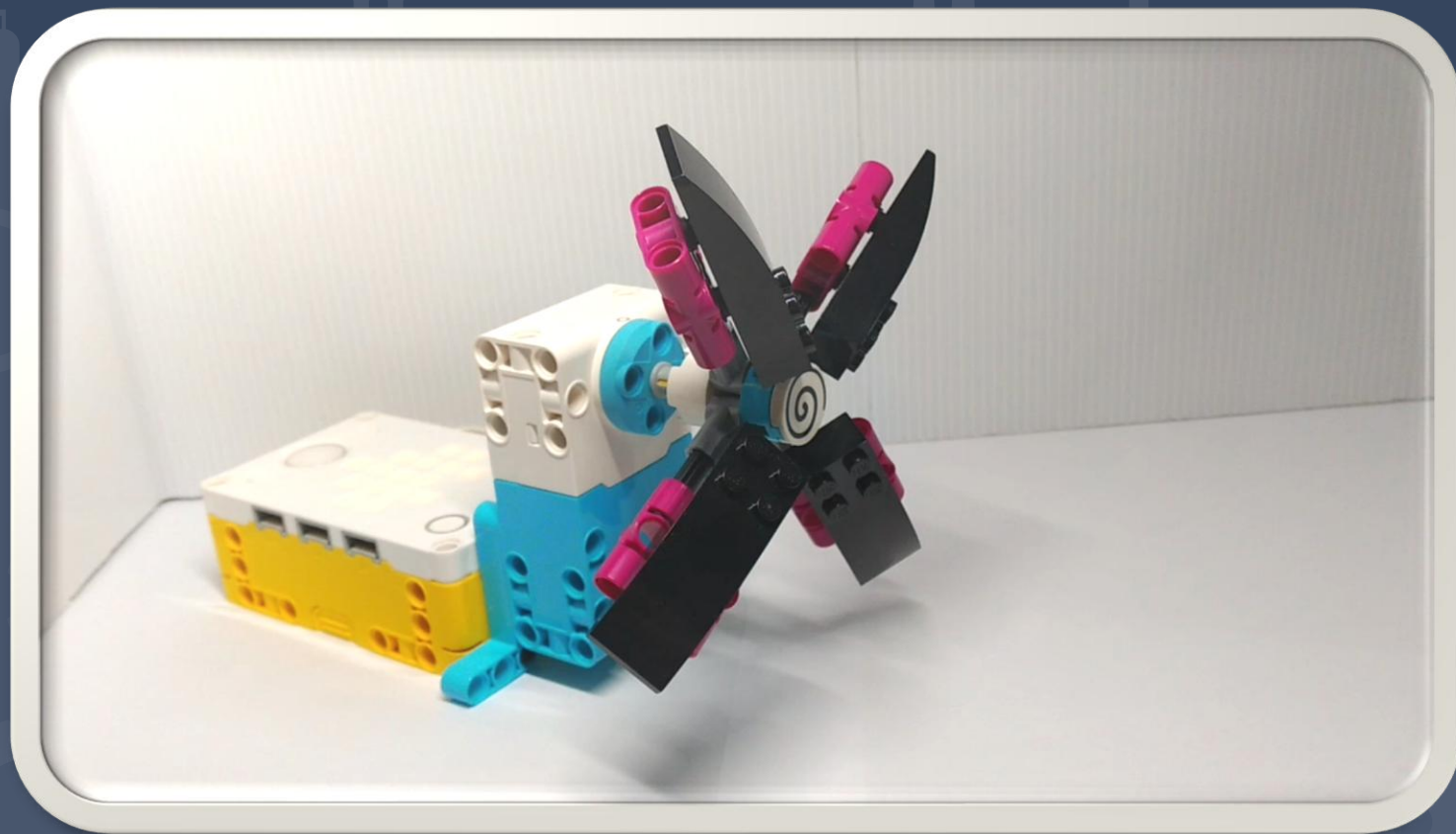
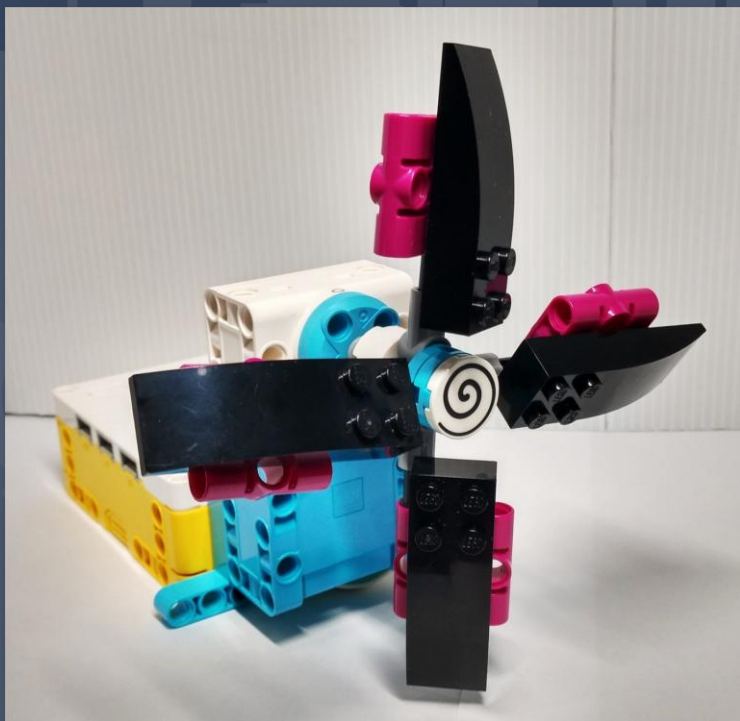
風扇葉片斜角設計原理



葉片的斜角設計，在風扇轉動時能使葉片與空氣產生磨擦，就像我們搧扇子的角度和動作，葉片能推走空氣，我們可以感受到磨擦所產生的「風」。



涼涼風扇參考





中華機器人科技教育學會

Chinese Association for Robot and Educational Technology

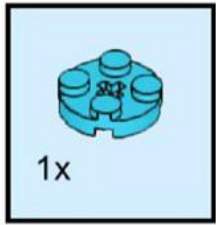


SPIKE

涼涼電風扇



有PDF與圖片檔，依使用之設備選擇查看。

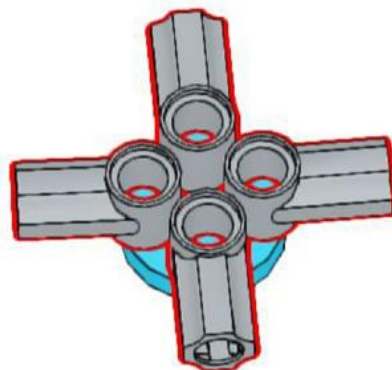


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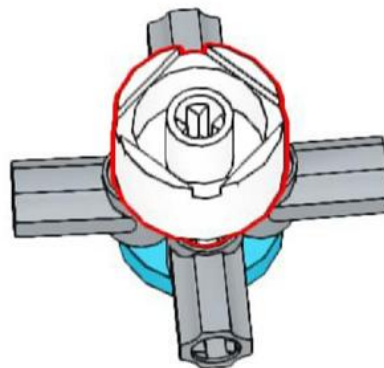
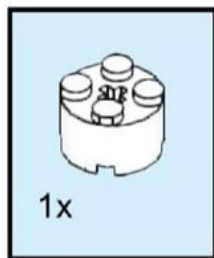




2

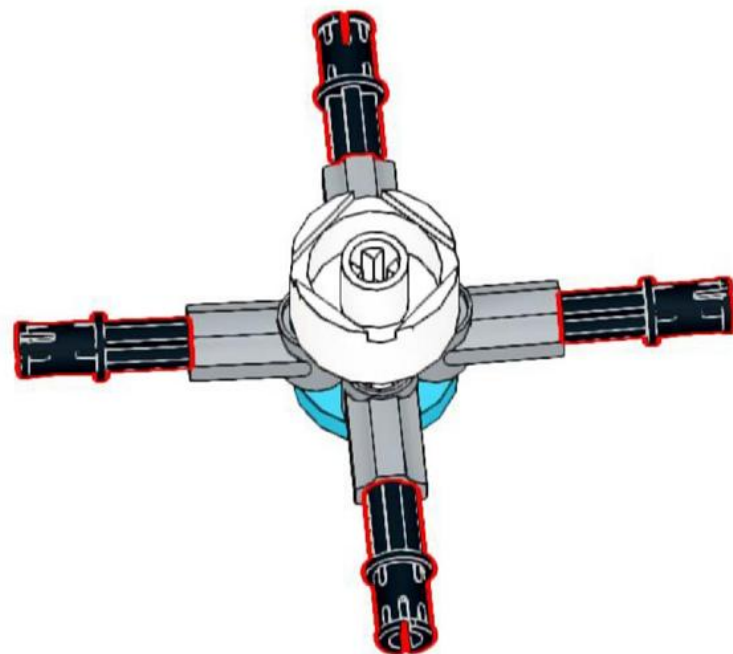


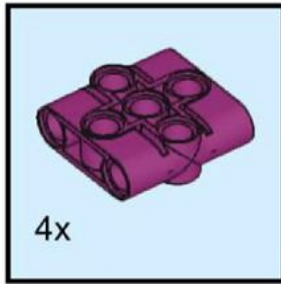
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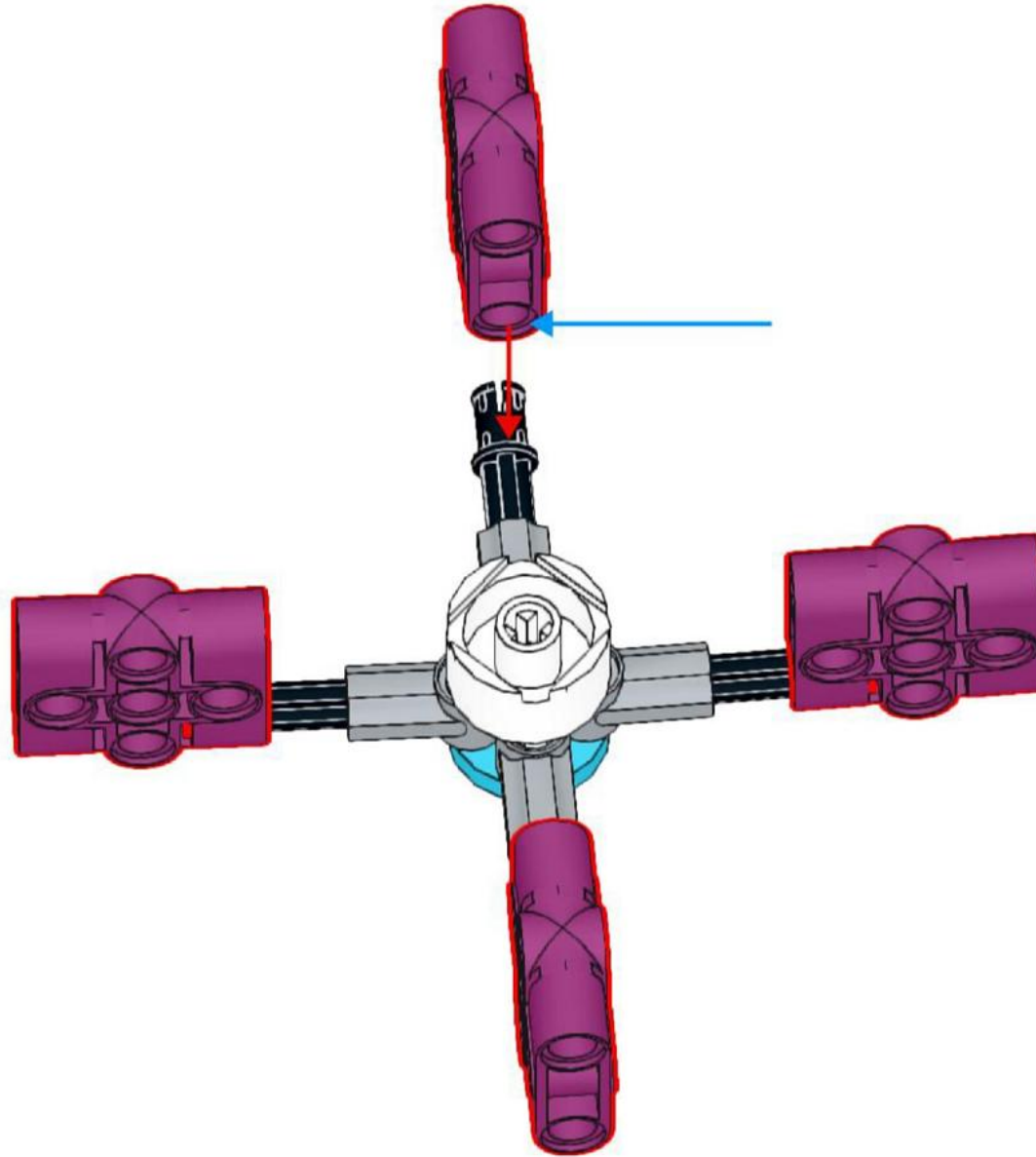


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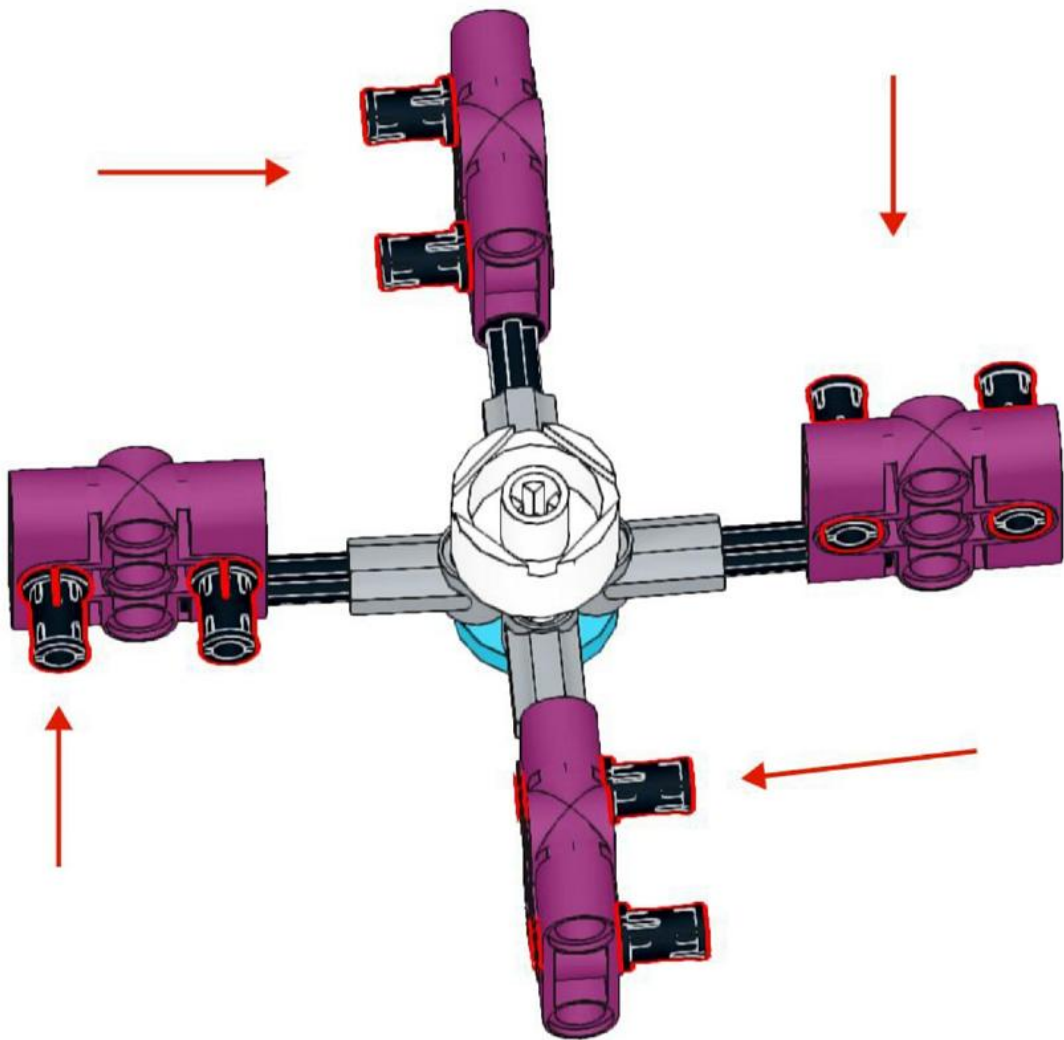


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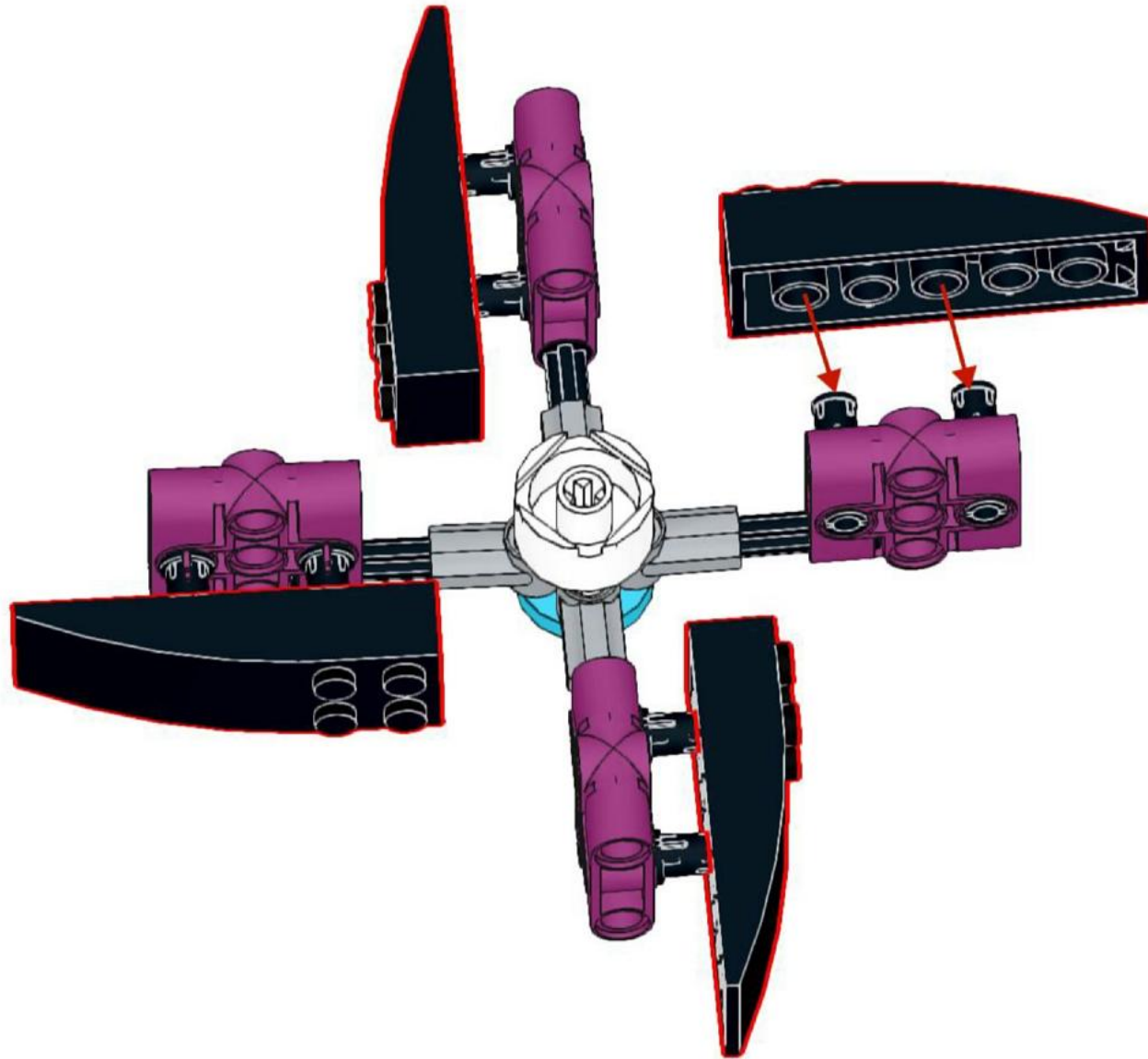


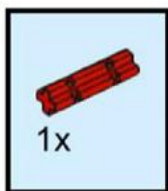
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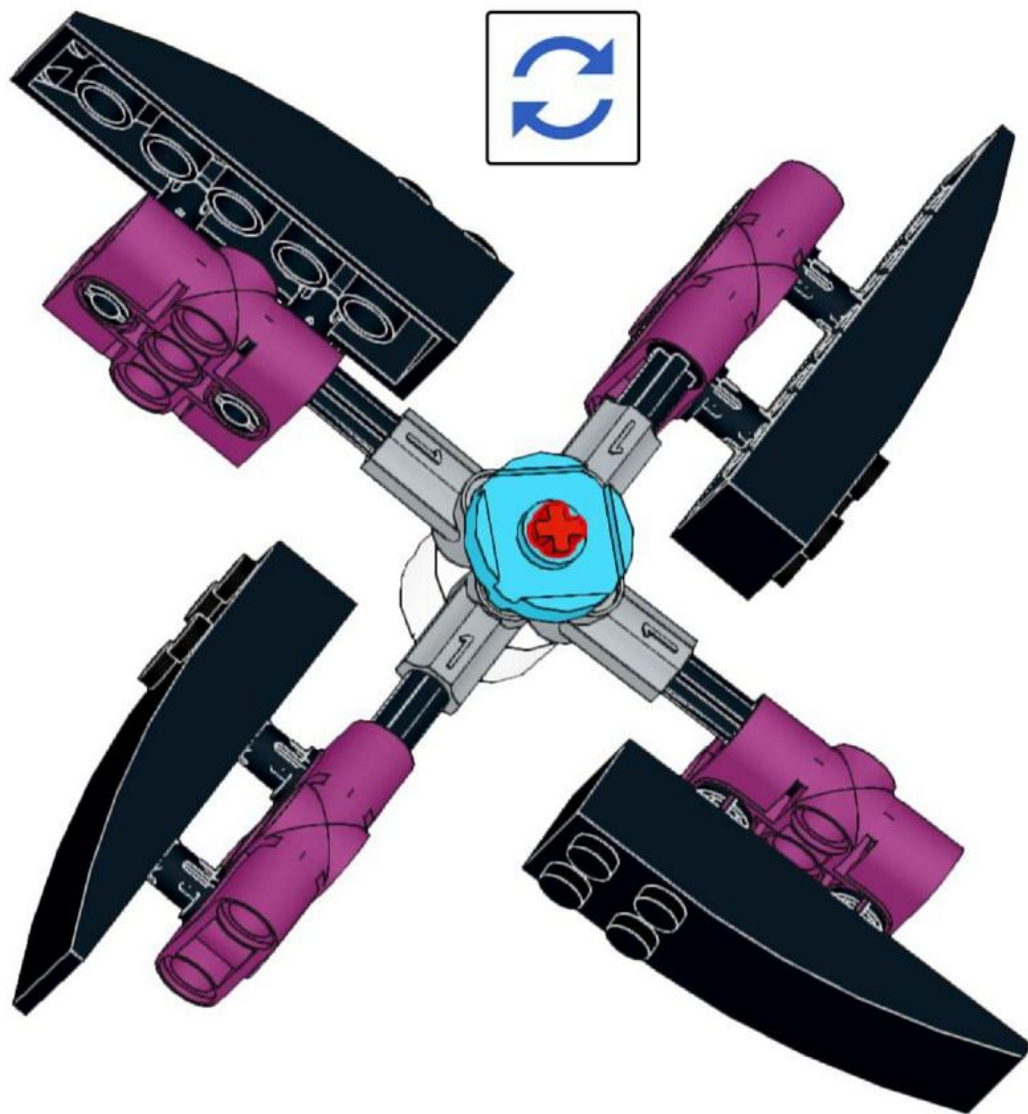


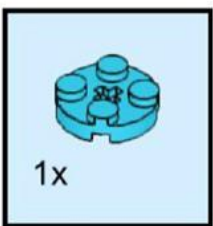
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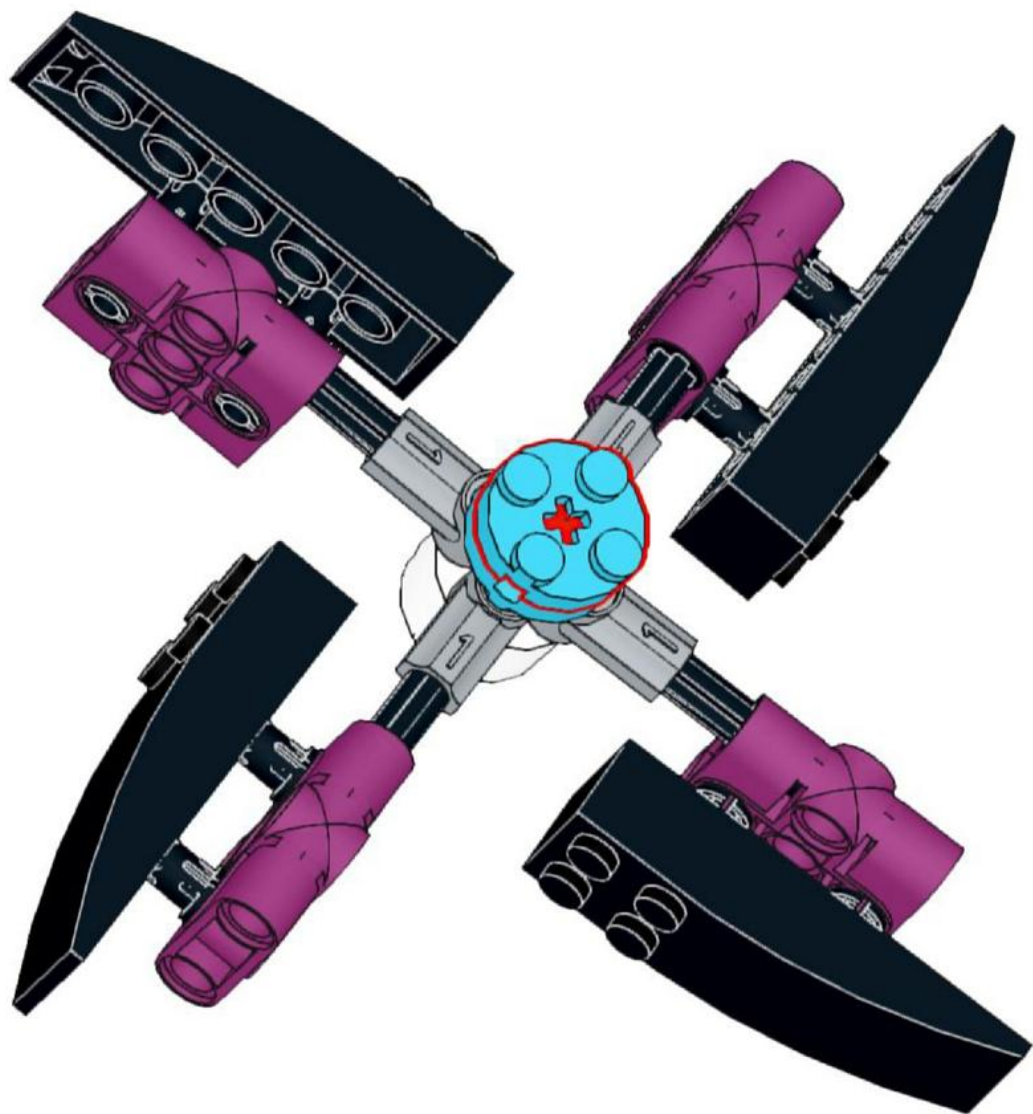


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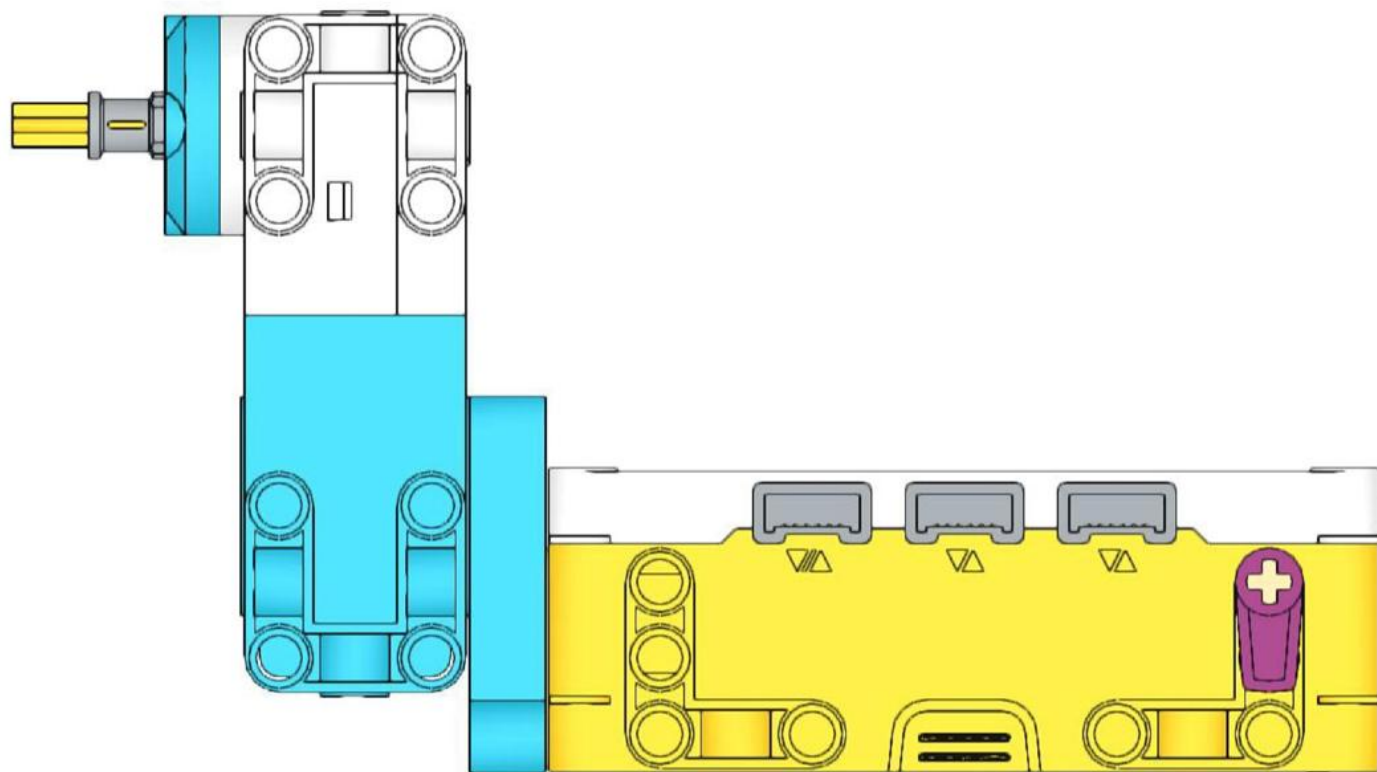




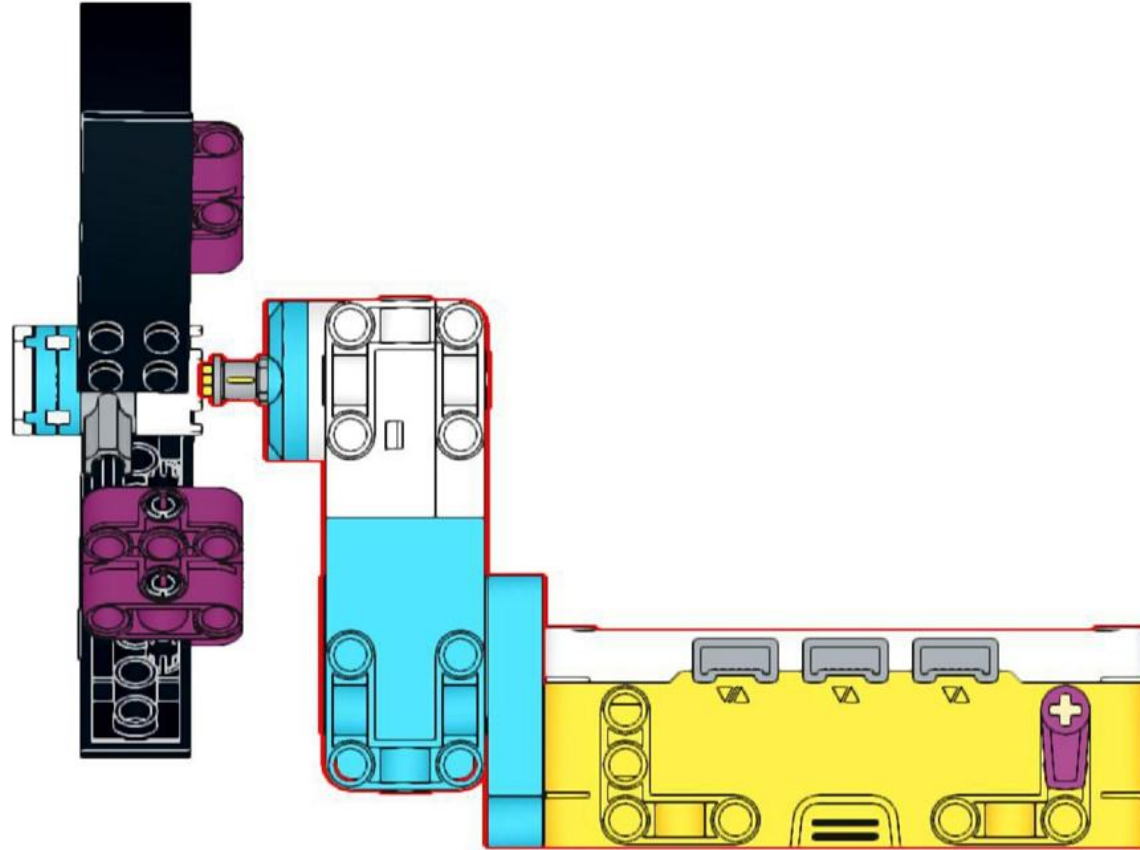
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11



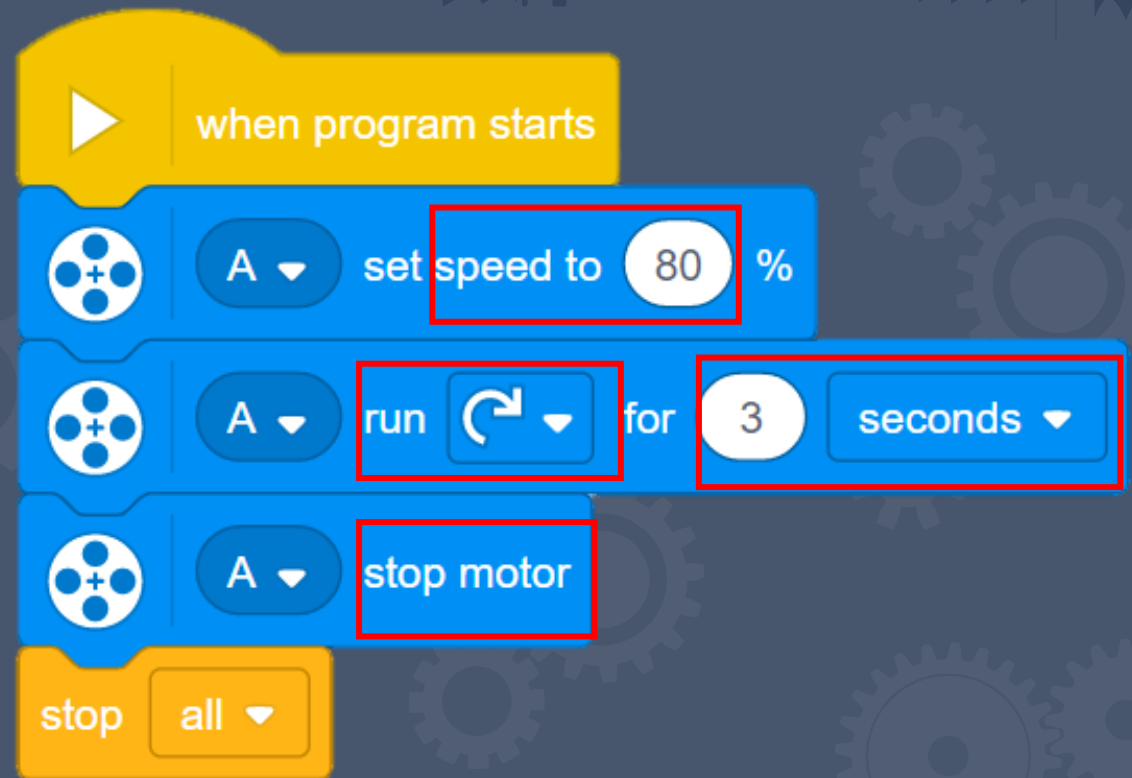
12



挑戰任務一

請設計程式，控制風扇：

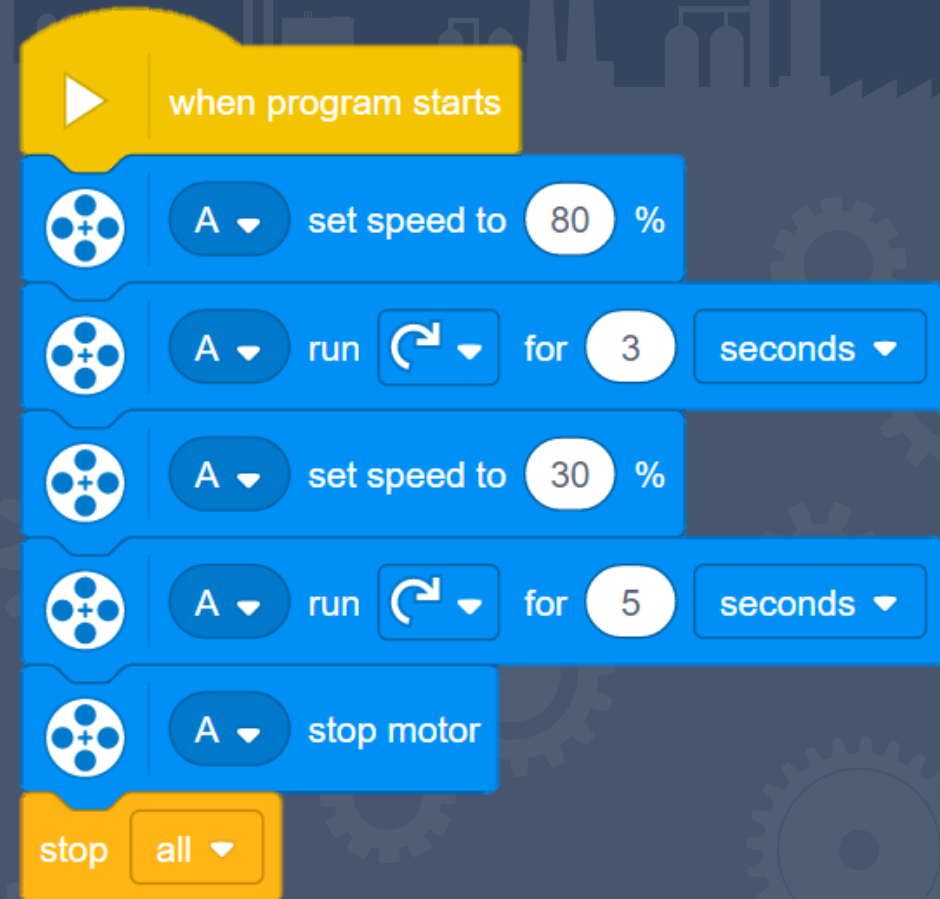
- 快速順時針旋轉3秒後，
停止風扇，結束程式。



挑戰任務二

請設計程式，控制風扇：

- 快速順時針旋轉 3 秒後，
慢速順時針旋轉 5 秒，
停止風扇，結束程式。



創造任務

試試看設計自己的風扇程式，
說說看你的風扇如何轉動。