

Nurture Students' Computational Thinking Skills Through the Development of Junior Form Tech Ed Curriculum



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Munsang College (H.K. Island)

About the Speakers



Eric Leung

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Munsang College (H.K. Island)



David Yao

Technology Education Teacher
Munsang College (H.K. Island)

Background

- Aided co-ed school
- There was no D&T and T&L since the founding of the school
- Technology Education was set up as a junior form subject in 2018-19
 - Offered in S.2 and S.3 in 2018-19
 - Offered in S.1 to S.3 from 2019-20 onwards
 - Aim at providing exposure of different elements in TEKLA



iMac Lab



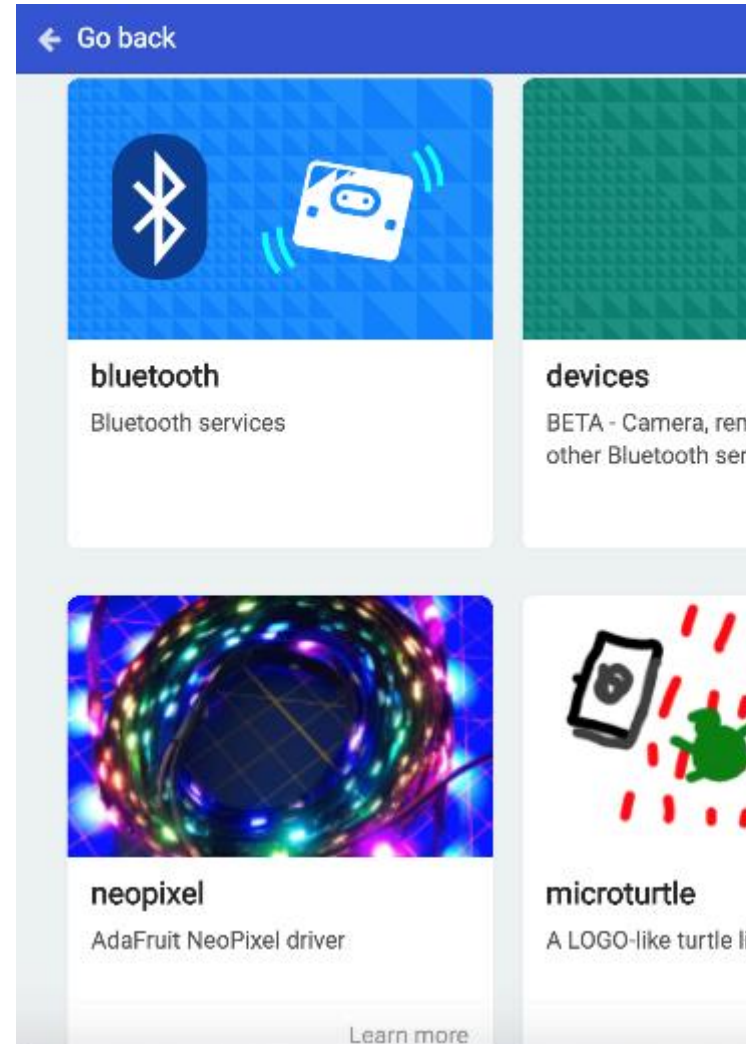
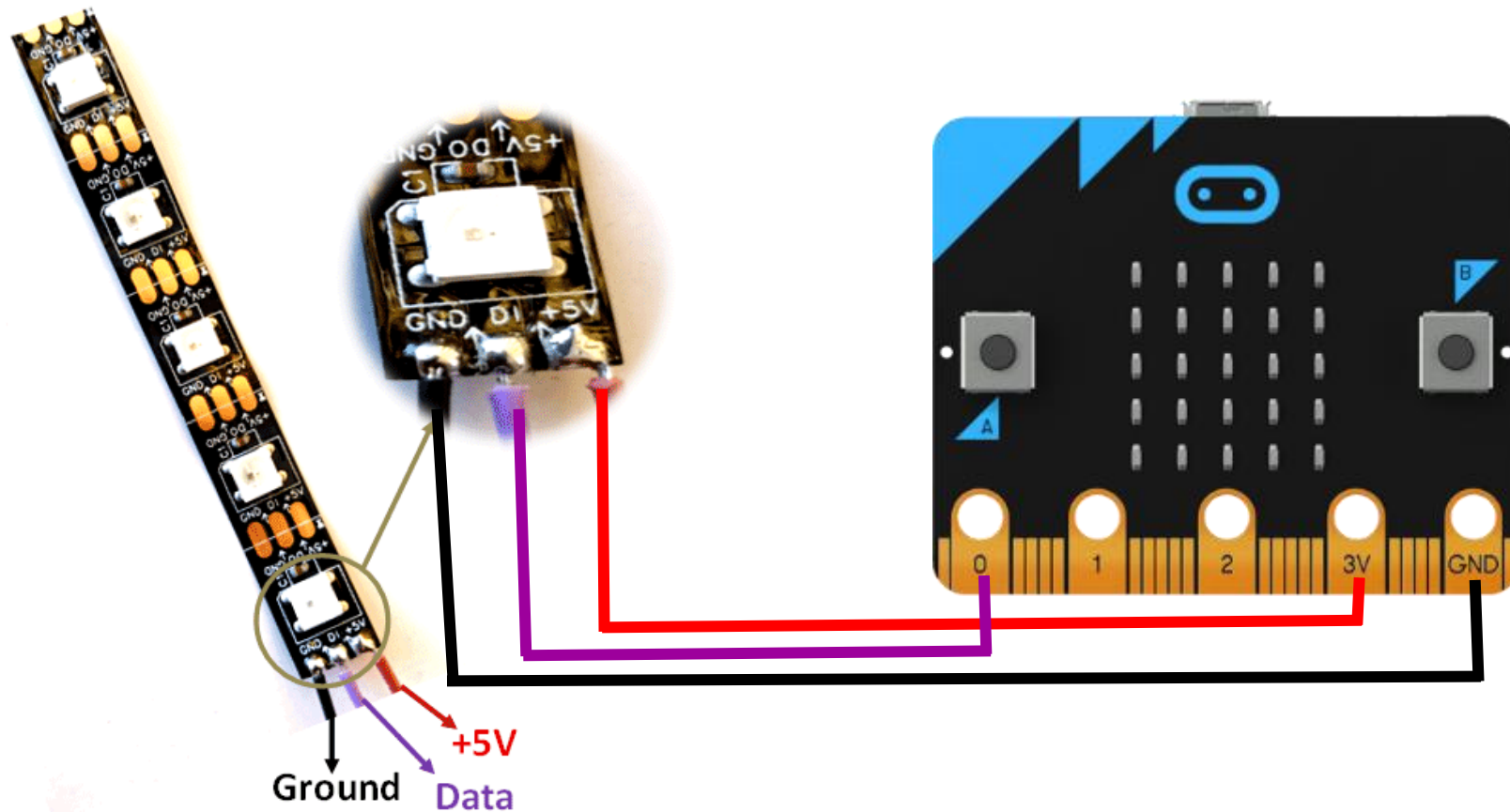
STEM Lab



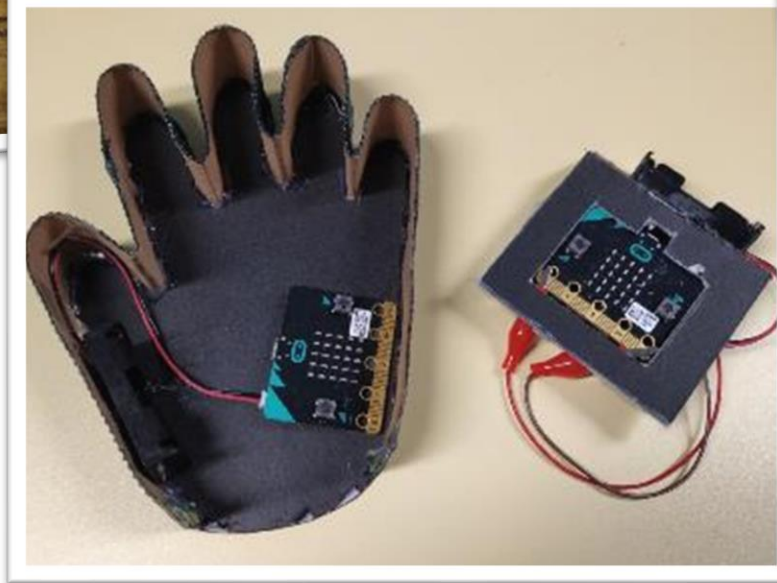
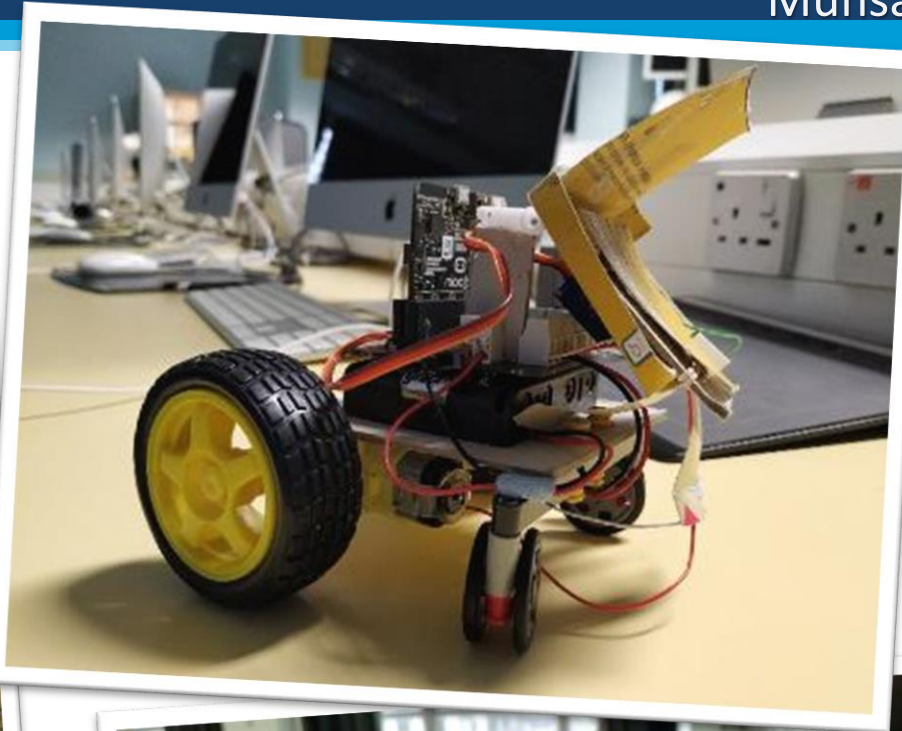
Curriculum Framework

	S1	S2	S3
Info and Comm Technology (ICT)	Micro:bit	CoSpaces	Arduino
Systems and Control	mBot Robotics	Robotic Boat	Networking and IoT
Materials and Structures	3D drawings and printing	Vector drawing	Laser cutting

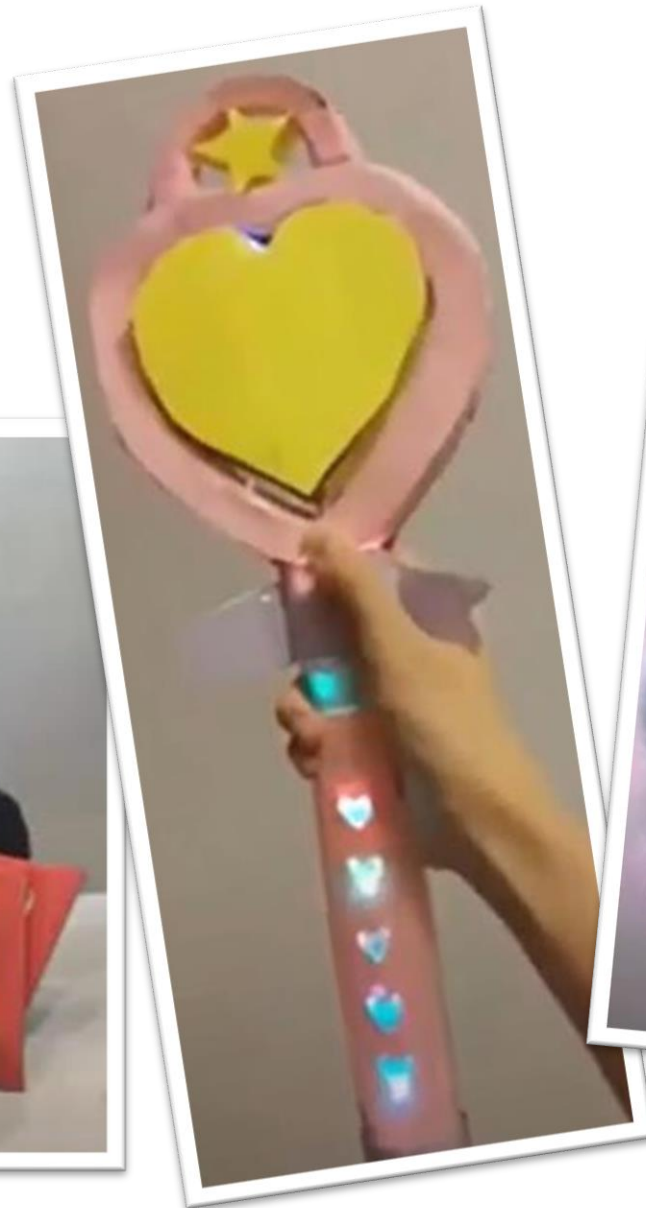
Micro:bit



STEM Projects



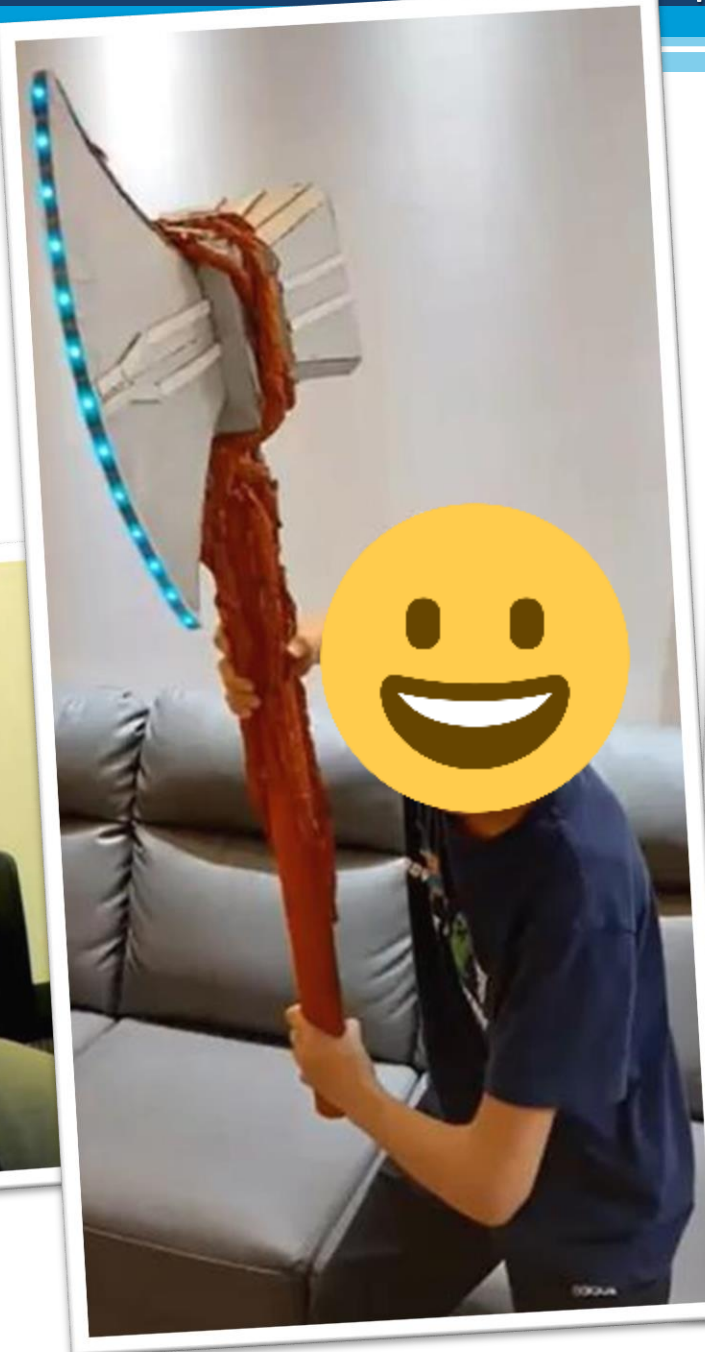
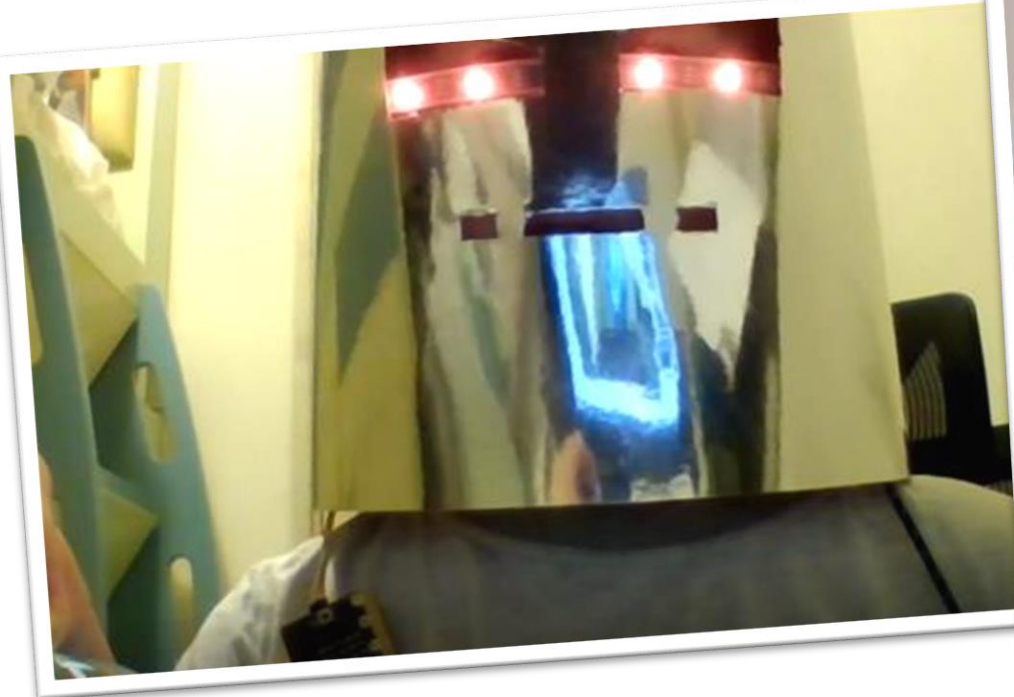
STEM Projects



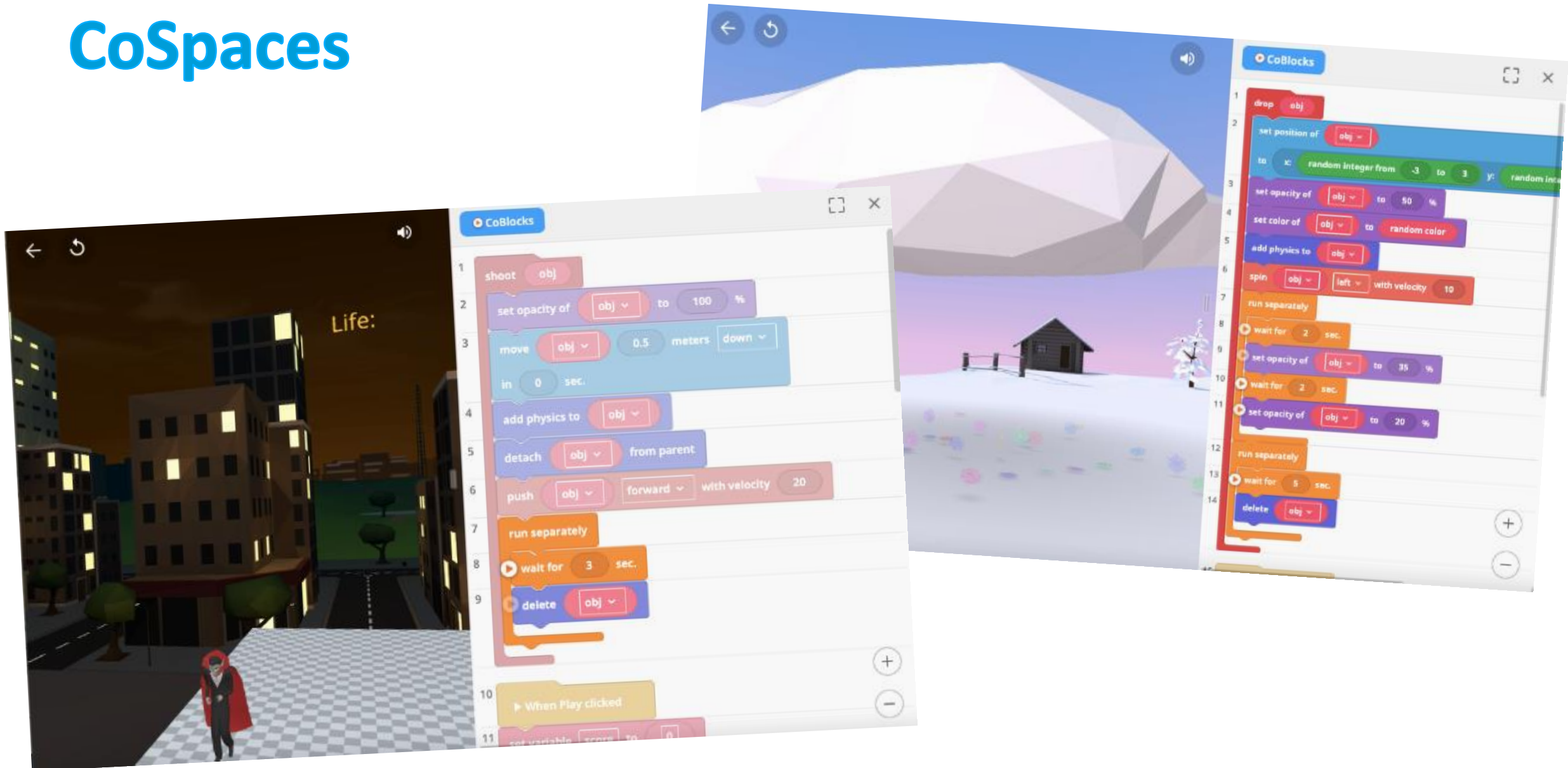
STEM Projects



STEM Projects



CoSpaces

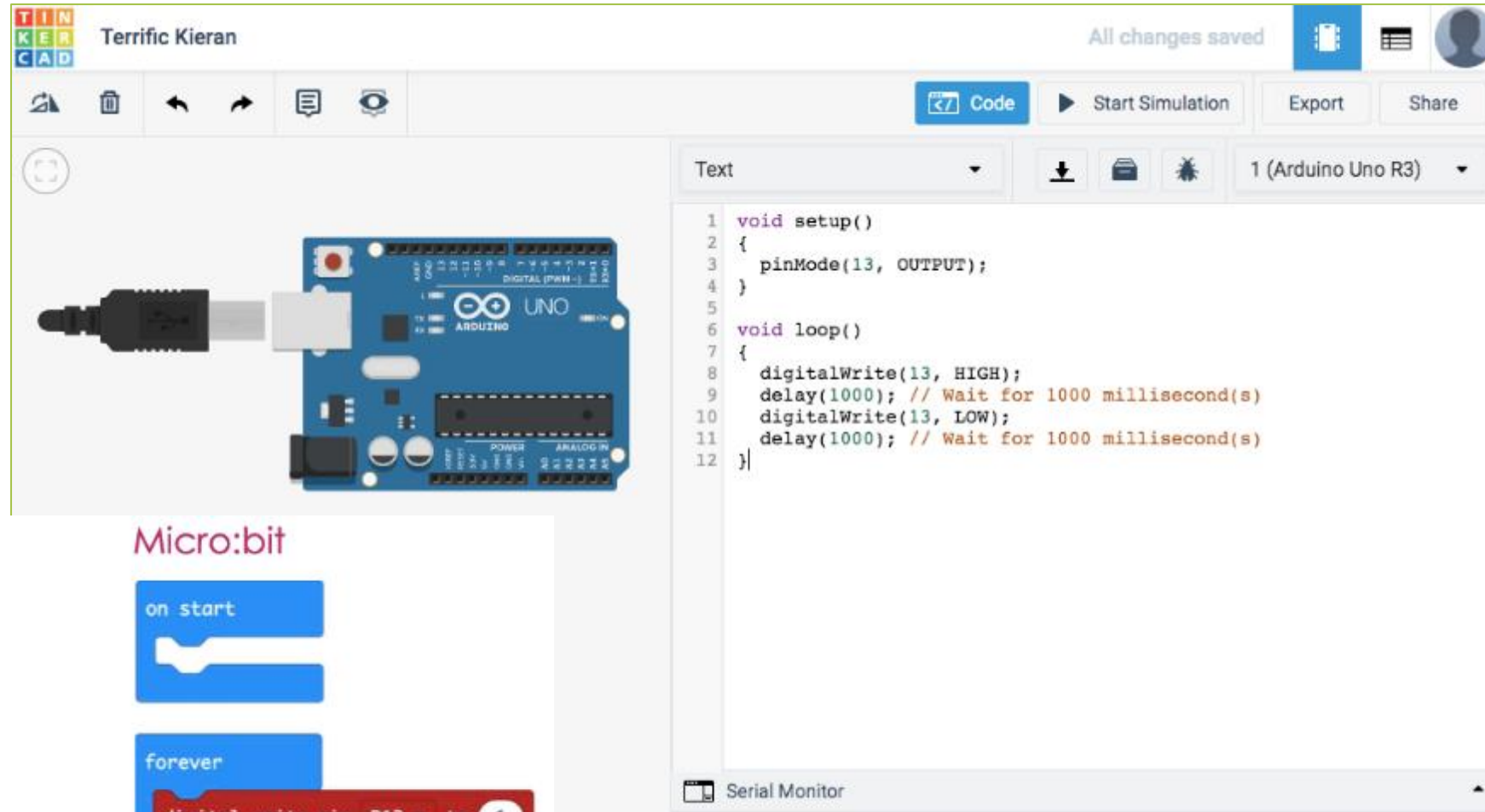


Arduino

Arduino

```
void setup()
{
  pinMode(13, OUTPUT);
}

void loop()
{
  digitalWrite(13, HIGH);
  delay(1000);
  digitalWrite(13, LOW);
  delay(1000);
}
```



TIN KERCAD Terrific Kieran All changes saved

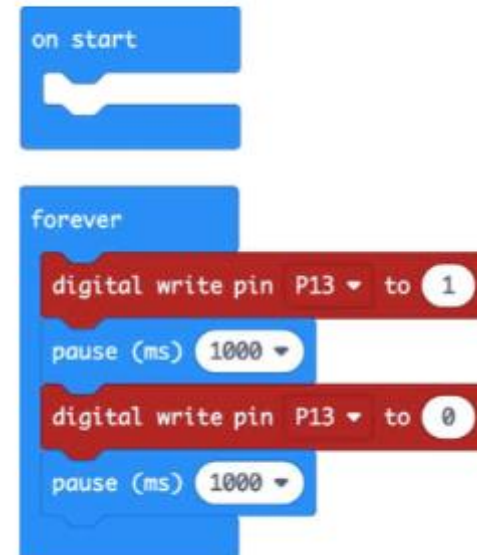
Code Start Simulation Export Share

Text 1 (Arduino Uno R3)

```
1 void setup()
2 {
3   pinMode(13, OUTPUT);
4 }
5
6 void loop()
7 {
8   digitalWrite(13, HIGH);
9   delay(1000); // Wait for 1000 millisecond(s)
10  digitalWrite(13, LOW);
11  delay(1000); // Wait for 1000 millisecond(s)
12 }
```

Serial Monitor

Micro:bit



on start

forever

digital write pin P13 to 1

pause (ms) 1000

digital write pin P13 to 0

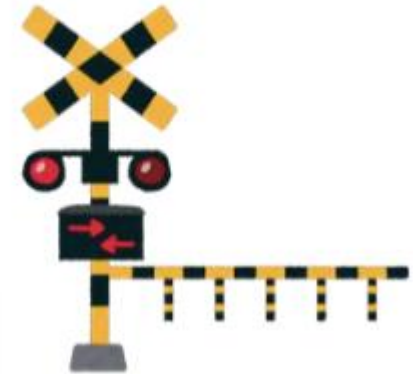
pause (ms) 1000

Arduino

S.3 Tech Ed – Arduino Programming (Ex2)

P.2

2. Marco would like to develop an Arduino application to simulate the operation of a railway crossing. Every 10 seconds, the barrier lever will be lowered to let a train pass through. After 3 seconds, when the train has left, the barrier lever will be lifted again to let cars cross the rail.

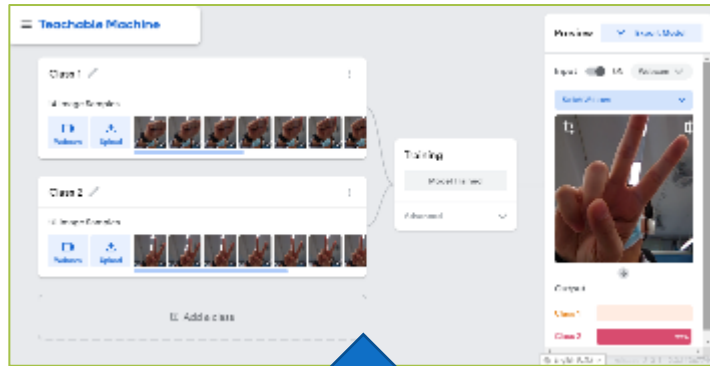


- (b) Complete the code below. (7 marks)

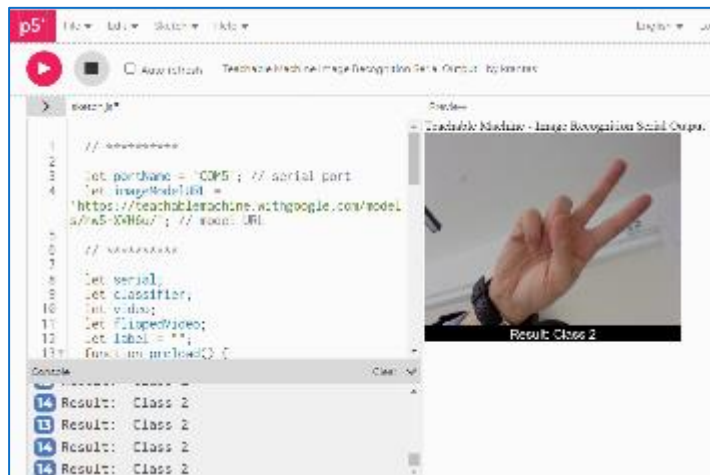
Program Code

```
#include _____ <Servo.h> _____  
  
_____ Servo s _____;  
  
void setup () {  
    s.attach(8);  
}  
  
void loop() {  
    s.write(90);  
    delay(3000);  
    s.write(0);  
    delay(10000);  
}
```

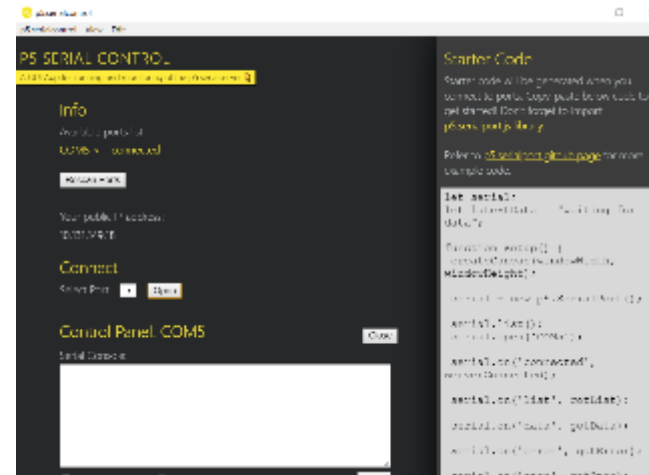

Arduino



Sharable link



Connects via
Internet



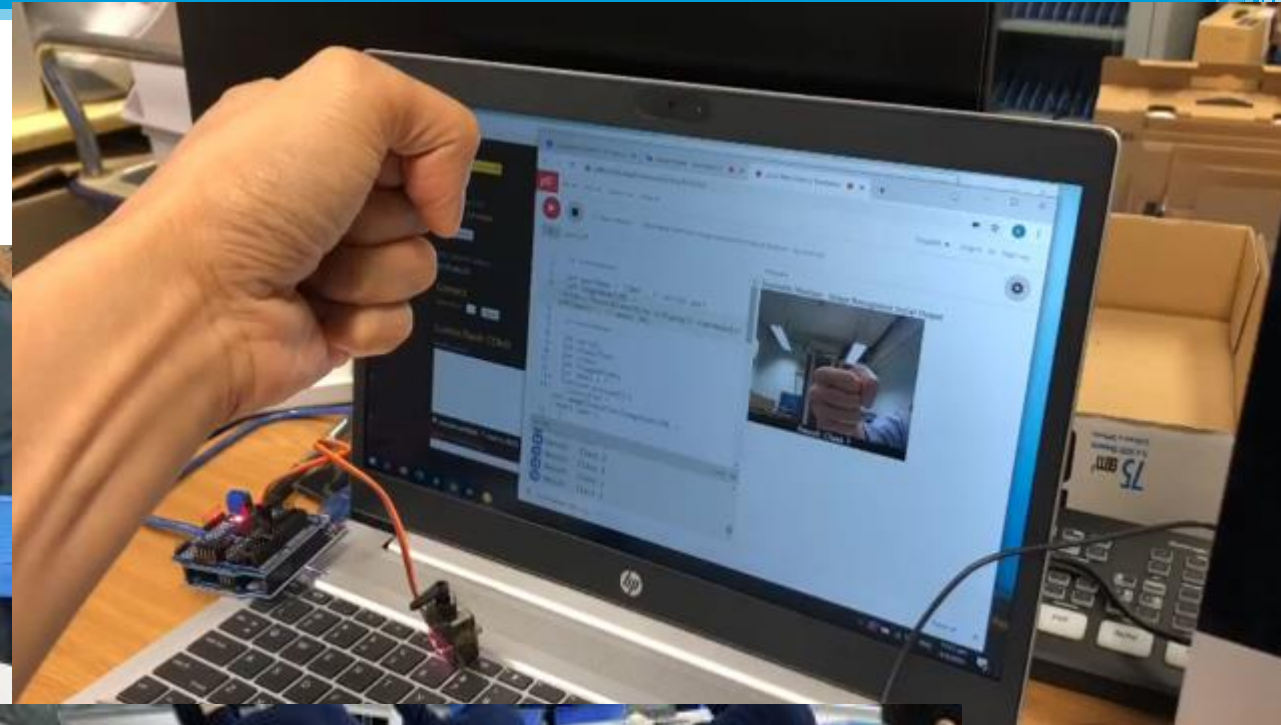
Connects via
Serial
connection



Connection pins



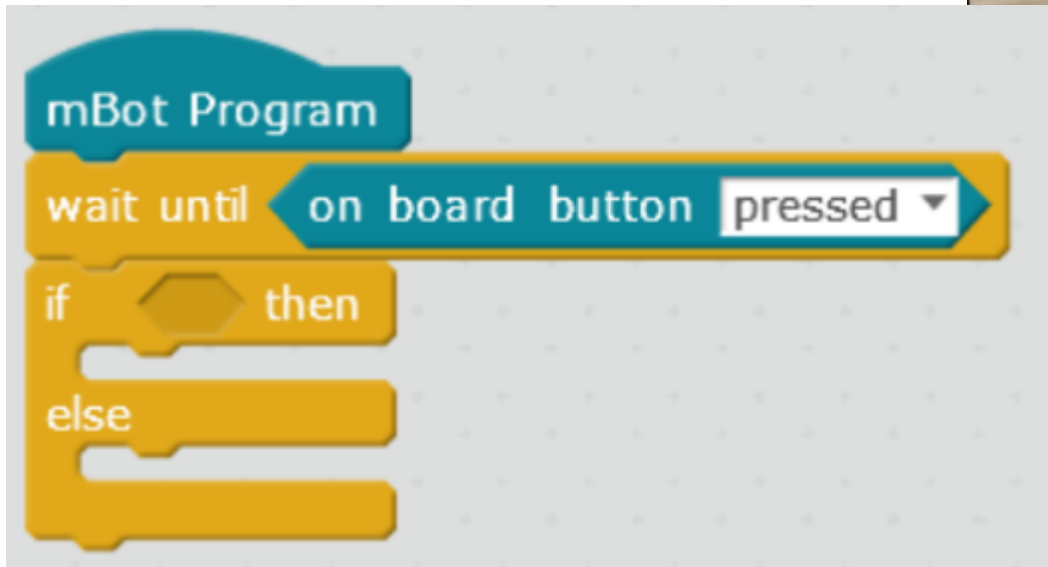
Arduino



mBot Robotics

Exercise: Auto-Stopping

- Press the on board button to move forward.
- If the distance is less than 20cm, the car stops.



Robotic Boat

Archimedes' Principle

- ▶ The volume of the object immersed in water
= The volume of the water displaced



**Propulsion
system**



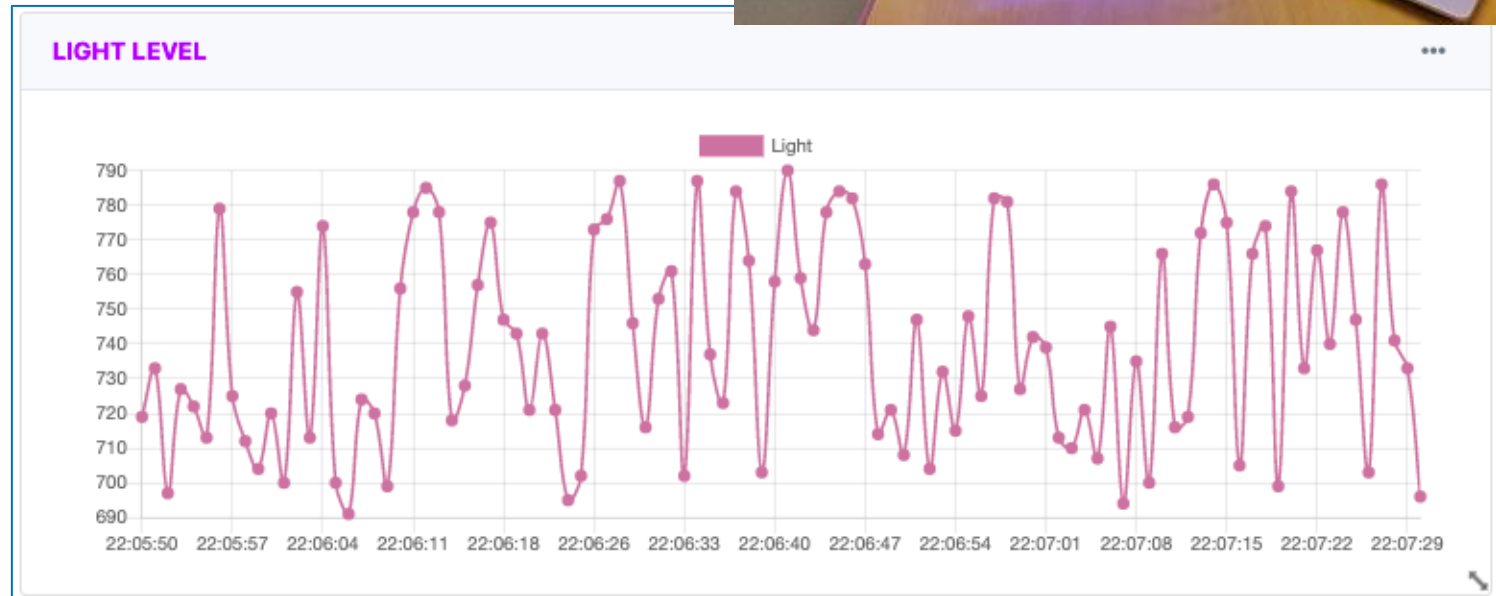
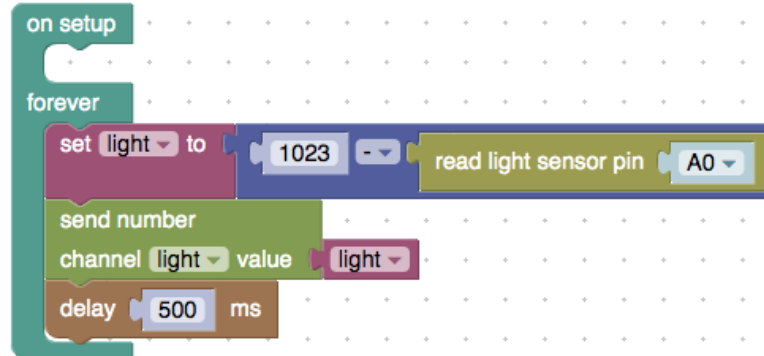
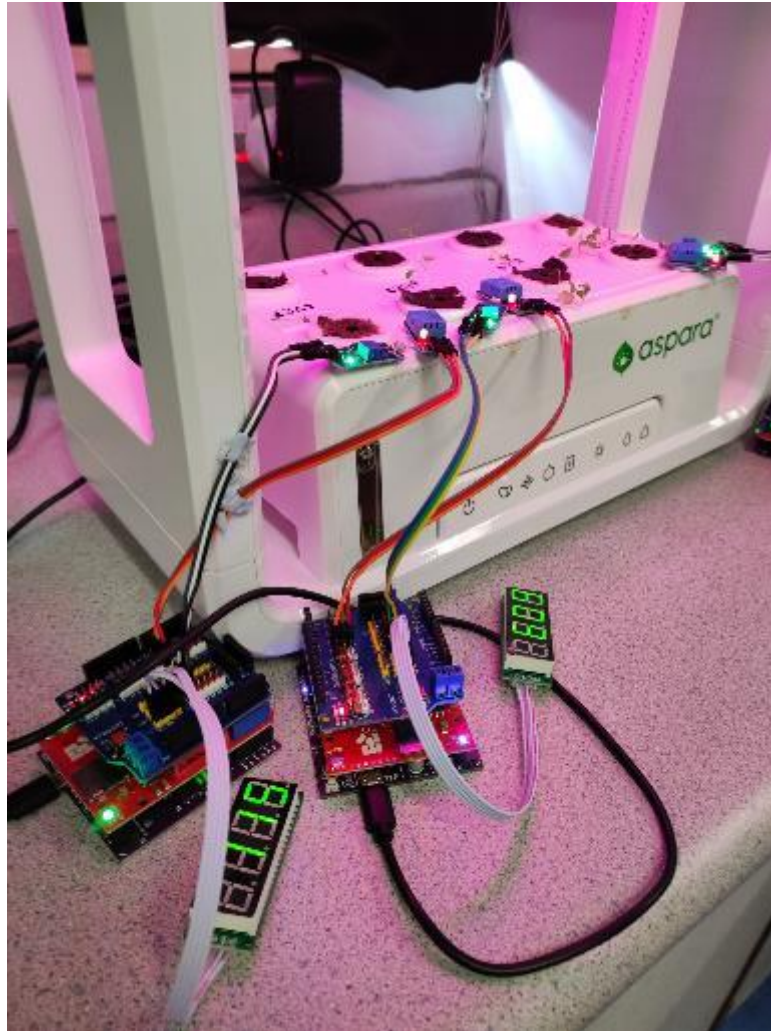
**Steering
system**



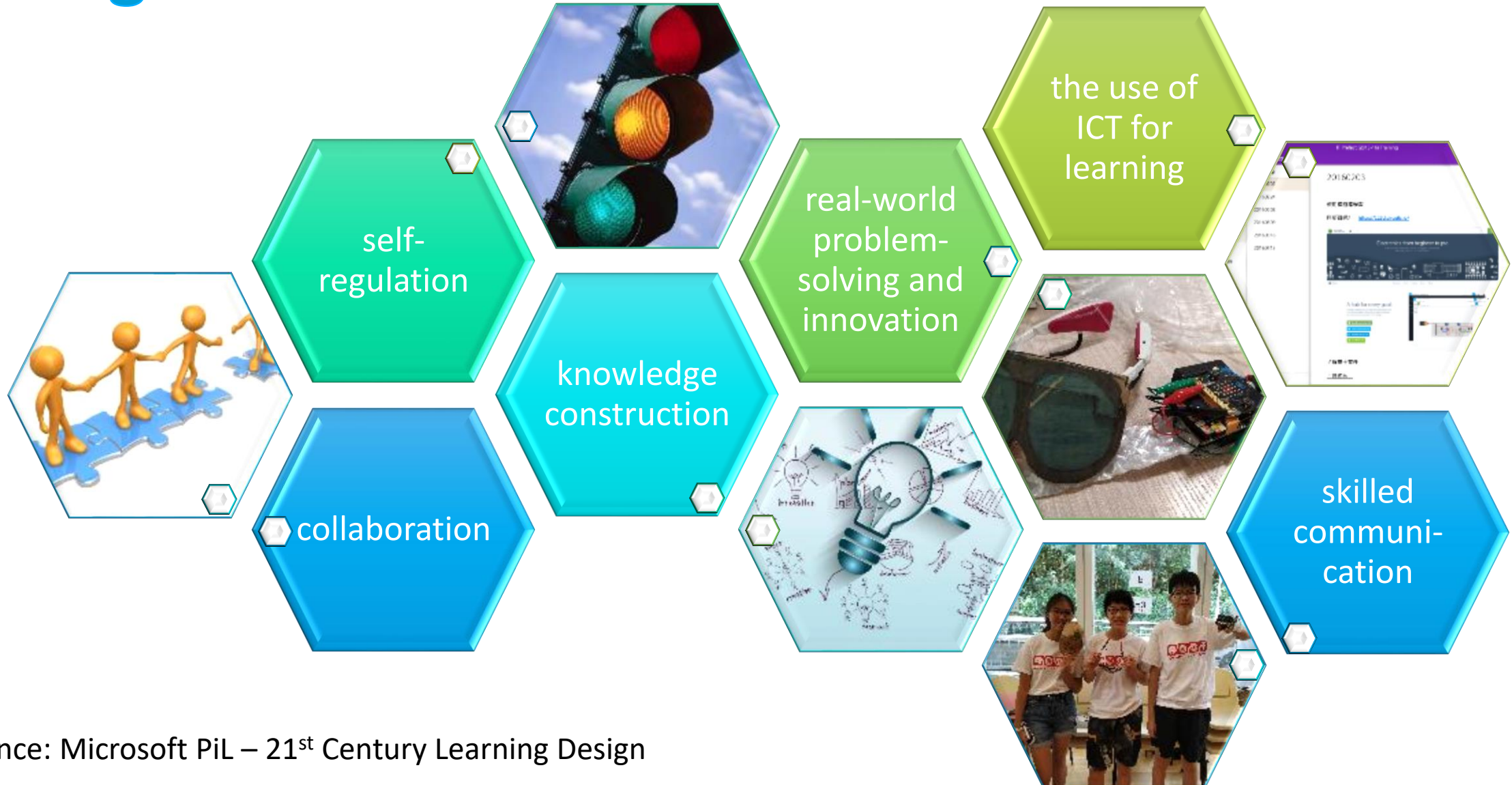
Robotic Boat



Networking and IoT

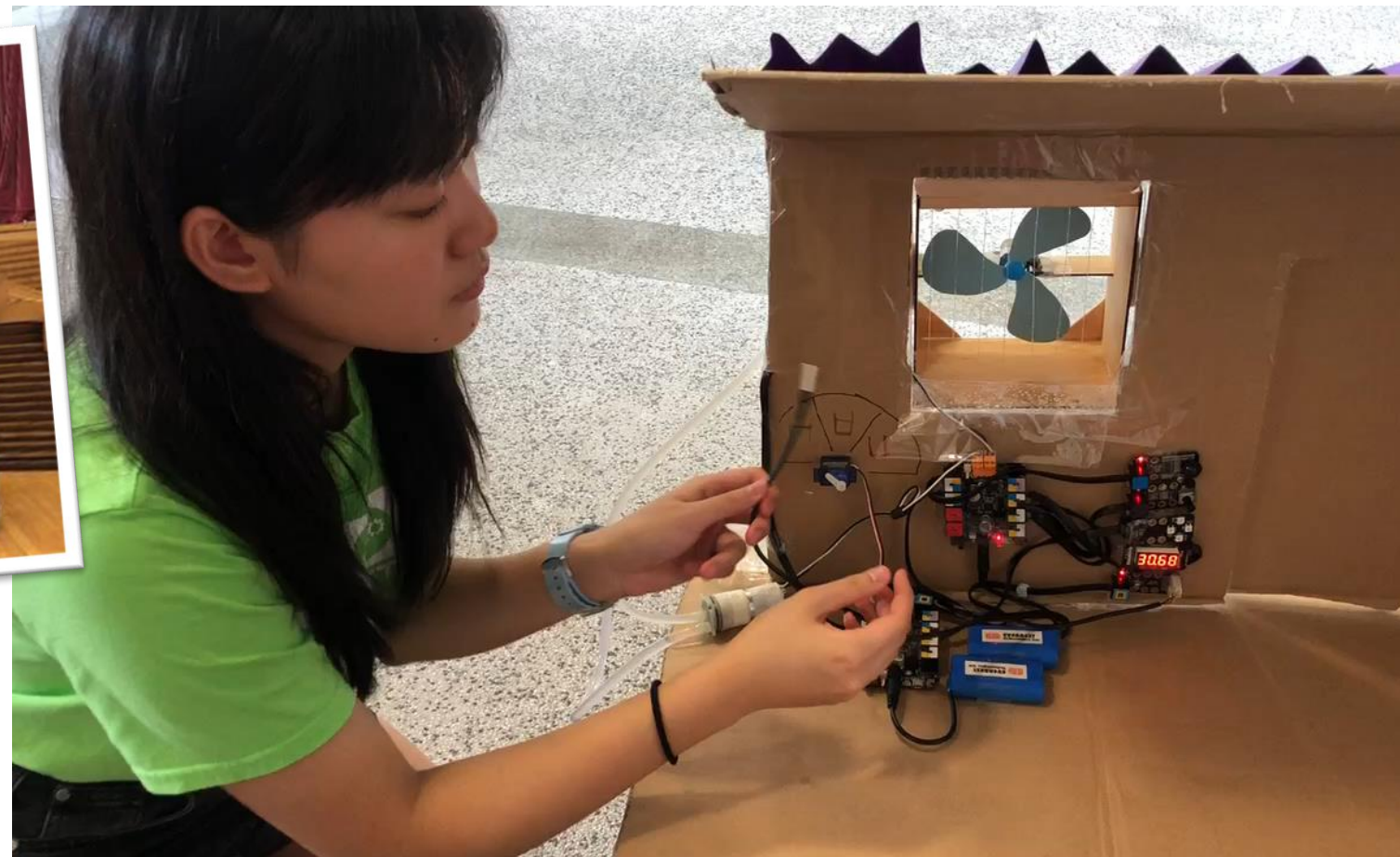


Design Framework



AiTLE + EDB InnoSTEMer Camp





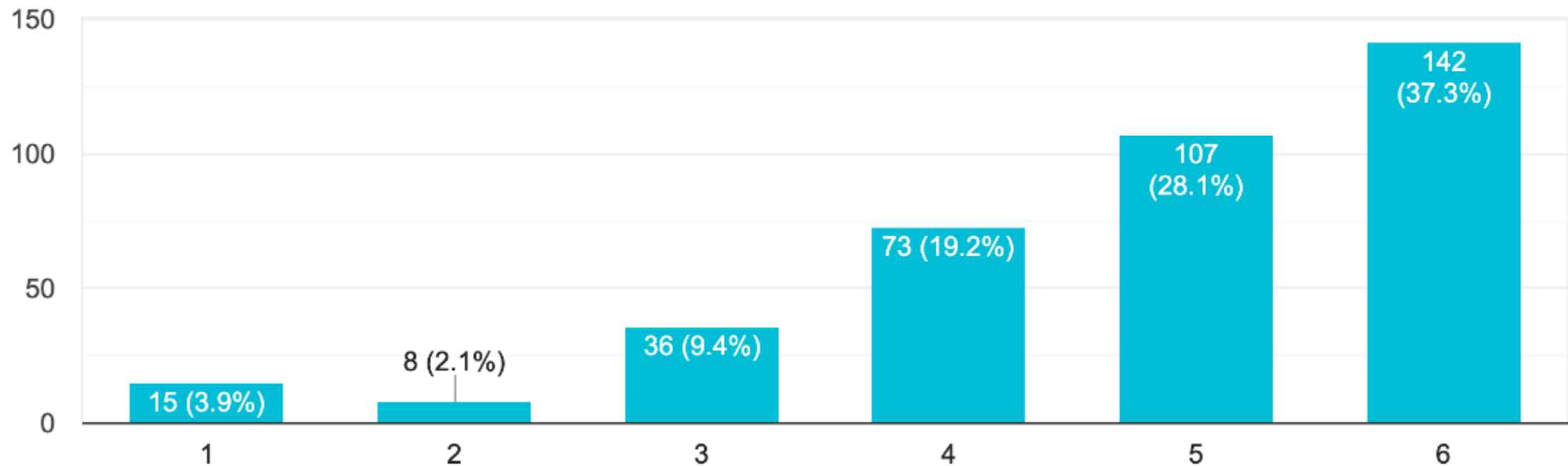


清島民生醫學院院長畢永成(左)及資訊科技組主任張麗燕(右)均鼓勵學生參加比賽，發揮在STEM方面的潛能。

Survey

相比傳統電腦科著重知識背誦，我更喜歡可以動手做的 Tech Ed 課程。

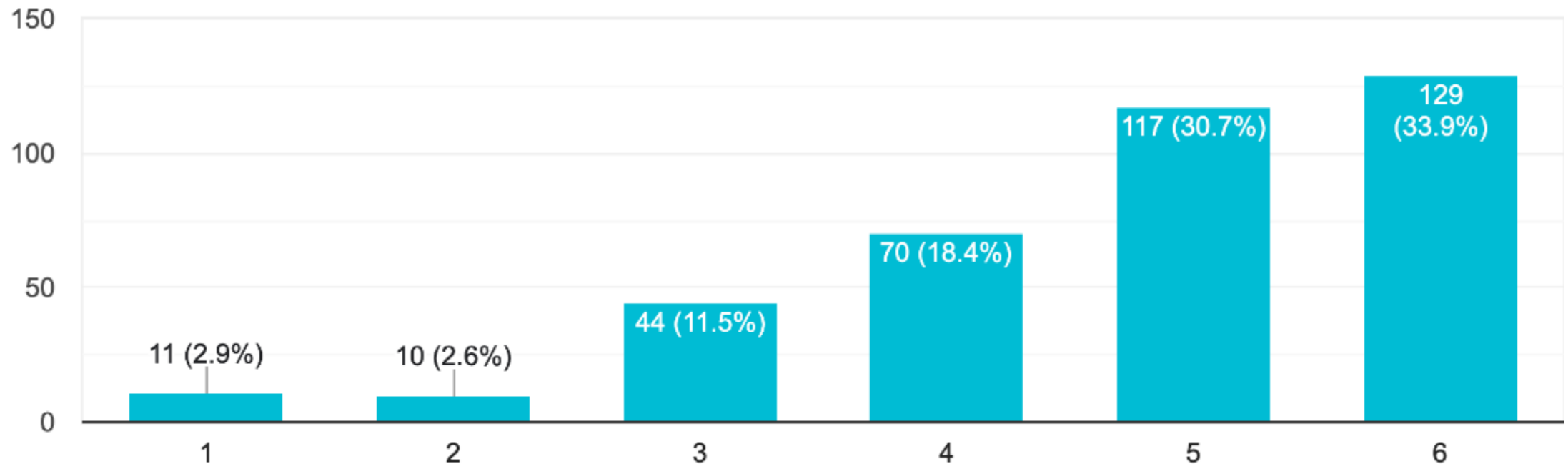
381 responses



Survey

相比傳統電腦科教授軟件應用，Tech Ed 課程結合硬件 (例如 micro:bit、3D 打印、VR/AR、IoT 等)，令課程更有趣。

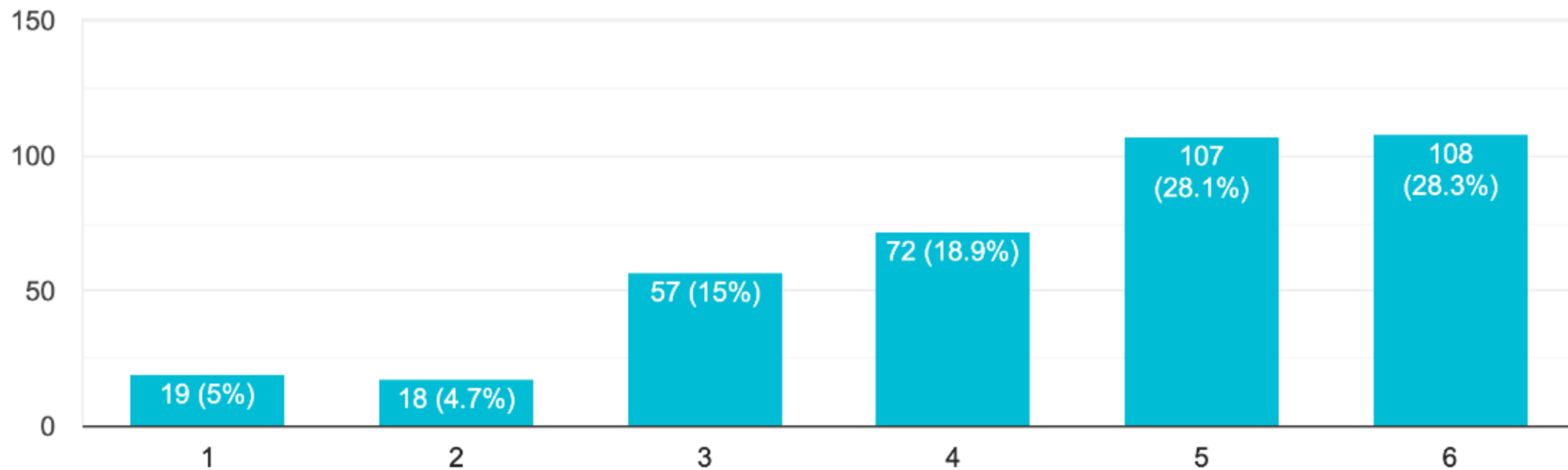
381 responses



Survey

成功編寫程式解決問題，我能獲得成功感。

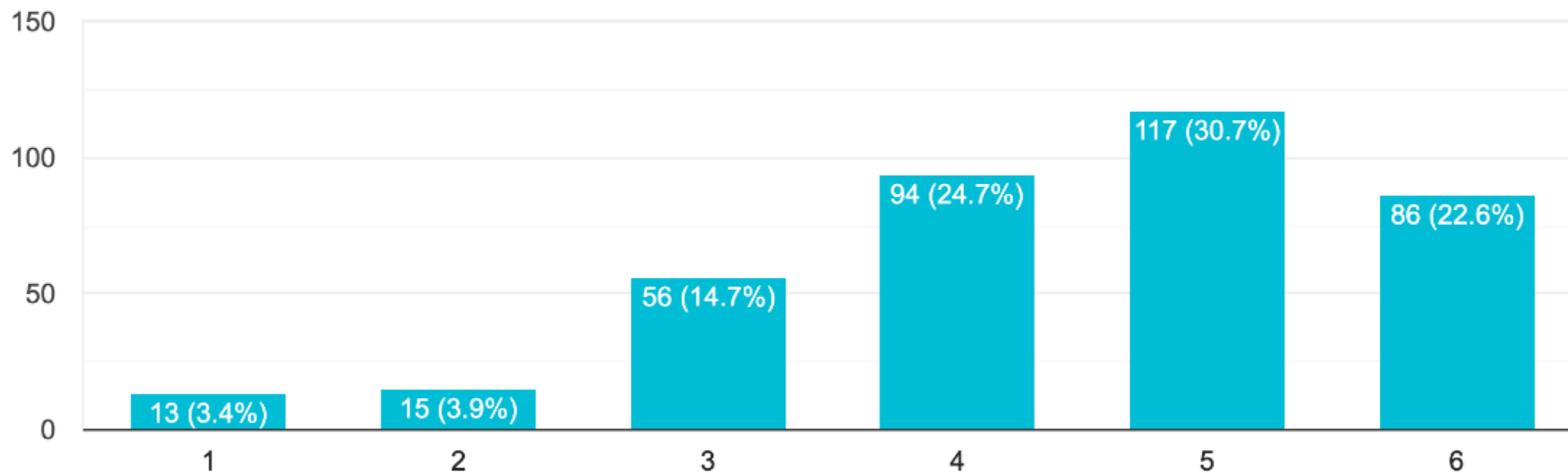
381 responses



Survey

學校 Tech Ed 課程有助訓練同學解難能力。

381 responses



EDB Gifted Development Framework

Tier	Format	Strategy
Tier 1	Whole Class	<ul style="list-style-type: none">• Whole class development in Technology Education KLA• Curriculum enrichment
Tier 2	Pull-out	<ul style="list-style-type: none">• After-school enrichment courses for interested or talented students
Tier 3	Off-site	<ul style="list-style-type: none">• New knowledge taught by external professional instructors• Matching suitable courses with outstanding students

STEM Club

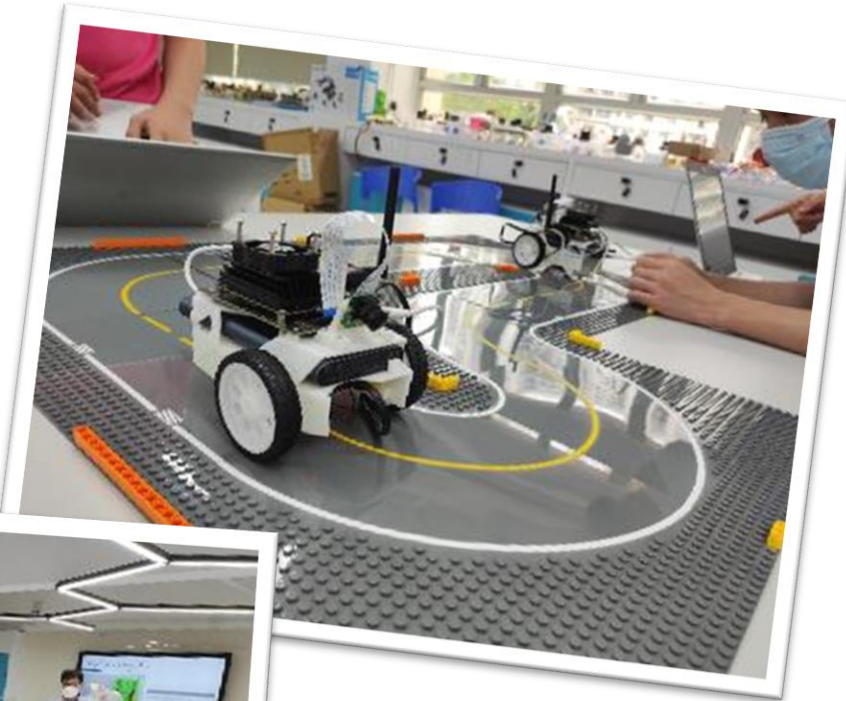
- Introducing Python and AI to students



Design Thinking Workshop



AI Self-driving Car Course



AI App Course



Other Pull-out Development





Thank You!