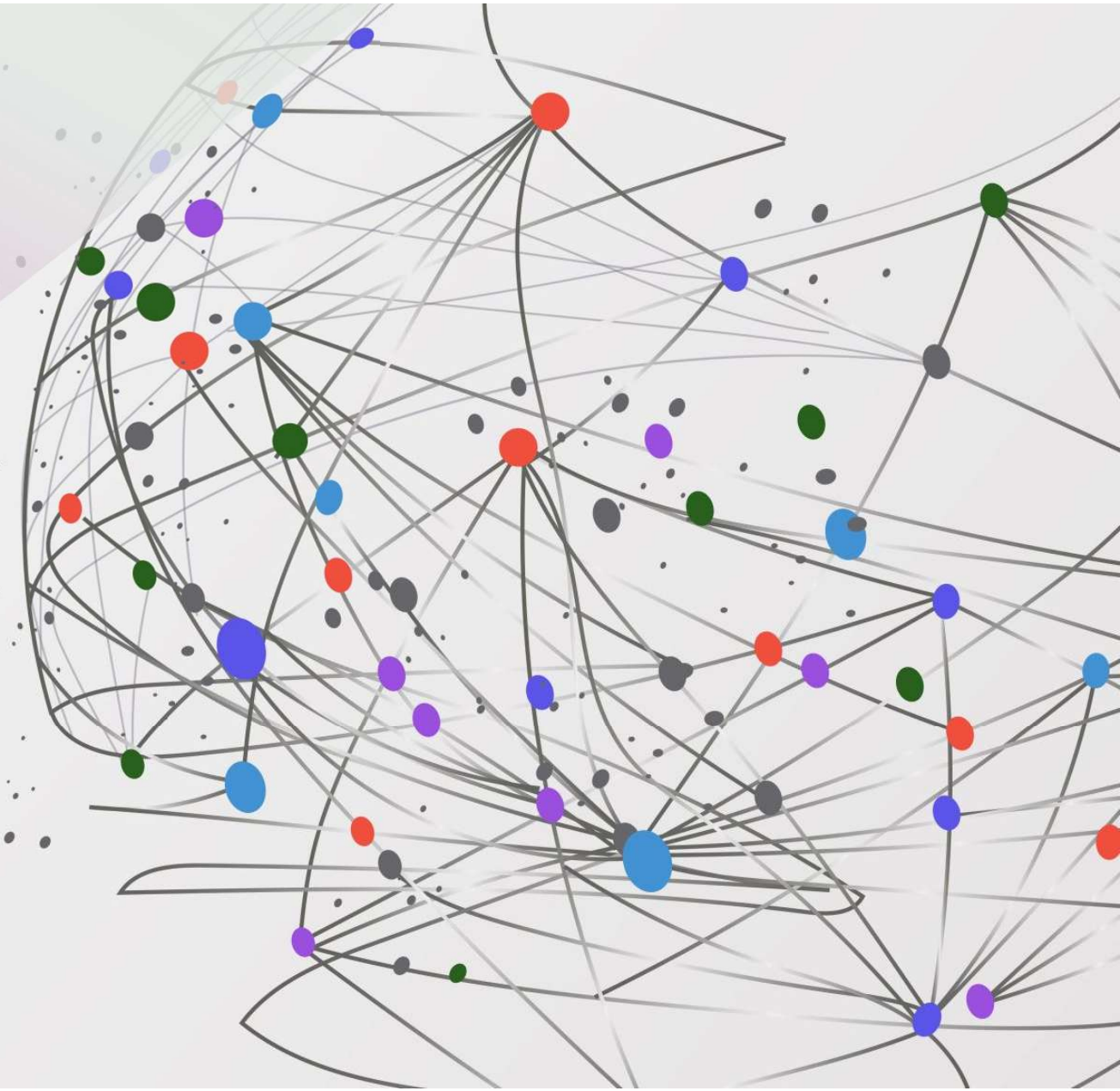
校本 STEM 創客課程分享

Learning & Teaching Expo 2024

2024年12月11日



Pui Tak Canossian College
嘉諾撒培德書院

Pui Tak Canossian College

Canossian Daughters of Charity

Girls' School

200 Peel Rise, Aberdeen, Hong Kong

Mr Lee Kwan Yu 利昆諭主任

- blky@ptcc.edu.hk, 68550536
- STEM & IT in Education Team Coordinator
- Physics Panel Head

Pui Tak Canossian College
嘉諾撒培德書院

聚焦解難、培養創客、讓 STEAM 融入至全校的發展細胞中

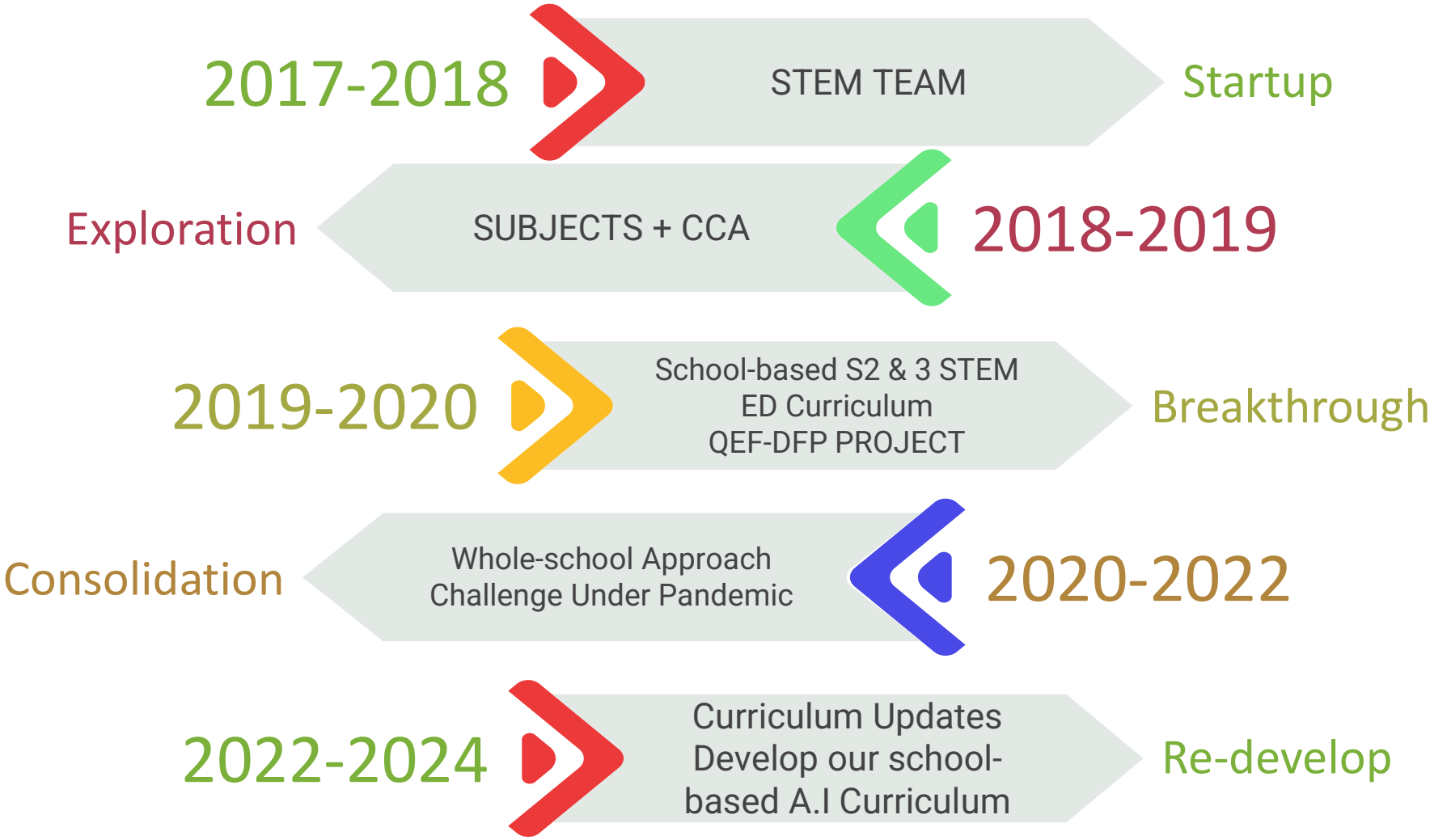
優秀教師選舉2023

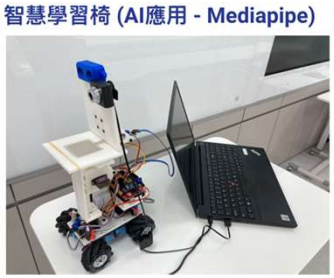
「教育管理組」參選報告

Key Takeaways

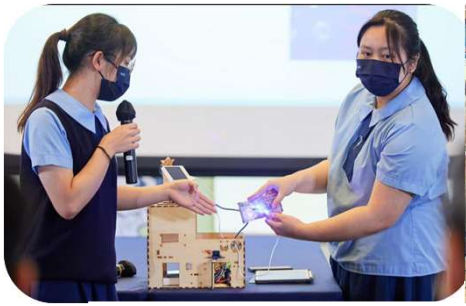
1. STEAM Development in our School; How to develop our school-based curriculum?
2. How to generate various educational ideas? How the ideas evolved from time to time?
3. How to conduct a STEAM lesson? (Objectblocks; Arduino)
4. How to efficiently utilize resources to purchase STEAM-related hardware? (Raspberry Pi)
5. Latest Updates on our STEAM Curriculum (AI and Python)

School-based STEAM Development





STEM Class

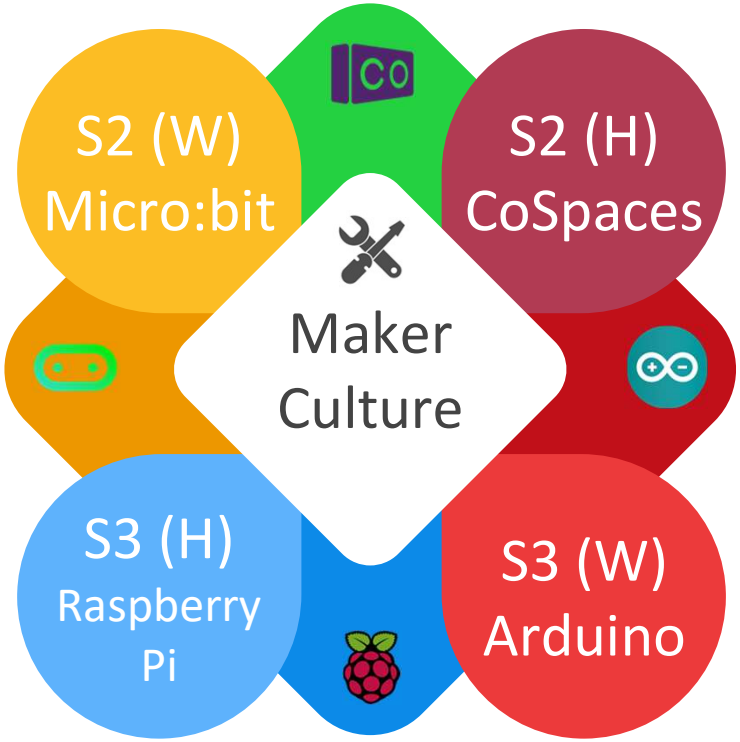


3 Pillars

Competitions

STEM Club

S.2 & 3 Curriculum Overview



Micro:bit

Simple Concepts on
Coding & Making

CoSpaces

Game Design
Experience VR & AR

Arduino ObjectBlocks

I-P-S (Cloud)-O + Internet of Things
Train to be a Maker

Raspberry Pi Codebooks

Computer + Python
A center to connect everything

A.I.

- Theory + Experience
- Computer Vision

(Extract Features)

- Natural Language Processing
- Generative AI

Information Literacy

Use of AI in Search Engine and Social Media and its Problem

AI Biased

好空氣挑戰賽 3組別19隊伍獲殊榮

嘉諾撒培德書院的隊伍奪得「硬件裝置」金獎。

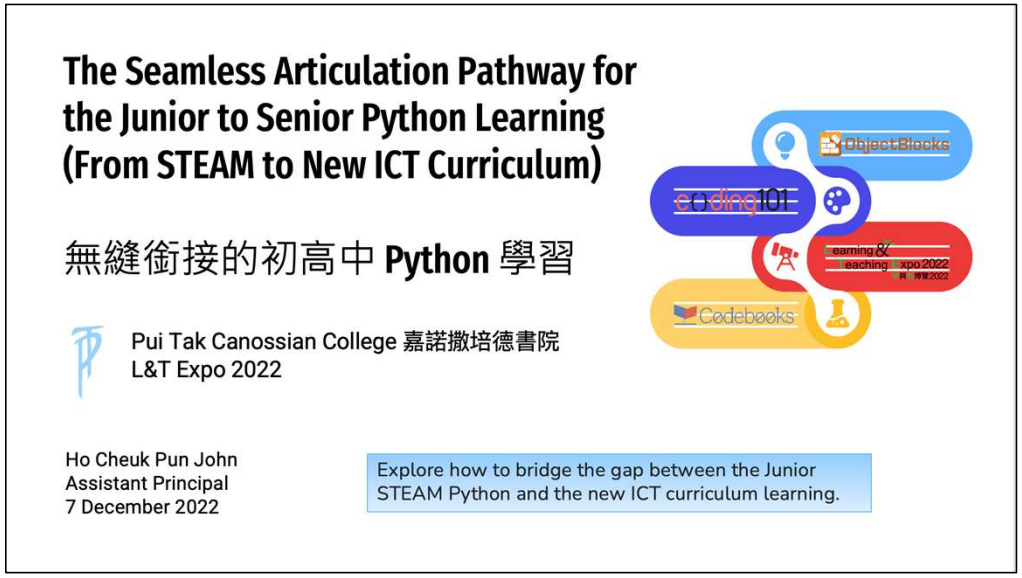
【本報訊】本港空氣污染情況令人關注，為培養更多精為香港的可持續發展作出貢獻，早前有大學聯同環保團攜手舉辦「好空氣挑戰賽」，參賽中學生透過活動認識氣污染的知識及應對技能，創作自己的參賽作品。頒獎禮及展覽於昨日舉行，由專家組成的評審團在「硬件裝置」、「軟件系統」及「社會及藝術」3個組別中，各出三甲及其他獎項，共19支隊伍獲得優秀殊榮。

Fruitful
2022-2024


嘉諾撒培德書院
Pui Tak Canossian College
ENG | 中文
IT in Education Technological Series
Using Microcomputer Sets and Mobile Computer Devices to Develop Students' Problem Solving and Coding Skills (Advanced Level)
12 June 2019
22 February 2019
Pui Tak Canossian College
Mr Ho Cheuk Pun John
匠印社 JF 3D JOLLY FAB


嘉諾撒培德書院
Pui Tak Canossian College
STEM (ARDUINO, IOT)
IT in Education Technological Series: Using Microcomputer Sets in Internet of Things in STEM Education Related Learning Activities at Junior Secondary Levels (Advanced Level)
12 April, 2021


嘉諾撒培德書院
Pui Tak Canossian College
STEM (RASPBERRY PI)
IT in Education Technological Series: Using Single Board Computer in STEM Education and Construct a Maker Culture at Junior Secondary Levels (Advanced Level)
3 August, 2022


The Seamless Articulation Pathway for the Junior to Senior Python Learning (From STEAM to New ICT Curriculum)
無縫銜接的初高中 Python 學習
Pui Tak Canossian College 嘉諾撒培德書院
L&T Expo 2022
Ho Cheuk Pun John
Assistant Principal
7 December 2022
Explore how to bridge the gap between the Junior STEAM Python and the new ICT curriculum learning.
ObjectBlocks
coding101
Codebooks

生成式 AI 技術在教育界的實踐與應用
教師分享暨工作坊

生成式 AI 如何革新
教育方法和學習過程

Ho Cheuk Pun John
Assistant Principal
2 May 2024

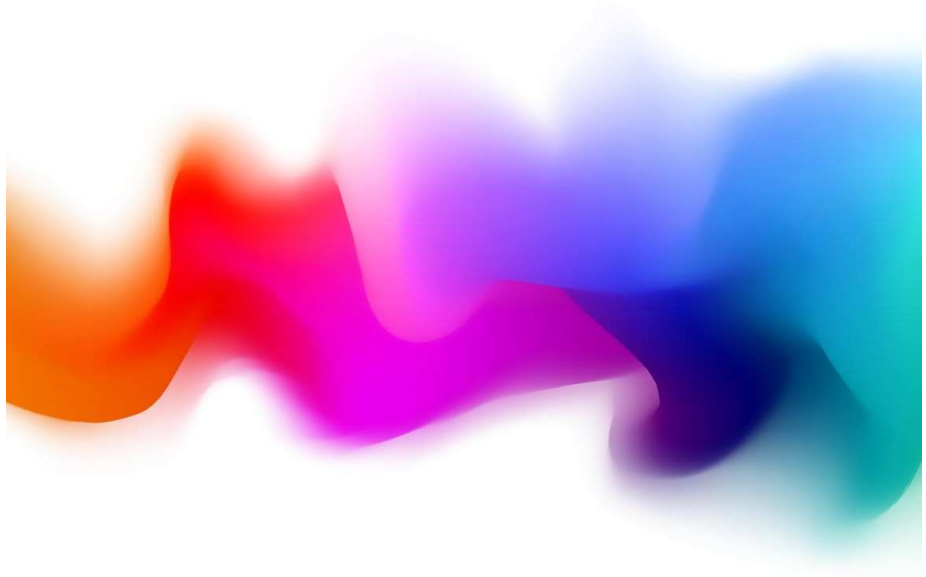
Pui Tak Canossian College 嘉諾撒培德書院

IT in Education Technological Series – How to teach Module on Artificial Intelligence for Junior Secondary Level through various online resources? (Advanced Level)

資訊科技教育科技系列 – 如何使用各種網上資源教授初中人工智能課程單元？(進階)

6 June 2024 (14:30 – 17:00)

EDB Ed. Centre E419



Pui Tak Canossian College
嘉諾撒培德書院

Partnership with HK Innovative Company

Resources

QEF / Innovation Lab

Cooperation

Synergy

Cost Effectiveness

How to calculate?

Build Up

A good foundation
People & Knowledge

Education Ideas

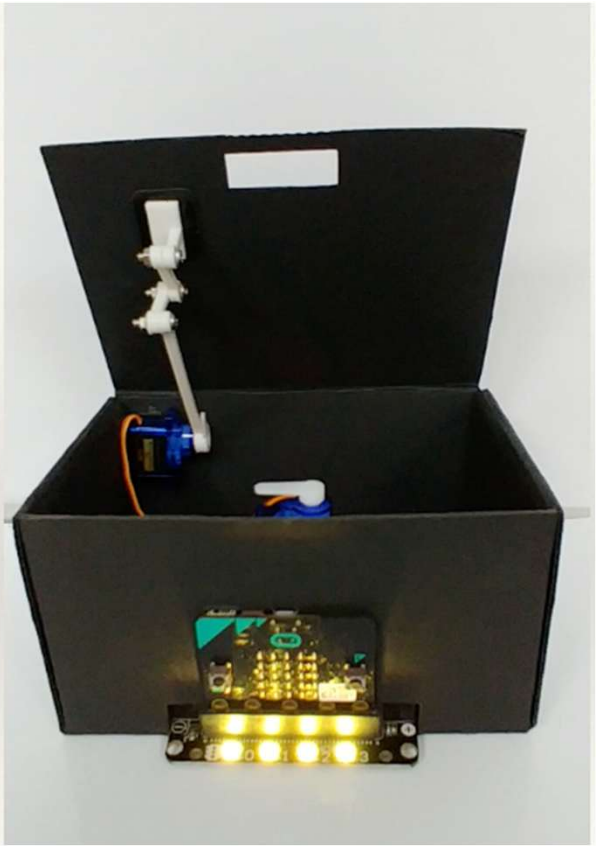
Valuable Products

Educational Ideas – Students' Interest & Needs
What are education goals?

2018 - 2019 S.2 LACP

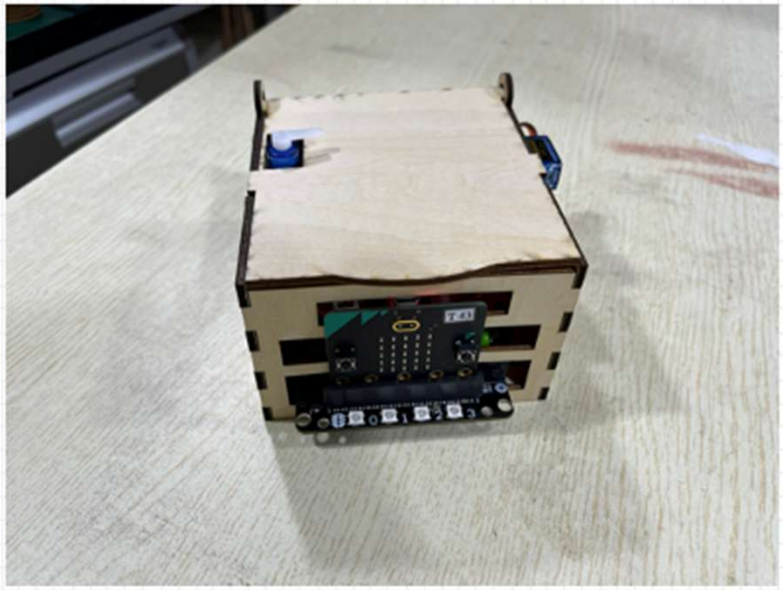
The IDEA

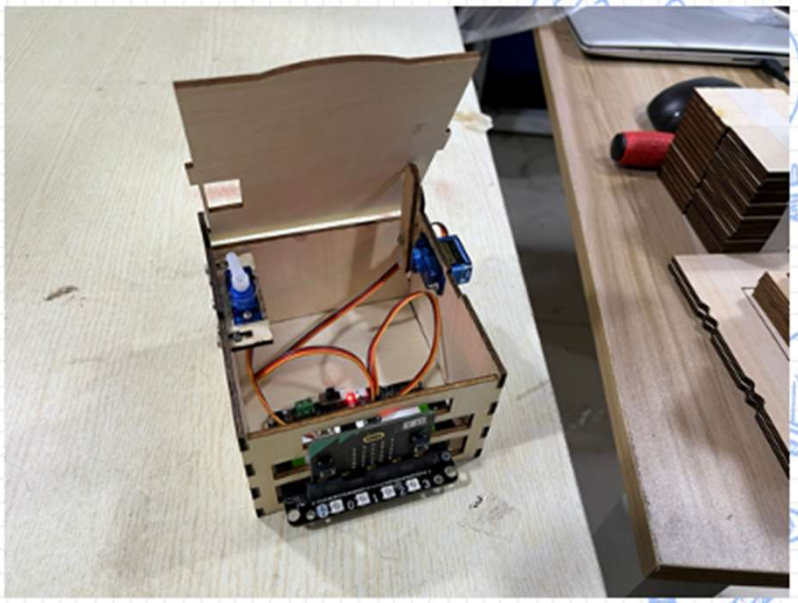
- The formation of the idea
  - Inspiration from the sharing of Mr Kwok Tsz Fung (Tin Ka Ping Secondary School)
- Discussion with STEM Team
  - Reflection on the experience of 2017 - 2018
- Help from 3D JollyFab
  - Hardware & Software Support



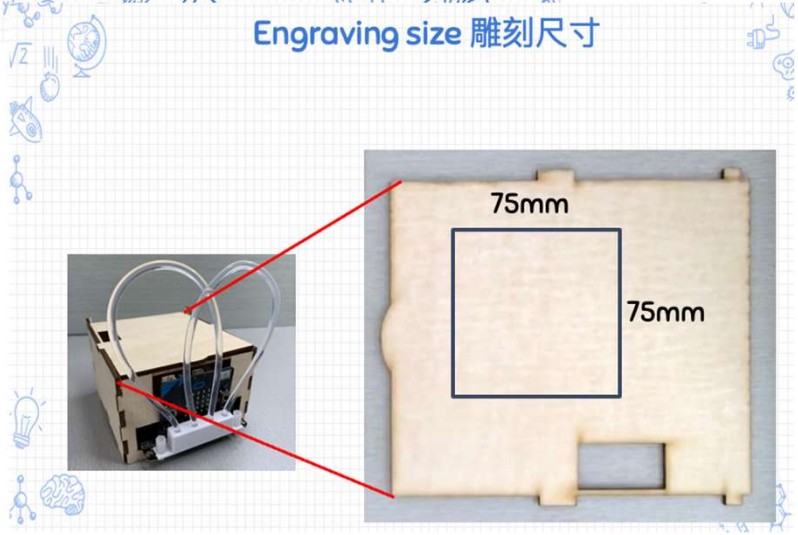
Educational Ideas – Students' Interest & Needs
How the ideas evolved?

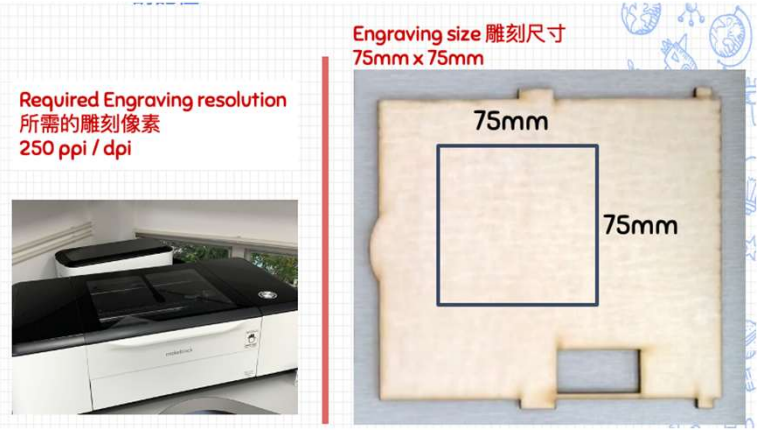
禮物盒製成品



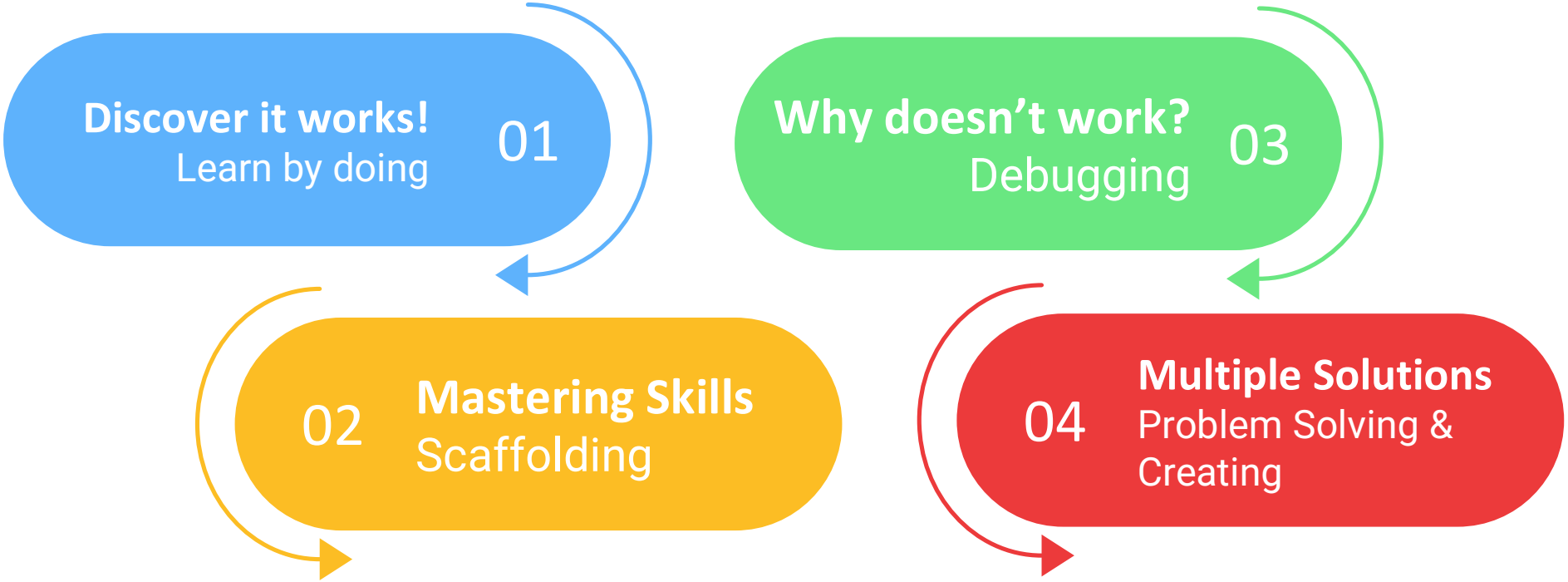


Educational Ideas – Students' Interest & Needs
How to further develop on the foundation?





Teaching with the learning STAGES in mind



LESSON STRUCTURE (50 MINS)

INTRODUCTION

5 minutes

DEMONSTRATION

10 minutes

MATERIALS & TASKS

5 minutes

HANDS ON WORK

20 minutes

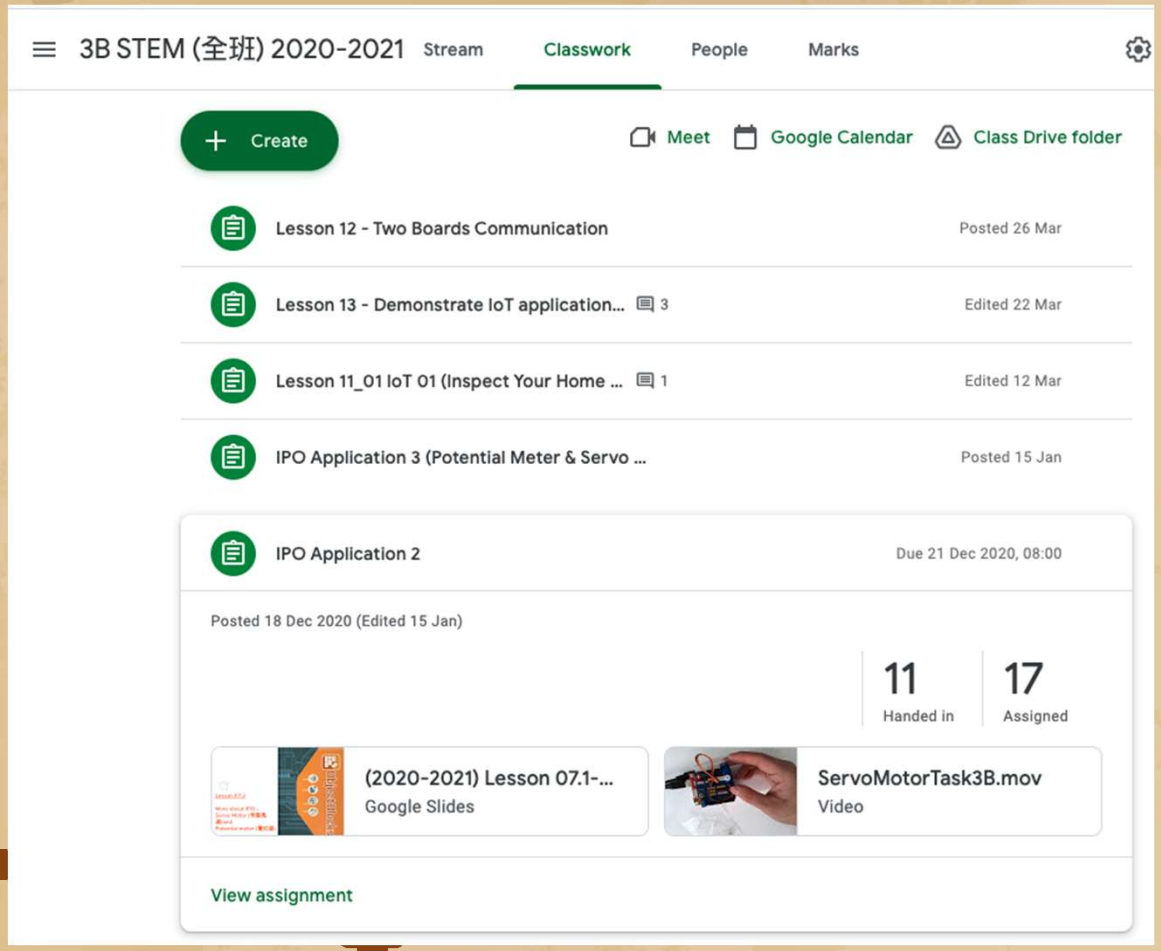
WORK SUBMISSION

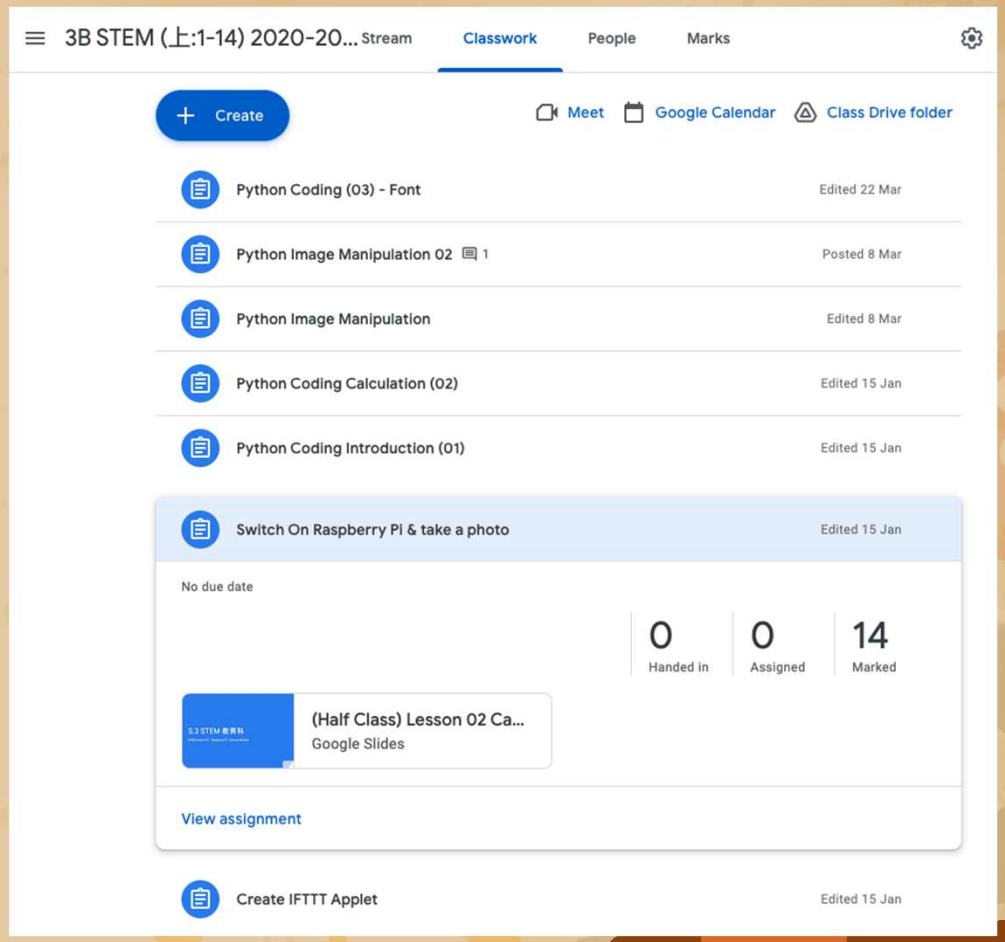
5 minutes

CONCLUSION

5 minutes

GOOGLE CLASSROOM

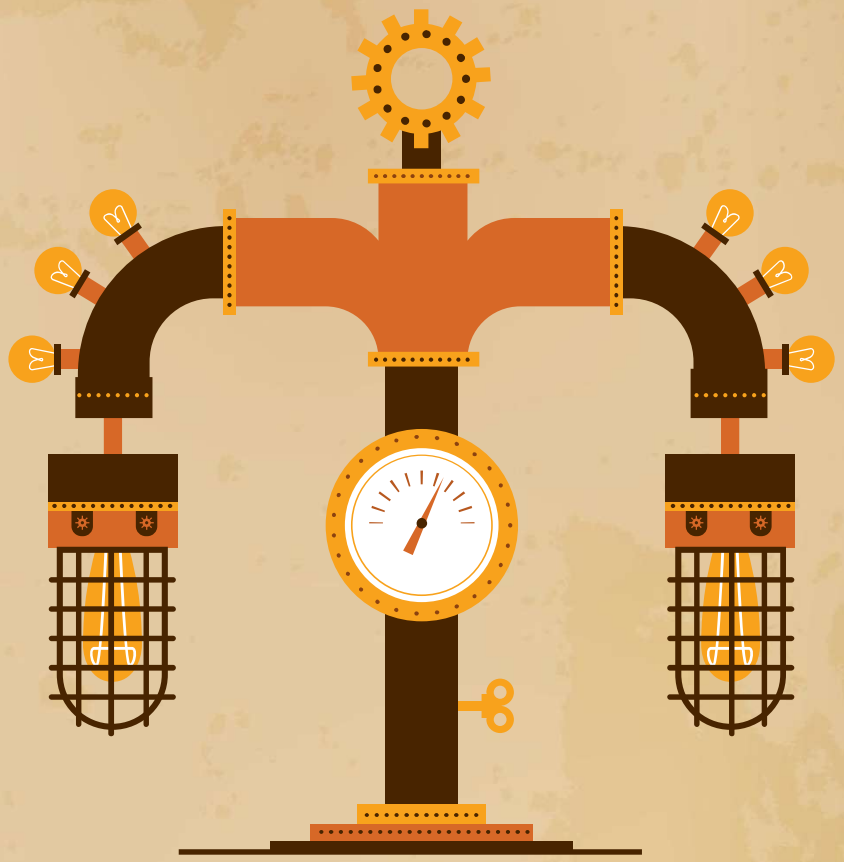




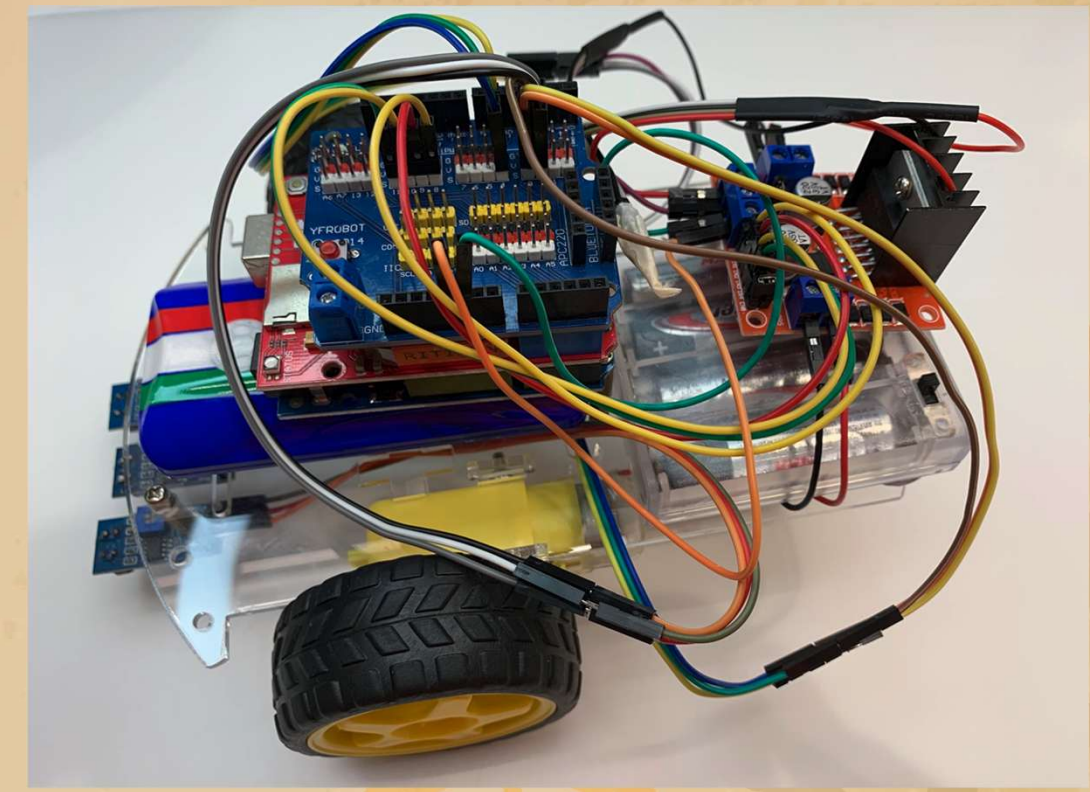

Celebrate Every
Tiny Victory
– Manoj Jain

WHY ARDUINO & OBJECTBLOCKS?

- An upgrade from Micro:bit
- Maker Culture
- Extensible
  - Resourceful
  - Parts from Taobao
  - Connect the future studies
- Manageable
  - BYOD (Platform on Tablet)
  - Password Issue
- Internet of Things (IoT) compatible



OBJECTBLOCKS CAR - PARTS FROM TAOBAO



CREATE YOUR OWN IPO APPLICATION

INPUT輸入

Button 按鈕
Potential Meter 電位器
Temperature Sensor 溫度感應器
Humidity Sensor濕度感應器
Light Sensor 光度感應器
Obstacle Sensor 障礙物感應器
Water Level Sensor 水位感應器
Sound Sensor 聲音感應器
Ultrasonic Sensor 超音波感應器

OUTPUT輸出

Servo Motor 伺服馬達
LED 燈
Buzzer 哮鳴器
7-Segment Display
LCD 16x2

MANAGEMENT TOOL - HOW IT WORKS?

STEM Lesson 08 (量度任務)

班別: ___ (___)

姓名: _____

問題一

量度不同的冷氣機出風口位的溫度:

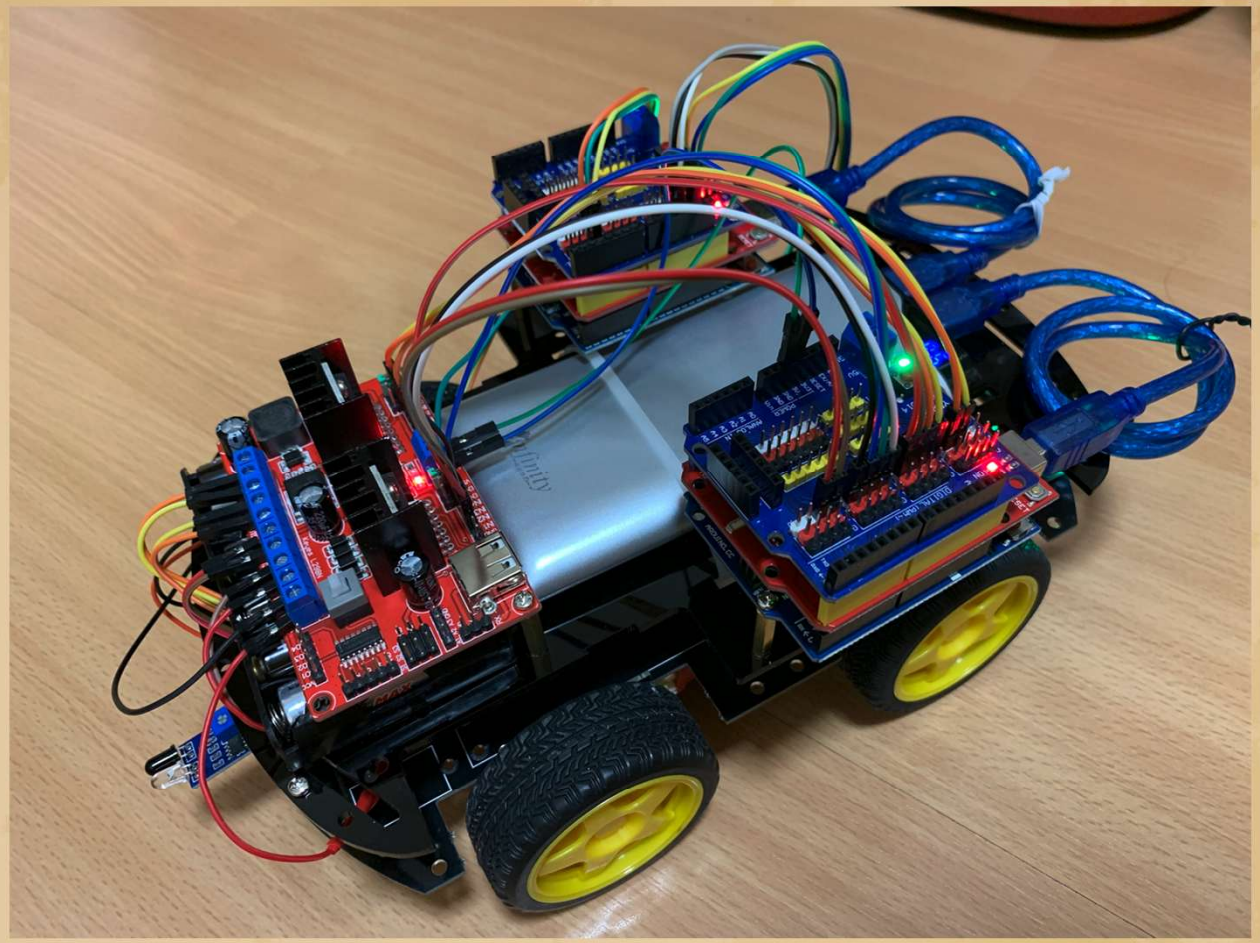
1) 溫度 (High Cool 8) = 6 度

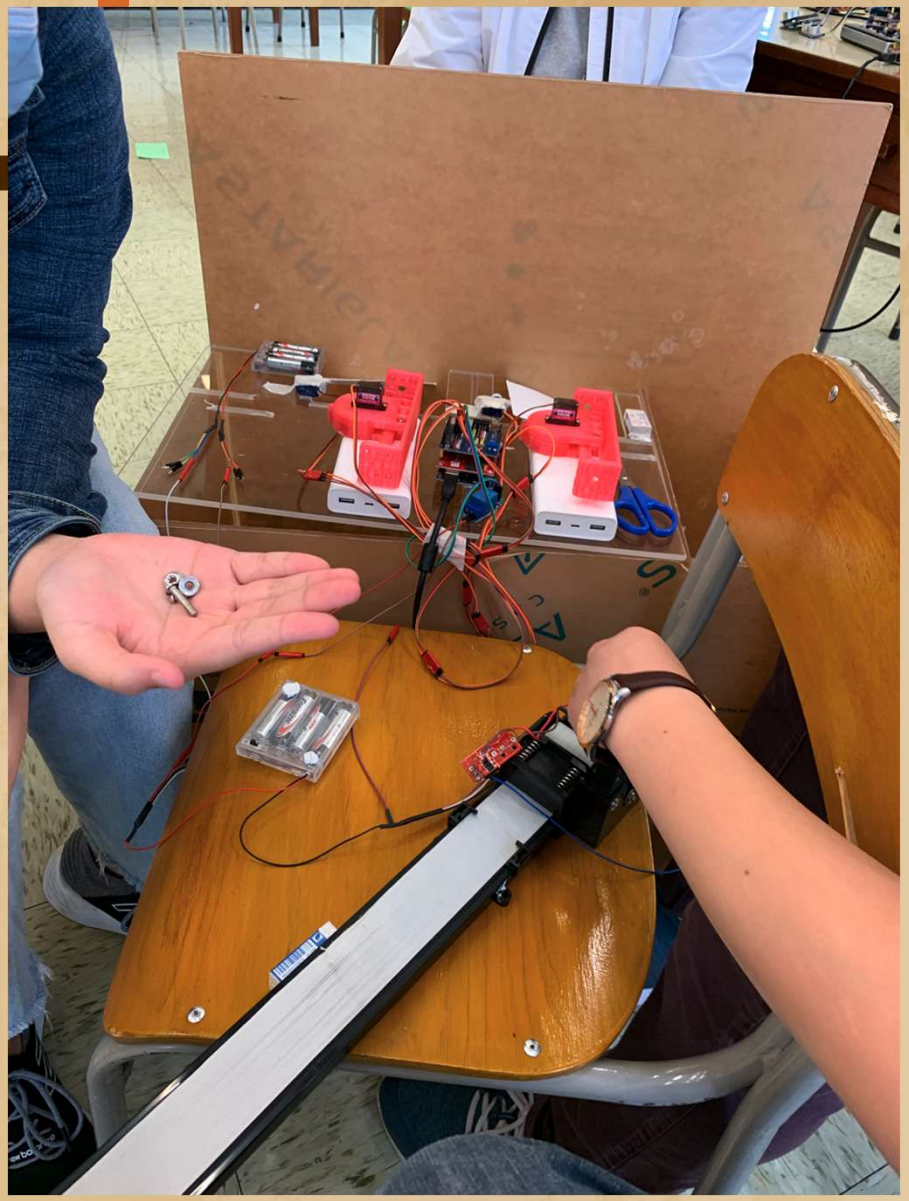
2) 溫度 (High Cool 5 = 17 度

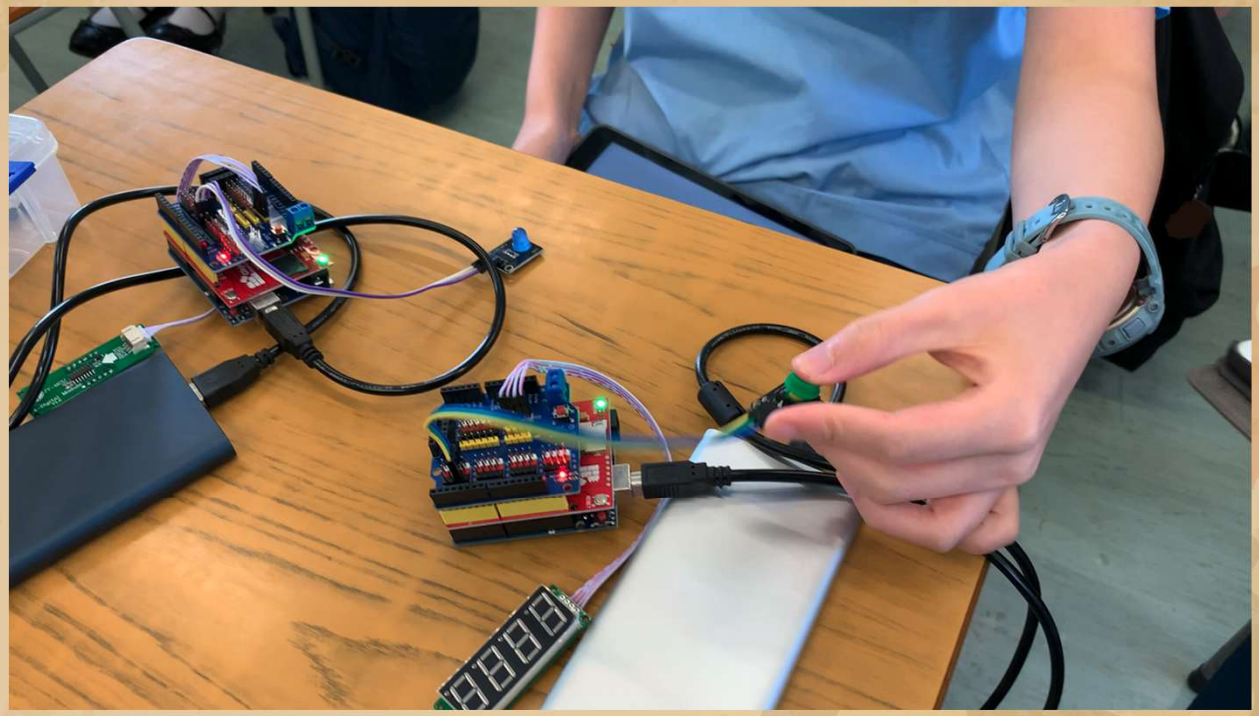
3) 溫度 (Low Cool 9) = 10 度

4) 溫度 (Low Cool 6) = 10 度

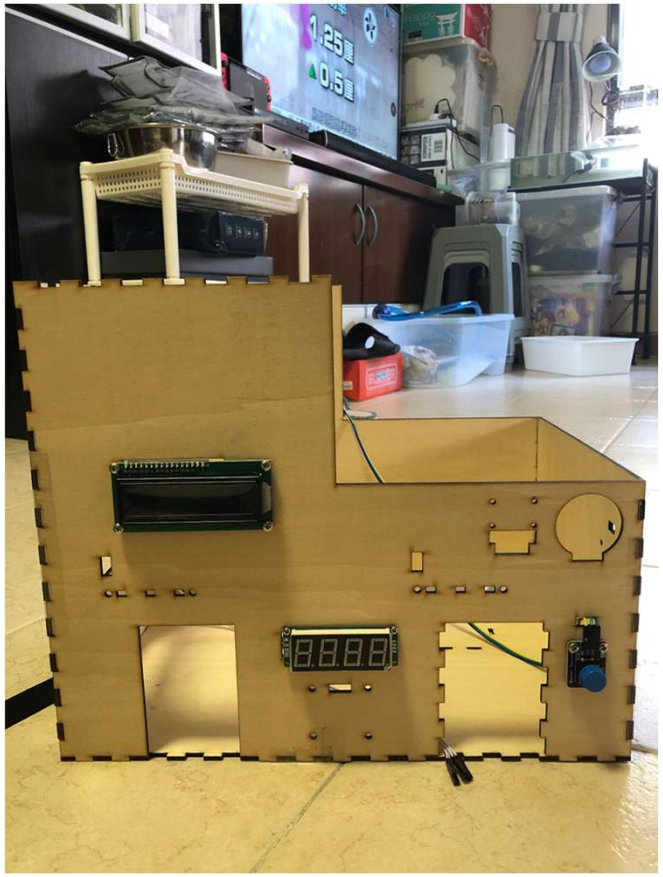

請勿關掉
或移動
Mr. Ho

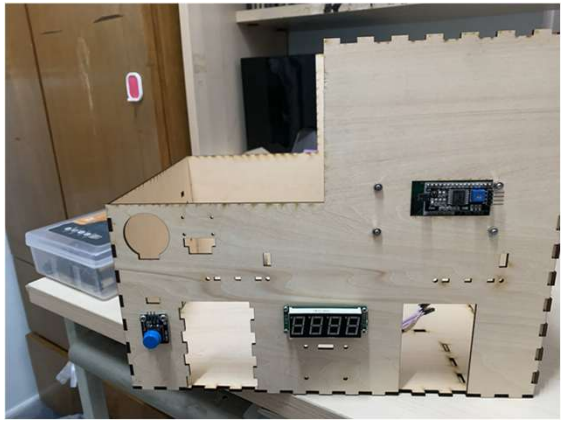






Maker Spirit: Persistent under pandemic





S43 嘉諾撒培德書院

中學 Secondary School | 智慧生活 Smart Living | 人工智能 Artificial Intelligence | 自動化設計 Automation Design

關於本攤位

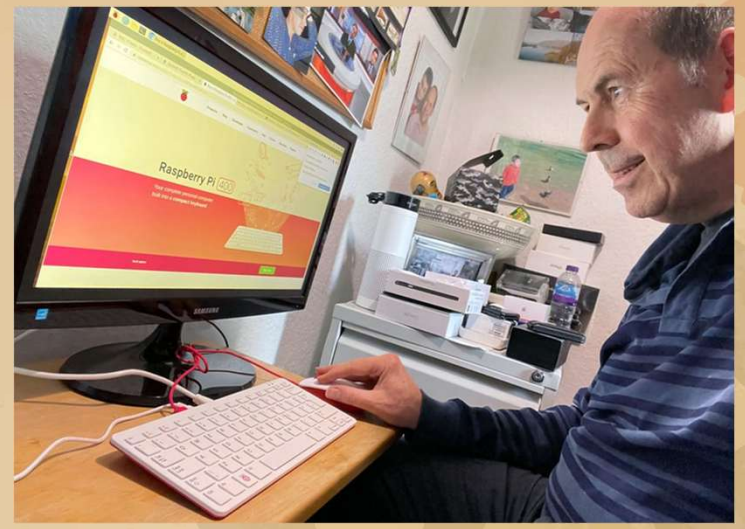
關於本攤位

培德智能家居
培德智能家居 – 以 Arduino, Objectblocks 和 Raspberry Pi 為基礎所設計的智能家居。除了各種的自動感應設備，小屋更配置了智能送貨區。現在網購盛行，智能送貨區能讓屋主遙距辨識送貨員的身份，且以即時生成的密碼讓他進入送貨區放下物件，達成無障礙交收！

送貨員只要 Scan 門口的 QR Code，再利用即時生成的密碼

What is a raspberry pi?

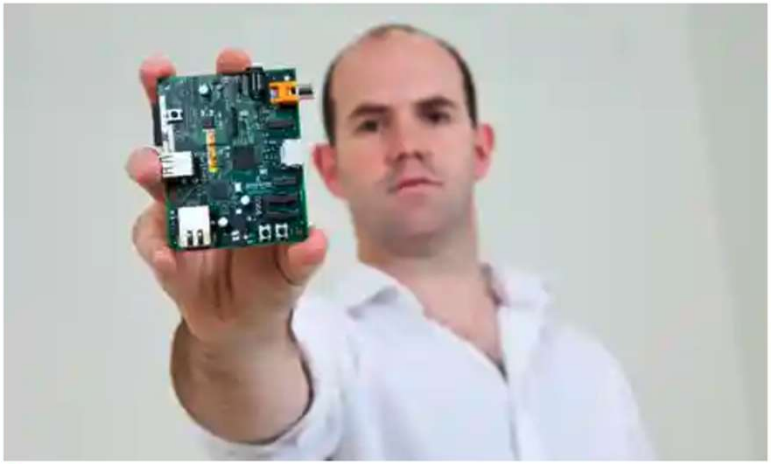
SINGLE BOARD COMPUTER



RASPBERRY PI - FOUNDED BY EBEN UPTON (2012-2-29 ON SELL)

Demand for Raspberry Pi, the British £22 computer, crashes website

Design intended to inspire schoolchildren and adults to program sees overwhelming demand as first versions go on sale



▲ Engineer Eben Upton with an earlier prototype of the Raspberry Pi computer, which is fully programmable and capable of running software such as Firefox. Photograph: Antonio Olmos

A new British computer that costs just £22 went on sale at 6am on Wednesday morning - and immediately sold out, crashing the websites selling it in the process.

The Raspberry Pi is intended to inspire a new generation of schoolchildren to learn to program, just as the Sinclair Spectrum and BBC Micro did in the 1980s, which led to the burgeoning UK games sector.

Historically we haven't really taught computer science in schools to any great degree, so we were getting our applicants from home computing in the hobbyist world.

"We've sold 25 million Raspberry Pi's now so it's a slightly different scale to what we imagined"

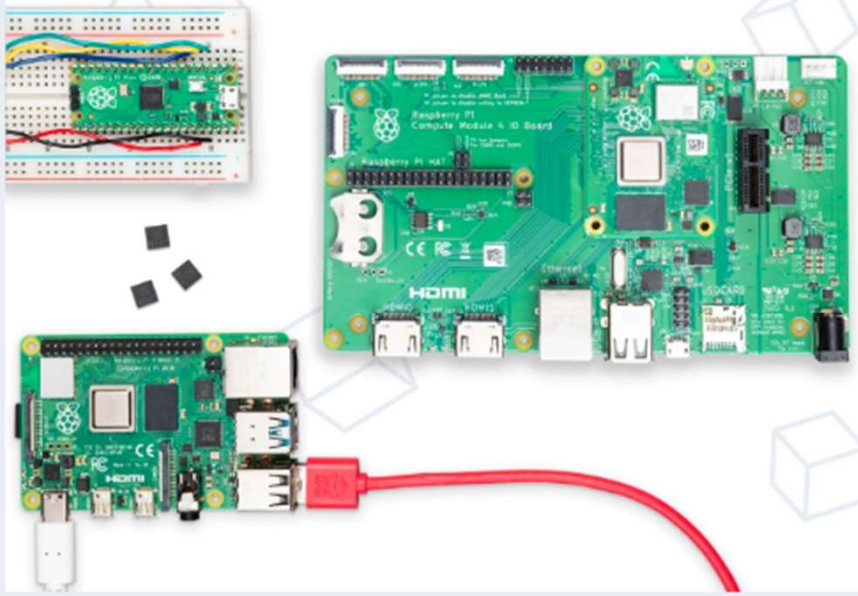
As home computing as a hobby declined during the 1990s, our supply of prospective undergraduates dried up. And really, the idea of Raspberry Pi was to see if we could reboot the home computing hobbyist world that used to exist in this country – and if we could reboot that, would it lead to an increase in the number of applicants.

QUICK BROWSE - RASPBERRYPI .ORG

Raspberry Pi Foundation

Learn Teach Research Computers About us

Donate

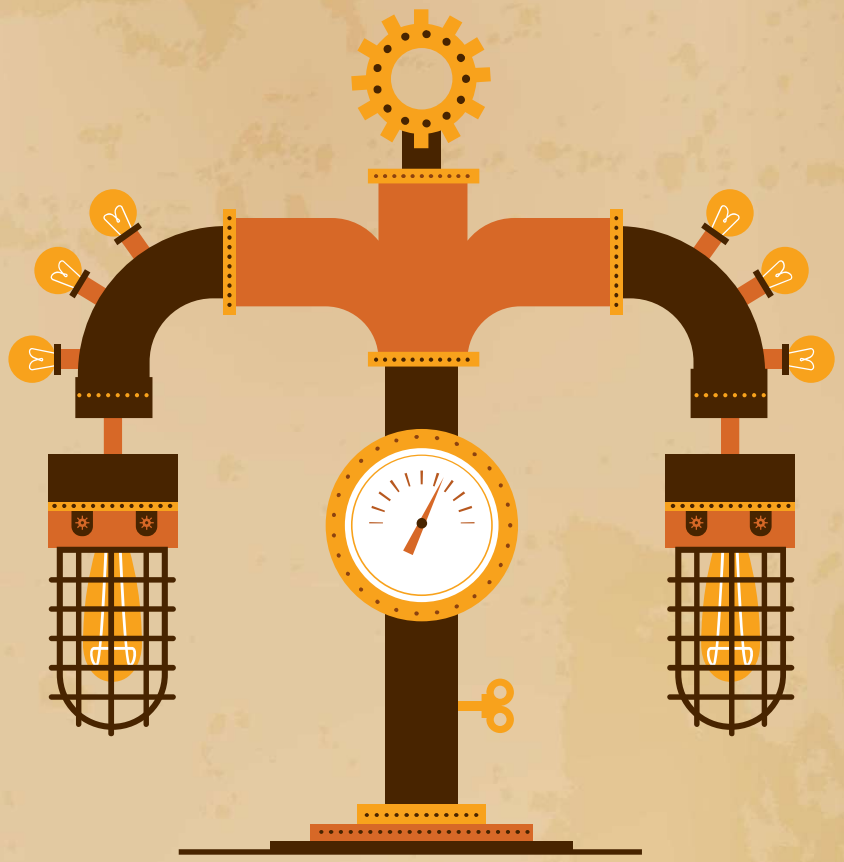


Find out more about our computers for home, industry and education at raspberrypi.com

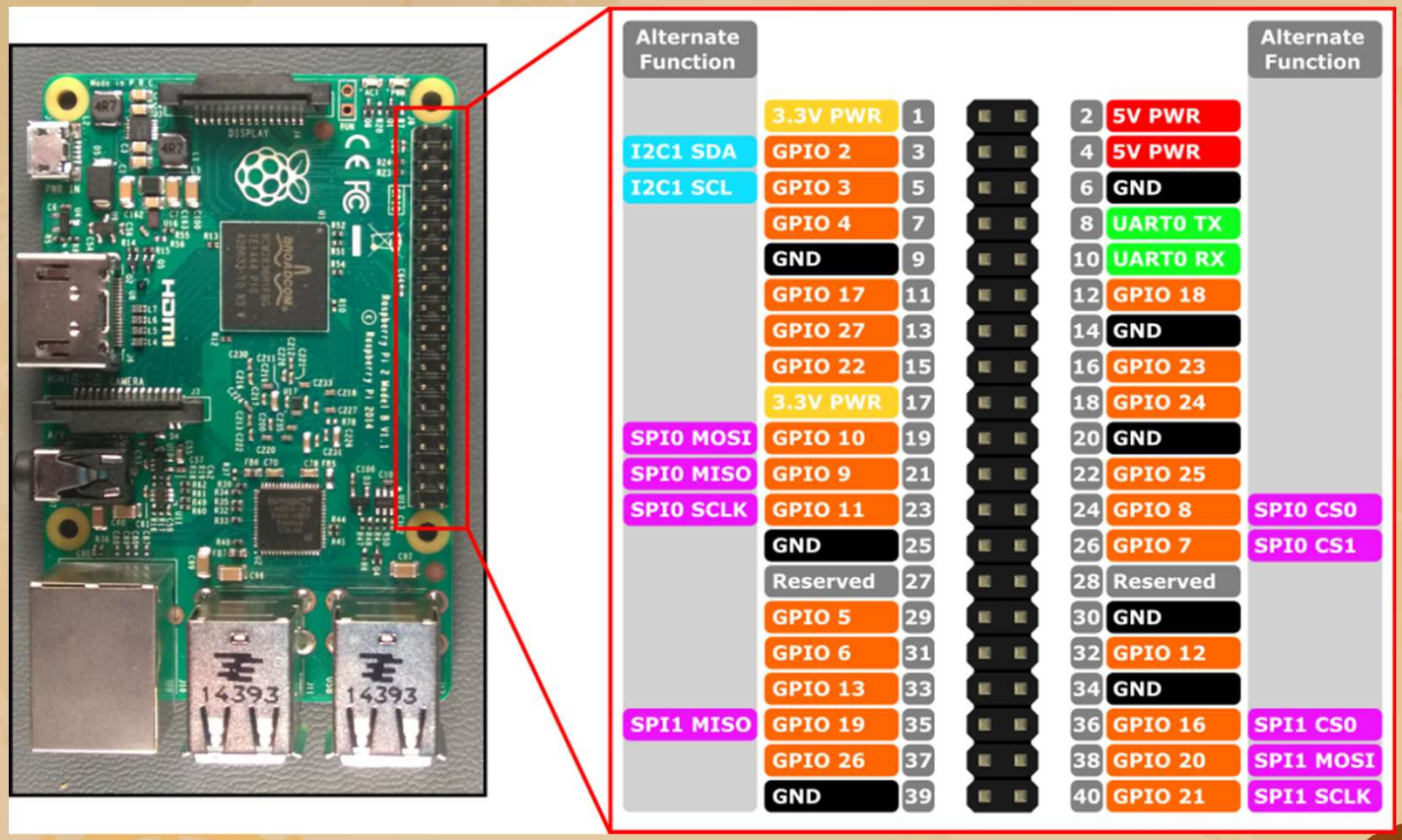
Visit raspberrypi.com

WHY RASPBERRY PI?

- Maker Culture consistency
  - Arduino to Raspberry Pi (Microcomputer set to Computer)
- Computer versus Tablet
  - Student Experience
  - Value of a desktop/laptop computer
  - Road to a software/hardware developer



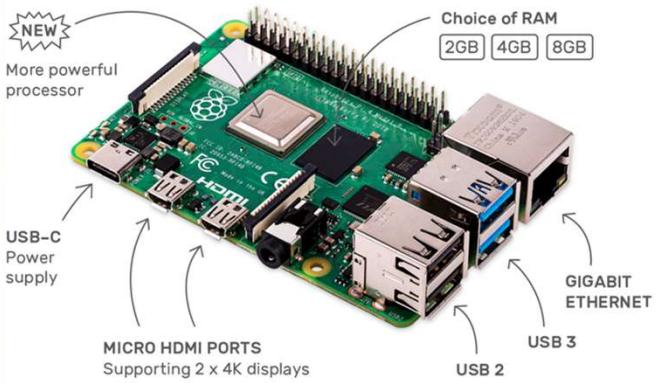
COMPUTER ED CONNECT WITH MAKER CULTURE (40 PIN GPIO)



RASPBERRY PI - MODELS & SPECIFICATIONS (4)

Completely upgraded, re-engineered

Faster, more powerful



You'll recognise the price along with the basic shape and size, so you can simply drop your new Raspberry Pi into your old projects for an upgrade; and as always, we've kept all our software backwards-compatible, so what you create on a Raspberry Pi 4 will work on any older models you own too.

Specifications

- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz
- 2GB, 4GB or 8GB LPDDR4-3200 SDRAM (depending on model)
- 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE
- Gigabit Ethernet
- 2 USB 3.0 ports; 2 USB 2.0 ports.
- Raspberry Pi standard 40 pin GPIO header (fully backwards compatible with previous boards)
- 2 × micro-HDMI ports (up to 4kp60 supported)
- 2-lane MIPI DSI display port
- 2-lane MIPI CSI camera port
- 4-pole stereo audio and composite video port
- H.265 (4kp60 decode), H264 (1080p60 decode, 1080p30 encode)
- OpenGL ES 3.0 graphics
- Micro-SD card slot for loading operating system and data storage
- 5V DC via USB-C connector (minimum 3A*)
- 5V DC via GPIO header (minimum 3A*)
- Power over Ethernet (PoE) enabled (requires separate PoE HAT)
- Operating temperature: 0 – 50 degrees C ambient

* A good quality 2.5A power supply can be used if downstream USB peripherals consume less than 500mA in total.

Raspberry Pi OS

Your Raspberry Pi needs an operating system to work. This is it. Raspberry Pi OS (previously called Raspbian) is our official supported operating system.

Install Raspberry Pi OS using Raspberry Pi Imager

Raspberry Pi Imager is the quick and easy way to install Raspberry Pi OS and other operating systems to a microSD card, ready to use with your Raspberry Pi. Watch our 45-second video to learn how to install an operating system using Raspberry Pi Imager.

Download and install Raspberry Pi Imager to a computer with an SD card reader. Put the SD card you'll use with your Raspberry Pi into the reader and run Raspberry Pi Imager.

Download for macOS

Download for Windows

Download for Ubuntu for x86

OTHER PARTS

AGI Class 10 UHS-1 TF138 MicroSD Card 16GB

(High Speed Class 10 UHS-1 16GB)

成為第一位評分的人 讚好 0 分享

種類： MicroSD 速度： Read 55MB/s, Write 20MB/s

容量： 16GB

以上項目資料及價格僅供參考，如發現資料有誤，歡迎指正以便我們了解及跟進。

Xiaomi 小米 充電寶 20000mAh 50W PB200SZM

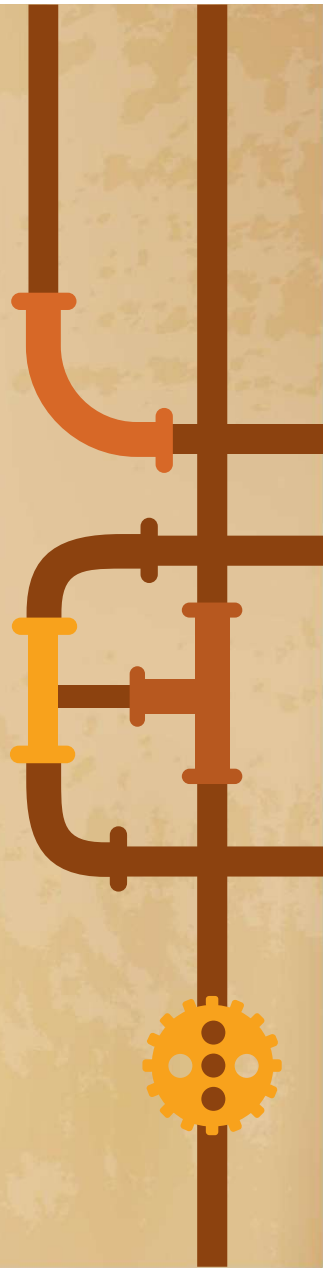
讚好 0 分享

類型： 外置電 電池容量： 20000mAh

以上項目資料及價格僅供參考，如發現資料有誤，歡迎指正以便我們了解及跟進。

REMARKS on MONITOR

OTHER POTENTIAL: AI EDUCATION



RASPBERRY PI - AI

Part 2 - How to Run TensorFlow Lite Object Detection Models on the Raspberry Pi (with Optional Coral USB Accelerator)

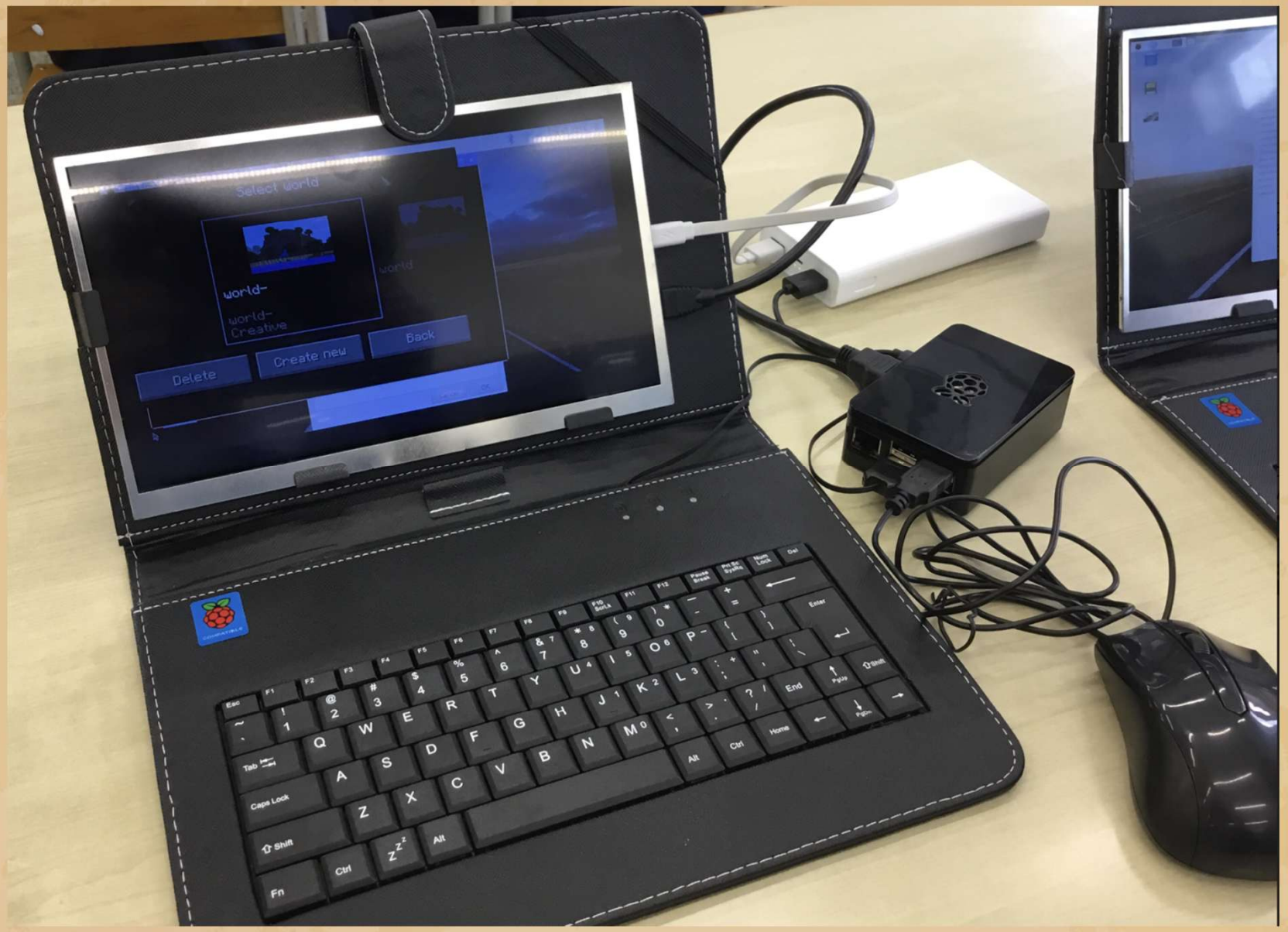
Introduction

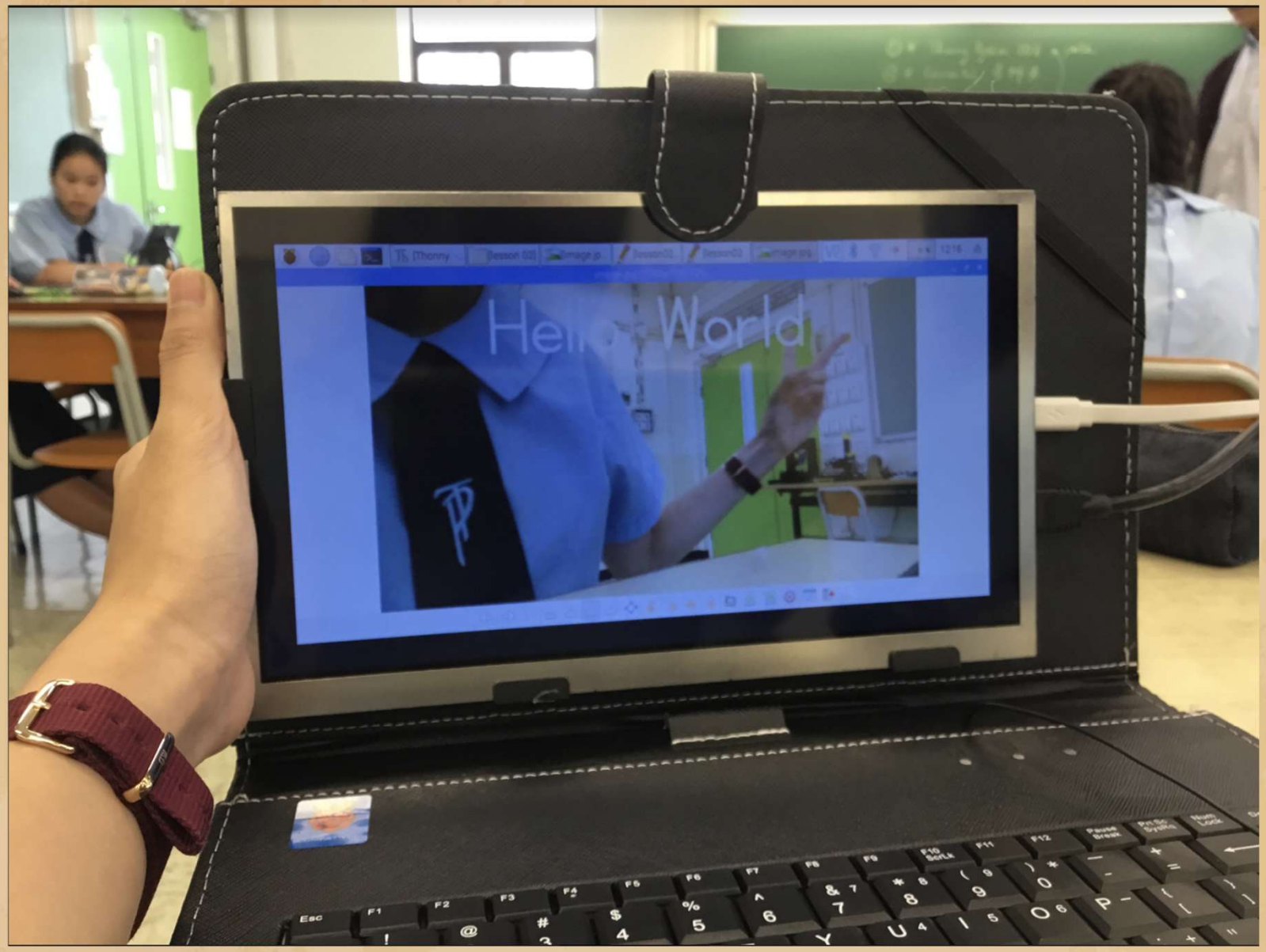
This guide provides step-by-step instructions for how to set up TensorFlow Lite on the Raspberry Pi and use it to run object detection models. It also shows how to set up the Coral USB Accelerator on the Pi and run Edge TPU detection models. It works for the Raspberry Pi 3 and Raspberry Pi 4 running either Rasbpian Buster or Rasbpian Stretch.

This guide is the second part of my larger TensorFlow Lite tutorial series:

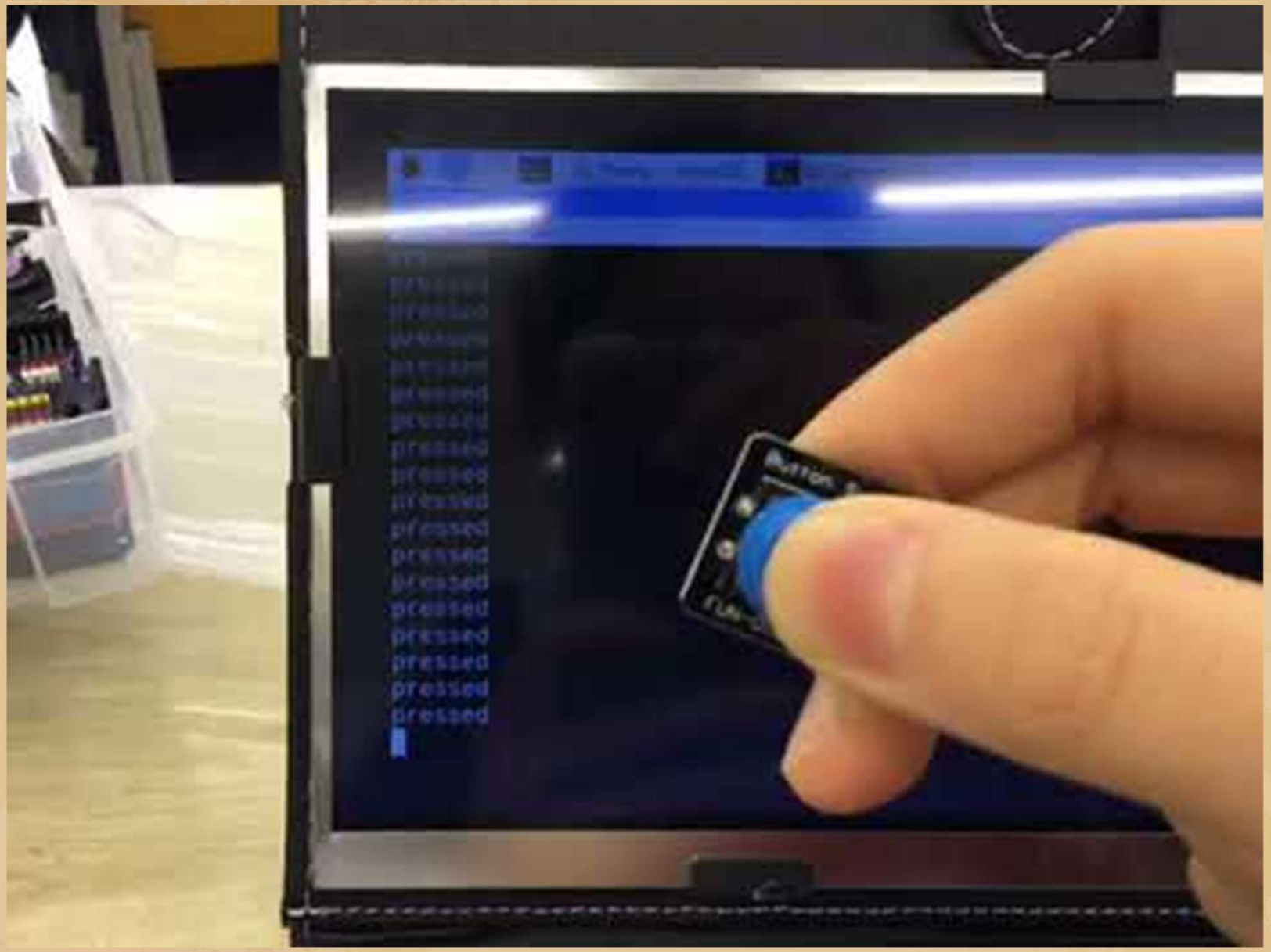
1. How to Train, Convert, and Run Custom TensorFlow Lite Object Detection Models on Windows 10
2. How to Run TensorFlow Lite Object Detection Models on the Raspberry Pi (with Optional Coral USB Accelerator) *<--- You are here!*
3. How to Run TensorFlow Lite Object Detection Models on Android Devices

LESSON & ASSIGNMENT PHOTOS & VIDEOS


Select world
world-
world-
Creative
world
Delete
Create new
Back


World


End
Home
Ctrl


pressed
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Button Switch
Tab
Q
A
S
D
F
G
H
Z
X
C
V
B
Alt


I am Kelly!
Here is 501

Raspberry Pi + ObjectBlocks Powered

嘉諾撒培德書院倆學生
研發智能購物系統
幫助長者輕鬆購物

（本報專題）「學校位於香港仔，聚居了不少長者，經常放學途徑商場時，見到不少長者在超級市場的收銀台前大排長龍，也不會選擇使用自助收銀機，當時想，若能夠設計一款容易結賬的購物系統，便可以疏導人流。」就讀嘉諾撒培德書院的中三生蔡慧喬說，近日她與另一中三生韓以趙研發了一套「智能購物系統」，幫助長者輕鬆購物。

只須三個步驟：把貨品放進「智能購物系統」購物籃，在籃子內裝置的平板電腦輸入貨物的數量，再按下結賬便完成購物。這套由蔡慧喬及韓以趙研發的「智能購物系統」，在「創協盃」創意科技機械人大賽電子科技創新設計比賽榮獲高級組冠軍，以及高級組最佳智能科技應用獎。她倆均認為，參與STEM比賽，認識到把科技應用到生活，提升自己對科技教育的興趣。

幫助長者生活需要

南區人口持續老化，根據香港政府統計處資料顯示，居於南區的65歲以上長者，由2018年的42,900人，至2021年上升至52,400人，數字在同區相比其他年齡層最高。蔡慧喬和韓以趙留意到南區人口老化的情況，顧及到長者平日外出購物，經常花上很長時間排隊付款的不便，部份店舖設置的自助收銀機服務因程序繁複令長者卻步。

為方便長者，縮短購物輪候時間，將智能購物系統安裝於購物籃或手推車，顧客只須把貨品放置在設有智能購物系統的籃子上，不用排隊便可以結算付款，吸引長者使用科技。

生活科技活學活用

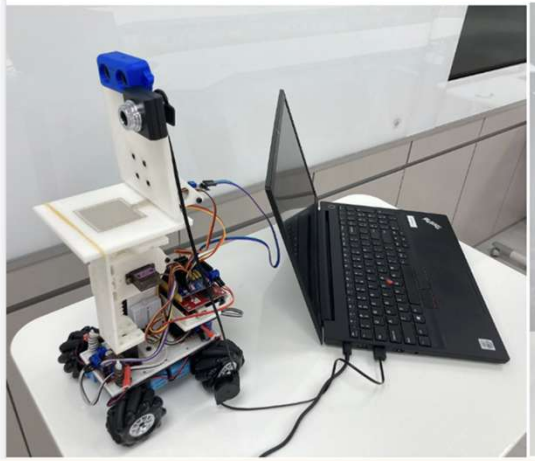
韓以趙說明智能購物系統時指出，顧客先將貨品放置於購物籃的背景板前，便會由內置的微型電腦Raspberry Pi的AI圖像識別系統，透過小型鏡頭偵測以識別貨品，當AI成功識別貨品後，資料傳送到雲端，運用Object-Blocks讀取資料，最後使用編程計算需要的價錢，在Dashboard（儀表板）中顯示貨品價錢和貨品數量，消費者可從Dashboard中選擇數量再付款。（下接第15版）

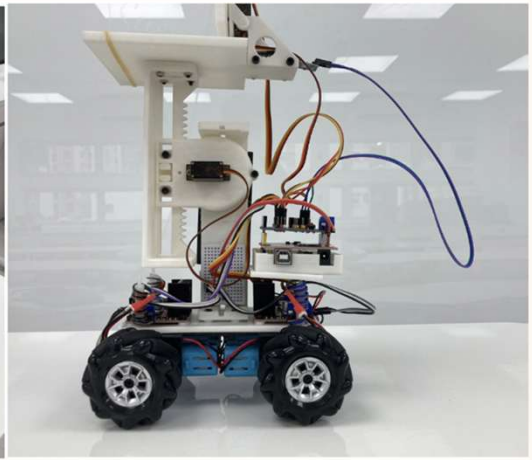
計比賽榮獲高級組冠

ObjectBlocks Powered

Pui Tak Canossian College
7月25日 ·

一如往年，STEM 學會的同學（肖婷、李巧言、王瑞雪）於思科解難挑戰賽中獲取了佳績！由於疫情關係，本屆比賽只設傑出表現獎而不設冠、亞、季軍。同學於眾多的對手中脫穎而出，獲得了頭 10 名的傑出表現獎。👏👏同學的成品 -「智能學習椅」設計獨特，除了巧妙地運用物聯網技術外，更加入了人工智能元素以幫助同學矯正坐姿、減少患都市病的機會。
大會網址：https://cicgps.hkace.org.hk/
同學的參賽影片：https://www.youtube.com/watch?v=nl3c3ob7D98





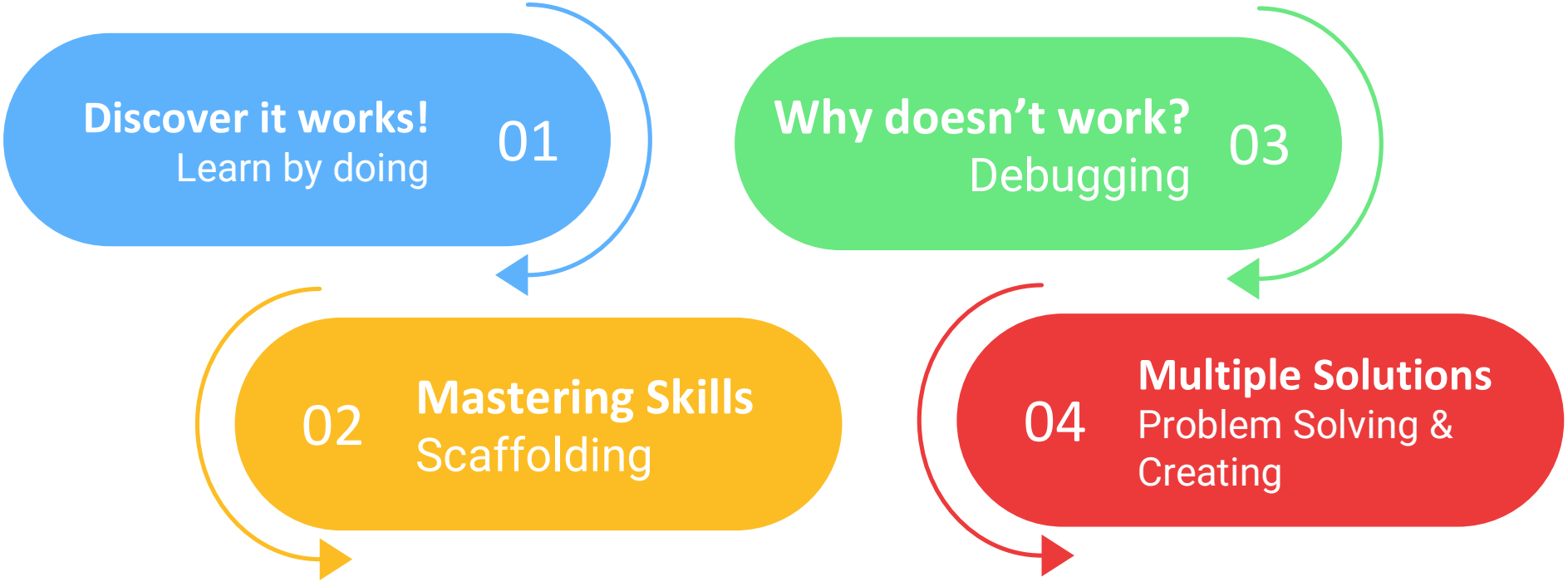
ObjectBlocks Powered

Pui Tak Canossian College
8月5日 20:33 ·

🏆培德 STEM 獎項停不了！

中四的吳芷澄、謝卓琳、黃希瑤憑作品「Reborn 家用再做紙機」和中五董詠琳、梁彤瑤、柯曉晴的「溫馨小居」在由「香港中文大學工程學院創新科技中心」主辦的「三菱電機綠色科技創意大賽2022」中獲得了中學組「亞軍」和「季軍」。他們的創意作品、充滿自信的匯報和即場的精彩示範獲得了評審的一致讚賞，並成功突圍而出。👏👏
恭喜各得獎同學！再一次證明，培德確是一個孕育創客的好地方。

Teaching with the learning STAGES in mind



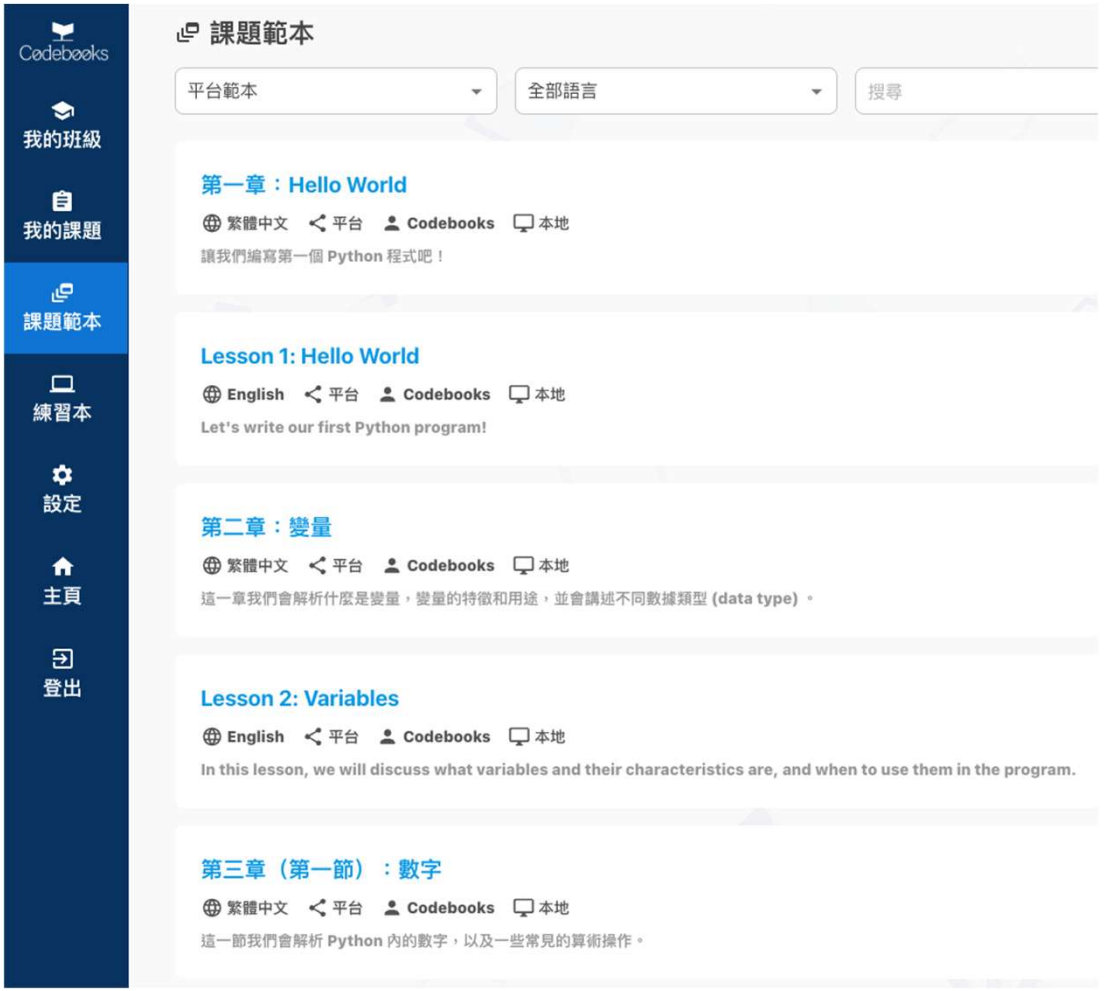
Latest Updates on our STEAM Curriculum

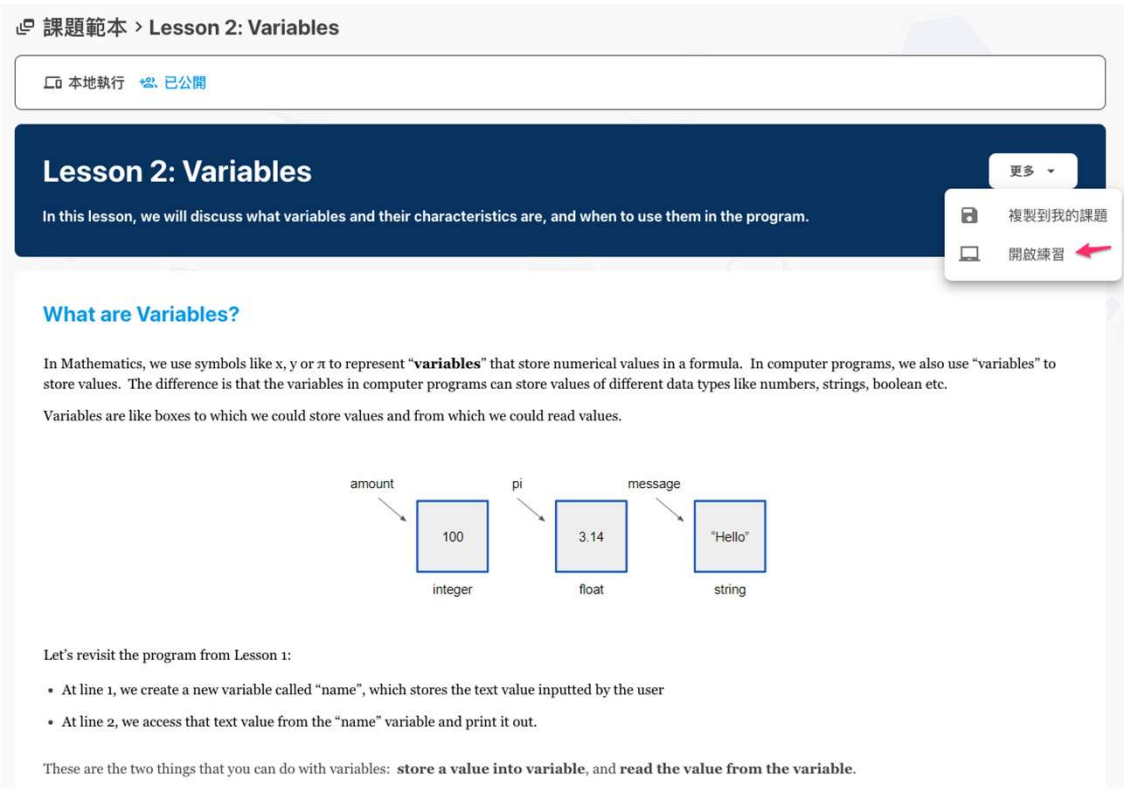
Python學習平台

為老師及初學編寫程式學生而設計的Python學習平台

立即加入

Build your curriculum (start from scratch or start from something)





Build from programmers
Not textbook writers

[redacted]

EDUCATION BUREAU CIRCULAR MEMORANDUM NO. 109 /2023

From : Secretary for Education

To : Heads of Government, Aided (including Special Schools), Caput and Direct Subsidy Scheme (DSS) Schools

Ref. : EDB/CSD/TE/08-40/01

Date : 19 June 2023

Curriculum Modules on Innovation and Technology Education -
"Enriched Module on Coding Education for Upper Primary Level" and
"Module on Artificial Intelligence for Junior Secondary Level"

Summary

The purpose of this circular memorandum is to announce the two captioned modules for adoption by schools to further promote innovation and technology (I&T) education.

Module on Artificial Intelligence for Junior Secondary Level

Learning and Teaching Resources

Description		English Version	Chinese Version
Module on Artificial Intelligence for Junior Secondary Level (Booklet 1) (Last update on 31.07.2023)	Booklet 1, Powerpoint, Worksheet	Details	詳細資料
Module on Artificial Intelligence for Junior Secondary Level (Booklet 2) (Last update on 31.07.2023)	Booklet 2, Powerpoint, Worksheet	Details	詳細資料
Module on Artificial Intelligence for Junior Secondary Level (Booklet 3) (Last update on 31.07.2023)	Booklet 3, Powerpoint, Worksheet	Details	詳細資料

Curriculum Analysis

1. Introduction to AI, AI Basics(I) & (II)
2. AI Ethical Issues
3. Computer Vision (I) & (II) & (III)
4. Computer Speech and Language (I) & (II)
5. AI and Computer Simulations (I), (II)
6. AI in Robotic Reasoning (I) & (II) & (III)
7. AI and Future of Work (I) & (II)
8. Societal Impact of AI (I) & (II)
9. Group Project Design, Development and Presentation (I) & (II)

Booklet 1	7 lessons; 35 minutes each • Introduction to AI • AI Basics (I) • AI Ethical Principles • Computer Vision (I) • Computer Speech and Language (I) • AI and Computer Simulation (I) • AI in Robotic Reasoning (I)
Booklet 2	8 lessons; 35 minutes each • AI Basics (II) • AI Ethical Issues • Computer Vision (II) • Computer Speech and Language (II) • AI in Robotic Reasoning (II) • AI and Future of Work (I) • Societal Impact of AI (I) • Group Project Design, Development and Presentations (I)
Booklet 3	6 lessons; 35 minutes each • Computer Vision (III) • AI and Computer Simulation (II) • AI in Robotic Reasoning (III) • AI and Future of Work (II) • Societal Impact of AI (II) • Group Project Design, Development and Presentations (II)

Curriculum Analysis

1. Introduction to AI, AI Basics(I) & (II)

- *Machine Learning versus Computer Programming*
  - *AI in Robotic Reasoning (Rule-based vs Knowledge-based)*
- *Google Platforms, Colab, Edge Impulse*

2. Computer Vision (I) & (II) & (III)

- *How do computers "see" things? Ideas of CNN; Features Extraction*
  - *AI and Computer Simulation (Simulator & Generative AI)*
- *Google Platforms, Colab, Donkey Car*

3. Computer Speech and Language (I) & (II)

- *Natural Language Processing (NLP)*
- *ChatGPT (Generative Pre-trained Transformer)*
- *Google Colab, k12GPT.ai*

Booklet 1	7 lessons; 35 minutes each • Introduction to AI • AI Basics (I) • AI Ethical Principles • Computer Vision (I) • Computer Speech and Language (I) • AI and Computer Simulation (I) • AI in Robotic Reasoning (I)
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Concept Mapping

Simplified Key elements

1. Introduction to AI, AI Basics(I) & (II)

- *Machine Learning versus Computer Programming*
  - *AI in Robotic Reasoning (Rule-based vs Knowledge-based)*
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- *Natural Language Processing (NLP)*
- *ChatGPT (Generative Pre-trained Transformer)*
- *Google Colab, k12GPT.ai*

Important AI & Related Concepts

Machine Learning

Supervised Learning

Edge AI / On-device AI

Extract Image Features and Convolution Neural Network

TensorFlow Lite

GANs (Generative Adversarial Network)

Natural Language Processing (NLP)

Prompt Engineering

Teaching A.I.
in a maker culture-centred curriculum

HANDS-ON PRACTICE

EXPERIENCE TO LEARN

Understand my teachers

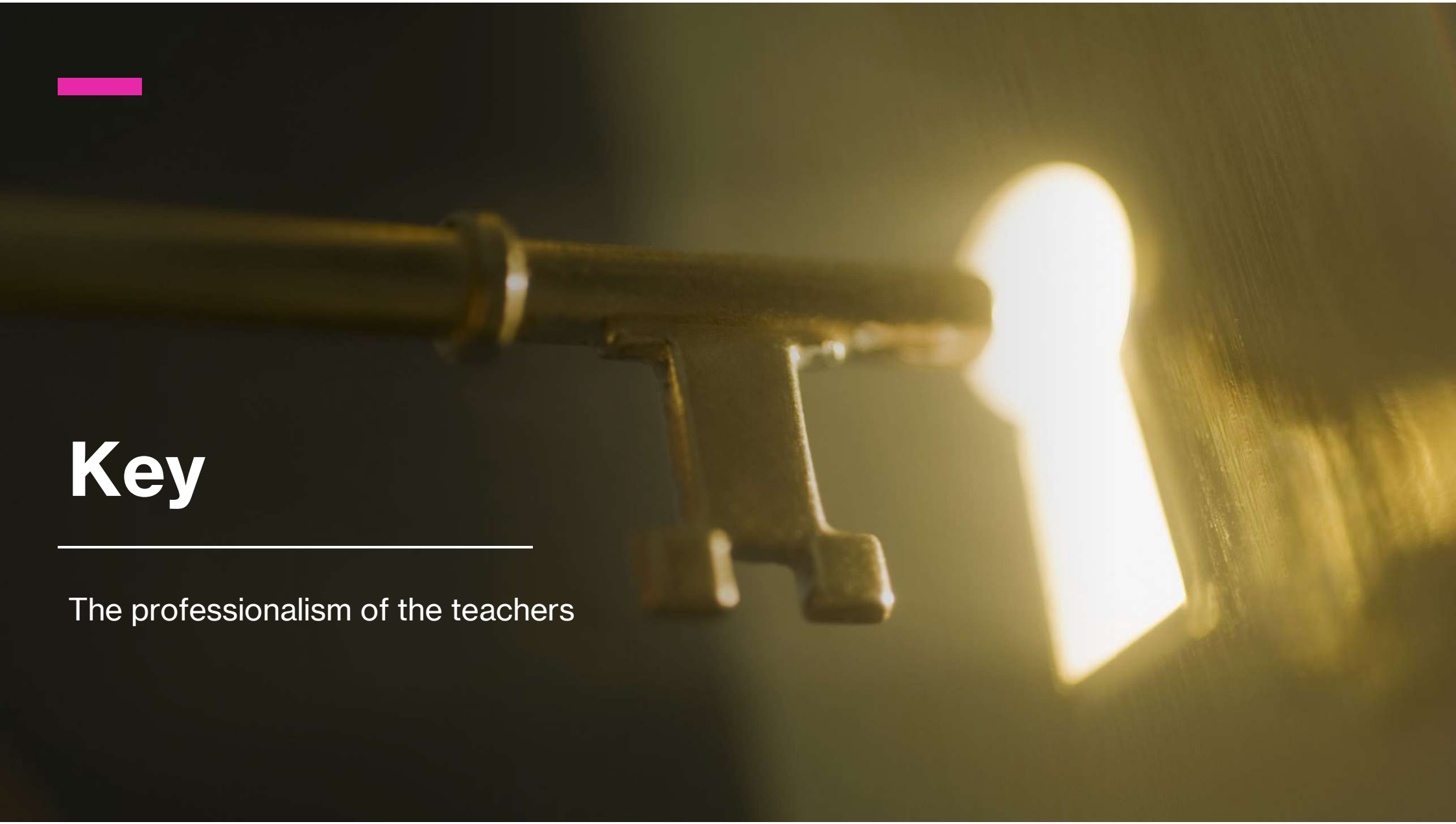
Worries

Realization and exploration of the potential of Generative AI

- Visual Arts
- Chinese Language
- English Language
- Economics

Tools and Platforms

- ChatGPT, POE, Copilot, Midjourney, Stable Diffusion...
- **k12GPT.ai**



Key

The professionalism of the teachers

Major Paradigm Shift

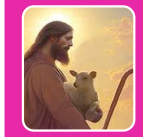
1
- Teacher is the master of knowledge.
- Role: Knowledge Deliverer

Google大神

2
- Teacher is the master of skills.
- Role: Skills Trainer

7 x 24 Tutor

3
- Teacher is a master learner.
- Role: Learning Tour Guide & Companion



Shepherd

k12GPT.ai

聚焦解難、培養創客、讓 STEAM 融入至全校的發展細胞中

Canossian Daughters of Charity

Girls' School

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Mr Ho Cheuk Pun John 何卓彬助理校長

- hcp@ptcc.edu.hk, 92269851
- Assistant Principal, IT & STEM Coordinator

Mr Lee Kwan Yu 利昆諭主任

- blky@ptcc.edu.hk, 68550536
- STEM & IT in Education Team Coordinator
- Junior Science & Physics Panel Head

優秀教師選舉2023

「教育管理組」參選報告分享

Pui Tak Canossian College
嘉諾撒培德書院