



Application of Generative AI: Development and Challenge in Computational Thinking

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Training up an Engineer

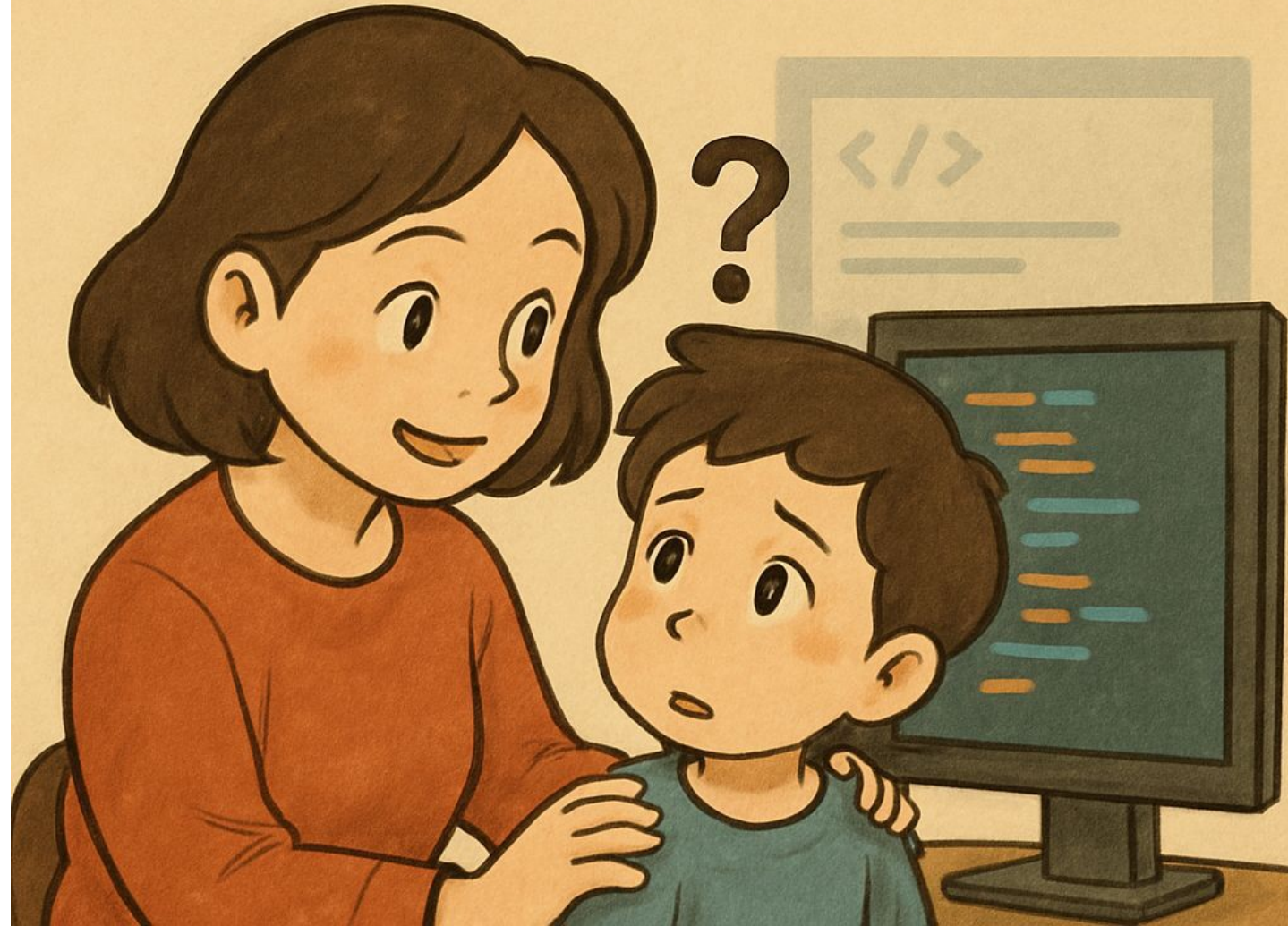
Working with programming teams and interests club in a secondary school

Two Types of Engineer in IT

1. Competitive Programming
2. Application Programming

Will they be replaced by AI ?

WILL I BE AN ENGINEER?



What is Competitive programming

Competitive Programming

- Elite students' battlefield

The **most difficult** programming contest
in the world

- Students receive training from university professors in most countries/regions.

IOI

EGOI
(Girls only)

APIO

NOI

HKOI



ICT Hall of Fame
(WYHK)

Rewarding result

Really good HKDSE ICT result

Unleashing a career potential:

- Top universities offer
- Big tech (FAANG)
- iBanker



2024-25
(WYK)



Dilemma

“I understand only DSE-level programming.”

“I don’t know competitive programming.”



In a recess...

Walk with the students

Vision:

Your time and companionship are crucial

- Talented students
- Share same vision
 - Finding buddies

My previous school

Year	2014
Score	5
School rank	-

Wah Yan College

Year	2021
Score	5
School rank	-

Progress

We all started humbly.
It takes years to build up a team.

IOI Gold-medalist training camp (2024)

Broadening horizon



Will AI replace top-tier programmers?

Home > News > AI

ChatGPT Passes Google Coding Interview for Level 3 Engineer With \$183K Salary

'Amazingly, ChatGPT gets hired at L3 when interviewed for a coding position,' reads a Google document, but ChatGPT itself says it can't replicate human creativity and problem-solving skills.



Conclusion - Competitive programming

Good DSE result

A competitive programmer always has a good performance in DSE

Meet elite students in HK

Join the HKOI team

Meeting elite students from around the world

Participate in international OI competitions

Possibility of joining top-tier university

Award winners are highly compatible

Unleashing a career path for elite students

Bring them to the top-tier IT-related company

Operation

It looks good, but how?



F1 training

1. Teaching the HKDSE curriculum
2. Teaching the basic advanced concepts
 1. Discrete Mathematics
 2. Quicksort/Merge sort/Counting sort
 3. Time complexity
3. AI and youtube resource are fruitful

F2 training

Join the HKOI Team by earning a medal

Done



Story – Chinese History

Smart Automatic Grading System

Using AI for recognition, optimization, and grading (v4.0 - Batch Processing)

Individual Grading

Batch Processing (10 Students)

Reports & Export

Upload Handwritten Images (max 5)

Choose files

No file chosen

Upload Reference Standard Image (optional)

Choose file

No file chosen

Process Reference

Recognize Text

Auto Grade

Handwriting Preview

Uploaded 0/5 images

Please upload JPG or PNG images

Reference Standard

Please upload reference standard image

Story – Chinese History Teacher

1.	分裂
2.	大兴城
3.	内史省
4.	均田制
5.	输籍法
6.	科举
7.	州县
8.	开皇
9.	靈
10.	寓兵
11.	宰相
12.	进士
13.	魏徵
14.	五经正义
15.	史
16.	房玄龄
17.	20
18.	天可汗
19.	减税
20.	唐

Smart Automatic Grading System

Using AI for recognition, optimization, and grading (v4.0 - Batch Processing)

[Individual Grading](#)[Batch Processing \(10 Students\)](#)[Reports & Export](#)

Upload Handwritten Image (optional)

Choose files5 files

Processing image 2 of 5...

Processing progress: 1/5

Handwriting Preview

Uploaded 5/5 images

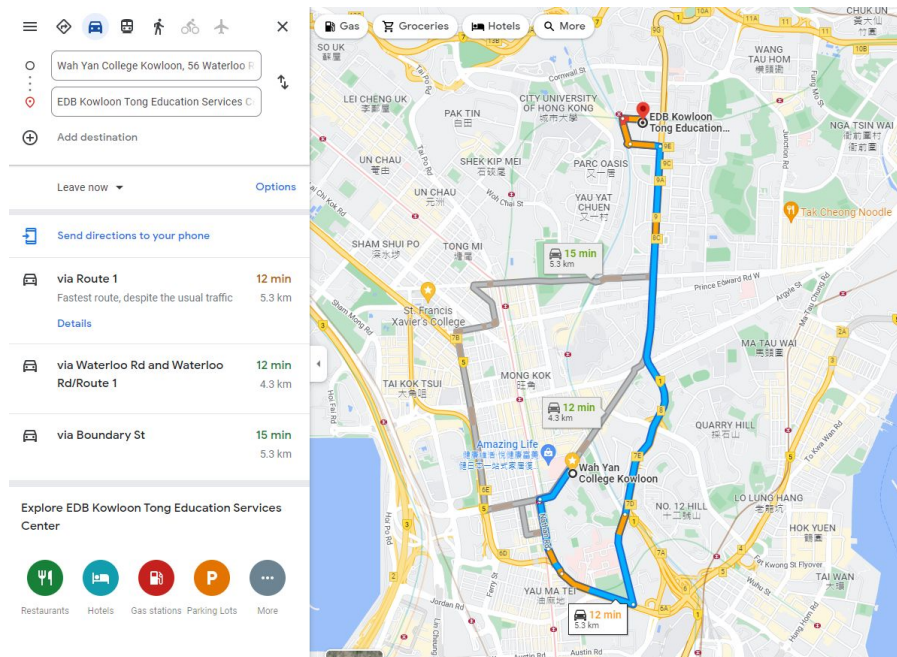
Reference Standard

Please upload reference standard image

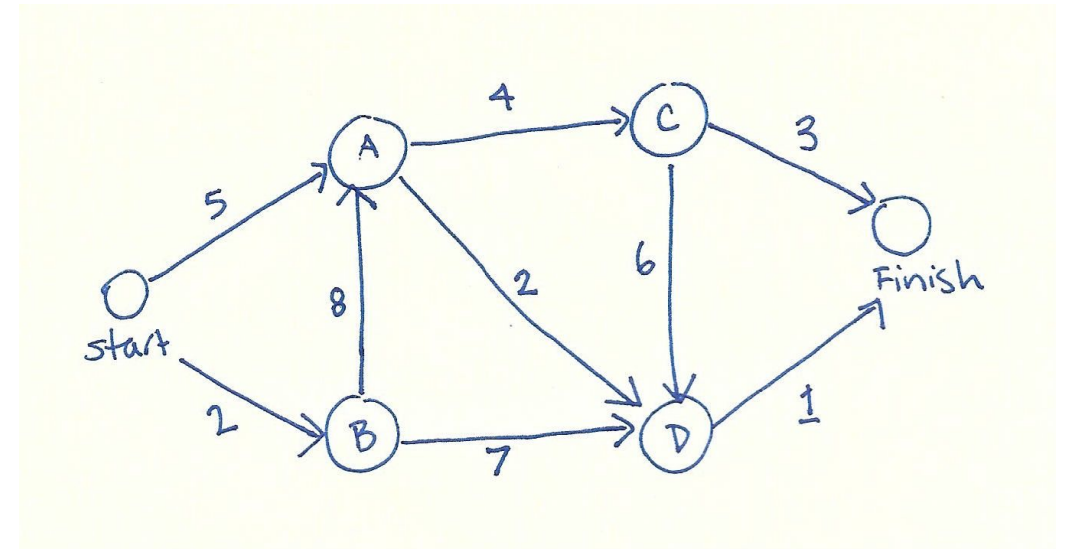
Possibility of coding AI (my current plan)

1. DeepSeek with massive API
2. Copilot with Sharepoint / Powerapp / Flow / etc

Computational Thinking & Algorithm



Google Map

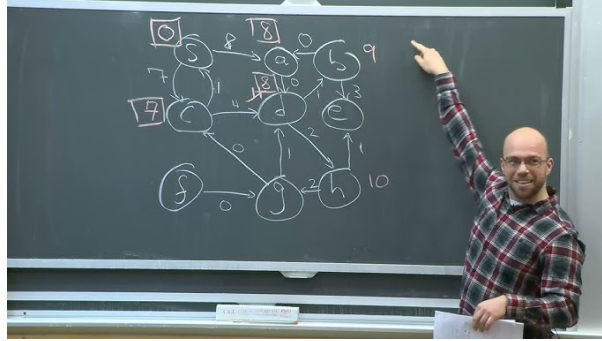
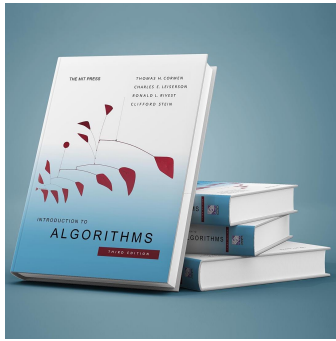


Dijkstra Algorithm
(Finding the Shortest Path)

Reference: <https://medium.com/@yk392/dijkstra-algorithm-key-to-finding-the-shortest-path-google-map-to-waze-56ff3d9f92f0>

Generations to Learn Coding

1. By Textbook / Lecture



3. By Video



2. By Search Engine



4. By Generative AI ?



Demonstration 1 – Paradigm Shift

Binary Search Learning Tool

Learn how binary search works by guessing the secret number!

[Binary Search Game](#)[Tutorial](#)[Coding Exercise](#)

Game Setup

Lower Bound

Upper Bound

1

100

Start New Game

1

Current Lower

100

Current Upper

0

Guesses Made

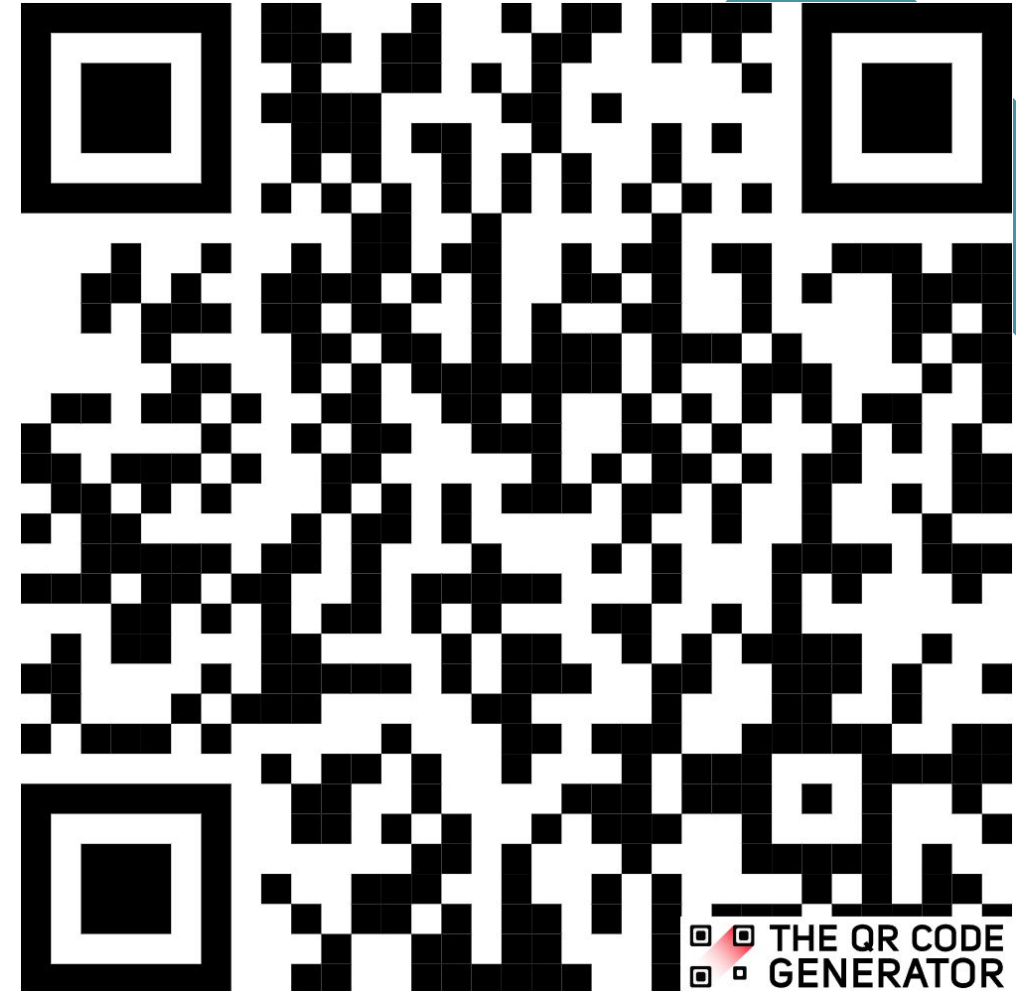
Max: 7

Make Your Guess

Enter your guess...

Guess

☐ Show hints



By POE App

Demonstration 2 – Paradigm Shift

8位元二進制轉換教材

選擇一個模式開始學習

十進制 → 二進制

二進制 → 十進制

十進制 → 二補碼

二補碼 → 十進制

上溢錯誤判斷

挑戰：十進制 → 二進制

目標數字：
45

128

64

32

16

8

4

2

1

0

0

1

0

1

1

0

1

新一題

幫我解釋

你組合的二進制數
00101101 (45)

計時器：
8.0s



Demonstration 3- Debugging

HKOI Online Judge

wykhcle - Rock Lee 15:40:24

Search...

Q

Tasks

Your Submissions

School Submissions

Judge Status

Code

Contests

Leaderboard

Attendance

School Admin

Phone number ☆ ✓

D101 Time Limit: 1.000 s Memory Limit: 256 MB

Submit Blockly Submissions Stats

Solution Test Data

In this exercise, you will learn how to perform basic input and output. Also, you will be able to try the HKOI Online Judge system.

Write a program to read a 8-digit Hong Kong phone number and determine whether it is a fixed line number (numbers that start with 2 or 3) or a mobile number (numbers that start with 5, 6 or 9).

INPUT AND OUTPUT

The 8-digit phone number will be provided through the standard input. The number will not start with 999.

After determining the correct type, output the word Fixed or Mobile.

Input and Output Format

No need to validate inputs. Do not output prompts. (e.g.: "Please enter a number: ")

The last line of your output should also contain the end of line character.

Pascal: `writeln(ans);` C: `printf("%d\n", ans);` C++: `cout << ans << endl;`

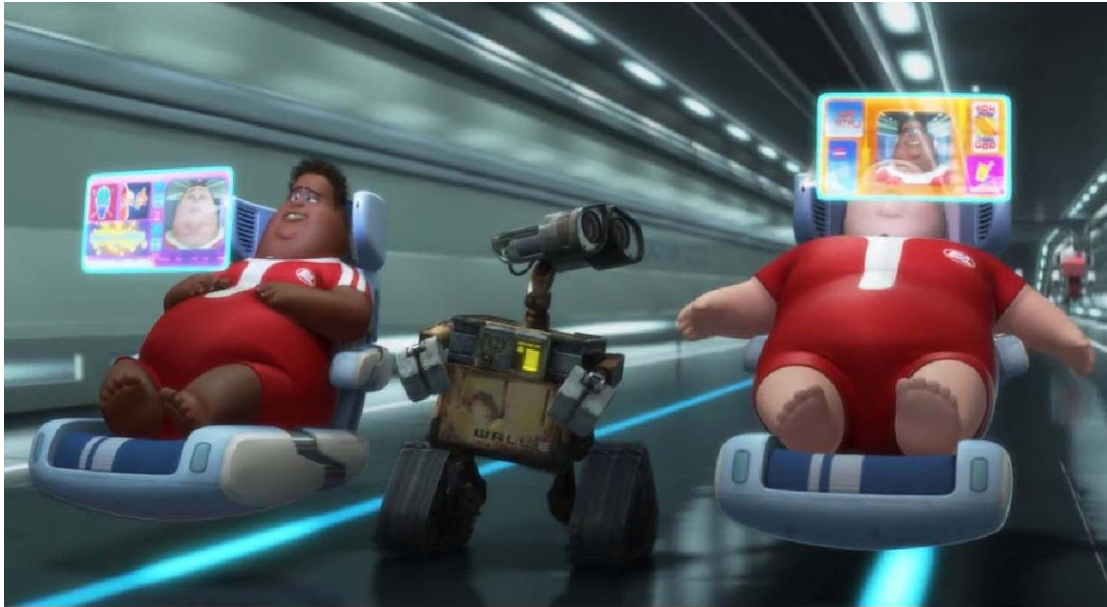
SAMPLE TESTS

	Input	Output
1	23382338	Fixed
2	98765432	Mobile

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HKOI D101
Phone number
By Replit AI

Risks of Relying on Generative AI

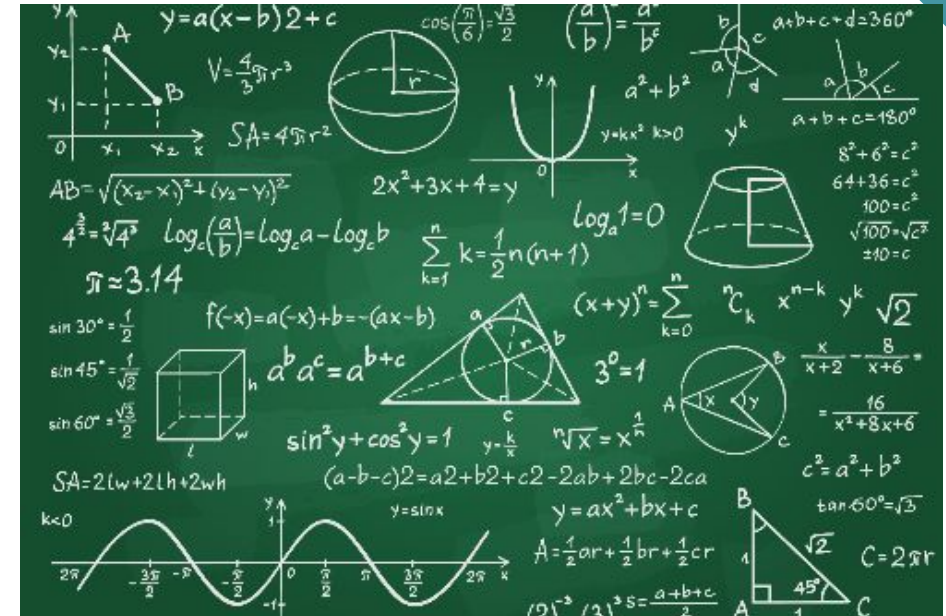


Reference: WALL-E, Disney & PIXAR @
2008

Math Education



Primary School



Secondary School



Programming Education

```
1  #include <stdio.h>
2  int a[100000];
3  int main() {
4      int n, q, i;
5      scanf("%d %d", &n, &q);
6      for (i = 0; i < n; i++) {
7          scanf("%d", &a[i]);
8      }
9      for (i = 0; i < q; i++) {
10         int x, l = 0, r = n - 1;
11         int found = 0;
```

Secondary School



University / Work



AI Ethics in ICT SBA

人工智能與校本評核



人工智能工具發展一日千里，並迅速地與日常生活的各方面融合。學生若適當運用，人工智能工具無疑可為學習帶來新機遇；但若不當使用，則會對其他考生造成不公，此屬違規行為，可致嚴重後果。學生須注意，若在完成校本評核課業過程中曾使用人工智能工具，必須與其他參考資料一樣，清楚註明出處。

學生亦須留意，縱使人工智能工具的功能日增，但它們並不能代替真正的學習經歷。過分依賴或不當使用人工智能工具，會減少學生親身體驗學習的機會。同時人工智能工具亦有其不足之處。人工智能工具所提供的資訊來自互聯網，我們無法得知資訊的來源，而且資訊有可能是錯誤或有偏頗的。人工智能工具亦有可能於未得原作者同意下引用其作品，甚或會虛構引文及參考書目。

如何在作業中註明出處？



學生在完成課業的過程中，可參考不同類別的資料，包括書籍、報章、雜誌、互聯網等，亦可與朋輩／家長討論，但須謹記不可觸犯抄襲行為。學生不可抄錄他人的著作或意念（包括以人工智能軟件生成的作品），視為自己的作品。學生可參考**附錄**中關於引用及註明資料出處的示例。

Reference: https://www.hkeaa.edu.hk/DocLibrary/Media/Leaflets/SBA_booklet_eng.pdf

Thank you - Contact HKACE

擬加入的香港學界專業社群 (WhatsApp) *可多選於一項*

- ☐ HKACE ITCA (資訊科技挑戰獎勵計劃)
- ☐ HKACE YITAA (青年資訊科技大使獎勵計劃)
- ☐ HKACE Primary CS/IT/CT
- ☐ HKACE DSE ICT
- ☐ HKACE IT in Education
- ☐ HKACE STEM
- ☐ HKACE x JSIT InnoTech Lab
- ☐ HKACE CCF: BYOD 實踐電子學習
- ☐ HKACE Drone Education
- ☐ HKACE AI for Education
- ☐ HKACE Apple Education
- ☐ HKACE Education Technology
- ☐ HKACE Google for Education
- ☐ HKACE Media Literacy
- ☐ HKACE Micro:bit
- ☐ HKACE Minecraft Education
- ☐ HKACE Raspberry Pi
- ☐ HKACE TSS Group (Recommended by IT Coordinator Teacher)
- ☐ HKACE VR/AR/MR Education
- ☐ HKACE WebSAMS & TTL



HKACE
Community
(1700+ members)



<https://forms.gle/cxKFDVwrihUyuaHo8>

