

HSMC 恒管 Computing Cup
2018

Organizers:

Hang Seng Management College

Broadlearning

HKACE



*** 1. Overview 概要 ***

Design and implement an Android mobile APP for visitors to Hong Kong. The APP need to contain basic information of 18 specified points of interest (POI) in Hong Kong. More importantly, it should contain a *Smart Travel Planner* function that allows users to select a number of POIs that he/she plans to visit during a day. The APP should then recommend the best order that the POIs should be visited, with the objective of helping the user to minimize the total travelling time between the POIs.

請為訪港旅客設計並開發一個 Android 移動應用程式作品 (下稱“程式”)。程式除了預載有本港的指定 18 個景點的基本資訊外，還設有一項《智能行程計劃助手》功能：當用家選取了一天內希望前往的景點後，程式就會為用家編排行程次序，並以節省往返各景點的旅途時間為目的。

*** 2. Point of Interests 景點 ***

To simplify the problem for this competition, the APP only needs to support 18 POIs in Hong Kong, which are specified in Table 1. The names and basic information of these 18 POIs should be pre-stored in the APP. Furthermore, we assume that the visitor will stay in the Student Residential Hall of Hang Seng Management College (HSMC Hall) in Sha Tin (and the HSMC Hall itself is a POI). Every day, the visitor leaves the HSMC Hall, visits all POIs he/she entered in the App, and returns to HSMC Hall at the end.

為了簡化問題，程式只須要支援《表 1》內所列出的 18 個指定景點，並預載有各景點的名稱以及基本資訊。本次比賽假設程式用家於訪港期間將於恒生管理學院附設之學生宿舍(下稱“恒管宿舍”)留宿。用家每天從程式挑選欲前往的景點，然後從恒管宿舍出發，按照程式建議的次序遊覽各景點，最後返回恒管宿舍完結當天的旅程。為了方便題目描述，恒管宿舍也列為景點之一。

Table 1.

表 1.

POI ID 景點編號	Description	描述
1	HSMC Hall (Sha Tin)	恒生管理學院 學生宿舍 (沙田)
2	Disneyland (Islands)	迪士尼樂園 (離島)
3	Tsing Ma Bridge (Kwai Tsing)	青馬大橋 (葵青)
4	Lai Chi Wo (North)	荔枝窩 (北區)
5	Clear Water Bay Country Park (Sai Kung)	清水灣郊野公園 (西貢)
6	Man Mo Temple (Tai Po)	文武廟 (大埔)
7	Noah's Ark (Ma Wan)	挪亞方舟 (馬灣)
8	Lung Kwu Tan (Tuen Mun)	龍鼓灘 (屯門)
9	Lau Fau Shan (Yuen Long)	流浮山 (元朗)
10	The Kowloon Walled City Park (Kowloon City)	九龍寨城公園 (九龍城)
11	The Wilson Trail Stage 3 (Kwun Tong)	衛奕信徑第三段 (觀塘)
12	Tin Hau Temple (Sham Shui Po)	天后廟 (深水埗)
13	Wong Tai Sin Temple (Wong Tai Sin)	黃大仙祠(黃大仙)
14	Kowloon Park (Tsim Sha Tsui)	九龍公園 (尖沙嘴)
15	City Hall (Central)	香港大會堂 (中環)
16	Noonday Gun (Causeway Bay)	午炮 (銅鑼灣)
17	Ocean Park (Southern)	海洋公園 (南區)
18	Lovers' Rock (Wan Chai)	姻緣石 (灣仔)

*** 3. Travelling time between the POIs 往返景點所需時間***

The travelling time between any two POIs is fixed in this competition. The data is given in Table 2, and should be pre-stored in the App.

程式須要預載景點與景點間的旅程時間作為行程計畫之用。往返景點間的時間是固定的，並以《表 2》所載者為準。所需時間應該預載在程式內。

Table 2: Travelling time between POIs (minutes).

表 2: 各景點間旅程時間(分鐘)

		Destination (POI #) 到達景點																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Starting point (POI #) 出發景點	1	0	137	58	60	40	35	35	89	49	30	40	30	26	35	55	53	69	55
	2	137	0	80	150	168	140	102	65	100	119	139	110	123	117	100	135	105	110
	3	58	80	0	75	90	60	23	60	55	55	70	40	57	47	50	77	65	60
	4	60	150	75	0	55	25	65	100	60	79	95	80	83	87	105	109	120	104
	5	40	168	90	55	0	30	70	108	68	49	40	60	45	59	79	55	85	70
	6	35	140	60	25	30	0	50	100	70	60	70	60	60	65	85	85	100	85
	7	35	102	23	65	70	50	0	80	54	35	50	20	35	27	40	57	58	45
	8	89	65	60	100	108	100	80	0	40	59	79	74	63	69	89	89	102	84
	9	49	100	55	60	68	70	54	40	0	19	39	34	23	29	49	49	62	44
	10	30	119	55	79	49	60	35	59	19	0	20	15	4	10	30	30	43	25
	11	40	139	70	95	40	70	50	79	39	20	0	30	20	25	40	15	45	30
	12	30	110	40	80	60	60	20	74	34	15	30	0	17	7	25	37	40	25
	13	26	123	57	83	45	60	35	63	23	4	20	17	0	14	34	30	45	29
	14	35	117	47	87	59	65	27	69	29	10	25	7	14	0	22	30	37	21
	15	55	100	50	105	79	85	40	89	49	30	40	25	34	22	0	37	18	11
	16	53	135	77	109	55	85	57	89	49	30	15	37	30	30	37	0	38	27
	17	69	105	65	120	85	100	58	102	62	43	45	40	45	37	18	38	0	18
	18	55	110	60	104	70	85	45	84	44	25	30	25	29	21	11	27	18	0

*** 3. Smart Travel Planner 智能行程計劃助手 ***

The APP needs to contain a *Smart Travel Planner* function that allows users to select a number of POIs that he/she wants to visit during a day. After the user has entered his/her selections, the APP then needs to compute a suggested travelling plan according to the travelling time specified in Table 2. The suggested route should start from HSMC Hall (POI #1), via each POI selected by the user, and finally return to HSMC Hall at the end. (Note that HSMC Hall will serve as the pre-determined starting and ending points only, and not a POI that the user will visit during the journey.) Whenever possible, the APP should suggest a route that can minimize the total travelling time for the user.

Basic requirement: the APP should be able to support, to the very least, the case of 5 POIs being selected by the user, and provide the result within one second.

程式需要備有一項《智能行程計劃助手》供用家選擇景點以及計畫行程。當用家透過程式選擇一天的景點後，程式就會按照《表 2》列出的所需時間計算出最佳路徑，而路徑必須以恒管宿舍(景點 1)為起點，經過用家所選的各景點（不能多也不能少），最後返回恒管。因此，恒管宿舍只會是行程的起點及終點，無須選擇，而不會是遊覽過程的停留景點之一。如果有可能的話，程式應當儘量為用家設計一條最節省時間的行程。

基本條件：程式至少應該能夠處理用家選取 5 個景點之個案，並在一秒內顯示結果。

*** 4. Examples 例子 ***

For example, say the user enters 3 locations he/she is interested, PO3 #3 "Tsing Ma Bridge", POI #5 "Clear Water Bay Country Park" and POI #10 "The Kowloon Walled City Park". The following two routes are two of the possible answers:

Route 1: POI #1 -> POI #3 -> POI #5 -> POI #10 -> POI #1

[Travelling time: $58 + 90 + 49 + 30 = 227$ mins]

Route 2: POI #1 -> POI #10 -> POI #3 -> POI #5 -> POI #1

[Travelling time: $30 + 55 + 90 + 40 = 215$ mins]

➤ Route 2 is better than Route 1 because of the shorter travelling time.

The following are examples of invalid routes

Route 3: POI #1 -> POI #5 -> POI #10 -> POI #3

➤ This route is invalid because it does not end at POI #1 (HSMC Hall)

Route #4: POI #5 -> POI #10 -> POI #3 -> POI #1

➤ This route is invalid because it does not start at POI #1 (HSMC Hall)

Route #5: POI #1 -> POI #10-> POI #3 -> POI #1

- This route is invalid because it does not visit POI #5, which is required by the user

Route #6: POI #1 -> POI #10-> POI #3 -> POI #54 -> POI #4 ->POI #1

- This route is invalid because it visits an extra POI #4 which is not selected by the user

舉例，假設用家選擇了三個景點，分別為青馬大橋(景點 3)、清水灣郊野公園 (景點 5) 以及九龍寨城公園 (景點 10)。以下為其中兩條可行路線：

路線 1: 景點 1 -> 景點 3 -> 景點 5 -> 景點 10 -> 景點 1

[旅程時間: $58 + 90 + 49 + 30 = 227$ 分鐘]

路線 2: 景點 1 -> 景點 10 -> 景點 3 -> 景點 5 -> 景點 1

[旅程時間: $30 + 55 + 90 + 40 = 215$ 分鐘]

需時較短的路線 2 較路線 1 優勝。

以下為不能接受的路線例子：

路線 3: 景點 1 -> 景點 5 -> 景點 10 -> 景點 3

不是以景點 1(恒管宿舍)為終點，路線無效。

路線 4: 景點 5 -> 景點 10 -> 景點 3 -> 景點 1

不是以景點 1(恒管宿舍)為起點，路線無效。

路線 5: 景點 1 -> 景點 10 -> 景點 3 -> 景點 1

沒有通過用家選取的景點 5，路線無效。

路線 6: 景點 1 -> 景點 10 -> 景點 3 -> 景點 5 -> 景點 4 -> 景點 1

多通過了一個用家沒有選取的景點 4，路線無效。

*** 5. Scoring Criteria 評分準則***

The APP developed by each team will be evaluated by the following criteria.

1. Functional objective

The Smart Travel Planner function of the APP will be evaluated by test-cases. The criteria are as follows.

- i. The validity of the suggested routes and correctness of the computed time.
- ii. The travelling time of the suggested routes (time minimization).
- iii. Response time (as a rough guideline, route planning for five or less POIs should take no more than 1 second).

2. Human-centred design

The APP should be designed according to the *human-centred computing (HCC)* principle and provide a pleasant experience for the user. In other words, it should be able to cater for the actual needs of the user, and the interface design should be intuitive, user-friendly, and comfortable to use. Information should be accurate and presented in a way that is useful and convenient to the user. The overall APP design should be attractive and visually appealing. The APP should be error-free and able to run smoothly.

各隊提交的作品將會按照以下準則評分：

1. 功能評估

我們會按照程式於多個測試用例(test cases)的表現來做出評估。準則包括：

- i. 所建議的行程是否有效，計算的旅途時間是否正確。
- ii. 所建議的旅途時間之優化(需時越短的方案越優勝)。
- iii. 程式的反應速度(作為指引，當所選的景點不多於五個時，程式反應時間不應該多於一秒)

2. 人本設計

程式應當符合人本設計原則，務求為用家提供愉快的使用體驗。就是說，程式應當能夠滿足用家的確實需要，介面應當清楚簡單易用，資訊要實用，表達方式要方便實際使用時的需要，程式的整體設計應該美觀及吸引，程式不應有錯誤，運行起來要順暢。

*** 6. Deliverable 提交作品 ***

Please submit the following items via the submission link in the competition web page.

- (a) An executable Android mobile app with graphical user interface (apk file)
- (b) A document for briefly explaining the design principle of app (including the overall design as well as the methodology used in finding the best routes in the Smart Travel Planner function).

請透過比賽網頁提交以下項目：

一個可運行的 Android 移動應用程式 (連使用者介面)，格式為 apk 檔案。

一份說明文件，簡介作品的設計概念 (包括程式整體的設計理念，以及規劃行程所用的方法)。

If there is any inconsistency or ambiguity between the English version and the Chinese version, the English version shall prevail.

如中、英文兩個版本有任何抵觸或不相符之處，應以英文版本為準。