COMPUTER APP PROGRAMMING (CAP2017)
電腦應用程式比賽 2017

CAP Day
即日解難比賽
(初中)

Regulations:
1. The time limit for this competition is **1.5 hours.**
2. There are two questions in this paper. **Attempt ALL questions.**
3. Follow the instructions in the paper to submit the answers.
4. All candidates must stop their work when the chief invigilator announces "Time up."
5. Candidates can use their own Android device(s) ONLY for program testing purposes.
6. Candidates must not search for similar apps through the Internet (i.e., the answers must be based on your own work).
7. If a candidate is found cheating or violating the regulations by any means, he/she will be disqualified from the competition immediately.

比賽守則：
1. 本比賽限時 **1.5 小時**。
2. 本卷共有兩個題目，**需全部作答**。
3. 請依照試題上的指示，完成答卷。
4. 當考場人員宣布「比賽結束」的時候，所有參賽者必須停止作答。
5. 參賽者可以自備 Android 裝置，但只能用作測試程序。
6. 參賽者不得在互聯網搜尋相關的應用（所有答案必需是參賽者自己作答）。
7. 若發現任何參賽者作弊或違反比賽守則，將被即時取消參賽資格。

Question 1: Save the project as "Question_1". 請開新專案，命名為"Question_1"。
Question 2: Save the project as "Question_2". 請開新專案，命名為"Question_2"。

| School name			
Student name			
Google account			
Question_1: File saved time		**Completion percentage**	
Question_2: File saved time		**Completion percentage**	

Note: By participating in the competition, you agree to follow the rules and regulations of CAP2017 and to allow the organizers to publish your name and your school name in CAP2017-related materials.

Question 1

Develop a drawing app to let a user draw on the screen. The color of each line will depend on the line sequence (序列) as shown in Table 1. For example, if it is the first line, the line color should be red. If it is the second line, the line color should be orange. A drawing example is shown in Screen1.

Table 1

nth line	Color
1, 8, 15, …	Red
2, 9, 16, …	Orange
3, 10, 17, …	Yellow
4, 11, 18, …	Green
5, 12, 19, …	Blue
6, 13, 20, …	Pink
7, 14, 21, ….	Purple
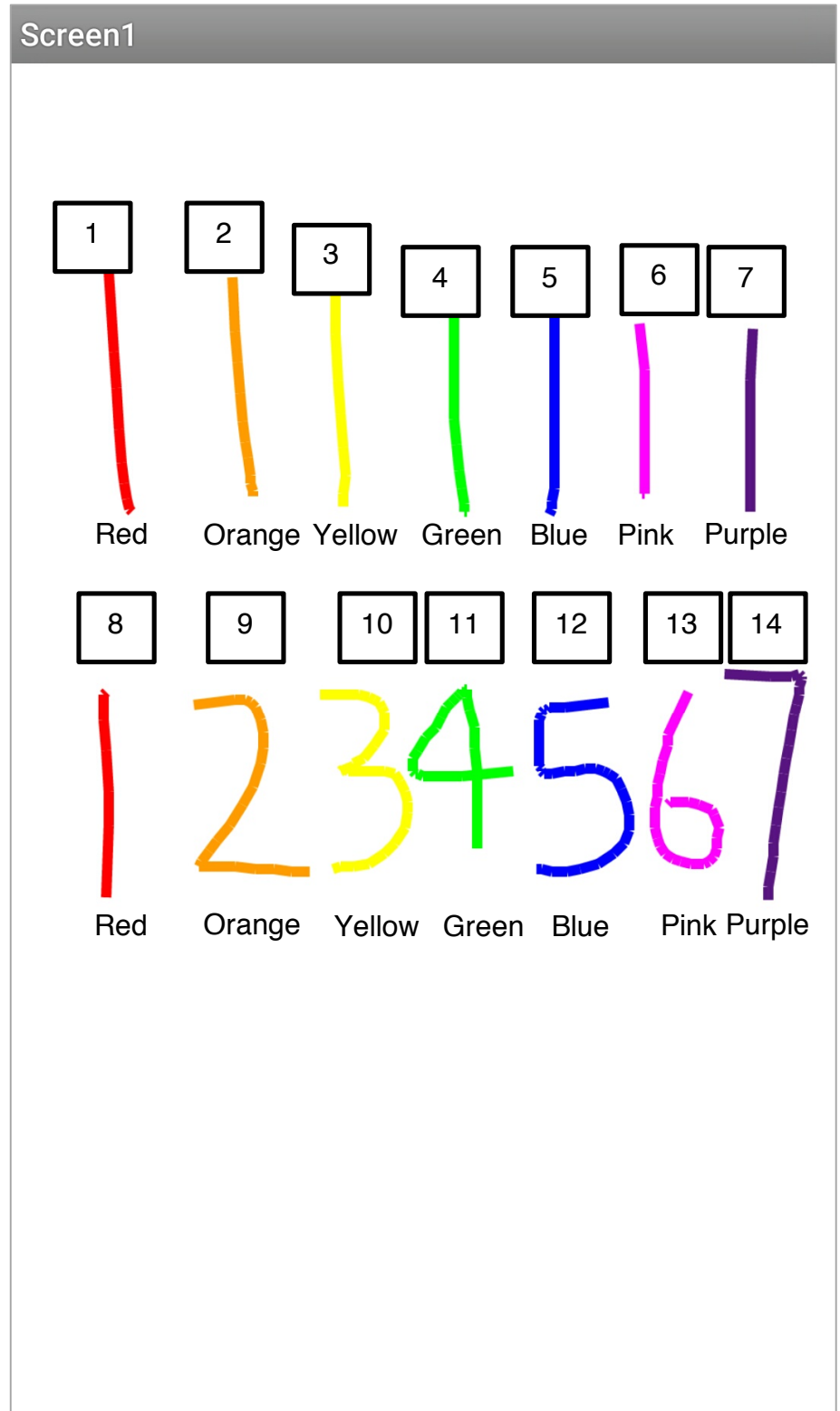
Question 2

Pi (π or 3.141592653589…) is an irrational number (無理數) with infinite decimal places (無限小數位). There are many ways to compute the value of π. For example, it can be computed by using the Gregory-Leibniz Series:

$$\pi = 4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \frac{1}{11} \dots\right)$$

Develop an app to compute π with the above formula. Make a textbox for a user to input the number of iterations (i.e., number of terms) for the computation.

The following table shows the first four iterations:

Number of iterations	π
1	$4(1) = 4$
2	$4\left(1 - \frac{1}{3}\right) = 2.6667$
3	$4\left(1 - \frac{1}{3} + \frac{1}{5}\right) = 3.46667$
4	$4\left(1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7}\right) = 2.89524$

Screen1

4

Calculate ← Click to calculate

← Number of iterations

pi =
2.89524 ← Result