Lab 2: Android Programming Report

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1. 請說明下列程式作用

```
<intent-filter>
    <action android:name="android.intent.action.MAIN" />
    <category android:name="android.intent.category.LAUNCHER/>
</intent-filter>
```

打開 AndroidManifest.xml 會發現只有 MainActivity 會有這段程式，而其他 Activity 都沒有。查了資料後發現<intent-filter>是一個包含了一個或多個<action>和<category>元素的容器，前者表示 Intent 的動作，後者表示 Intent 的類別。<intent-filter>用來定義 Activity 的啟動條件，也就是說它可以指定哪些 action 和 category 可以觸發此 Activity。

第二行是<intent-filter>中的一個子元素，它指定了一個 action，也就是 android.intent.action.MAIN。這表示這個 Activity 是應用程式的入口，也就是我們啟動 app 時首先顯示的 Activity。

第三行是<intent-filter>中的一個子元素，它指定了一個 category，也就是 android.intent.category.LAUNCHER。這表示這個 Activity 是可以從裝置的主畫面啟動的，也就是它是 app 的啟動器。LAUNCHER 是 Android 系統中的桌面啟動器，是桌面 UI 的統稱。

所以這段程式碼的作用是將特定的 Activity(在這次 lab 是 MainActivity)標記為 app 的入口，同時將它設置為可以從裝置的主畫面啟動的啟動器。當使用者啟動 app 時，Android 系統會找到這個被標記為入口的 Activity 並啟動它。

2. 請貼上自己的程式碼並附上註解

Q1

```
//  Package folder path, used for classification
package com.example.app109511207_lab2;

// Import the required libraries
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;

// MainActivity inherits AppCompatActivity
public class MainActivity extends AppCompatActivity {
    // Declare the object variables that will be used
    Button button;
    EditText ID;
    EditText name;
```

```java
// Override the onCreate() function of the parent class AppCompatActivity
@Override
protected void onCreate(Bundle savedInstanceState) {

    // Access members of the parent class
    super.onCreate(savedInstanceState);

    // Transform the layout through the setContentView() function
    setContentView(R.layout.activity_main);

    // Obtain the object through the id set in xml file
    button = (Button)findViewById(R.id.button);
    ID = (EditText)findViewById(R.id.ID);
    name = (EditText)findViewById(R.id.name);

    // Listen for whether the button triggers an event
    button.setOnClickListener(new View.OnClickListener() {

        // Override the onClick() function of the parent class AppCompatActivity
        @Override
        public  void  onClick(View v) {

            // Create a new intent
            Intent intent = new Intent();

            // MainActivity intends to open MainActivity2 through an intent
            intent.setClass(MainActivity.this, MainActivity2.class);

            // Create a new bundle
            Bundle bundle = new Bundle();

            // Put the data to be sent into the bundle with the key 'name'
            bundle.putString("name", name.getText().toString());

            // Put the data to be sent into the bundle with the key 'ID'
            bundle.putString("ID", ID.getText().toString());

            // Place the data bundle to be sent onto the transportation vehicle intent
            intent.putExtras(bundle);

            // Switch activity
            startActivity(intent);
```

```
            }
        });
    }
}
```

Q2

```
//  Package folder path, used for classification
package com.example.app109511207_lab2;

// Import the required libraries
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.EditText;
import android.widget.TextView;

// MainActivity inherits AppCompatActivity
public class MainActivity2 extends AppCompatActivity {

    // Declare the object variables that will be used
    Button enter, restart, finish;
    TextView hint, times, best;
    EditText guess;

    // Declare the variables that will be used in the game
    int randNum = 0, history = 999;
    int min = 1, max = 50, count = 0;

    // Override the onCreate() function of the parent class AppCompatActivity
    @Override
    protected void onCreate(Bundle savedInstanceState) {

        // Access members of the parent class
        super.onCreate(savedInstanceState);

        // Transform the layout through the setContentView() function
        setContentView(R.layout.activity_main2);
```

```
        // Obtain the object through the id set in xml file
        enter = (Button)findViewById(R.id.enter);
        restart = (Button)findViewById(R.id.restart);
        finish = (Button)findViewById(R.id.finish);
        hint = (TextView)findViewById(R.id.hint);
        times = (TextView)findViewById(R.id.times);
        best = (TextView)findViewById(R.id.best);
        guess = (EditText)findViewById(R.id.guess);

        // Random an answer between 1~50
        randNum=(int)(Math.random() * 50 + 1);

        // Declare a bundle and get the data sent from the previous activity
        Bundle bundle = this.getIntent().getExtras();

        // Listen for whether the enter triggers an event
        enter.setOnClickListener(new View.OnClickListener() {

            // Override the onClick() function of the parent class AppCompatActivity
            @Override
            public  void  onClick(View v) {

                // Parse the string into an integer and store it in variable 'in'
                int in = Integer.parseInt(guess.getText().toString());

                // If the input value is within the range
                if(in <= max && in >= min){

                    // count + 1
                    count += 1;

                    // If the input value > the answer
                    if(in > randNum){

                        // Update max = in
                        max = in;

                        // Update the text
                        times.setText("猜測次數: " + count);
                        hint.setText("請輸入" + min + "~" + max + "的數字");
                    }
```

```
            // If the input value < the answer
            else if(in < randNum) {

                // Update min = in
                min = in;

                // Update the text
                times.setText("猜測次數: " + count);
                hint.setText("請輸入" + min + "~" + max + "的數字");
            }

            // If the input value = the answer
            else if(in == randNum){

                // If count < history(best record), update history = count
                if(count < history){
                    history = count;
                }

                // Update the text
                times.setText("猜測次數: " + count);
                hint.setText("答對");
                best.setText("最佳紀錄: " + history);
            }
        }

        // If the input value is out of the range
        else{

            // Update the text
            hint.setText("請輸入" + min + "~" + max + "的數字，請輸入正常值");
        }
    }
});

// Listen for whether the restart triggers an event
restart.setOnClickListener(new View.OnClickListener() {

    // Override the onClick() function of the parent class AppCompatActivity
    @Override
    public  void  onClick(View v) {
```

```
            // Reset an answer between 1~50
            randNum=(int)(Math.random() * 50 + 1);

            // Reset the variables that will be used in the game
            min = 1;
            max = 50;
            count = 0;

            // Update the text
            times.setText("猜測次數: " + count);
            hint.setText("請輸入" + min + "~" + max + "的數字");
        }
    });

    // Listen for whether the finish triggers an event
    finish.setOnClickListener(new View.OnClickListener() {

        // Override the onClick() function of the parent class AppCompatActivity
        @Override
        public  void  onClick(View v) {

            // Create a new intent
            Intent intent = new Intent();

            // MainActivity2 intends to open MainActivity3 through an intent
            intent.setClass(MainActivity2.this, MainActivity3.class);

            // Put the data to be sent into the bundle with the key 'history'
            bundle.putInt("history", history);

            // Place the data bundle to be sent onto the transportation vehicle intent
            intent.putExtras(bundle);

            // Switch activity
            startActivity(intent);
        }
    });
  }
}
```

Q3

```java
//  Package folder path, used for classification
package com.example.app109511207_lab2;

// Import the required libraries
import androidx.appcompat.app.AppCompatActivity;
import android.content.Intent;
import android.os.Bundle;
import android.view.View;
import android.widget.Button;
import android.widget.TextView;

// MainActivity inherits AppCompatActivity
public class MainActivity3 extends AppCompatActivity {

    // Declare the object variables that will be used
    Button back;
    TextView id, Name, bestrecord;

    // Override the onCreate() function of the parent class AppCompatActivity
    @Override
    protected void onCreate(Bundle savedInstanceState) {

        // Access members of the parent class
        super.onCreate(savedInstanceState);

        // Transform the layout through the setContentView() function
        setContentView(R.layout.activity_main3);

        // Obtain the object through the id set in xml file
        back = (Button)findViewById(R.id.back);
        id = (TextView)findViewById(R.id.id);
        Name = (TextView)findViewById(R.id.Name);
        bestrecord = (TextView)findViewById(R.id.bestrecord);

        // Declare a bundle and get the data sent from the previous activity
        Bundle bundle = this.getIntent().getExtras();

        // Place the data in the bundle with the key 'ID' into the variable 'ID'
        String ID = (String)bundle.getString("ID");
```

```
        // Place the data in the bundle with the key 'name' into the variable 'name'
        String name = (String)bundle.getString("name");

        // Place the data in the bundle with the key 'history' into the variable 'history'
        int history = bundle.getInt("history");

        // Update the text
        id.setText("學號: \t" + ID);
        Name.setText("姓名: \t" + name);
        bestrecord.setText("最佳紀錄: \t" + history);

        // Listen for whether the back triggers an event
        back.setOnClickListener(new View.OnClickListener() {

            // Override the onClick() function of the parent class AppCompatActivity
            @Override
            public  void  onClick(View v) {

                // Create a new intent
                Intent intent = new Intent();

                // MainActivity3 intends to open MainActivity through an intent
                intent.setClass(MainActivity3.this, MainActivity.class);

                // Create a new bundle
                Bundle bundle = new Bundle();

                // Place the data bundle to be sent onto the transportation vehicle intent
                intent.putExtras(bundle);

                // Switch activity
                startActivity(intent);
            }
        });
    }
}
```

3. 心得

一個 app 是由多個 Activity 組成的，當要切換不同 Activity 時，交通工具(Intent)就會派上用場。這次 lab 主要在利用交通工具(Intent)來在不同的 Activity 間傳遞資料，而我們實作的方式是透過 Bundle 來傳送複數資料，在從 A 傳送資料到 B 時，把 Bundle 放在交通工具(Intent)上來傳送。而只要使用 Bundle 中的 putXXX()的 function，就能將不同型態的多筆資料放進 Bundle 中，可說是相當方便。

而我在這次 lab 遇到的一個問題是當我第一次打完程式碼後要跑 app 時跳出以下錯誤訊息。

```
An issue was found when checking AAR metadata:

  1.  Dependency 'androidx.activity:activity:1.8.0' requires libraries and applications that
      depend on it to compile against version 34 or later of the
      Android APIs.

      :app is currently compiled against android-33.

      Recommended action: Update this project to use a newer compileSdk
      of at least 34, for example 34.

      Note that updating a library or application's compileSdk (which
      allows newer APIs to be used) can be done separately from updating
      targetSdk (which opts the app in to new runtime behavior) and
      minSdk (which determines which devices the app can be installed
      on).
```

上網查詢後發現要把 compileSdk 的版本更新到 34，所以解決方式就是打開 build.gradle.kts，將 compileSdk = 33 跟 targetSdk = 33 改成 compileSdk = 34 以及 targetSdk = 34，如下。

```
android {
    namespace = "com.example.app109511207_lab2"
    compileSdk = 34

    defaultConfig {
        applicationId = "com.example.app109511207_lab2"
        minSdk = 16
        targetSdk = 34
        versionCode = 1
        versionName = "1.0"

        testInstrumentationRunner = "androidx.test.runner.AndroidJUnitRunner"
    }
```

整體來說這次 lab 並不難，也充分了解了 Intent 和 Bundle 的機制和如何使用，寫 app 感覺也沒想像中地難。

4. reference

[1] 【APP/Android】如何使用 Intent, Bundle：在兩個 Activity 之間傳遞資料

[2] 使用 Intent 轉換 Activity 並傳遞資料，什麼是 Intent 意圖?

[3] 对于 android.intent.action.MAIN 和 android.intent.category.LAUNCHER 的理解

[4] Intent

[5] What is the meaning of android.intent.action.MAIN?

[6] Android Studio error: "6 issues were found when checking AAR metadata"