Lab 1: Android Basics (20 marks)

The purpose of this lab is to help you get started with Android mobile application development.

Configuration note:

- Please use Android Studio (with Java as the programming language—recommended platform for this course). The TAs will use this to load, build, and run your code. If you use any other toolkit or software development kit (e.g., Flutter), please write the corresponding name of the toolkit in the submission comment box in Canvas.
- Assignments will be marked using an Android Virtual Device (AVD) running a **Pixel 3a (API 33 or 35** is preferred).

Submission note:

Create a folder with your student number. Then, create two subfolders, **Code** and **APK**, under the folder.

- The **Code** subfolder should include your Android project code for question 1 and 2
- **APK** folder should contain two .apk files – one for question 1 and another for question 2.

Now, create a Zip file of the folder with your student number and upload it to Canvas.

Also, in the Canvas submission comment box, please include **two video links (one for question 1 and another for question 2) showing** the app working for different user inputs.

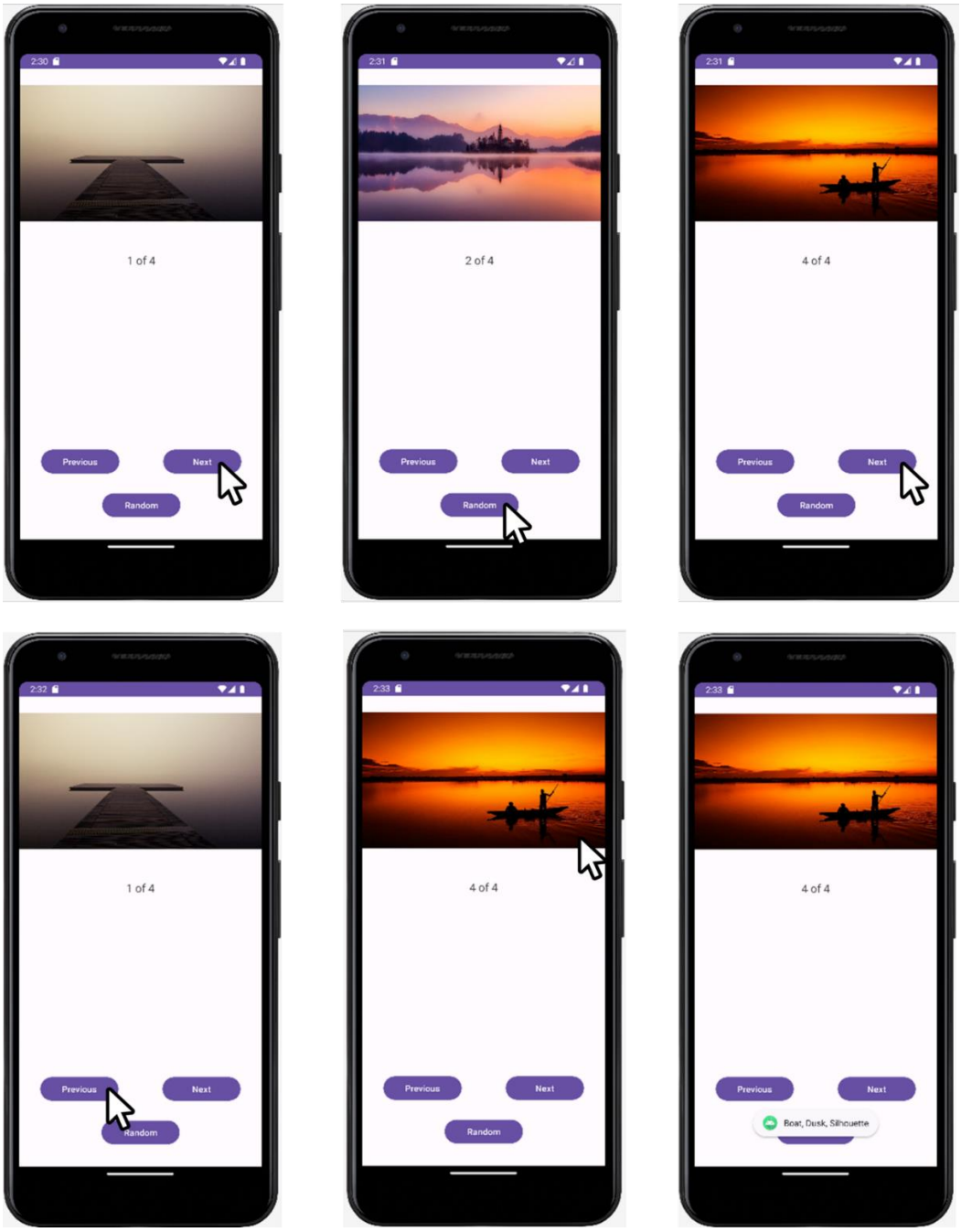
Question 1 (10 marks): Create an Android application that allows users to switch between multiple images.

The app should contain the following:

- [1 mark] An ImageView to display an image. First, load four images into your drawable folder (see Lab 1 resources.zip file). Now, Load one image at a time into the ImageView based on the button click events (see the button click instruction next)
- [1 mark] Add one text view below the ImageView showing the current image number (e.g., 1 of 4)
- [4.5 marks] Button click instruction: Add three buttons: “Next”, “Previous” and “Random”. Pressing the
    - “Next” button loads the next image into the ImageView. Once a user reaches the last image (e.g., 4 of 4) and presses the next button again, the application will show the first image (e.g., 1 of 4).
    - “Previous” button shows the previous image. Once a user moves to the first image (e.g., 1 of 4) and presses the previous button again, the application will show the last image (e.g., 4 of 4).
    - “Random” button will display a random image from the list of images

- [2 marks] If a user clicks on an image (i.e., on the ImageView), it shows tags associated with the image with a toast (see Image "tags.txt" for the tags under "Lab 1 resources" folder). Use a short toast duration.
- [1.5 mark] A video showing how the app works.

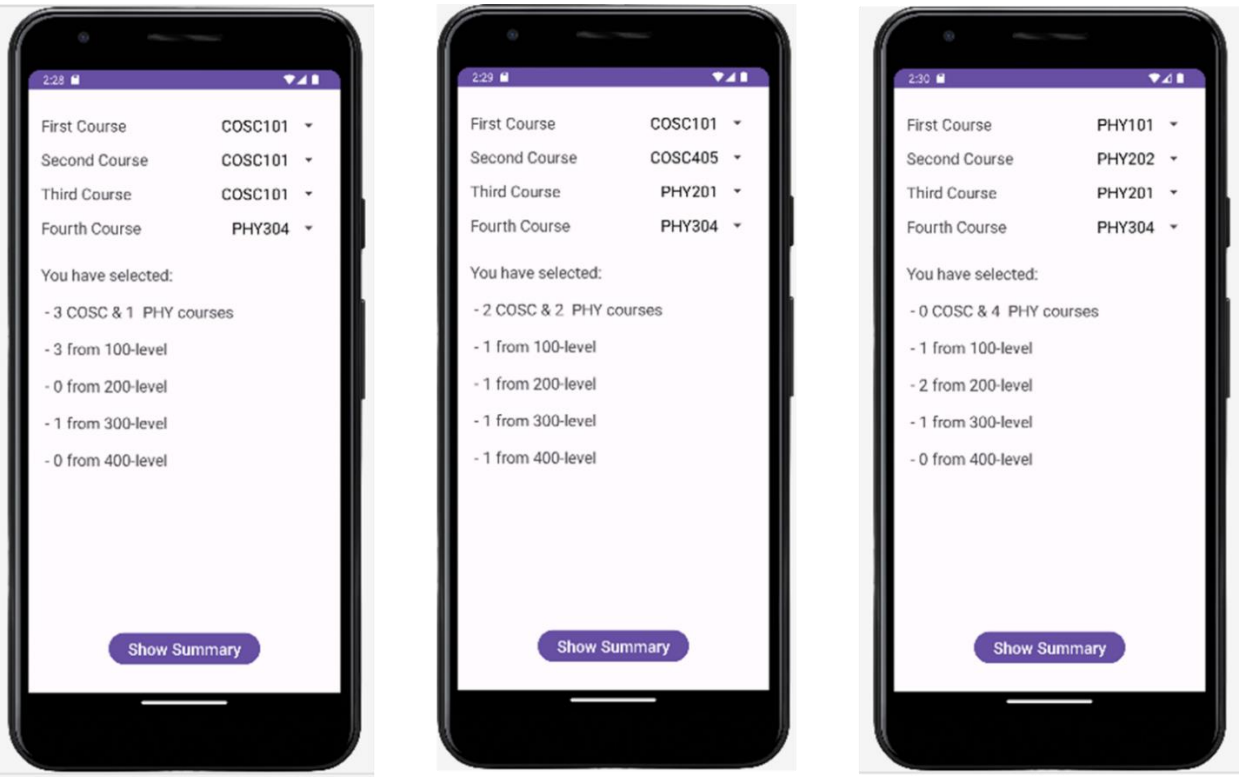
Note: This can also be solved using ImageSwitcher. However, we will use ImageView for this question.



Sample screenshots

Question 2 (10 marks): Create an Android application that allows users to show the number of selected courses with their corresponding levels. The app should contain the following:

- [1 mark] Four text views to show “First Course”, “Second Course”, “Third Course”, and “Fourth Course”.
- [2 marks] Four spinners to show a list of courses (Course name: COSC101, COSC102, COSC201, COSC304, COSC405, PHY101, PHY201, PHY202, PHY304, PHY405). All the courses start with a department name (e.g., COSC, PHY), followed by a 3-digit course level. Course levels begin with 1 are 100-level courses, 2 are 200-level courses, 3 are 300-level courses, and 4 are 400-level courses.
- [0.75 mark] A button with the text “Show Summary”
- [0.75 mark] A text view to show the summary of selected courses
- A user first selects courses from the spinners. Once selected, they can get a summary of selected courses by pressing the “Show Summary” button.
- [4 marks] Functionalities: 2 marks for showing the correct number of courses per department and 2 marks for the correct number of courses from each level
- Note: You can assume that we have only COSC and PHY courses. Your UI design (e.g., font size, spacing) might differ from the following screenshots as we used a customized spinner design. Feel free to use the default spinner design.
- [1.5 mark] A video showing how the app works.



Sample screenshots

Resources:

1. Use ConstraintLayout to design your Android views.
   https://codelabs.developers.google.com/codelabs/constraint-layout/index.html#4

2. Use spinner in Android:
   https://developer.android.com/guide/topics/ui/controls/spinner

3. Code to get spinner values in Android:

```
Spinner mySpinner = (Spinner) findViewById(R.id.my_spinner);
String value = mySpinner.getSelectedItem().toString();
```

4. How to run an app on a hardware device
   https://developer.android.com/studio/run/device

5. How to find .apk files?
   Go to “Build” → “Build App Bundle(s)\APK(s)” → “Build APK(s)”. Once the apk has been built, you should see a window on the bottom right corner called “Build APK(s)”. Click on the “locate” link to find the apk.