MONASH University

FIT5046 (Mobile and Distributed Computing Systems)

Assessment 1 – Android App Design Proposal (20%)

Moodle Submission Deadline: Thursday 28 March 2024, 11:55 PM (Week 5)

The assignment is **worth 20%** of the total mark for this unit.

The assignment is a **group assignment**:

- Each group must have **3 to 4 members**.
- All group members should be **from the same lab.**

This assignment requires **submitting two files to Moodle**:

1. **A project proposal report using the template provided in Appendix A**
    - The word limit of the proposal is **1200 words**.
2. **A task allocation form (Appendix B)**.

The purpose of this assignment is to propose the design specifications of a mobile distributed application for an Android app that you will develop and implement as a group in Assessment 3.

Assessment 3 (Android App Development) is based on this proposal, so **the group members should stay the same in these two assignments.**

This assessment supports unit learning outcomes 1 and 2:

- **LO1:** identify and describe different approaches and methods for building distributed and mobile computing systems;
- **LO2:** evaluate several models and approaches and select suitable mobile computing solution to a particular case;

Overview:

You will **propose** the design and implementation of a mobile distributed application, i.e., an Android app. The app will interact with online public web APIs like a weather API, and cloud-based services such as Google Firebase for storage (as the backend).

In Assessment 3, you will build this app in Android according to your proposal. This assignment is an opportunity to use creative and technical skills to develop an innovative mobile app that could benefit the society or solve real-world problems.

Please **make sure the functionalities and features that you propose can be successfully implemented** in the assessment 3.

To complete the assignment, please follow these steps:

Section 1 - Key steps (following the template in Appendix A)

Step 1. As a group, you will first decide on the **application domain** (health, fitness, entertainment, education, smart energy, smart parking or smart gardening to name a few) and **its use and purpose**. You need to also describe the **user group**, and discuss **the scope and limitations**.

Step 2. While you can select any type of app for your assignment, you **must include the main screens and Android components**, listed in **Table 1**, that are covered in FIT5046. This means your proposed app **MUST** include these screens and features.

Table 1. Key screens and components

Key screens	Android Key components
1. **Login screen with the option to Sign-up** (register) that will lead to **the Signup/Register Screen** 2. **Home Screen** 3. **Form (Data Entry) screen** - this could be the sign-up or Registration screen if you get the user details where you can use the Date picker and Expanded dropdown menu 4. **Map OR Report screen** o **Map screen** (MapBox or any FREE map API) where the address of the logged-in user will be shown on a map **OR** o **Report (graphs) screen** showing a bar or pie chart where the data from the Room will be displayed	**UI screens must be created using Jetpack Compose*** 1. **Navigation Drawer OR Navigation Bottom Bar** 2. **Room** (with one table to store some data locally) 3. **LazyColumn** to display a list of items 4. **Date Picker** 5. **Expanded Dropdown Menu** 6. **Retrofit** for interacting with a public web API (other than Google Search)

*No marks will be given if Compose is not used

Step 3. You need to **draw a system diagram** for your proposed Android app (**see Figure 1** as an example). In the diagram, you need to include the Android components as well as the server-side components.

For the **client-side** Android app, you **must include and name the components** that you will develop in Android app. Be very specific about every concept you will use, e.g. Room, ViewModel, Navigation, Retrofit, etc.

For the **server side**, you **must also include and name each component** that you will use, e.g. the Firebase and the public web API you plan to use (e.g. weather API).

The figure below is just an example. Your diagram must show exactly what components (libraries/dependencies) you will include in this proposed app.

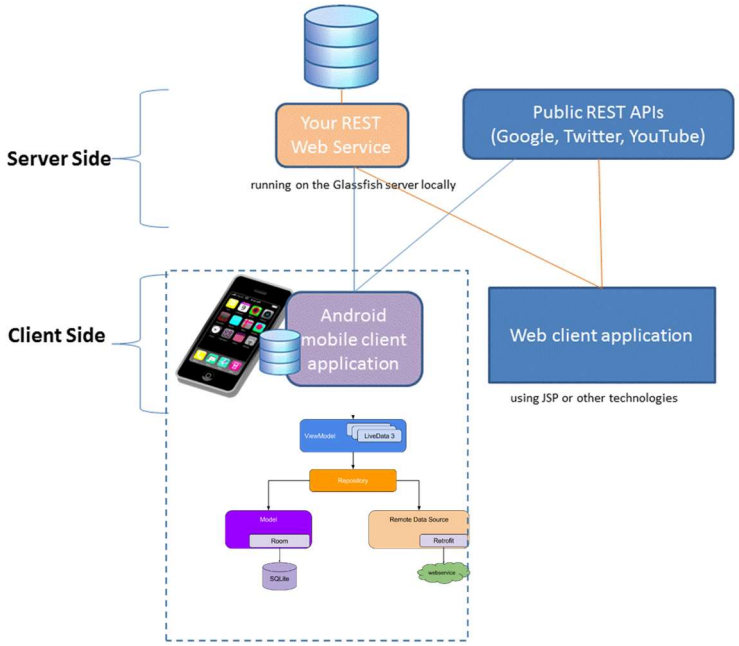

Figure 1. An example of the main components

Step 4. This task includes two requirements.

1- You will **create a prototype of your proposed app** by **creating the main UI screens** in **Android using Jetpack Compose** (Composables). These will include all the **key screens from Table 1** and any additional screens you would consider essential for your proposed app.

Every screen must have **a title** that reflects its purpose and **include UI components** that you consider for user interactions such as buttons, lists, navigation drawer or bottom bar, etc.

For this prototype, you **do not need to write any code to make the UI components to work.** The purpose here is to **just show how each screen will look like**. In the report, you will **only include the screenshot of each screen**. You do not need to provide the code or do a demo. The code to make all the UI components work will be written in Assessment 3.

Please note: all screens must be created in Android using Compose, otherwise you will not get any mark for this section.

2- You will then **create a diagram** (in Word, PowerPoint or any other program) and you will **insert the screenshot of each screen in this diagram**, and then **add arrows to show the navigation flow** between them. To show navigation in the diagram, you manually add arrows between them.

Step 5 – As part of this proposal, you also need to select and propose **TWO advanced features** from the list below that will be implemented in your proposed mobile app in Assessment 3.

You need to **briefly describe how you will learn and implement these features** in your app.

Also, you need to **provide URLs of the online sources** (online tutorials, libraries, GitHub pages, or sample source code) that you will use to help you to implement these features.

1. **Google Authentication** to manage the login for your app
2. **Google Firebase Database** to store some data important to your app
3. **Android WorkManager** to run a job in the background continuously e.g. every night to store the local data in the Firebase database (https://developer.android.com/topic/libraries/architecture/workmanager)
4. **Integrating the android app with Facebook SDK** and sending a message/data from the app to your Facebook account
5. **Incorporating Google calendar** and using the user's calendar events to perform context-aware and personalised tasks
6. **Running a mobile lite version of an AI model** (e.g. using the TensorFlow Lite library) in the app for detection or prediction
7. **Using sensors** in the app that is meaningful and related to your app but it must be implemented and demonstrated with the emulator
    - Sensors (https://developer.android.com/guide/topics/sensors)
- **CoroutineWorker or WorkManager** to run a job in the background continuously e.g. every night to store the local data in the Firebase database or send reminders and alarms every time something happens

https://developer.android.com/reference/kotlin/androidx/work/CoroutineWorker

https://developer.android.com/develop/background-work/background-tasks/persistent/threading/coroutineworker

https://developer.android.com/topic/libraries/architecture/workmanager

- **To include any other advanced feature, you need the permission from your tutor.**

Step 6 – You also need to **complete the Task Allocation** form (**Appendix B**) where you will assign the tasks among the group members **for Assessment 3** (NOT for this assessment) based on this proposal.

Please note: in the Assessment 3's individual interviews, we expect each group member to know and understand the whole project's code. This means you need to understand other group members' written code to be able to answer the interview questions. You need to work together even if each member will be responsible for implementing a particular part.

Submission Requirements (Week 5)

Only one group member should submit the report (pdf file) AND the Task Allocation Form to Moodle by Thursday 28 March 2024, 11:55 PM

There is a 10% penalty per day for late submissions.

Academic Integrity Rules

Please note: **Generative AI tools are not restricted** for this assessment task **BUT a combination of the following should be provided to acknowledge the use of generative AI** in academic work:

- Written acknowledgment of the use of generative artificial intelligence and its extent;
- Descriptions of how the information was generated (including the prompts used); and
- Citing and referencing using closest source types in the style being used

When marking assessments, **if unauthorised use of generative AI is suspected or unacknowledged work is discovered,** it will be managed **as an allegation of academic misconduct** in accordance with existing disciplinary processes.

https://www.monash.edu/learnhq/build-digital-capabilities/create-online/acknowledging-the-use-of-generative-artificial-intelligence

An example from the above website:

Prompt: Was Sir John Monash a good man?

"Sir John Monash is widely regarded as one of Australia's greatest military leaders" (OpenAI, 2023)

Reference

OpenAI. (2023). *ChatGPT* (Jan 9 version) [Large language model] http://chat.openai.com/chat

Appendix A

The project proposal Report template

The proposal must have all the following headings:

1 Introduction

1.1. **An Overview** of the proposed android app

*Here briefly discuss the application **domain** and **main use/purpose***

1.2. **User group**

*Discuss the **expected user group** (e.g. considering their demographics, ethnicity or health conditions) and if any design consideration to adjust the app for this user group*

1.3. **Scope and limitations**

Discuss the scope of this development, i.e., what your proposed app will include and cannot include, and what could be really implemented in the assessment 3. Describe the limitations that will constrain developing some parts, and any adjustments that you must do accordingly, and if you have any creative idea to address any of these limitations.

2 Proposed Functionalities and Screens

*List the **functionalities** your proposed app will have and briefly describe the purpose of each.*
*Also, describe **the main screens** this app will have and their purposes.*
You could describe both screens and their functionalities/features together.
*You must **include a Table** to show these functionalities and screens **similar to Table 1** but you need to add any additional screens and functionalities you will propose.*

3 The system architecture

*In this section, you will provide a **system architecture diagram** of your proposed app that shows the front-side and server-side components, plus all the key Android components mentioned in. You also need to **provide a short paragraph** about these components and how they work together.*

4 The UI Design and Android Prototype (Compose)

*In this section, you need to provide **a diagram of your prototype** that includes **the screenshots of the screens** created in **Android using Compose** and the **navigation flow** between them shown by using arrows. You need to provide a meaningful title for each screen.*

*Add **a short sentence to describe each screen** in the diagram.*

5 Advanced features

*Provide **a description of two advanced features** that will be included in the Android app*
*Provide **URLs and details of online resources** that you plan to implement in your proposed app*

6 References (the publications, and website links based on the APA style)

Correct use of **in-text citation** for citing from the publications and website links you mentioned in the proposal
Provide a **Reference List** at the end of the report with at least 5 references using the APA style for your references including URLs

Monash University Library. (2020). Citing and Referencing: APA. https://guides.lib.monash.edu/citing-referencing/apa7th

Appendix B

FIT5046 Task Allocation Form

Please provide the name of tasks and the name of the group member(s) who did the task in the table below.

Task Name and Description *You need to briefly describe which proposed components and app screens group members will develop later in Assignment 3*	**Team Members**