Excellent evidence of development from TMA01 here. (LO2)

|  |  |
| --- | --- |
| Photo by Merlene Goulet on unsplash.com  Development and iteration of an exclusive Java-based android application for the dissemnation of equity linked insights | Abstract  This document presents a thorough and evidenced detailing of the development process I have undergone to plan, build, iterate over and produce an exclusive and secure Java based android application that can be used for the dissemination of Equity-linked insights and information among trusted individuals.  Evan Neale  TM470 |

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Good inclusion of a contents page. You have included indenting for sub-topics and this is a great inclusion and shows development from TMA01. (LO7)

The page numbering should exactly match the page numbering within the main body of the report. (LO7) (e.g. ‘Project Logs’ starts on Page 72)

# Preparation and planning

## Background

Over the past decade I have developed an interest In trading stocks and shares in my free time. I view it as an enjoyable pass time but it does require doing a lot of research. I have found that this hobby gives me a much more optimistic outlook on the world, as it provides me with a clearer picture of some of the technological advancements that may help lessen or overcome a number of the worlds [Punc - world’s] key problems.

In recent years many of my friends have gained an interest in investing, attracted by greater accessibility to trading platforms, a parabolic stock market, easier access to trusted information and, also, by having a friend (myself) who can help guide them through the initial steps required. I have also encountered online acquaintances who I regularly converse with regarding stock based topics.

Both I and my friends do the entirety of our research online where information resources are vast, spread across multiple different websites and apps.

## Problem Description

The key problem we find is that due to the extensive sources and constant stream of new information it can be impossible to filter through everything and it’s difficult for all interested friends to keep abreast of current events alone and especially in a timely manner, which can be very important when investing in newer more speculative companies. Combine this with the added complexity of trying to interpret poorly researched, purposefully misleading articles and having to decipher any hidden motives in some of the public discourse in online forums and it ends up being a very time consuming enterprise.

Our current system is a group chat, via WhatsApp, which allows for people to post links to resources and any accompanying comments they feel is relevant. This format has an absence of any further functionality and creates a messily structured thread of information that can be troublesome to filter and find old posts. There is a search function but its too basic and lacks the ability to refine it any further.

Over multiple years myself and friends have used a long list of different apps and websites that act as useable forums for communication however none have suited us perfectly in their layout, their level of personalisation and their trustworthiness as they are usually home to scammers and dishonest individuals. I will note a few of these applications below in alternatives to my proposed solution and explain why they aren’t ideal.

## My Proposed Solution

At it’s most basic principle my solution will be to create a relatively simple, safe, invite only java based android application that allows for the dissemination of news, links and rumours within a more trustworthy and customisable application. Initially, to tame it’s complexity, I would like the application to only be available to a select group of individuals. As I further develop the application I would like to add more functionality and eventually open it to a greater number of people in my online social circle and beyond.

In more detail, the user will have to sign up and register their details to access the application, the user will have to create a basic user profile and they will be required to enter their login details on each visit. The structure of the application will consist of a central page containing the main thread of user made posts. Each post will have a strict and consistent layout, and will contain identifying tags, a title, a hyperlink, a discussion area for comments and, optionally, an image. The tags will specific to what company, sector and what kind of information is being posted (for example financial results or social media rumours). There will be a forum element attached to each post so that users can discuss each post in a more focused area. The main page will also have a search element which initially will be able to filter the posts in the main thread based on their identifying tags.

Simply this application will be a safer, simpler and free option which is better than all current alternatives. This will make the process of staying current on news a lot more efficient as more individuals are sharing the workload of sourcing and pooling information in an more user friendly and personalised environment.

I believe that developing this application perfectly aligns with the Software focus of the my degree route. A second year module I studied was ‘*Object-Orientated Java programming (M250)*’, and it was the enjoyment I experienced during this module that played a role in my decision to choose a project with a heavy Java element to it. This project builds on the Java and object orientated programming skills acquired during this time as I will be required to further research and understand progressively more complicated programming syntax, data structures and object orientated implementation.

In year three I enrolled in the module ‘*Software Engineering (TM354)’*, this module has played a key role in maturing the approach that I have used to develop the application, and it’s valuable to put the skillset and knowledge I’ve acquired into practice to further solidify this knowledge. Another module I’m studying in year three is ‘*Web, mobile and cloud technologies (TM352)*’ which focuses on application development, from concept to completion, and has helped to develop the development approach, even though it involves using different technologies.

I have also been developing my knowledge and skills outside of the Open University modules, as I have been experimenting with development within android studio, this project will further expand and solidify my foundational skills I’ve previously acquired.

Good development from TMA01, showing that you are building on skills developed in previous OU Modules. (LO1)

## Alternatives

|  |  |
| --- | --- |
| **Alternative** | **Reasons why they are inappropriate** |
| Continue using WhatsApp | * Not suitable due to the large messages backlog * Search function is limited |
| Use a different messaging application | * Same issues to WhatsApp * Lacks the ability to create separate discussions around individual posts |
| Use stock twits (popular stock based social media app) | * Open and unfilterable userbase can be problematic and misleading * No functionality to create a closed system or group |
| Use a mainstream social media website to create groups | * Lots of non relevant functionality, for example Facebook has the capacity to create events which would be irrelevant * Not popular amongst potential users due to the nature of social media platforms business models |
| Bloomberg terminal | * Overly complex system, more than what is required * Extremely expensive |

## Major Tasks and Subtasks

As I have progressed through the project I have developed a greater understanding of the tasks and as such I have updated the list of tasks and subtask as required.

1. **Read TM470 Module website**
   1. Review study guide
   2. Review 'choosing a project' material
   3. Review forum posts
2. **Decide on project topic**
   1. Review potential topics and post on forum
   2. Reflect on feedback and finalise decision
3. **Work through TMA01**
   1. Review assessment details
   2. Create a skeleton of the document
   3. Work through TMA section 3.1 – preparation and planning
      1. Work through main sub-headings creating a flawed draft
      2. Review the sections that require attention and create a plan of attack
      3. Review content against learning outcomes
      4. Finalise draft
   4. Work through TMA section 3.2 – Project work completed
      1. Work through main sub-headings creating a flawed draft
      2. Review the sections that require attention and create a plan of attack
      3. Review previous module resources to help create diagrams and wireframe
      4. Review content against learning outcomes
      5. Finalise draft
   5. Create initial wireframe and Project files
   6. Work through TMA section 3.3 – Review and Reflection
      1. Work through main sub-headings creating a flawed draft
      2. Review the sections with the biggest issues
      3. Review any module resources needed
      4. Review content against learning outcomes
      5. Finalise draft
   7. Review, finalise and hand in TMA01
4. **First increment of the application**
   1. Build Login and registration page
      1. Review documentation and official guides
      2. Review final authentication choice
      3. Review final login and registration pages design
      4. Build frame of login and registration pages
      5. Embed authentication process into the pages
5. **Work through TMA02**
   1. Work through TMA section 3.1 – preparation and planning
      1. Review Specific Tutor Notes
      2. Review Assignment guidelines and Learning outcomes
      3. Implement Changes
   2. Work through TMA section 3.2 – Project work completed
      1. Review Specific Tutor Notes
      2. Review Assignment guidelines and Learning outcomes
      3. Implement Changes
   3. Work through TMA section 3.3 – Review and Reflection
      1. Review Specific Tutor Notes
      2. Review Assignment guidelines and Learning outcomes
      3. Implement Changes
   4. Review, finalise and hand in TMA02
6. **Second increment of Application**
   1. Build first iteration of main page and post creation page
      1. Review documentation and official guides
      2. Review final main page and post creation page design
      3. Build frame of main page and post creation page
7. **TMA03**
   1. Work through TMA section 3.1 - Draft Project report
   2. Work through TMA section 3.2 - Review
   3. Review, finalise and hand in TMA03
8. **Third increment of application**
   1. Iterate on the post creation section to include a comment section for each post
   2. Build first iteration of the separate search page
      1. Review documentation and official guides
      2. Review final search page design
      3. Build frame of search page
      4. Embed search functionality into search element
   3. Add a simplified search element at top of main page
9. **EMA**
   1. Work through EMA section 3.1 – General advice
   2. Work through EMA section 3.2 – Developing your report
   3. Review, finalise and hand in EMA
10. **Finalise the application**
    1. Review entire application codebase
       1. Gather and undertake all TODO tasks
       2. Identify elements that require further iteration
       3. Review MoSCoW Document
       4. Construct a plan and update project schedule
    2. Work through finalised tasks

A definitive list of resources skills and activities needed for successful project completion presented. (LO3)

## Life cycle model and schedule

|  |  |  |
| --- | --- | --- |
| **Lifecycle Model** | **Pro’s** | **Con’s** |
| Waterfall lifecycle | * Suits a Project where the numbers of stakeholders are limited (which holds true in this project) * Has an easily understandable sequentially structured approach which makes it easier to break down into sections, which would be appropriate for this project | * Structured in a way that there is no going back, this would not suit my intentions * Requires a lot of prior experience and knowledge, which I lack * Suits a Task that is routine, where there is familiarity with all aspects of the problem, this doesn’t hold true here |
| Iterative | * Can use alongside prototyping, which is a useful tactic when there is uncertainty about a product or a stakeholders desires * Can follow a adjusted waterfall model whereby there is regular movement backwards and forwards trough the stages | * Using a system that implements evolutionary prototyping creates multiple prototypes with limitations imbedded (for example in scope or design) which can bleed into the final model if not managed appropriately * Would require me to release small fully functioning elements of the application at regular intervals which may slow the |
| Incremental | * By developing simpler increments that are less complex is preferable and more manageable as this project is something relatively new to me * Allows the adjustment of requirements and overall deliverables as I develop experience and gain understanding in the project | * Generally used for larger more complex projects. My personal lack of experience means that this project is larger and more complex that anything I’ve done before |
| Agile | * Has a smaller planning section which means that a useful product will be released on a much quicker timeframe * Incredibly flexible to change due to the close cooperation of developer and user | * Hard to calculate the final costs, primarily time in this case but also financial in a business scenario, due to the flexible nature of the development. * Requires a highly skilled developer, which I am not. |

I believe the best lifecycle model choice for my project would be an **Incremental and Iterative** model. I’m relatively new to an undertaking such as this project, and using a lifecycle model that is malleable and allows for regular change during development is one of the priorities for me. Following an incremental methodology would allow me to gradually build the application out, starting with some smaller and simpler functionalities while also reiterating over certain elements that I may have gained greater understanding in after my initial increment. By also implementing a iterative methodology I can make notes on the developments that I intend to implement in the future, this allows me to prioritise making the increments functional above all else.

## Schedule

**Main changes**

As the project has progressed I’ve encountered no major set backs however there are small issues and considerations that have led me to adjust the project schedule. Due to some life events I’ve pushed beginning the second increment of the application onwards by a week. I have also increased the number of weeks time that I will prescribe to work on this increment, I believe this will be needed as while I’ve been prepping myself for this element of the application I have come to the realisation that it could be a little more complex and time consuming than I first anticipated, when combined with the fact that I will be revising heavily for exams in my other modules.

I have also added more detail to the tasks and sub tasks in regards to the third increment of the application. I did this as my understanding of the application has increased throughout the project and now felt I had the ability to elaborate further and make better judgement on these elements.

I have provided a cropped screenshot of the entire task list from the Gantt chart, *Figure 1*, and then proceeded to elaborate on each following phase of the project beneath it. I have provided a series of cropped images of the entire Gantt chart, split into each phase, in [‘Appendix 1 – Schedule’](#_Appendix_1.1_–) which can be accessed by clicking on appendix links in the phase descriptions. For further clarity a more user friendly schedule is available as a PNG in the ‘project schedule’ folder within the ‘supporting documents’ folder of my TMA02 folder, the file itself is called ***TM470\_Project\_schedule(updated).png.***

**Tasks and Sub-Tasks**

This section covers the review of the course details and literature as well as the conception of the initial project idea. The changes I made to the task and sub tasks can be see clearly here, these changes were made during my 13th session of work, evidenced in **Log Sheet no.13 Appendix 8** , and then iterated over during my 14th session of work, evidenced in **Log Sheet no.14 Appendix 8**.

Excellent evidence of adjustment to planning. (LO9)

Table

Description automatically generated with medium confidence

Figure - Task and sub task of the project schedule as well as the first phase of work

**Application Preparation and TMA01**

This section covers the foundational activities, including the preparatory work creating a basic wireframe design of the application as well as the activities required to progress and complete the first assignment, TMA01. The illustration of this can be found in [Appendix 1.1](#_Appendix_1.1_–).

**First increment and TMA02**

This section covers the initial increment of the application which include the activities to build a functioning registration and login page as well as the activities required to progress and complete the second assignment, TMA02. In regards to the change I made regarding pushing back the start of the second increment can be seen illustrated in [Appendix 1.2](#_Appendix_1.2_-).

**Second increment, Third increment and TMA03**

This section covers the second and third increment of the application which will centre around building the functioning main page and post creation page, and all the elements needed to do facilitate that. Included will be the third increment will iterate over the main page post elements to include individual comment sections as well as a separate search page and also a search element at the top of the main page. Additionally included are the activities required to progress and complete the third Assignment, TMA03. It was in this phase of work where where I extended the weeks required to finish the second increment and is evidence in [Appendix 1.3](#_Appendix_1.3_-).

**Final increment, Iteration and EMA**

This section covers the final increment which is the finalisation of the application which will involve iterating on previous increments and finalising the EMA. The illustration of this can be found in [Appendix 1.4](#_Appendix_1.4_-).

## Resources, skills and methods

I will primarily be using Java and XML to develop the application within the Android Studio Integrated Development Environment (IDE) which is provided by Android Inc. I chose these elements as I have previous experience with them, gained during previous modules as well as personal study, and they are also the most commonly used constituents in respect to android development and as such have a considerable amount of documentation, guides and a friendly online communities that will prove valuable during development.

I will be utilising the IDE’s emulator during development but have also purchased a cheap Google Pixel device to test the application in a more realistic scenario. Initially during development I will focus o the app’s functionality however on later iterations I will focus purely on the quality of the design and I intend to implement the material 3 design sensibilities within the application to make it appear more modern and fit within Google’s own open source design system.

I will be using GitHub as a repository for the project which will allow for version control and also be a useful element in providing access to tutors and assessors if required. I have some experience with Git version control from previous modules and have used GitHub before in personal context. It is a free and popular version control option that has extensive documentation.

In regards to the authentication and database requirements of the application I have decided to implement Firebase authentication and the Firebase Firestore database. I chose these options as they were free use and were designed to integrate within the Android Studio IDE seamlessly, this is likely because they are provided by google which, as mentioned previously, also owns android.

During later iterations of the application I also intend to implement more graphics, as such I’ve decided I will use the ‘Unsplash’ website of free images as well as AI created images via Midjourney. Midjourney has the ability to create free use art based on user prompts in many different sizes and formats.

For creating my project schedule I will be using the smart sheets website to create, review and maintain the ever changing schedule.

As I produce the application I will be testing it via the inbuilt emulators in the IDE however since staring (Sp – ‘starting’) the project I have decided to purchase a cheap android device to act as a more realistic testing environment. I will be also be making use of a small number of users, who I will interrogate and include them and their android phones at specific points throughout production.

I will also need to gain better understanding of the formal requirements, methods and technologies required to accurately and fully test the application, a good starting point will be the official developer documentation and the official android studio guide combined with the literature I have gathered. However at this moment I’m aware of and intend to implement unit testing via JUnit which is supported by default in android studio.

A list of the respective links to the relevant documentation and resources are as follows:

* Android Application developer guides (Android, 2023a)
* Android studio guide (Android, 2023b)
* Material 3 documentation (Google, 2023)
* GitHub documentation (GitHub, 2023)
* Firebase developer documentation (Firebase, 2023a)
* Unsplash, for free images (Unsplash, 2023)
* Midjourney (Midjourney, 2023)
* Smartsheet’s Gantt charting (SmartSheet, 2023)
* JUnit 5 User Guide (Bechtold, S., Brannen, S., de Rancourt, J., Link, J., Merdes, M., Philipp, M & Stein, C. , 2023)

**Risk Assessment Matrix**

By reviewing the risks and using a risk matrix, I can calculate a more specific risk profile and resultingly the overall risk.

**Total risk Key**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Very Low** | **Low** | **Medium** | **High** | **Very high** |
| 4 - 6 | 7 – 10 | 11 - 13 | 14 – 16 | 17 - 20 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| RAG Risk Register |  | ***Impact*** | | | | |
|  |  | **Insignificant**  **(2)** | **Minor**  **(4)** | **Significant**  **(6)** | **Major**  **(8)** | **Severe**  **(10)** |
| ***Likelihood*** | **Almost certain**  **(10)** | Medium  (12) | High  (14) | High  (16) | Very High  (18) | Very High  (20) |
| **Likely**  **(8)** | Low  (10) | Medium  (12) | High  (14) | High  (16) | Very High  (18) |
| **Moderate**  **(6)** | Low  (8) | Low  (10) | Medium  (12) | High  (14) | High  (16) |
| **Unlikely**  **(4)** | Very Low  (6) | Low  (8) | Low  (10) | Medium  (12) | High  (14) |
| **Rare**  **(2)** | Very Low  (4) | Very Low  (6) | Low  (8) | Low  (10) | Medium  (12) |

Very good evidence of risk identification here.

You have introduced a numeric scale for likelihood and impact (e.g. 1 to 10), with a key included to identify values considered low/medium/high. (LO3).

Your overall risk is calculated as the sum of likelihood and impact. This should in fact be the product (multiplication) of these two values. (LO3).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk Ref | Risk | Likelihood | Impact | Overall Risk |
| Ref.1 | Potential users become uncommunicative | 4 | 2 | 6 |
| Ref.2 | Failure of computing equipment | 2 | 10 | 12 |
| Ref.3 | Miscalculation of planning schedule | 6 | 6 | 12 |
| Ref.4 | Misjudgement of my technical ability and my capacity to follow through in fully developing the project | 4 | 10 | 14 |
| Ref.5 | Scope creep affects the schedule I have created | 6 | 4 | 10 |
| Ref.6 | Other modules take up more time and affect project schedule | 8 | 8 | 16 |

**Mitigation**

I regards to Ref.1 All of the initial potential users have been selected and there are multiple so in the case that some users withdraw this shouldn’t be an issue.

In Ref.2 which focuses on computing equipment failing, I will make regular saves of all my Open university files to a local USB and I will also intend to push regular updates to my GitHub repository so that, in a worst case scenario, there wouldn’t be too much work lost. I would then quickly replace the computing device.

In regards to Ref.3 a miscalculation of the schedule and Ref.4 the misjudgement of my technical ability I intend to allot far more time and effort to the project moving forwards and I intend to expedite my familiarity with the elements of the project and the literature noted in my literature review.

To prevent scope creep, Ref.5, I will make sure to regularly temporarily adjust the project schedule and review feasibility of the increased scope and if it’s impractical to add then it will not be implemented.

In the case of Ref.6 where other modules vie for more time then I will simply allot more of my personal time to them. I won’t let them affect the overall project schedule however I may adjust smaller sections within the schedule. My other modules end a month before I must provide TMA03 so if the other modules do require more time this can be rectified by giving complete focus, and working days, to make up time in the final month.

## Future Plan

In regards to the schedule of my future plan I have made adjustments to my initial project schedule and these changes have been covered I the *Schedule* section of this document. My short term future plan which will take me to the end of the next increment of the application is as follows below.

As I’m nearing the completion of TMA02 I intend to review the initial design of the main page and post creation page and finalise my design choices for this stage. I then intend to review my conceptual understanding of what is required, such as the classes and how they will interact, as well as review the documentation. I will then proceed to create the relevant java files and XML files and generate their internal structures as required. I am concerned that this phase of the project could become more complex and problematic than I initially anticipated and I am ready to adjust the schedule and my expectations as required.

While this increment of the application is being created I will make sure to regularly test it via the IDE emulator as well as the Google Pixel device. Similar to previous increments I intend to focus on getting these core elements functioning so I will not spend a great amount of time labouring over the beautification or extended testing of the application. I intend to create several *‘TODO’* notes within the code that I can return to in further iterations.

Once I have completed and personally tested the application I will engage with the selected users, whom I intend to make use of to further test the application, as I would like to test the functionality of multiple registered users being able to post as well and view the main thread of user created posts. I intend to ask these users to test the application according to some tests that I will define and I also to acquire some feedback from them. I will need to make use of the documentation I have available and the literature I’ve gathered to develop a more formal and complete testing scenarios for the application as a whole.

# Project Work completed

Further evidence of continuing research from TMA01 here, identifying existing applications and reviewing them. (LO4, LO6).

## Information sources – the literature

During the course of this project there will be certain elements that I don’t have a wealth of experience in and as such I have taken it upon myself to find some literature that would help build upon and fortify my current knowledge. I am currently reading through these books and I believe they will all prove useful to the development of the project

As such I uncovered **‘Android Studio IDE Quick Reference: a pocket guide to Android Studio Development’** by Ted Hagos that provides some very basic guides for quick reference to each step of the development process from setup of the IDE to preparing the application for release. Most likely this will provide a reference to point me in the right direction for further research or deeper reading of other literature

I am currently reading ‘**Android design patterns and best practice ’** by Kyle Mew, I believe it will prove most useful as the experience I have within android studio is largely informal and may not conform to best practices. This resource will provide more in-depth directions on certain aspects of development that I have not encountered, and be especially important around the best practice in regards to these components.

I have also initially skimmed and I’m currently working through in more depth ‘**Android Programming for beginners – third edition’** by John Horton, this is a much more exhaustive and informative piece of literature and it covers the development of java applications within android studio in even greater depth, it is also relatively recently released which means that its content should be more up to date than other options.

Another literature source I have discovered and intend to use as both a reference and for more focussed reading is **‘Android Studio 3.0 Development essentials – Android 8 edition’** by Neil Smyth, it is comparable in depth to the book above by John Horton however it is a little older, therefore potentially less relevant, but it does have a more detailed contents list and acts as another beneficial point of reference.

A key literature source I have obtained and will examine is **‘Testing and securing Android Studio Applications‘** By Belén Cruz Zapata , Antonio H Ninirola. This will provide a great introduction to the testing methods and technologies that I must begin t implement going forward.

## Project work

The work completed in the first phase in the build up towards TMA01 was almost entirely preparatory, the wireframe from this phase of work can be found in [Appendix 3](#_Appendix_3_–) (figures 11 – 18 inclusive). Building on the work completed and referenced in TMA01, I have progressed the project in accordance with the project schedule. In TMA01 I provided screenshots of the files structure in both Android studio and GitHub ([Appendix 2.1](#_Appendix_2.1_–) and [Appendix 2.2](#_Appendix_2.2_–) respectively). In *figure 2* below, have provided the evidence of the updated Android studio file structure . I have chosen not provide any further evidence of the GitHub file structure as it effectively looks similar to the previous iteration.

Good evidence of practical development here. (LO11).

Text

Description automatically generated

Figure - updated Android Studio file structure

After completion of TMA01 I solely focussed on building the first increment of the application. Within this increment was the login page and the registration page. At this time the application opens to the login activity where users can input their login details to access the main activity, alternatively they can navigate to the registration activity and input their details to register an account before continuing to login.

Graphical user interface, text, application

Description automatically generated

Figure - Login activity

Again, good evidence of practical progression here. (LO11).

Graphical user interface, application

Description automatically generated

Figure - Registration activity

To implement this I developed multiple java classes, which are as follows:

* LoginActivity
* RegistrationAcitivity
* UserProfile
* UserValidation
* MainActivity

I also further developed the XML files that provide the layout of the activity, they are as follows:

* activity\_login
* activity\_registration
* activity\_main

As the appearance of the GitHub files look largely identical to *figure 1*, Appendix 2.2, I will not provide evidence of that at this point, however I will provide the GitHub hyperlink in my final EMA document.

The various files I have developed I will elaborate on individually below, I have added hyperlinks to the titles which will take you straight to the relevant code snippets located in the appendix, I have removed boilerplate code where possible.

### JAVA files

**[LoginActivity (Appendix 5.1)](#_Appendix_5.1_–)**

After the setting the overall layout view as the activity\_login XML file I created variables to access the views that take input from the users, whether that was from users inputting text in, the case of inputting an email address and password, or from users clicking on the login or register buttons. I also initialise a Firebase instance for usage in the authentication process.

I set on click listeners for both the login button and the register button. The login button calls the userAccountLogin() Method while the register creates a new intent and then starts that activity, which moves the user to the user registration view.

Once the login button is clicked the inputs the has user made in the edit text views are initialised to variables. The variables are then validated against validation criteria, which are elaborated on in the UserValidation class, they will produce a informative Toast message if there are any issues otherwise the method will continue.

I have used a modified version of the authentication method that I obtained from the Firebase documentation (Firebase, 2023b). It will interrogate the Firebase instance to see if the user credentials are present, if they are there will be a Toast message in the affirmative, it will get the users credentials and initialise them to a key value pair for use in the main activity, and then navigate to the MainActivity. If unsuccessful then the method will convert the returned exception into an informative error message Toast.

**[RegistrationActivity (Appendix 5.2)](#_Appendix_5.2_–)**

After the setting the overall layout view as the activity\_registration XML file I created variables to access the views that take input from the users, whether that was from users inputting text in, the case of inputting a username, email address, password and password confirmation, or from users clicking on the register button. I also initialise a Firebase instance for usage in the authentication process.

I set an on click listener for register button, this calls the registerNewUser() Method.

Once the register button is pressed the inputs the user made into the edit text views are initialised to variables. The variables are then validated against validation criteria, which are elaborated on in the UserValidation class, they will produce a informative Toast message if there are any issues otherwise the method will continue.

I have used a modified version of the registration method that I obtained from the Firebase documentation (Firebase, 2023c). It will then create a new user based on their inputted details, if successful there will be a Toast message in the affirmative, retrieve the UserID created in the Firebase instance and attempt to create a UserProfile object which will be stored I the Firebase Firestore User collection. If successful an affirmative toast message is displayed and the user is navigated back to the login activity to proceed to use their new UserProfile to log into the application. If unsuccessful then the method will convert the returned exception into an informative error message Toast.

**[UserProfile (Appendix 5.3)](#_Appendix_5.3_–)**

The UserProfile class was generated to produce UserProfile objects, which can be used to give individuals users their own unique experience of the application. The user profile class constructs a user profile object based on the supplied parameters of userID, username and userEmail. It contains auto generated getter and setter methods.

**[UserValidation (Appendix 5.4)](#_Appendix_5.4_–)**

I have created the UserValidation class as I wanted to take the depth of the UserValidation elements outside of the individuals classes that implement it. I know that I will expand on some of the methods that are needed across different activities within the application and preferred the idea of having them all in one place as I believe this was a reasonable implementation of OOP principles.

**[MainActivity (Appendix 5.5)](#_Appendix_5.5_-)**

This is almost empty at the moment, it will be key in the next increment of the application as it will be used to stage the main thread of the application. Currently all that is present in this class is setting the content view to the main\_activity XML file (which is also largely empty) and initialising the user details that were linked to the intent in the LoginActivity class, for usage in the implementation of a user profile element within the application.

### XML Layout files

**[activity\_login (Appendix 6.1)](#_Appendix_6.1_–)**

This file contains the layout information for the login activities, in this iteration it’s a simple login screen with a simple welcome message and two input TextEdit boxes and two buttons, login button and a register button

**[activity\_registration (Appendix 6.2)](#_Appendix_6.2_–)**

This file contains the layout information for the registration activities, in this iteration it’s a simple registration page with a welcome message, four input text edit boxes and a register button.

**[activity\_main (Appendix 6.3)](#_Appendix_6.3_–)**

This file contains the layout information for the main activity, in this increment it’s a almost empty with only a little message that is useful to verify that we have made it to main activity.

### Other files

Through out the application I have made specific changes and additions to an assorted collection of files.

I’ve updated the AdroidManifest.xml file so that when the application opens it opens to the login activity and not the main activity. I’ve also listed all of the different activities into this manifest.

I’ve updated the strings.xml with all of the text I have used up until now within the application, this is useful as all the text that is used can be accessed and changed via just this single file.

I’ve also added dependencies to the Gradle scripts which are required to make use of the different services related to google and the Firebase services.

### Testing

As I’ve been working through the development in this increment I’ve been making use of emulator based testing and physical device based testing. When testing I have been making use of a logical, non exhaustive template whereby I have simply tested to check that they function as expected. This has involved me attempting to login with non registered details, registering as a user and reattempting to login with the newly registered details, while checking that the firebase authentication and Firestore database have collected the expected information.

Although this has proved adequate thus far this form of testing is ultimately nowhere near sufficient and I intend to implement a more structured, rigorous and formalised testing in later iterations. Implementing unit and system testing as required.

Very good evidence of honest reflection here. (LO8)

# Review and reflection

Initially I concentrated on gathering resources, creating a clear foundation for the project and iterating over the application in my mind and on paper to get a clearer image of what I hoped to create and achieve.

I believe the exploration of the documentation and resources required to build on my knowledge and guide me through aspects of development within the IDE has proven beneficial. I have resourced the required documentation and found interesting books through which I can further develop my knowledge. I also believe my creation of the wireframes has helped me obtain a clearer picture of how the application will look and this has helped me to reflect and iterate over it to create a better, albeit not perfect, representation of my intentions.

I believe the less structured layout of this module and the less clearly defined elements to the final project and assignment expectations slowed me down initially as it took me time to gather my thoughts as well as start piecing all the elements of the project together. This also lead (Sp – ‘led’) to me elaborating and adjusting the schedule regularly. I believe I have mostly recovered from this issue and this should hopefully prove evident in my TMA’s and future presentations of my actual project work.

Throughout the creation of the first TMA and increment of development I became aware that I hadn’t done enough in the form of eliciting requirements and creating a conceptual model of the application which would prove more useful during development. This is something I have taken on board and rectified which is quire important moving forwards the increments become gradually more complex and unfamiliar to me.

Again, good reflection here. (LO8)

**Explain how you have been developing the skills necessary for your project, if you do not already have them.**

In terms of managing a project and planning it’s undertaking I have some skills and knowledge acquired through earlier modules within my degree course, these skills have been further developed in more recent modules such as *‘TM354 software Engineering’*.

Some of the key skills that are required for this project will be java programming and the skills required to fully utilise the IDE. Previously I’ve covered Java within *Object-orientated Java programming M250* , I have also spent my personal time developing my familiarity with Java language using a multitude of online resources, however I haven’t used these skills in such a large scale project or to the level of complexity needed here but I am confident that I will manage to adapt and learn throughout the project. I have gathered a sizeable collection of official documentation and helpful user guides, both provided by android which will help me overcome any issues.

**Indicate to your tutor any issues on which you would like specific feedback.**

The areas of concern where I required feedback in the first TMA was around the scale and complexity of the project. I felt that the project was substantial and complex enough to be a good foundation for this module but I required a little more input. I was aware that there are other elements that I could’ve included in the application but I wasn’t sure on where the line was between having unreasonable aims and creating an application that is too small of a scale. I created a MoSCoW document which has further examples of elements I could add to the application to make it more complex, this is in **appendix 4**.

I would like some feedback in regards to how I have evidenced and explained the work I have done so far. Although it makes sense to me my current concern is it may not be as readable to any tutors who may read it and especially tutors who may not be as familiar with Java or android development. Is it appropriate as it currently is? or would it be better with more screenshots and more concise explanations instead?

A visual image will always assist a tutor in their understanding.

**Briefly summarise how your tutor has influenced your thinking in terms of your project choice and how you have agreed to maintain contact with your tutor.**

When I first contacted my tutor I was still in the process of finalising the project and the scale of it. My initial communication with them made me realis (Sp – ‘realise’) that the scale of my project was initially too small and that it needed to be expanded if it was to be deemed appropriate. I had reviewed some of the elements of the project that I had in my MoSCoW table and moved some from the ‘Should have’ to the ‘must have’ section. It was also brought to my attention that there would be some important legal elements that would need to be considered as the application is stock trading based app that could have legal ramifications if trades were made based off recommendations or based off insider knowledge.

I have taken advantage of the tutorial that was held by my tutor and I have exchanged emails, he has also made me aware of the different avenues of communication open to myself and his availability for more direct and extended contact. For now email communication alone has been sufficient for what has been needed.

## Ways of working

In regards to the way in which I have been working to progress this project I have been pretty happy with my approach and feel it is sufficient to continue though to the completion of the project. I am currently studying three other modules alongside TM470 and have managed to find a routine which suits me well, I usually spend 2-3 days focussing on TM470, depending on requirements and external circumstances, which is enough to allow me to keep pace with the schedule I have set out. Alongside the primary working days, which I have allotted to the core work of the project, I am regularly skimming parts of the android developer guides and books I have purchased and referenced in the literature sources.

As I have worked I have kept a daily record of what I have done and any issues that have arisen in my Project Log. I have included some examples in the appendices at **Appendix 8**. I find that the inclusion of these logs helps me to keep abreast of what I’m doing and intend to do the next working day. I also use a few different notes applications where I write informal notes which to act as simpler reminders of what to include in the assignments as well as a storage place for relevant hyperlinks and notes which help me pick up where I left off when I return to developing the application.

I regularly keep in contact with my Tutor via email, both in regards to bi-weekly updates and with any assignment related queries that come up. I’ve found he has been very helpful and incredibly rapid in replying to any and all messages I’ve sent. An example of the regular updates and queries can be found in an exhaustive list of communications in **Appendix 7.**

As well as building out the TMA02 document based on the initial TMA01 document I have also made changes based on Tutor feedback received with the marked TMA01. Some of the more significant recommendations which I adhered to were the inclusion of a more exhaustive list of resources, skills and methods that will be utilised during the project, the provision of a more detailed RAG risk assessment matrix, the including all of my project logs and communication logs as well as the inclusion and brief explanation of the project schedule I have set out.

## Evaluating Project management

I believe my chosen lifecycle model is supporting my project appropriately, the iterative and incremental model suits it perfectly. This approach allows me to focus my attention on smaller elements of the overall application which stops me from getting too overwhelmed or losing focus from the component I’m working on and results I me producing a functioning component of the application.

The iterative aspect of it also helps me to focus on a the primary elements of the application and not allow issues, which aren’t as important in the initial increment, to distract from finishing the increment. By focusing on these smaller incremental components it is easier to comprehend the application as a whole conceptually and break it into a schedule. This approach also helps with regards to development past the intentions of this project as future increments can be built onto the application and future iterations can perfect the components already built.

I think that my schedule and the granulation of my tasks and subtasks within it has been appropriate. I find that as well as following the cadence and project schedule I also regularly create informal short term plans to help me gather my thoughts on what needs to be done at an even more granular detail as well as check that I going to be able to match the schedule I have set out, this allows me to adjust my the time I allot to the project regularly and dynamically and prevents any issues with keeping with the overall project schedule.

Consideration of LSAPI and EDI evidenced. (LO10)

## Legal, social, ethical and professional issues and equality, diversity and inclusion concerns

The application I am creating will initially be focused on a small, likeminded clique however there will still be a host of LSEP Issues to be aware of and attend to. The application will be a conduit of stock based information and this comes with certain legal obligations in regards to how users must be treated and how content is moderated. I will have to develop a legal disclaimer that users of the application will be required to agree to during registration, it will state that the application developer and other users hold no responsibility for loss of money as well as inform the users that they must not post anything potentially illegal, offensive or non-related to the stock trading.

There will be the legal concern of the sensitive data that the user shares, initially this will be the profile information that will include their email and a username (that can sometimes be identifying). This data will have to be delt with in the appropriate way and will need to be done so in accordance with GDPR.

In regards to equality, diversity and inclusion there aren’t many issues related to these topics in this project. However there are two that are clear, the application must be accessible and inclusive to all individuals who want to use it. The design of the application needs to be built, or modified in later increments, with accessible attributes imbued throughout. The application is primarily a space for user created posts and user discussion, as such without the correct barriers in place there could be offensive or exclusive posts which would harm the inclusive nature that should be imbued into it, there will be a need for rigorous moderation to be in place.

Consider expanding the EDI section here by including consideration of visually impaired users ?. (LO10)

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# Appendices

Excellent inclusion of GANNT chart iterations, demonstrating good evidence of progression (LO9).

Appendix 1 – Schedule

### Appendix 1.1 – Application Preparation and TMA01

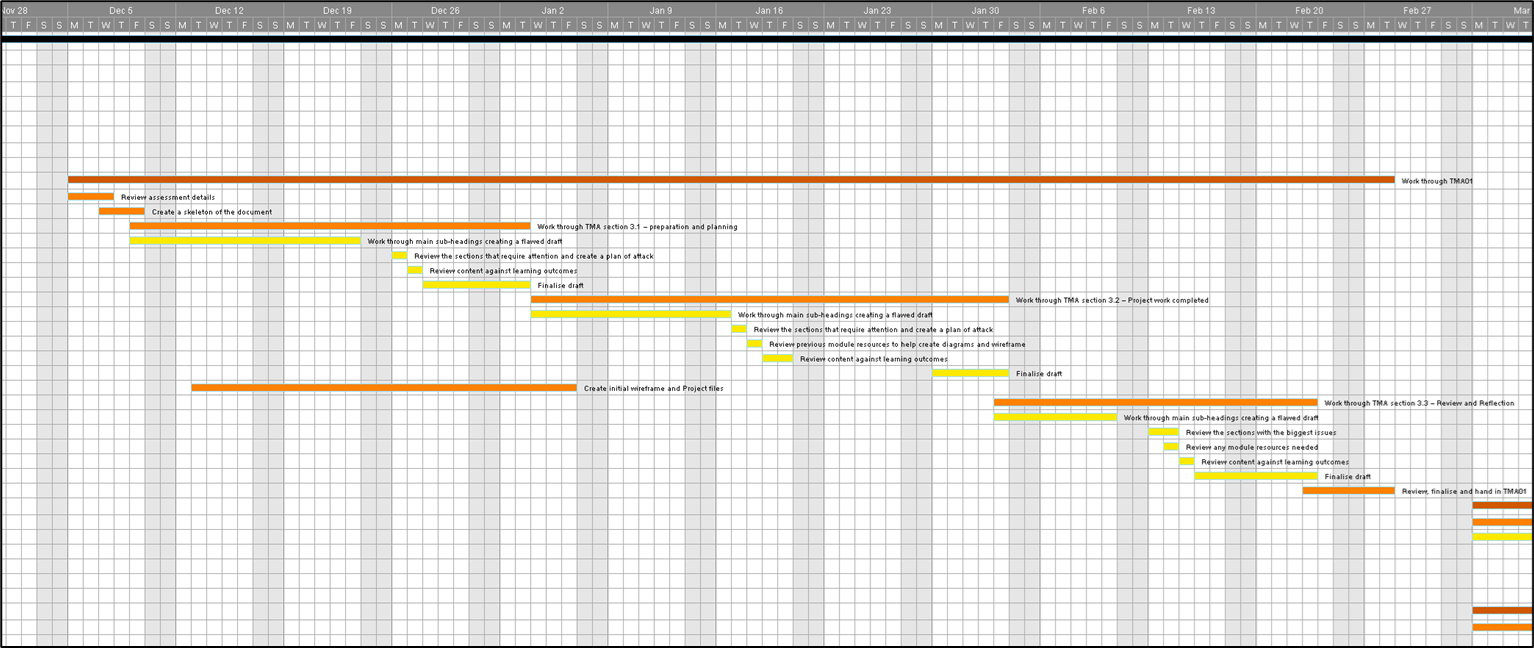


Figure - second stage of Gantt chart

### Appendix 1.2 - First increment and TMA02

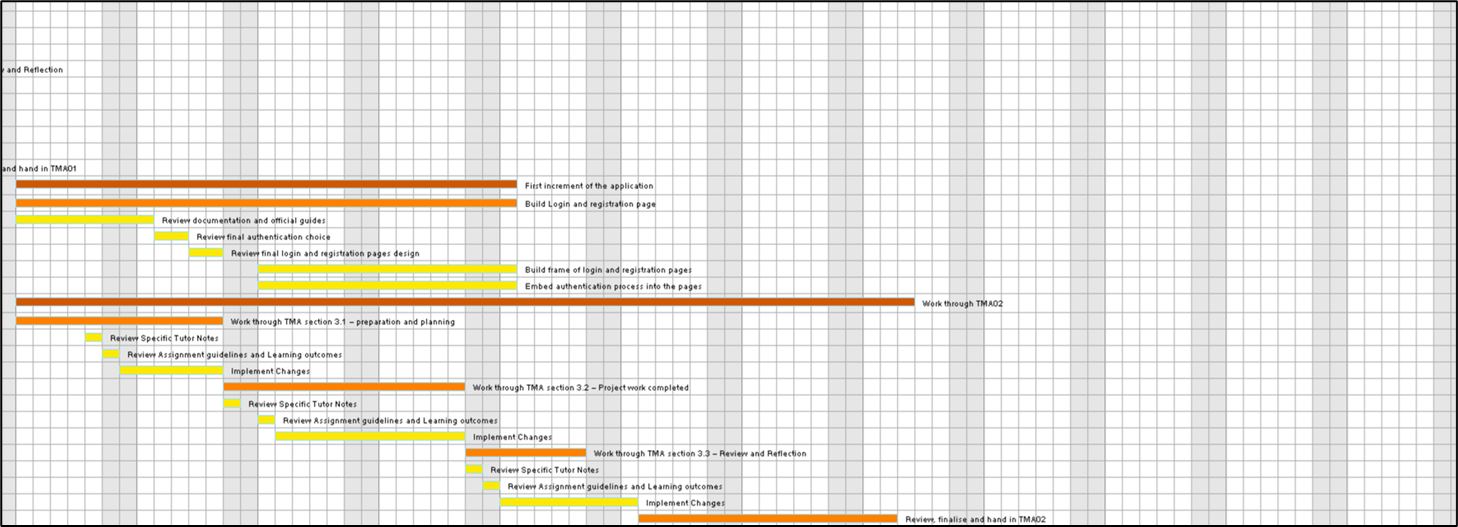


Figure - third stage of Gantt chart

### Appendix 1.3 – Second increment, Third increment and TMA03

Timeline

Description automatically generated

Figure - fourth stage of Gantt chart

### Appendix 1.4 - Final increment, Iteration and EMA

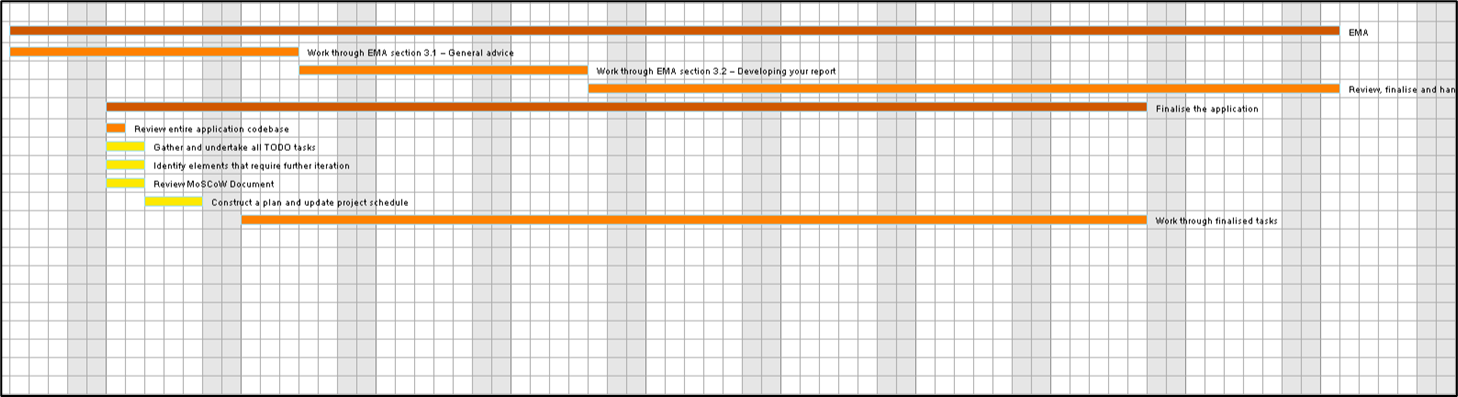


Figure - fifth stage of Gantt chart

Appendix 2 – TMA01 Work completed evidence

### Appendix 2.1 – Old Android Studio file structure

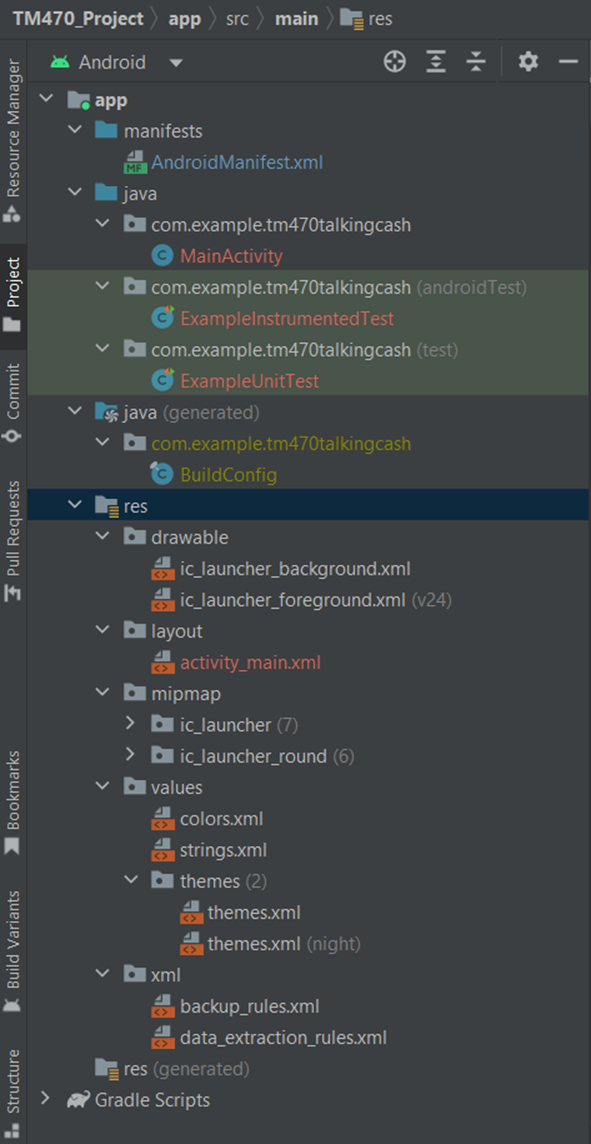


Figure - Android studio file structure

### Appendix 2.2 – Old GitHub file structure

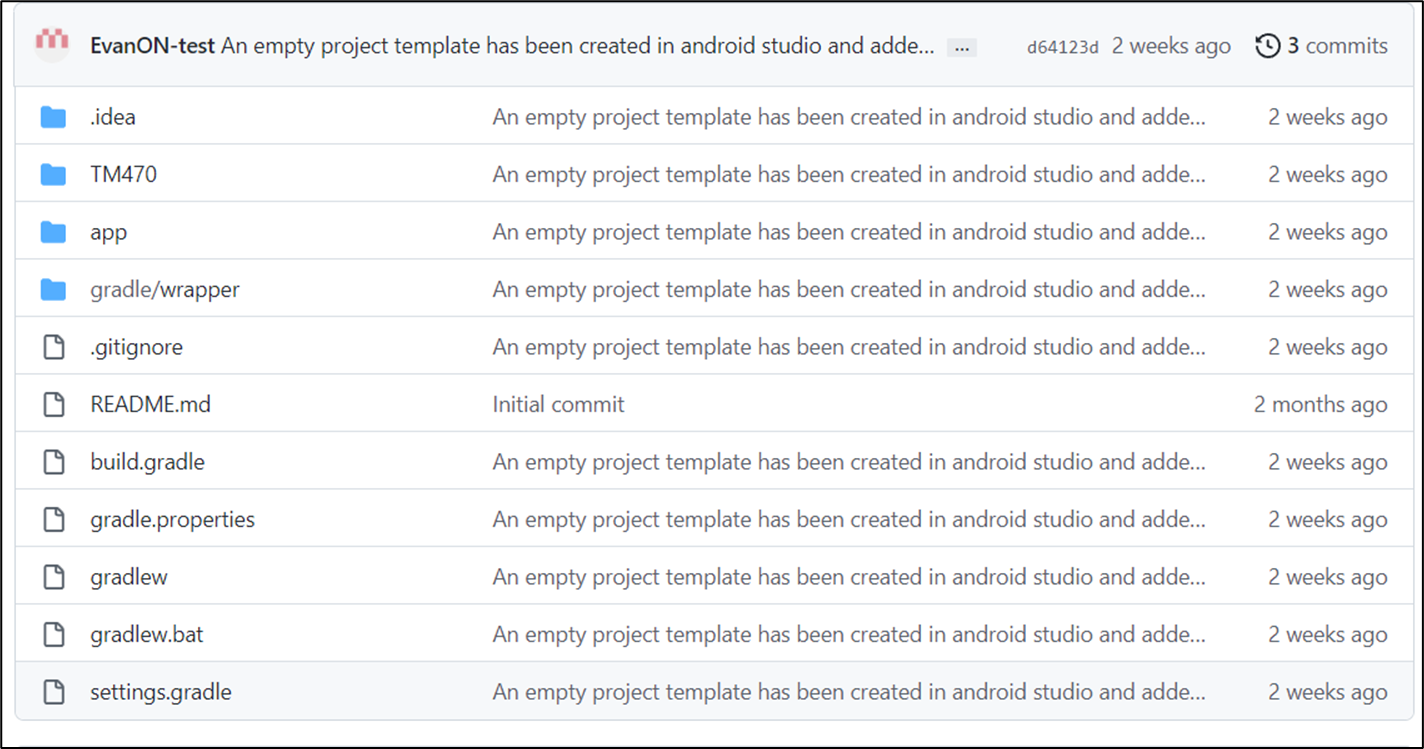


Figure - GitHub file structure

## Appendix 3 – Wireframes

- Incorporating figures 11 - 18

**Diagram

Description automatically generated with medium confidence**

Figure - Login page

**Graphical user interface

Description automatically generated with medium confidence**

Figure - Registration page

Table

Description automatically generated

Figure - Main page

**Diagram

Description automatically generated**

Figure - An expanded view of the post layout as it would appear on the main page

**Graphical user interface

Description automatically generated with low confidence**

Figure - Post creation page

**Diagram

Description automatically generated with medium confidence**

Figure - Discussion page that is linked to each individual post. It will expand from the 'comments' element of a post when clicked

**Diagram

Description automatically generated with medium confidence**

Figure - A view of the menu button when clicked

*Text, letter

Description automatically generated*

Figure - Expanded search page

## Appendix 4 – MoSCoW

A MoSCoW template of some of my thoughts on the initial requirements of the application

**Must Have:**

* A form of login process so that only registered users can use the Application
* A home page consisting of a stream of user sourced posts including article links, website links and links to relevant, trusted social media threads (mainly from twitter and reddit)
* The post creation element must force a common pattern, each post must have a clear and informative title, prominent tags denoting the company and sector as well as the type of information is in the link/article/social media thread (for example financial results, production news or social media based rumors) .
* An enhanced element to the link sharing where by a link preview is shown and not just the simple hyperlink itself
* A simple forum element, attached to each post allowing users to create discussions.
* The ability to filter the main page, either into specific companies, specific sectors (e.g. software, EV, Crypto), and information types.

**Should have:**

* The ability to post PDF files (which are a common format of investor deck).
* An improved search function that will search other aspects not just the tags, for example it will search titles and within comments
* The ability to subscribe to various tags, and a push notification that is initiated any time a post is made about a relevant topic

**Could Have:**

* A simple form of stock watchlist allowing the addition of info such as company name, holdings and money invested and even the extension of a profit/loss element based on the current price sourced only on a limited timescale basis (every hour or every day).

**Will not have:**

* Any form of live share price feed.
* Any form of individual static page for a specific company, although as mentioned the feed can be filtered to show specific companies articles, website links and possibly PDF’s.
* Any further trading information relevant to specific companies outside of the post stream. For example no extra info on analyst expectations or trade volume etc.

## Appendix 5 – Java Code

### Appendix 5.1 – LoginActivity

package com.example.tm470talkingcash;  
  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.Toast;  
  
import androidx.annotation.NonNull;  
import androidx.appcompat.app.AppCompatActivity;  
  
import com.google.android.gms.tasks.OnCompleteListener;  
import com.google.android.gms.tasks.Task;  
import com.google.android.material.textfield.TextInputEditText;  
import com.google.firebase.auth.AuthResult;  
import com.google.firebase.auth.FirebaseAuth;  
import com.google.firebase.auth.FirebaseUser;  
  
*/\*\*  
 \* Provides the function to sign into the application using their registered email and password, and  
 \* also navigate to the registration activity if required  
 \*/*public class LoginActivity extends AppCompatActivity {  
  
 private TextInputEditText emailText;  
 private TextInputEditText passwordText;  
 private Button loginBtn;  
 private Button registerBtn;  
 private FirebaseAuth fAuth;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState){  
 super.onCreate(savedInstanceState);  
 //sets the view to the login activity layout  
 setContentView(R.layout.*activity\_login*);  
 //Gets the firebase instance for the firebase authentication service  
 fAuth = FirebaseAuth.*getInstance*();  
 //Finds the views based on their ID's  
 emailText = findViewById(R.id.*log\_email\_input*);  
 passwordText = findViewById(R.id.*log\_pass\_input*);  
 loginBtn = findViewById(R.id.*log\_button*);  
 registerBtn = findViewById(R.id.*reg\_on\_click*);  
  
 //Sets a click listener for the login button, calls the userAccountLogin method when clicked  
 loginBtn.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View view) {  
  
 userAccountLogin();  
 }  
 });  
  
 //Sets a click listener for the register button and directs to registration activity when clicked  
 registerBtn.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View view) {  
 Intent intent = new Intent (LoginActivity.this, RegistrationActivity.class);  
 startActivity(intent);  
 }  
 });  
 }  
  
 */\*\*  
 \* This method logs the user into the application if they have a valid email and password  
 \* that is stored in the authentication database  
 \*/* private void userAccountLogin(){  
 String email;  
 String password;  
 Integer minLength;  
  
 //initializes the variables based oin their inputs  
 email = emailText.getText().toString();  
 password = passwordText.getText().toString();  
 minLength = 6;  
  
  
  
  
 //*TODO: review and maybe implement validation techniques in a smarter way. Move toasts to UserValidation?* //Validates the inputs using methods imported from the UserValidation class  
 if (!UserValidation.*isValidEmail*(email)){  
 Toast.*makeText*(getApplicationContext(), "Please enter Valid Email", Toast.*LENGTH\_LONG*).show();  
 return;  
 } else if (!UserValidation.*isValidPassword*(password, minLength)){  
 Toast.*makeText*(getApplicationContext(), "Please enter Valid Password", Toast.*LENGTH\_LONG*).show();  
 return;  
 }  
  
 */\*\*Attempts to sign in to a user account based on their inputted email and password. If successful  
 \* the main activity launches with a affirmative message. If unsuccessful an informative  
 \* error message will be displayed.  
 \*  
 \*/* fAuth.signInWithEmailAndPassword(email, password).addOnCompleteListener(this, new OnCompleteListener<AuthResult>() {  
 @Override  
 public void onComplete(@NonNull Task<AuthResult> task) {  
 if (task.isSuccessful()){  
 Toast.*makeText*(getApplicationContext(), "Login Successful", Toast.*LENGTH\_LONG*).show();  
 FirebaseUser user = fAuth.getCurrentUser();  
 Intent intent = new Intent(LoginActivity.this, MainActivity.class);  
 intent.putExtra("userEmail", user.getEmail());  
 intent.putExtra("userUid", user.getUid());  
 if (user.getDisplayName()!=null){  
 intent.putExtra("userName", user.getDisplayName());  
 }  
 startActivity(intent);  
 } else {  
 String errorMessage;  
 errorMessage = "Login Failed: ";  
 if (task.getException() != null){  
 errorMessage = errorMessage + task.getException().getMessage();  
 }  
 Toast.*makeText*(getApplicationContext(), errorMessage, Toast.*LENGTH\_LONG*).show();  
 }  
 }  
 });  
 }  
}

Good evidence of use of a fundamental technical IT aspect in your project here. (LO1).

### Appendix 5.2 – RegistrationActivity

package com.example.tm470talkingcash;  
  
import android.content.Intent;  
import android.os.Bundle;  
import android.view.View;  
import android.widget.Button;  
import android.widget.Toast;  
  
import androidx.annotation.NonNull;  
import androidx.appcompat.app.AppCompatActivity;  
  
import com.google.android.gms.tasks.OnCompleteListener;  
import com.google.android.gms.tasks.OnSuccessListener;  
import com.google.android.gms.tasks.Task;  
import com.google.android.material.textfield.TextInputEditText;  
import com.google.firebase.auth.AuthResult;  
import com.google.firebase.auth.FirebaseAuth;  
import com.google.firebase.firestore.FirebaseFirestore;  
import java.util.Objects;  
  
//*TODO: Make sure the comments are all appropriate i.e. elaborate and make sure they conform to language syntax*//*TODO:In later iterations review other login methods e.g. google accounts/twitter accounts*//*TODO: Also investigate the implementation of an email verification functionality*//*TODO: review the registration process, as in is it worth logging the user in automatically after registration  
  
/\*\*  
 \* provides the functionality to register a new account using a username, email and password.  
 \* Navigates to the login page if successful  
 \*  
 \*/*public class RegistrationActivity extends AppCompatActivity {  
 private TextInputEditText usernameText;  
 private TextInputEditText emailText;  
 private TextInputEditText passwordText;  
  
 private TextInputEditText confirmPasswordText;  
 private Button registerBtn;  
 private FirebaseAuth fAuth;  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState){  
 super.onCreate(savedInstanceState);  
 //sets the view to the login activity layout  
 setContentView(R.layout.*activity\_registration*);  
 //Gets the firebase instance for the firebase authentication service  
 fAuth = FirebaseAuth.*getInstance*();  
 //Finds the views based on their ID's  
 usernameText = findViewById(R.id.*reg\_user\_input*);  
 emailText = findViewById(R.id.*reg\_email\_input*);  
 passwordText = findViewById(R.id.*reg\_pass\_input*);  
 confirmPasswordText = findViewById(R.id.*reg\_pass\_confirm\_input*);  
 registerBtn = findViewById(R.id.*reg\_button*);  
  
 //Sets a click listener for the register button, calls the registerNewUser method when clicked  
 registerBtn.setOnClickListener(new View.OnClickListener() {  
 @Override  
 public void onClick(View v) {  
 registerNewUser();  
 }  
 });  
 }  
  
 */\*\*  
 \* This method registers the user into the firebase authentication database and also adds their  
 \* username and email, alongside a generated userId, to the users collection in the Cloud  
 \* firestore database  
 \*/* private void registerNewUser() {  
 String username;  
 String email;  
 String password;  
 String confirmPassword;  
 Integer minLength;  
  
 //initializes the variables based oin their inputs  
 username = usernameText.getText().toString().trim();  
 email = emailText.getText().toString().trim();  
 password = passwordText.getText().toString().trim();  
 confirmPassword = confirmPasswordText.getText().toString().trim();  
 minLength = 6;  
  
 //*TODO: review if more validation techniques are required, restructure into UserValidation class where possible* //Validates the user inputs using methods imported from the UserValidation class  
 if (!UserValidation.*isValidUsername*(username, minLength)){  
 Toast.*makeText*(getApplicationContext(), "Please enter a Valid Username", Toast.*LENGTH\_LONG*).show();  
 return;  
 } else if (!UserValidation.*isValidEmail*(email)){  
 Toast.*makeText*(getApplicationContext(), "Please enter a Valid Email", Toast.*LENGTH\_LONG*).show();  
 return;  
 } else if (!UserValidation.*isValidPassword*(password, minLength)){  
 Toast.*makeText*(getApplicationContext(), "Please enter Valid Password", Toast.*LENGTH\_LONG*).show();  
 return;  
 } else if (!UserValidation.*doPasswordsMatch*(password, confirmPassword)){  
 Toast.*makeText*(getApplicationContext(), "Please make sure that Passwords match", Toast.*LENGTH\_LONG*).show();  
 return;  
 }  
  
  
 */\*\*  
 \* Creates a new user with the email and password combonation, and saves the user profile  
 \* information to 'users' collection in the firestore database  
 \*/* fAuth.createUserWithEmailAndPassword(email, password).addOnCompleteListener(new OnCompleteListener<AuthResult>() {  
 @Override  
 public void onComplete(@NonNull Task<AuthResult> task) {  
 if (task.isSuccessful()) {  
 Toast.*makeText*(getApplicationContext(), "Successful Registration", Toast.*LENGTH\_LONG*).show();  
 String userId = Objects.*requireNonNull*(fAuth.getCurrentUser()).getUid();  
 UserProfile userProfile = new UserProfile(userId, username, email);  
 FirebaseFirestore db = FirebaseFirestore.*getInstance*();  
 db.collection("users").document(userId).set(userProfile).addOnSuccessListener(new OnSuccessListener<Void>() {  
 @Override  
 public void onSuccess(Void unused) {  
 Toast.*makeText*(getApplicationContext(), "Registration Details saved to user database", Toast.*LENGTH\_LONG*).show();  
 Intent intent = new Intent(RegistrationActivity.this, LoginActivity.class);  
 startActivity(intent);  
 }  
 });  
 } else {  
 String errorMessage = task.getException().getMessage();  
 Toast.*makeText*(getApplicationContext(), "Registration Failed: " + errorMessage, Toast.*LENGTH\_LONG*).show();  
 }  
 }  
 });  
 }  
}

### Appendix 5.3 – UserProfile

package com.example.tm470talkingcash;  
  
  
  
*/\*\*  
 \* Represents a user with a id, username and email  
 \*/*public class UserProfile {  
 private String userId;  
 private String username;  
 private String userEmail;  
  
 //Constructs a userProfile object  
 public UserProfile(String userId, String username, String userEmail){  
 this.userId = userId;  
 this.username = username;  
 this.userEmail = userEmail;  
 }  
  
 //All the autogenerated getters and setters have been removed   
}

### Appendix 5.4 – UserValidation

package com.example.tm470talkingcash;  
  
  
import android.util.Patterns;  
  
  
  
*/\*\* I thought it would likely comply with OOP by making use of an extra class in which to focus on the  
 \* validation methods  
 \*  
 \*/*public class UserValidation {  
  
//*TODO:Review these techniques again in the next iteration. Could you implement more specific*// *checks and toasts here?* public static boolean isNullOrEmpty(String text){  
 return text == null || text.trim().isEmpty();  
 }  
  
 public static boolean isValidUsername(String username, int minLength){  
 return !*isNullOrEmpty*(username) && username.length() >= minLength;  
 }  
  
 public static boolean isValidEmail(String email){  
 return Patterns.*EMAIL\_ADDRESS*.matcher(email).matches();  
 }  
  
 public static boolean isValidPassword(String password, int minLength){  
 return !*isNullOrEmpty*(password) && password.length() >= minLength;  
 }  
  
 public static boolean doPasswordsMatch(String password, String confirmPassword){  
 return password.equals(confirmPassword);  
 }  
  
  
}

### Appendix 5.5 - MainActivity

package com.example.tm470talkingcash;  
  
import androidx.appcompat.app.AppCompatActivity;  
  
import android.content.Intent;  
import android.os.Bundle;  
  
  
  
public class MainActivity extends AppCompatActivity {  
  
  
 @Override  
 protected void onCreate(Bundle savedInstanceState) {  
 super.onCreate(savedInstanceState);  
 //sets the view to the main activity layout  
 setContentView(R.layout.*activity\_main*);  
  
 //Gets user information from login  
 Intent intent = getIntent();  
 String userEmail = intent.getStringExtra("userEmail");  
 String userUid = intent.getStringExtra("userUid");  
 String userName = intent.getStringExtra("userName");  
 }  
}

## Appendix 6 – XML Layout

### Appendix 6.1 – activity\_login

<?xml version="1.0" encoding="utf-8"?>  
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:id="@+id/root\_constraint\_layout"  
 android:padding="15dp"  
 app:layout\_constraintHeight\_min="600dp"  
 app:layout\_constraintWidth\_min="300dp"  
 tools:context=".LoginActivity">  
  
 <!--*TODO: review yor options in modifying the UI, needs beautifying . Create style.xml*-->  
 <!--*TODO: add background and logo in next iteration*-->  
 <TextView  
 android:id="@+id/appName"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="@string/app\_name"  
 android:textSize="30sp"  
 android:textStyle="bold"  
 android:layout\_marginTop="100dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.5"  
 app:layout\_constraintVertical\_bias="0.2"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent"/>  
  
 <TextView  
 android:id="@+id/welcome"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="@string/log\_welcome\_text"  
 android:layout\_marginTop="30dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.5"  
 app:layout\_constraintVertical\_bias="0.2"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/appName" />  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/log\_email\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="250dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/welcome"  
 app:layout\_constraintVertical\_bias="0.5">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/log\_email\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/email\_hint"  
 android:inputType="textEmailAddress" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/log\_pass\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="30dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/log\_email\_layout"  
 app:layout\_constraintVertical\_bias="0.5">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/log\_pass\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/pass\_hint"  
 android:inputType="textPassword" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <Button  
 android:id="@+id/log\_button"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="15dp"  
 android:text="@string/login"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="1.0"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/log\_pass\_layout"  
 app:layout\_constraintVertical\_bias="0.5"/>  
  
 <Button  
 android:id="@+id/reg\_on\_click"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="50dp"  
 android:clickable="true"  
 android:focusable="true"  
 android:text="@string/register"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.5"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/log\_button"  
 app:layout\_constraintVertical\_bias="0.8"/>  
  
  
</androidx.constraintlayout.widget.ConstraintLayout>

### Appendix 6.2 – activity\_registration

<?xml version="1.0" encoding="utf-8"?>  
<androidx.constraintlayout.widget.ConstraintLayout xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:id="@+id/root\_constraint\_layout"  
 android:padding="15dp"  
 app:layout\_constraintHeight\_min="600dp"  
 app:layout\_constraintWidth\_min="300dp"  
 tools:context=".RegistrationActivity">  
  
 <!--*TODO: review yor options in modifying the UI, needs beautifying . Create style.xml*-->  
 <!--*TODO: as background and logo in next iteration*-->  
  
 <TextView  
 android:id="@+id/welcome"  
 android:layout\_width="236dp"  
 android:layout\_height="45dp"  
 android:text="@string/reg\_welcome\_text"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="0.5"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent"  
 app:layout\_constraintVertical\_bias="0.25" />  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/reg\_user\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="32dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/welcome">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/reg\_user\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/username"  
 android:inputType="text" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/reg\_email\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="32dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/reg\_user\_layout">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/reg\_email\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/email\_hint"  
 android:inputType="textEmailAddress" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/reg\_pass\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="32dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/reg\_email\_layout">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/reg\_pass\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/pass\_hint"  
 android:inputType="textPassword" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <com.google.android.material.textfield.TextInputLayout  
 android:id="@+id/reg\_pass\_confirm\_layout"  
 android:layout\_width="0dp"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="32dp"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@id/reg\_pass\_layout">  
  
 <com.google.android.material.textfield.TextInputEditText  
 android:id="@+id/reg\_pass\_confirm\_input"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:hint="@string/confirm\_pass\_hint"  
 android:inputType="textPassword" />  
 </com.google.android.material.textfield.TextInputLayout>  
  
 <Button  
 android:id="@+id/reg\_button"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_marginTop="15dp"  
 android:text="@string/register"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintHorizontal\_bias="1.0"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toBottomOf="@+id/reg\_pass\_confirm\_layout"  
 app:layout\_constraintVertical\_bias="0.1" />  
  
  
  
</androidx.constraintlayout.widget.ConstraintLayout>

### Appendix 6.3 – activity\_main

<?xml version="1.0" encoding="utf-8"?>  
<ScrollView xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:app="http://schemas.android.com/apk/res-auto"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:layout\_gravity="center"  
 tools:context=".MainActivity">  
  
 <!--the textview and id below are just there as a placeholder so that the main activity  
 isn't blank once logged in-->  
 <TextView  
 android:id="@+id/internalApp"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="You're in!! Nothing else here for now though"  
 android:textSize="30sp"  
 app:layout\_constraintBottom\_toBottomOf="parent"  
 app:layout\_constraintEnd\_toEndOf="parent"  
 app:layout\_constraintStart\_toStartOf="parent"  
 app:layout\_constraintTop\_toTopOf="parent" />  
  
</ScrollView>

## Appendix 7 - Communications Log

\*As of 14/04/2023\*

|  |
| --- |
| **Welcome to TM470B for 2023 Ref: 263095981** 4 messages |

|  |  |
| --- | --- |
| **darren.bolton@open.ac.uk**<darren.bolton@open.ac.uk> | 25 January 2023 at 19:38 |
| To: e22neale22@gmail.com | |
| |  | | --- | | Hi, my name is Darren Bolton and I am your TM470B tutor for 2023 !  I have posted an initial welcome post on our tutor group Forum - please have a read of that and reply to that post to confirm that you are seeing the forum. (don't worry if you cant see it - I will paste a copy of the post at the end of this email, but please let me know if you cant access the tutor group forum.)  For now, just reply with the details as indicated below so that we can get a line of communication established.  Just to put your minds at rest from the start - my job is to help you get the best pass grade possible and I will do my best to help you in whatever way I can !  Text of post on Tutor group forum...  "Hi everyone and welcome to TM470B for 2023 !  My name is Darren Bolton and I will be your module tutor this year.  I will shortly be sending everyone an introductory email, so if you could just reply to that email to ensure we have good, established, private communication, via email.  It would be useful if everyone could include in that email the full thread of their posting on the preparation forum. (if you haven't been able to do that, have a look at the posts that have been made and send that detail to me in an email). We can then start discussing your ideas for your project and hopefully come up with an achievable project for you.  I am going to propose holding an initial 'live' group tutorial on Sunday morning (5th February 2023) at 10:00hrs (UK time) where I will run through an introductory powerpoint, which gives an overview of the module and some specific information about TMA 01. I will also give you up to date information from last year's TM470 module in terms of "do's and dont's" as you head into this year's project.  Right at the outset - If I can make two suggestions, which will pay dividends as you near the EMA hand in date in September...  1. Start a project journal and record everything you do on your project, everything from initial planning and design to decision making to coding. (decisions in your journal may well correspond to amended versions of your GANNT charts [more on that in the tutorial] )  2. Keep a communications log - record all interactions with me, including emails, online tutorials and also your TMA feedback.  The headline here is - help me to help you to get the best grade possible by providing me with the evidence to justify it (remember the final EMA is second marked by a different TM470 tutor) !!!  Let me know if Sunday 5th February works for you. If not, let me know whether mid week evenings would be better.  Don't worry if you cant make date of the initial tutorial, I will upload the introductory powerpoint and a second powerpoint which gives you some background information about myself, such as my employment history and qualifications.  If there is demand for it, I can run a second introductory group tutorial on a different date, as getting all of my students together at the same time is not always possible due to many different factors.  I am going to run these live tutorials on the OU's preferred web based application, 'Adobe Connect'. More details on that once we have a confirmed date(s) for our first tutorial.  There is no need to have a camera for video if you don't want to, but speakers are needed as a minimum and a microphone will be required if you wish to ask any questions.  From the 1st of February (the official course start date), I will be making myself available for 30 minute, 1:1, tutorials (using Adobe Connect) on weekend or midweek evenings. To book a time slot, please email me with preferred date and time and I will get back to you to confirm the booking, or to suggest an alternative, if I can't make your suggested date & time.  I look forward to seeing some of you at our first tutorial and I anticipate your emails in due course.  Please reply to this post with a quick confirmation so that I can be assured that everyone has sight of our tutor group forum  Regards,  Darren"  -- The Open University is incorporated by Royal Charter (RC 000391), an exempt charity in England & Wales and a charity registered in Scotland (SC 038302). The Open University is authorised and regulated by the Financial Conduct Authority in relation to its secondary activity of credit broking. | | |

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| --- | --- |
| **Evan Neale**<e22neale22@gmail.com> | 26 January 2023 at 09:32 |
| To: darren.bolton@open.ac.uk | |
| |  | | --- | | Hi Darren,  I've seen both your Email and Forum post (It hasn't opened for replies just yet otherwise I'd have confirmed within the forum) so we're all good on those fronts. I'll paste my posts from the project preparation forum below. Hopefully it all looks ok and I'm interested to get your thoughts on the project idea.  **Post 1**  **Which L3 course?** TM352 - Web, Mobile and Technologies  **What is the Problem?** Myself and a few friends have a keen interest in investing. We all share relevant information (articles/company releases/financial statements) in a group chat which, although convenient, means that it is just a untidy stream of links with no deeper functionality or ability to further personalise the information.  **The stakeholders:** Myself  **The user:**  Myself, my friends and family.  **I will be able to find out more by talking to:** My friends and other interested parties within my investment social media circle.  **The skills I have from my L3 study include these which are relevant to the problem:** TM352 covers the development of apps which will be most relevant. TM354 covers the processes to be used in software development which will be most useful when developing the application.  **The ways in which I will be moving my skills and knowledge beyond the L3 module(s)  are:**  Developing a functioning, java based android app will require deepening my java knowledge and familiarity with the frameworks, technologies and development software which isn't covered in the module.  **Any legal or ethical ramifications that might occur:** There is a multitude of legal ramifications in the world of investing. Making clear that this is only a simple app for dissemination of information from official sources and light discussion and not a place for official investing advice. Also the legal and ethical ramifications with dealing with members personal data.  **The end product I will deliver will be:** A java based android app that acts as a hub of investing information and discussion for friends and family. The App will have multiple functionalities that are only unlocked when registered as a member. The app will incorporate streams of information posted by both myself (the creator) and registered members alongside forum elements and other elements which will be decided during development.  **Post 2**  Hi Ju,  Yeah I'll be able to get others to test it.  Ok I'll have a look at that and have a think on what would be realistically achievable. Will come back to this after a bit of other TMA work.  **Post 3**  Hi Ju,  At the moment I’ve knocked up a few thoughts and I’d like to get your opinion on what you think so far?  I think this is something I’ll review again in a few days and add to a little more with a fresh mind. I’ll be more specific at that point, removing the ‘ect.’ And ‘e.g.’, and I’ll also expand the list a little.    **Must Have:**   * A form of login process so that only registered users can use the Application * A home page consisting of a stream of user sourced posts including article links, website links and links to relevant social media threads (e.g. twitter and reddit) * The posts must be In a common pattern, e.g. they must have a title and prominent tags denoting the company and sector as well as what type of information is in the link/article/social media thread (for example financial results, production news or social media based rumours ) . * A forum element, allowing users to create discussions.   **Should have:**   * The ability to post PDF files (which are a common format of investor deck). * The ability to filter the main page, either into specific companies, specific sectors (e.g. software, EV, Crypto), and information types.   **Could Have:**   * A simple form of stock watchlist allowing the addition of info such as company name, holdings and money spent  and even the possible extension of a profit or loss element based on the current price. * A comment section specific to each article.   **Will not have:**   * Any form of live share price feed. * Any form of individual static page for a specific company, although as mentioned the feed can be filtered to show specific companies articles, website links and possibly PDF’s. * Any further trading information relevant to specific companies outside of the news stream. For example no extra info on analyst expectations or trade volume etc.     Evan | | |

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| --- | --- |
| **Darren.Bolton**<darren.bolton@open.ac.uk> | 29 January 2023 at 12:53 |
| To: Evan Neale <e22neale22@gmail.com> | |
| |  | | --- | | Hi Evan, thanks for getting back to me.  I think the idea is a great starting point if it is relevant to you personally, which will make the development and management of the project much more interesting than picking some arbitrary topic.  However, I am perhaps not quite seeing the main 'functionality' of the app you are proposing to develop.  If I have understood correctly, the information gathered (and comments) by yourself and your investment media circle would be made available within the developed app for other users to search and gain information about a specific company ?  I would initially suggest that the coding for this might not be sufficiently demanding enough to give the project a wide enough scope to attract a high grade.  The scope of a project is always difficult to find the right balance for. Between a project that is massively out of scope (e.g. developing an electric car recharging App for the whole of the United Kingdom) and a project that is too simplistic and very easy to implement in a very short space of time (e.g. developing a noughts and crosses app) and therefore wouldn't have enough 'substance' to gain a high grade for the EMA.  Could I suggest that you review existing stock investment apps and try and identify something unique that your app will introduce that is not available in other existing ones ?    The development phase might be piloted in your own environment but the aspiration should perhaps be to make the app available for other users.  You will most definitely want to include consideration of Legal and Ethical issues as there is a specific Learning outcome for TMA2 which you will need to provide evidence of:  **LO10: Identify and address the legal, social, ethical and professional issues (LSEPIs) and the equality, diversity and inclusion (EDI) concerns that may arise during the development and use of computing and IT systems.**  As an example, you may want to consider the possibility of someone gaining access to information on which they purchase shares. If those shares drop in value, would that user be able to challenge the owner/developer of the app legally for compensation ?  I strongly recommend reviewing the Learning Outcomes for the first TMA and I have attached a useful document (the information is also available on the TM470 website) which contains the Learning Outcomes against which I have to mark all the TMA's and the final EMA.  The development of an 'artifact' (the final coded application) is quite important if you are wanting to use the TM470 project as part of an application for accreditation to the British Computer Society but the main bulk of the marks for TM470 are awarded for project planning and management !  I hope this helps. Please come back to me if you have any further questions and I hope to see you at our first tutorial on Sunday 5th February at 10:00 if you can make it ?  Regards,  Darren  TM470 Tutor | | |

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| --- | --- |
| **Evan Neale**<e22neale22@gmail.com> | 2 February 2023 at 10:11 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Hi Darren,  Thanks for such an informative response and apologies in advance for such a long winded reply.  My previous email contained my initial thoughts on what the project should be. I've been working through the first TMA and had time to think on my reasons why it's needed and how it should look ect and I'll try to elaborate and see if that sounds better.  Yeah I believe your understanding is correct.  The App would require users to have to register as a member to use the app, and only I would be responsible for accepting or denying these registration requests. Once accepted users can make posts containing website links to News articles, company websites and social media comment threads (to name a few); All of these posts would initially appear as a stream of chronological posts; when each post is made it would have to be created in a set format, to help readability, and it would require tags (I've moved this from the 'should have' to 'must have' MoSCoW group); the user would then be able to filter the thread as required looking for posts about specific companies, sectors or geographic areas (to name a few example tags) and even filter using multiple tags. It would initially be for only a select group of friends but with the aim to make it available to extended acquaintances. I would aim to have a relatively controlled user base though some form of invite only set up.  This is a topic that interests me so Ideally I'd like to build out this project and expand on it to make sure it's elaborate enough. Would moving some of the other elements from the 'should', 'could' and 'wouldn't have' sections of Moscow make it elaborate enough a project? Or should I think of some more things that I could add to give it a wider scope?  I'll have to review a few of the more mainstream investing apps out there and see if I can think up something to make it a little more unique.  Yeah there will definitely be a considerable legal element I'd need to thoroughly investigate and I'd need to make sure to create the app with some sort of legal disclaimer to negate the issues that could arise with the example you mentioned (although thinking about it this would probably require some legal expertise). Ultimately all the information being exchanged would be publicly available and any user discussion would just be 'friendly conversation' around this information, by keeping it between close friends this shouldn't be a major issue until it is opened up to a larger audience.  I've actually rarely attended Tutorials during my studies, I tend to prefer using the prerecorded ones that become available as I find them more convenient however I will definitely make attending the one for this module my priority.  Sincerely,  Evan  On Sun, 29 Jan 2023 at 12:53, Darren.Bolton <[darren.bolton@open.ac.uk](mailto:darren.bolton@open.ac.uk)> wrote:  Hi Evan, thanks for getting back to me.  I think the idea is a great starting point if it is relevant to you personally, which will make the development and management of the project much more interesting than picking some arbitrary topic.  However, I am perhaps not quite seeing the main 'functionality' of the app you are proposing to develop.  If I have understood correctly, the information gathered (and comments) by yourself and your investment media circle would be made available within the developed app for other users to search and gain information about a specific company ?  I would initially suggest that the coding for this might not be sufficiently demanding enough to give the project a wide enough scope to attract a high grade.  The scope of a project is always difficult to find the right balance for. Between a project that is massively out of scope (e.g. developing an electric car recharging App for the whole of the United Kingdom) and a project that is too simplistic and very easy to implement in a very short space of time (e.g. developing a noughts and crosses app) and therefore wouldn't have enough 'substance' to gain a high grade for the EMA.  Could I suggest that you review existing stock investment apps and try and identify something unique that your app will introduce that is not available in other existing ones ?    The development phase might be piloted in your own environment but the aspiration should perhaps be to make the app available for other users.  You will most definitely want to include consideration of Legal and Ethical issues as there is a specific Learning outcome for TMA2 which you will need to provide evidence of:  **LO10: Identify and address the legal, social, ethical and professional issues (LSEPIs) and the equality, diversity and inclusion (EDI) concerns that may arise during the development and use of computing and IT systems.**  As an example, you may want to consider the possibility of someone gaining access to information on which they purchase shares. If those shares drop in value, would that user be able to challenge the owner/developer of the app legally for compensation ?  I strongly recommend reviewing the Learning Outcomes for the first TMA and I have attached a useful document (the information is also available on the TM470 website) which contains the Learning Outcomes against which I have to mark all the TMA's and the final EMA.  The development of an 'artifact' (the final coded application) is quite important if you are wanting to use the TM470 project as part of an application for accreditation to the British Computer Society but the main bulk of the marks for TM470 are awarded for project planning and management !  I hope this helps. Please come back to me if you have any further questions and I hope to see you at our first tutorial on Sunday 5th February at 10:00 if you can make it ?  Regards,  Darren  TM470 Tutor | | |

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| **Evan Neale (F2724895) - TM470 - TMA02** 10 messages |

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| **Evan Neale**<e22neale22@gmail.com> | 23 March 2023 at 09:25 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Hi Darren,  I hope all is well with you. Thanks for all the feedback you provided in TMA01 it's proved very helpful and I've already planned the changes I need to make.  So far everything is on schedule, even a little ahead of it. I've managed to create the registration XML and Java files as well as the XML for the login. I've also set up a firebase account which I'm using for authentication, and I've integrated it into the Java file (not tested yet though). I still need to work on the Java element for the login and tie everything together then test it all works.  To make it easier to mark, would you like me to highlight or use different text colours for all the extra text/changes I've added in this TMA02?  Am I right in thinking I need to keep in contact with you every few weeks to let you know where I'm at and if everythings going ok regarding the project?  Thanks,  Evan | | |

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| **Darren.Bolton**<darren.bolton@open.ac.uk> | 23 March 2023 at 18:07 |
| To: Evan Neale <e22neale22@gmail.com> | |
| |  | | --- | | Hi Evan, thank you for the email and yes, please just a short summary of progress every few weeks or so which gives me documentary evidence of communication.  Dont worry about the colouring for changes - I will be able to pick out where you have made changes in line with the TMA01 feedback.  Good to see your progression towards TMA02.  Regards,  Darren  TM470 Tutor  **From:** Evan Neale <[e22neale22@gmail.com](mailto:e22neale22@gmail.com)> **Sent:** 23 March 2023 09:25 **To:** Darren.Bolton <[darren.bolton@open.ac.uk](mailto:darren.bolton@open.ac.uk)> **Subject:** Evan Neale (F2724895) - TM470 - TMA02    [Quoted text hidden] | | |

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| **Evan Neale**<e22neale22@gmail.com> | 6 April 2023 at 13:59 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Hi Darren,  Just a few queries regarding the TMA.  I'm currently putting together the 'work done' section and at the moment I've decided that in regards to the main Java and XML files I'll outline what code I've implemented and then maybe add the extended code into appendix's. Does this sound reasonable?  When I paste code into the TMA02 document I'll take out any of the boilerplate code however there are some bits (like the authentication and database bits) which have a set structure, that I've taken and adjusted, from the firebase documentation. Assuming I have referenced these there shouldn't be any issues there?  Thanks,  Evan  [Quoted text hidden] | | |

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| **Darren.Bolton**<darren.bolton@open.ac.uk> | 6 April 2023 at 14:05 |
| To: Evan Neale <e22neale22@gmail.com> | |
| |  | | --- | | Evan, that sounds the right approach - placing code 'snippets' in the appendices and referring to them in the main body of the report.  There is never a problem, with regards to plagiarism, when you cite and reference correctly, as you are acknowledging the author.  There can be problems with copyright if the code used is not Open Source, so you may need to consider this aspect.  Regards,  Darren  **From:** Evan Neale <[e22neale22@gmail.com](mailto:e22neale22@gmail.com)> **Sent:** 06 April 2023 13:59 **To:** Darren.Bolton <[darren.bolton@open.ac.uk](mailto:darren.bolton@open.ac.uk)> **Subject:** Re: Evan Neale (F2724895) - TM470 - TMA02    [Quoted text hidden] | | |

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| **Evan Neale**<e22neale22@gmail.com> | 6 April 2023 at 14:33 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | That's great.  Thanks for such a speedy reply.  Evan  [Quoted text hidden] | | |

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| **Evan Neale**<e22neale22@gmail.com> | 13 April 2023 at 13:07 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Hi Darren,  I've got another query for you :)  So in my TMA02 document I've iterated over my Gantt chart and placed it into the 'schedule' section, replacing the old one.  However I've just got to the 'future plan' section of the document and it mentions:  Future plan  ***You should give an updated schedule of future activity for the project. You may use a format of your choosing for the schedule, as long as it is clear and can be inserted as text or a table in your TMA document. Your tutor will make an assessment of whether your approach is justified in relation to the nature of your project***  As I've already put a lengthy, fully updated schedule in my document covering all the elements of the project to completion, would it be more appropriate to have a smaller plan here, maybe in the form of a table or bullet points that cover the phases of the project from now until the next TMA hand in date?  Thanks,  Evan  [Quoted text hidden] | | |

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| **Evan Neale**<e22neale22@gmail.com> | 14 April 2023 at 09:20 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Hi Darren,  Just another query.  In relation to the **'Review and reflection**' section, should I remove all the writing I added in TMA01 and fill that space following only the TMA02 specific guidelines? or should I adjust the TMA01 writing slightly instead?  Regards,  Evan  [Quoted text hidden] | | |

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| **Darren.Bolton**<darren.bolton@open.ac.uk> | 14 April 2023 at 13:40 |
| To: Evan Neale <e22neale22@gmail.com> | |
| |  | | --- | | Hi Evan, rather than replace previous GANNT charts, include them all showing their evolution. Each change should correspond to a 'decision point' in your reflective journal.  An updated GANNT chart covering the project through to completion will meet the requirements of a future plan and you can make a referal to the appendices where you have placed it.  Regards,  Darren  TM470 Tutor  **From:** Evan Neale <[e22neale22@gmail.com](mailto:e22neale22@gmail.com)> **Sent:** 13 April 2023 13:07  [Quoted text hidden]    [Quoted text hidden] | | |

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| **Darren.Bolton**<darren.bolton@open.ac.uk> | 14 April 2023 at 13:43 |
| To: Evan Neale <e22neale22@gmail.com> | |
| |  | | --- | | Evan, no don't replace everything submitted for TMA01. Make any required adjustments in line with new work or TMA feedback and then develop each section from the previous TMA. It is important that there should be evidence of development in each TMA.  The project should be viewed as an evolving, growing document which culminates in the production of the final EMA.  Hope this helps.  Regards,  Darren  TM470 Tutor  **From:** Evan Neale <[e22neale22@gmail.com](mailto:e22neale22@gmail.com)> **Sent:** 14 April 2023 09:20  [Quoted text hidden]    [Quoted text hidden] | | |

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| **Evan Neale**<e22neale22@gmail.com> | 14 April 2023 at 15:05 |
| To: "Darren.Bolton" <darren.bolton@open.ac.uk> | |
| |  | | --- | | Great,  I’ll take all that on board.  Thanks,  Evan  [Quoted text hidden] | | |

## Appendix 8 – Project Logs

N.B. does this need to be formal? I’ve just realised it’s all been written in an unformal manner (as it’s been purely for my own benefit).

This is fine Evan, the work presented in appendices is not formally marked – it is just used as supporting evidence to the main part of the project.

**Log sheet no.** 1

**TMA 01 date:** 28th February

**Time spent:** 2 hours

**Work -** Read through the TMA information as well a the learning outcomes to clarify how to fulfil the requirements and attain the highest marks. I started to complete the initial preparation and planning sections of the TMA . I reiterated over it a few times to further clarify my reasoning for the solution as well as to get a clearer image of the solution itself. I also started looking at what software would be best to plan the project, as I intended to use a Gantt chart.

**Problems –** No major problems at this stage, although it took more time than I’d liked to clarify the solution. Choosing the software for the Gannt chart took more time than I would have liked as it took a little trial and error of using the application to make sure it would be adequate.

**Comments –** Feels good to have actually gotten the module underway and to have started creating a picture of what needs to be done. My priority needs to be breaking down the project into a tasks so that I have a clearer view of the steps I need to take to create the project.

**Next work planned –** Continue working through the Planning and preparation section of the TMA as well as prioritising the development of the project plan in the form of the Gantt chart.

**Log sheet no.** 2

**TMA 01 date:** 28th February

**Time spent:** 3

**Work -** Continued through the process of setting out the skeleton of the TMA document and working through it. I also reflected on the practical elements of the project and used a brainstorm structure to set out the key elements of the project. I spent time deliberating over and reiterating this section until I was relatively happy and started to develop a Gantt chart that combined these elements into a time orientated plan.

**Problems –** No major problems to mention, took a little longer than expected to iterate over and identify the key elements of the project

**Comments –** Feels much better having started to produce and fill out the Project plan as I can now see a route to the end of the project whereas previously it wasn’t as clear.

**Next work planned –** Continue working through the TMA and actually created the initial Project files in Android Studio

**Log sheet no.** 3

**TMA 01 date:** 28th February

**Time spent:** 4

**Work -** Continued working through the first section of he TMA. Reflected on the different project lifecycles and decided on the one that best for my scenario. Laid out the

**Problems –** No major problems at this stage. Although it did take some understanding and further thought on which lifecycle model would this project.

**Comments –** I have noticed that my ability to carry out the tasks related to the project is already taking much longer than first anticipated. I believe that because it is my own personal project I send more time deliberating on things than I should.

**Next work planned –** Work through the second section of the TMA. Research the literature I believe I will need to help me carry out the project and also create the body of the project in android studio

**Log sheet no.** 4

**TMA 01 date:** 28th February

**Time spent: 5**

**Work -** Made a draft of the section 3.3 – review and reflection and made some notes on how to progress it. Further iterated over the description and scope (section 3.1) to finalise these parts and make sure they were clear for the reader. Built out the tasks and sub tasks in section 3.1.

**Problems –** No major problems at this point just gradually working through the elements, no issues appeared.

**Comments –** Went smoothly today nothing of note to speak of

**Next work planned –** Continue on and reiterate over the task, sub task and their conversion to a Gantt chart. Then continue through 3.1

**Log sheet no.** 5

**TMA 01 date:** 28th February

**Time spent: 5**

**Work -** Finished most of the tasks and sub tasks. Adjusted the Gantt chart to match. Reiterated over the lifecycle and fleshed out the risks section

**Problems –** No major problems at this point just gradually working through the elements, no issues appeared.

**Comments –** Everything will still need review before finalising and handing in

**Next work planned –** Concentrate on the work done section and focus on the diagram you’d like to use

**Log sheet no. 6**

**TMA 02 date:** 25th April

**Time spent:  5**

**Work -**  I reviewed the marked TMA01 and copied the feedback from the marked document into a fresh TMA02 document to act a reminder of what to change. I then reviewed the more thorough feedback form and made a more thorough list of TODO actions to develop the TMA further. I then reviewed all the resources I’ve accumulated and decided upon using and gathered them together for easy access. I then Thoroughly reviewed authentication options and the final design of registration and login pages.

**Problems -** No immediate problems however as I was reading the feedback from the previous TMA I realised that I hadn’t implemented time into the project schedule for making these changes, Initially I will just front load these tasks into the time I’ve allotted for TMA02, I will review the time scale after another 2 sessions to see if an issue has been caused.

**Comments -** Pretty easy session as it was just reviewing feedback and resources. This helped me to build a short term plan for how to move forward.

**Next work planned -** On Thursday 16th April, using the finalised design and guides/ references which were finalised in this session, I will begin to build out the initial registration page and login page. Concentrating on the body of it initially and implementing the authentication after.

**Log sheet no. 7**

**TMA 01 date: 25th April**

**Time spent:  5 hours**

**Work -**  Created the login and registration XML files and java classes. Set out the basic skeleton of both the XML files, the registration one needs some work still though.

**Problems -** I realised that I spent too much time trying to beautify the application, to no avail. At this stage in my project I can’t be too focused on this aspect otherwise it will affect my schedule and eventually the overall outcome of the project.

**Comments -** I have realised at the stage of creation I will focus on expending very little time iterating over how the application looks. My main priority will be making sure that the application is functional.

**Next work planned -** Tomorrow. Finish up the registration page and connect up the authentication feature of firebase API.

**Log sheet no.** 8

**TMA 01 date: 25th April**

**Time spent:  4**

**Work -**  Finalised the layout of the registration XML file. Then reviewed my resources and fleshed out the java required to access users input, once register has been clicked, and register a new user . All in RegistrationActivity.Java

**Problems -** No major issues occurred yet however I have focussed getting this element functioning and not focusing on some of the finer details which may hold me back. This has ended up with me creating a couple of TODO notations within the XML and Java files which I will need to return to.

**Comments - A**s I haven't technically created anything functional yet I haven't been able to test anything, I have a slight concern that there may be an issue I’ve overlooked which is why I’m focussing on getting it built and not deliberating over the smaller issues yet.

**Next work planned** - I will have a go at doing some of the notes that were made by the tutor on the TMA either tomorrow of Sunday

**Log sheet no.** 9

**TMA02 date: 25th April**

**Time spent:  5**

**Work -  I implemented the java code needed for the login process. This included making the onclick listeners for the login and register buttons and the actions that clicking them entailed. This also involved extremely basic form of error checking.**

**Problems - Had a few issues regarding the testing of the login process. It took a little time finding the mistakes I’d made.**

**Comments - The whole app still looks a little bland. Will spend some time beautifying it by changing the constraints and the theme/style at a later date**

**Next work planned - Tomorrow. Will focus on registration validation. May possibly add an email verification API or at the very least add it as a TODO for later iterations. Will look into user profile creation and storage on firebase.**

**Log sheet no.** 10

**TMA02 date: 25th April**

**Time spent:  4**

**Work -  I reviewed the validation code I used and decided, for better or worse, to create a separate class for them, which I then made use of in the login and registration classes. I further developed the registration java file so the registration would create a input to a collection of the firebase store whereby it can be tied to a profile for usage in other activities of the project.**

**Problems - Labouring over the most appropriate validation methods took time, will probably require more formulaic thought about what’s appropriate later. Also the creation of the collection in the database to a lot of trial and error to get right.**

**Comments - No major comments**

**Next work planned - Tomorrow, I will focus on the TMA and tidy up regarding the notes given in TMA01**

**Log sheet no.** 11

**Session no.** n

**TMA02 date: 25th April**

**Time spent:  5**

**Work -  I reviewed some of my code removing elements that weren’t needed, improved some of the TODO comments that I have added to be done at a later iteration and fiddled with some of the views constraints to make it look nicer. I then spent some time reviewing and working through the TMA02 trying to implement some of the notes made from TMA01 as well as adding further to-do notes within the assignment.**

**Problems - None**

**Comments - None**

**Next work planned - tomorrow - I would like to finalise all the comments in my code for clearer understanding and then evidence them into my ‘work done’ section of the TMA02**

**Log sheet no.** 12

**TMA02 date: 25th April**

**Time spent:  2**

**Work -  Restructured the code making sure that all comments were of better quality and more informative. I also reviewed some of the TODO elements which I’ve added for later iterations. Also started building out the ‘work done’ part of the TMA02 ready for filling in next session**

**Problems - No problems here in regards to the work, some other stuff came up so I couldn’t give a full day to carrying out the work**

**Comments -** n

**Next work planned - Tomorrow. I intend to try complete the work done section of the TMA, adding in all code an referencing any sources i borrowed code from (e.g. auth stuff)**

**Log sheet no.** 13

**TMA02 date: 25th April**

**Time spent:  3**

**Work -  Remade the project log in SmartSheet’s web app. Made a short list of changes I’ve made in the document which needs to be explained and expanded on.**

**Problems - Took a bit longer to trial and error the best Gantt chart application**

**Comments - Still needs finalising of the project schedule**

**Next work planned - 06/04/23 - continue working through TMA**

**Log sheet no.** 14

**TMA02 date: 25th April**

**Time spent:  4**

**Work -  Fiddled with schedule and fiddled with other bits related to the schedule as well as the work done section, specifically the information resources.**

**Problems - None**

**Comments - None today**

**Next work planned -** n

**Log sheet no.** 15

**TMA02 date: 25th April**

**Time spent:  5**

**Work -  Tightening up the entire TMA02 document, rewording sections, filling out other sections, adjusting citations and references. making notes on what else needs to be done**

**Problems - Sent a query to Darren about schedule section in the future plan ,whether a smaller limited reference to the schedule was fine**

**Comments - None**

**Next work planned - 14/04/2023 - continue TMA**

**Log sheet no.** 16

**TMA02 date: 25th April**

**Time spent:  5**

**Work -  Tightened up TMA02 centring around the future plan and review and reflection sections.**

**Problems - Found myself jumping around the sections which ultimately led to a slightly disjointed day of work.**

**Comments - A lot has been done but still not happy. Need to add project logs and communication logs and tighten them up**

**Next work planned - 15/04 - probably start reviewing design of the next increment and maybe create a basic class diagram**

**Log sheet no.** 17

**TMA02 date: 25th April**

**Time spent:  6**

**Work -  Finalised multiple sections across the whole of the TMA document. Added the communications log and project log into the appendix and referenced them in the appropriately. Reviewed the wireframes of the pages/view I intend to create in the next increment of the application. Iterated and improved them as well as thought through an noted down the the classes and files that I will need to create to implement them.**

**Problems - No problems, only solutions.**

**Comments - Still need to finalise the review section , more specifically the evaluation of project management and the covering of the Legal, social, ethical and professional issues and equality, diversity and inclusion concerns**

**Next work planned - 21/04/2023 - Finalise the entire TMA before having a day off and returning on another day for a final review**

Good introduction of a project Log demonstrating good evidence of progression (LO9).