Quality Assurance Manual

MEng Year 3

Department of Electronics

Software Engineering Group Project

"SWEng Group 3"

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Introduction

Company Profile

Our company was born to define the future of interactive assistive technologies. Through innovative design and engineering, we focus on delivering high quality solutions that stand out against competition.

We are skilled engineers with unique backgrounds and skill sets, and together we form a strong, diverse team with a broad range of strengths united under a passion for excellence.

Company Vision

- To develop high-quality software, that is both innovative and easy to use.
- To approach new challenges with an open and inquisitive mindset, working with the client to deliver a unique solution that stands out against competition
- To integrate modern technologies and trends into our software, enabling easy integration with modern society

Roles and Responsibilities

Company Hierarchy and Structure

A company's success is dependent on its organizational structure, as well as the team members understanding of their respective roles. Thus it is incredibly important that roles within the company are well defined within a hierarchy; it is also necessary that team members are fully aware of their responsibility within the company.

This figure shows the structure of the company. Note that it is not indicative of the team members' importance to the company, ALL team members have equally important tasks and are assessed respectively to that. Instead of representing importance, the hierarchy in this diagram represents how work is delegated and to whom it must be internally delivered to.

All team members must communicate without fault to each other; this is achieved mainly through the collaboration tool 'Slack' on the team's server. Weekly meetings also provide a more official communication period, with notes/minutes being taken of all important topics covered.

Team Leader

Role Description

The Team Leader is ultimately responsible for the team's operation and output. They must direct the company and set clearly defined goals so that all members of the team work together in a unified direction. Through this, they supervise the entire development process, ensuring the project runs smoothly and setting contingency plans so that deliverables are always met.

Tasks involved with the role of Team Leader include:

- Organising weekly meetings with all members in the team.
- Defining a clear direction for the company.
- Outlining weekly tasks and objectives for each team member.
- Supervising the overall operation of the company, ensuring that it is making good progress and meeting specification.
- Ensuring that all team members' voices are heard, and generating a cooperative work environment that allows teamwork to thrive.
- To ensure the client has a say in the development of our product.
- Producing the project plan and timing schedule.
- Supporting team members when necessary

Risk Management

Risk	Severity (0-5)	Likelihood(0-5)	Mitigation and/or Solution
Team Members are unable to cohesively operate as a group.	3	3	**Mitigation** Trying to maintain a positive, controlled atmosphere **Solution** Direct the team in a way that avoids disruption and is amicable to any involved parties
Team Members lose respect / don't follow leadership of the Team Leader	4	3	**Mitigation** Have confidence in the project. Clearly define the outlook of the company that all members of the team can follow and have confidence in.
Prolonged	2	1	**Solution**

absence of a team member			Know the strengths of all team members and assign roles to members in a fair, but effective way.
Final deadline overdue	5	2	**Mitigation** Regularly review the productivity of the team to ensure that the assigned work is getting done. Provide / arrange support for any team members who feel as though the workload is too great.
Failure to meet requirements	3	2	**Mitigation** Regularly review the output of the company and check requirement conformity. **Mitigation / Solution** Encourage modular development so that any missing elements can be added with (relative) ease

QA Metrics

Metric	How the metric will be measured
Deadlines are being met	Tracking team progress through weekly meetings
Deliverables are being met	Performing regular reviews of software development and checking against the deliverables to ensure conciseness
Team output is to a good standard	Observe team output against product specification.
Team is working to schedule	At each team meeting, check current development stage against the projected timeline and account for any discrepancies

QA & Documentation Manager

Role Description

Management of the company's Documentation is indispensable in that, if done well, it will allow all team members to access important information and thus work as effectively as possible. To assure this the Documentation Manager will manage the team's document depository (Google Drive/Slack).

Company document standards are also defined by the Documentation Manager and included in the "**Standards for Company Documents**" section of this document; maintaining a consistent high quality of the team's work (in both appearance and content) is necessary for full transparency to the client.

Quality Assurance is imperative to a company as it ensures all products produced are of an exemplary quality and strictly follow all of the client's requirements. After collecting the initial QA metrics from all team members the QA manager will follow a fortnightly (or after every major deadline) regime of quality analysis for all team members against the metrics already defined. Maintaining this regime will take a high level of communication between the QA Manager and all other team members. Note that the QA procedure is subject to change during the timeline of a project; changes should not be made until a full company meeting takes place, in which a consensus is reached.

Tasks for the QA & Documentation Manager include:

- Monitoring, and editing when necessary, the writing of all company documentation.
- Analysing the quality of all company work done by its team members.
- Provide an internal QA plan to team members. This should be done in conjunction with the team leader.
- Taking minutes during all group meetings and typing them up. Minutes should be available digitally, either scanned or typed, at maximum 2 days after the meeting and ideally on the same day.
- Managing the group document depository; keeping track of document changes/versions; editing documents written by other team members (commenting, fixing formatting).
- Tracking documentation deadlines and ensuring that all these deadlines are met.
- Defining the company's documentation standards in the QA Manual.
- Ensuring that all team members follow the documentation standards.
- Ensuring that final copies of any company documentation follows the relative documentation standards.
- Collection and editing of QA metrics from team members, to be included in this QA manual. (Including QA metrics for the QA Manager themselves)
- Conducting assessments of team members against their respective QA metrics after every major deadline. These assessments are to be carried out at appropriate times during the project and in the future. For example at the first iteration deadline and the final deadline.

- Archival of all company documentation on the online repository.

Risk Management

Risk	Severity (0-5)	Likelihood (0-5)	Solution
QA Metric not met	4	3	Make sure that all company members are firmly aware of the deadlines that must be met. Talk to group members about their metrics at the end of the project and ask them to retrospectively update them.
QA Analysis is not carried out	3	3	Regularly talk to each individual group member about the work they have completed and analyse it respective to their QA metrics.
Minutes are not available due to the absence of the QA/Documentation manager	3	4	If the QA/Documentation manager is aware that they will be absent before the meeting then they should delegate someone to take notes in their place. These notes can then be typed up and uploaded by the QA/Documentation manager.
Minutes for a meeting are not available within 2 days (or ever)	3	2	Ensure that handwritten notes are taken during the meeting and typed up on the same day. The minutes must then also be uploaded to the team drive.
Inconsistent styles within company documents	1	4	Review the document multiple times before submission. This can be done by multiple group members. Note that this is likely to occur due to multiple team members working on the many different documents at once.
Deadlines not met	5	2	Track all deadlines during the project and ensure that all group members are aware of them.
Documentation Quality is of a low standard. (For example does not follow the client's specification)	3	1	Regularly edit any written work by the group and communicate with them regularly to ensure that work is of good standard. Thoroughly proofread the final document in conjunction with the Team Leader before submission.

QA Metrics

Metric	How the metric will be evaluated
Employees (Group Members) all provide their own list of QA metrics that are agreed upon and collected by the QA Manager.	Number of QA metrics actually met during development against the expected initially defined in this manual.
Documentation delivered.	Number of Documents required by the specification vs what is actually delivered.
All project deadlines met	From the timetabled submission deadlines, if a document is not delivered before this then the metric is failed.
Group members meet their QA Metrics	2 Audit sheets to be handed out and filled in by the group, this will allow them to self-evaluate their work compared to their respective metrics

Software Manager

Role Description

The software manager is responsible for the implementation, development, and testing of the software from the defined specifications of the project. They must have a full understanding of the specifications, requirements, and goals for the development of the software to ensure that the quality of the product is to the clients standards. Additionally, they will have to work closely and communicated regularly with the Multimedia and Content manager, the GUI Developer, the Design and Implementation manager, and the QA and Documentation manager to ensure that the software development runs smoothly and meets the requirements needed.

The tasks for a software manager include:

- Having a clear understanding of all the procedure for the development of the product from the specifications provided.
- Using the product specifications to create user stories that match the requirements needed for the software.
- Drawing from the Functional Specification document , requirements, user stories etc. to create a plan to design, implement, and test the product.
- Testing and verifying that the product is up to the standard which match the client's requirements.
- Deciding the methodology and techniques used in all stages of development such as programming languages used, the IDE, libraries used, and testing strategies. This is to keep the coding process consistent.
- Having the knowledge to confidently present new ideas to the group and assess whether or not it's possible to implement the given designs into a piece of functioning software.
- Assigning coding and testing tasks to themselves and other employees and monitor the coding process through a shared repository (GitHub).
- Being proactive in the development cycle of the product by using their technical skills and knowledge to give insight on the project.
- Attend meetings and communicate regularly with all other members of the project.

Risk Management

Risk	Impact (0-5)	Probability (0-5)	Solution
Coding errors	5	3	Communicate any errors to the group. Stay on top of the coding process and come up with solutions to the errors through test cases and changing code.
Consistencies not being met	2	4	Make sure that the coding practices and consistencies are being met, and alter code to meet the standards if needs be. Provide a standard format for how the code should be.
Hardware/software incompatible with the requirements specified	4	1	Speak to the Design and Implementation manager about these incompatibilities. Mention them in the meetings and suggest an alternative solution or approach to achieving the affected requirements.
Deadline overdue	3	2	Reassure the client/project manager that the deadline will be met by working closely with the other group members. If it cannot be met in time, request an extension.
Developed solution not being accepted by the other group members	2	2	Communicate with the other group members to discuss the developed solution. From this discussion, come up with a better one to satisfy the requirements.

QA Metrics

Metric	How the metric will be evaluated
Timing of coding, developing, and testing the software	Keep a schedule of each stage and track how much time is being spend on them.
Assigning tasks to team members	Keep track of the tasks that need doing and make sure they fulfill the requirements of the user stories.
Errors in code and bugs	Document the errors in the code. Assign issues for each error/bug through branches in Git.
Quality of code written by others	Check over and approve the code written by others before committing it to the main project code in Git.

Design Manager

Role Description

The Design defines how the application will work and how the user will interact with the application. The Design needs to have the required features to fulfill the vision of the app to differentiate itself from competition and also have the necessary features to appeal to a large audience. This will require working closely with the marketing team in order to find out what features are absolutely necessary in the design and what features were popular in our competition. It will also require working with the software manager to see if the design ideas are possible and realistic in addition to working with the GUI developer and Multimedia and content manager to ensure high quality of the end product. Responsibilities of the Design Manager include:

- Establish the requirements for the product from the customer.
- Establish the main idea of the product to highlight it in the design.
- Communicate with the marketing manager to find popular features to include in the design and the target audience for the design.
- Designing the graphical user interface and the system features.
- Establish standards to ensure consistency of all the design work ie: colour scheme, font.
- Communicating with the software manager to ensure feasibility of the design.
- Supervise and provide feedback on the design work for the product from the GUI developer and multimedia and content manager.
- Delivering documentation regarding the design.
- Attend meetings and communicate regularly with all other members of the project.

Risk Management

Risk	Severity (0-5)	Likelihood (0-5)	Solution
Design deemed unfeasible by software manager	2	3	Make appropriate changes to the design as required by the Software Manager.
Design not accepted by project manager	2	3	Regularly meet with the team leader to discuss the design.
Deadline overdue	4	2	Keep track of the deadline and ask for support if some help is needed.
Make sure the product stays true to the design	2	4	Follow the product development and communicate any differences to the design.

QA Metrics

Metric	How the metric will be measured
Design cost	This can be measured by the time spent creating the design
Quality of the design work produced by others	Check the work produce to make sure they fit the standards and specification
Design correctness	Ensure that the final product corresponds and operates according to the design specification

Finance Manager

Role Description

A skilled financial plan is a vital part of project management to ensure a company remains financially stable. The Finance Manager may have the following responsibilities and tasks:

- To analyse, research, and provide:
  - Financial information to the Project Manager/Group Leader and other group members.
  - Supplementary information on pricing proposals for the group's app.
  - Supplementary information on appropriate sales strategy proposals to accompany product pricing.

- To create and provide the following:
  - A Financial Business Plan that covers the total development cost of the product in full.
  - Accurate periodic financial reports showing actual against planned spending.
  - A Financial Performance Review, which will cover how the group's finances have been managed and include:
    -A profit and loss statement as part of this review.
    -A balance sheet showing relevant debtors and a cash balance as part of this review.
  - The financial information required for sales presentations of the product.

- To monitor and manage the following:
  - Cash flows (receipts and expenses, and outstanding debtors and creditors when needed).
  - The group's spending and cash/income received.
  - Any potential opportunities to reduce costs for the group.
  - Any potential changes to the product that might affect the group's finances, if needed.

Risk Management

Risk	Severity (0-5)	Likelihood (0-5)	Solution
Loss of key records (System failure, theft, accidental disposal).	4	2	Ensure there are multiple printed/ digital copies of records available both on and offline.
Failure to communicate effectively (leading to inaccurate records).	4	4	Check regularly with the Group Leader/Project Manager to ensure that information is accurate. Check during each meeting that all relevant members of the group have the necessary correct information.
Financial fraud.	5	1	Regularly check financial records to ensure they are accurate. Ensure there is supporting evidence for information provided by all members of the group.(Such evidence to be found through verifiable research).
Potential disruption to accommodation, utilities or infrastructure (changing office or utility providers).	3	1	Monitor possibility of future disruption and allocate funds if necessary.
Failure to budget correctly.	4	4	Ensure regular financial monitoring is sufficiently detailed to identify risk areas and actions needing to be taken promptly.
Incorrect financial information given by the Financial Manager to the group.	4	3	Ensure that members of the group needing the information understand why it is inaccurate, its limitations, and what is being done to rectify the situation, if this is possible.
Incorrect financial information given to the Financial Advisor.	4	1	Ensure that the Financial Advisor needing the information understands why it is inaccurate, its limitations, and what is being done to rectify the situation, if this is possible.
Incorrect information given by Group Managers (such as Marketing or Group Leader).	4	3	Check to ensure that information is correct, and request verifiable evidence where possible.

Contracts made do not lead to group profitability.	3	3	Communicate with the Group Leader/Project Manager and those participating in negotiations to ensure that contracts can provide a profit as far as possible.
Delegated work not carried out to the required standards.	3	3	Communicate effectively with members of the group and regularly check standards required are met.
Loss of Financial Advisor.	5	2	To maintain good relations with the Financial Advisor, always keep them informed of relevant information, current profitability, and show how funds provided are used.
Late loan payments to Financial Advisor.	5	2	Check the dates of the loan payments with the Financial Advisor when negotiating the loan amount. Inform the Financial Advisor promptly should late payments arise and what action will be taken to prevent this happening in future.
Change in interest rate.	4	2	Ensure that there is potentially sufficient cash flow to cover any increases in interest rates producing increased loan costs.
Possible rejection of product by Financial Advisor and Customer.	5	3	Consider possible adaptations of product that are acceptable to Financial Advisor and Customer requirements when needed. Monitor and report any additional costs involved.
Purchasing and selling of contracts does not occur simultaneously.	4	4	Communicate with the Project Manager/group leader and ensure that all contracts are closely monitored and changes implemented. Monitor cash flow closely.
Group becoming bankrupt.	5	2	Maintain accurate documentation, manage the group budget, and ensure there are verifiable records kept of any money spent. Also ensure that there is sufficient cash flow for unexpected costs.
Expenses unable to be funded.	5	1	Ensure there is sufficient cash flow for unexpected costs.

Loan cancellation.	5	1	Maintain a positive and continuous professional relationship with the Financial Advisor and provide regular updates through financial reports, showing profitability and viability.
Assets not covering expenses and exceeding loan payments.	4	2	Ensure that there is sufficient cash flow to cover unexpected costs.

QA Metrics

Metric	How the metric will be measured.
Maintaining a positive cash flow by monitoring receipts and payments each week and using full absorption costing throughout the project.	Production of supporting records, cash flow statements, and actual versus planned spending statements for all financial reports required.
Ensuring wages are recorded, monitored, paid on time, and are regularly employed to calculate overhead recovery rates for financial forecast and actual results.	Maintaining records of wages calculations, payments, and outstanding payments, and providing a clear document trail from timesheets to wage costs and calculation of overhead recovery rates throughout production of all financial reports as far as possible and required.
Ensuring loan interest (simple or compound) is calculated and paid correctly during cash flow forecasting and the production of all financial reports required, and that outstanding credit payments are calculated for the final Financial Performance Review and Profit and Loss Statement.	Maintaining records of interest calculations, payments, and outstanding payments, and providing a clear document trail from loan agreement to interest costs throughout production of all financial reports as far as possible and required.
Ensuring Rent, IT Infrastructure costs, and Utilities costs are calculated and paid correctly during cash flow forecasting and that outstanding credit payments at the end of the project are calculated for in the Financial	Maintaining records of rent, IT, and utilities calculations, payments, and outstanding payments in order to provide a clear document trail from expected to actual costs throughout production of all financial reports as far as possible and required.

Performance Review and Profit and Loss Statement.	
Monitoring and recording of the overhead recovery rate and its relationship to product pricing throughout the project.	Monitoring variable wage and other fixed costs to establish total costs in order to ensure that overhead recovery rates are accurately communicated during the production of all financial reports as far as possible and required.
Continuous monitoring and recording of the non-recurring engineering costs (total development cost) and its relationship to product pricing throughout the project.	Calculating, monitoring, and recording all costs to ensure that the non recurring engineering cost is known throughout the project and clearly communicated during the production of all financial reports as far as possible and required.
Continuous monitoring and recording of all contracts in and out during the project and ensuring this is accurately represented during all financial reports.	Maintaining records of contracts calculations, payments, and outstanding payments, and providing a clear document trail of contracts in and out costs throughout production of all financial reports as far as possible and required.

Multimedia and Content Manager

Role Description

An eye catching and memorable app design are essential to the successful reception of a newly released application by its users. First impressions can often mean the decision between whether a user will decide to keep using the product or not. To ensure that users have the best possible first impression when using the product, our company will spend a portion of the budget on sourcing and creating graphics, sound and video that will be included in the product. The artwork, sound design and video recording that will be included in the product are influenced by market and consumer research and are tailored to the target audience to deliver an attractive product and company ethos to our consumers.

Specific responsibilities of the Multimedia and Content Manager include:

- Having a full understanding of the specification, including what the target audience of users want from the product. This means designing the application media to suit the company ethos and fit the target audience style.
- Sourcing/Creating Fonts and Graphics to be used in the application and website.
- Sourcing/Composing Sounds and Music to be included in the application and website.
- Sourcing/Recording the video to be displayed within the application and on the website.
- Reporting development costs and pass timesheets to the Business and Finance Manager.
- Communicating with the Design and Implementation manager, GUI developer, Market manager and Project Manager whilst sourcing and creating the content for the product.
- Communicating with the Software Manager and GUI developer whilst coding the shopping list GUI.
- Meeting on a weekly basis with all other company members to discuss progress and future decisions for the project.
- Writing the HTML tour for the project.

Risk Management

Risk	Severity (0-5)	Likelihood (0-5)	Solution
Delays with meeting project deadlines	4	2	Keep to a fixed schedule that is agreed with the project manager and allow overhead for any time off needed for illness or unforeseen circumstances. If delays occur, review why the delay occurred and identify the reason so a rectification can be established.
Designs are not accepted by the PM.	2	4	Find out what the PM does not like about the design and then work with them to create a design that aligns with both managers' ideals.
Shopping list code errors	5	3	Work closely with the Software manger to find and patch out any bugs to get the app back up and running smoothly.
Images/Video size does do not fit the GUI design.	3	1	Work with the GUI developer and the Design and implementation manager to come up with standard sizes to adhere to when creating content to be shown in the GUI.

QA Metrics

Metric	How the metric will be evaluated
Multimedia and Content Cost.	This can be measured by the time spent creating/sourcing the content.
Errors/faults.	This is measured by the number of faults found in the designs and the number of errors experienced during the development of the app.
Website development cost.	This should be measured and calculated by the time spent developing the website as well as the tools used and licenses required for the operation of the website.

GUI Developer

Role Description

The GUI (Graphical User Interface) allows the user to interact with the app, and must be robust, intuitive and have a polished presentation. The GUI developer is responsible for the implementation of the GUI based on the specification given by the design and specification manager. They should also be in regularly contact with the design and specification manager to ensure the feasibility of the design, as well as work closely with the lead software manager to ensure the overall quality of the product.

Responsibilities of the GUI developer include:

- Developing a well structured GUI design based of the specifications provided by the design and specification design manager, as well the the customer requirements.
- Having a clear understanding of what is required from the GUI specification.
- Deciding on the means and design techniques to used during implementation.
- Communicating with the design and specification manager to ensure feasibility of the GUI design.
- Communicating with the multimedia and content manager when implementing multimedia content.
- Working closely with the software manager to ensure that the overall product works seamlessly.
- Assessing the quality of the produced GUI.
- Delivering documentation regarding the design.
- Meeting regularly with other team members to discuss progress, necessary specification changes and future decisions.

Risk Management

Risk	Severity (0-5)	Likelihood (0-5)	Solution
Code Failure	5	3	Work in tandem with the software manager to fix errors. Communicate any errors with the team regularly to discuss possible high level changes.
Deadline overdue	4	2	Communicate progress with the team regularly and request support if workload becomes too great.
Final Product not	4	2	Regularly update the project manager

accepted by project manager			on progress to ensure that they have a say in how the product will function

QA Metrics

Metric	How metric will be evaluated
Planned coding time compared to actual coding time	Keep a track of how much time is spent coding. This can be done using timesheets.
Errors	Communicate errors to software manager and ensure that they are documented. Determine how to resolve errors.
Usability of the app	Test the app throughout development and ensure that it is robust and easy to use.

Marketing Manager

Role Description

A sound marketing strategy is essential for the development and progress of any product. In order to achieve our company's marketing goals and thrive as a business we must set ourselves apart from the competition by identifying solutions to problems in existing products and implementing them in an attractive, useful product. The marketing division of the company will analyse the market in terms of size, what is already out there, what the pros and cons are of existing solutions and what barriers there may be to entry into the market. The marketing department will relay these findings to the rest of the company and work with teams within the company to address the customer's needs ensuring the product is suitable but also economically viable. Good intercompany communication skills are essential to this role. Marketing will be responsible for setting suitable pricing based on research into the competition.
Responsibilities of the Marketing Manager include:

- Scrutinising existing competitor's products, finding out what works well and what doesn't and what we can do differently that is innovative.
- Estimating size of the market based on current users and future predictions.
- Identifying obstacles in entering a market and how to overcome them.
- Identifying a target audience.
- Liaise with product development, contributing ideas for the product based on market research.
- Working with the finance team to price our product accordingly and to explore appropriate business models.
- Working on brand awareness by gathering consumer feedback at key stages of the product development and promotion of the product.
- Investigating protection of our innovations.

Risk Management

Risk	Severity (1-5)	Likelihood (1-5)	Solution
Competition too strong	3	2	Thorough market research will identify what already exists, what works and what doesn't for the customers. By identifying gaps in the market and addressing these with an innovative and exciting solution to the customer's requirements we will be able to compete and set ourselves apart.
Cannot break into the market	4	2	Identify barriers to entry, saturation of the market and assess risk of entering a new field. If this is researched carefully and appropriately in advance we stand a much better chance of success. Innovation will aid in our venture into a new area.
Poor public relations/perception of the company	5	3	Thorough research of what the customer wants puts the company in an advantageous position of knowing problems we need to solve for the customer before they ask us to solve something. Building a rapport and valuing the customer's needs improves the relations with the customer and the company
The customer's needs aren't communicated within the team	4	1	Clearly identifying what the customer wants and sharing with the whole team and ensuring we have a clear grasp of what they want will reduce this risk and provide the customer with a product that is a solution for them. Working closely with the design and implementation team ensures that the customers' needs are translated to an innovative and useful product.
Pricing/ sales issues	3	3	Obtain figures of sales of similar products and asses their marketing strategy. How can we emulate and improve on their success? Is what we are doing financially viable? Will customers pay for it ? This will come from extensive research and will require working with the finance team to come to an agreement on how to use our resources effectively.
Protection of our innovation/ threat of copycats	3	3	Investigation of protection of our intellectual property, can we minimise copycats? By investigating the options available to us and employing them to reduce the risk of our market share being stolen from us.

QA Metrics

Metric	How the metric will be evaluated
Brand Awareness/ strength	Customer feedback, focus groups, surveying the public
Sales	Exploring sales figures and comparison of rivals' figures will show our share of the market
Customer satisfaction and customer loyalty	This can be measured by direct feedback from the customer, live trials of the product and assessing repeat sales of the product and reviews of the product.

Software Developer [Programmer]

Role Description

The software developers are responsible for the implementation and development of the software as delegated by the Software Manager. They must have a full understanding of the specifications, requirements, and goals for the development of the software to ensure that the quality of the product is to the clients standards.
The tasks for the software developer include:

- Having a clear understanding of all the procedure for the development of the product from the specifications provided.
- Drawing and adhering to the provided functional specification document. Specifically following the requirements, user stories etc. to help design, implement, and test the product.
- Carefully following the methodology and techniques as decided by the software manager, this includes; programming languages, the IDE, and libraries. This is to keep the coding process consistent.
- Performing coding tasks as assigned by the Software Manager.
- Pushing all work to a shared repository (GitHub).
- Being proactive in the development cycle of the product by using their technical skills and knowledge to give insight on the project.
- To attend meetings and communicate regularly with all other members of the project.

Risk Management

Risk	Impact (0-5)	Likelihood (0-5)	Solution
Coding errors	5	4	Communicate any errors to the group. Stay on top of the coding process and come up with solutions to the errors through test cases and changing code.
Inconsistency in programming methodology	2	4	Make sure that the coding practices and consistencies are being met, and alter code to meet the standards if needs be.
Failure to complete work assigned by the software manager	4	3	Regularly check with the Software Manager as to what must be done and when. Stick to a tight schedule and do not leave a large amount of programming towards the end of the deadline.

QA Metrics

Metric	How the metric will be evaluated
Timing of coding, developing, and testing the software	Keep a schedule of each stage and track how much time is being spend on them.
Errors in code and bugs	Document the errors in the code. Assign issues for each error/bug through branches in Git.

Deputy/Assistant Financial Manager (Commencing on 7.5.18)

Role Description

The deputy Financial Managers are to help the Financial manager with anything that is required:

The Deputy/Assistant Finance Manager will assist the Finance Manager with:

- Group research.
- Overseeing the correctness, accuracy and readiness for deadlines of all group timesheets.
- To add and supply basic timesheet analysis information from which the Finance Manager will conduct further analysis.
- To assist the Finance Manager with analysis and research of :
    - Regular financial information to the Project Manager/Group Leader and other group members.
    - Pricing proposals for the group's app.
    - Appropriate sales strategy proposals to accompany product pricing (in conjunction with the marketing manager).

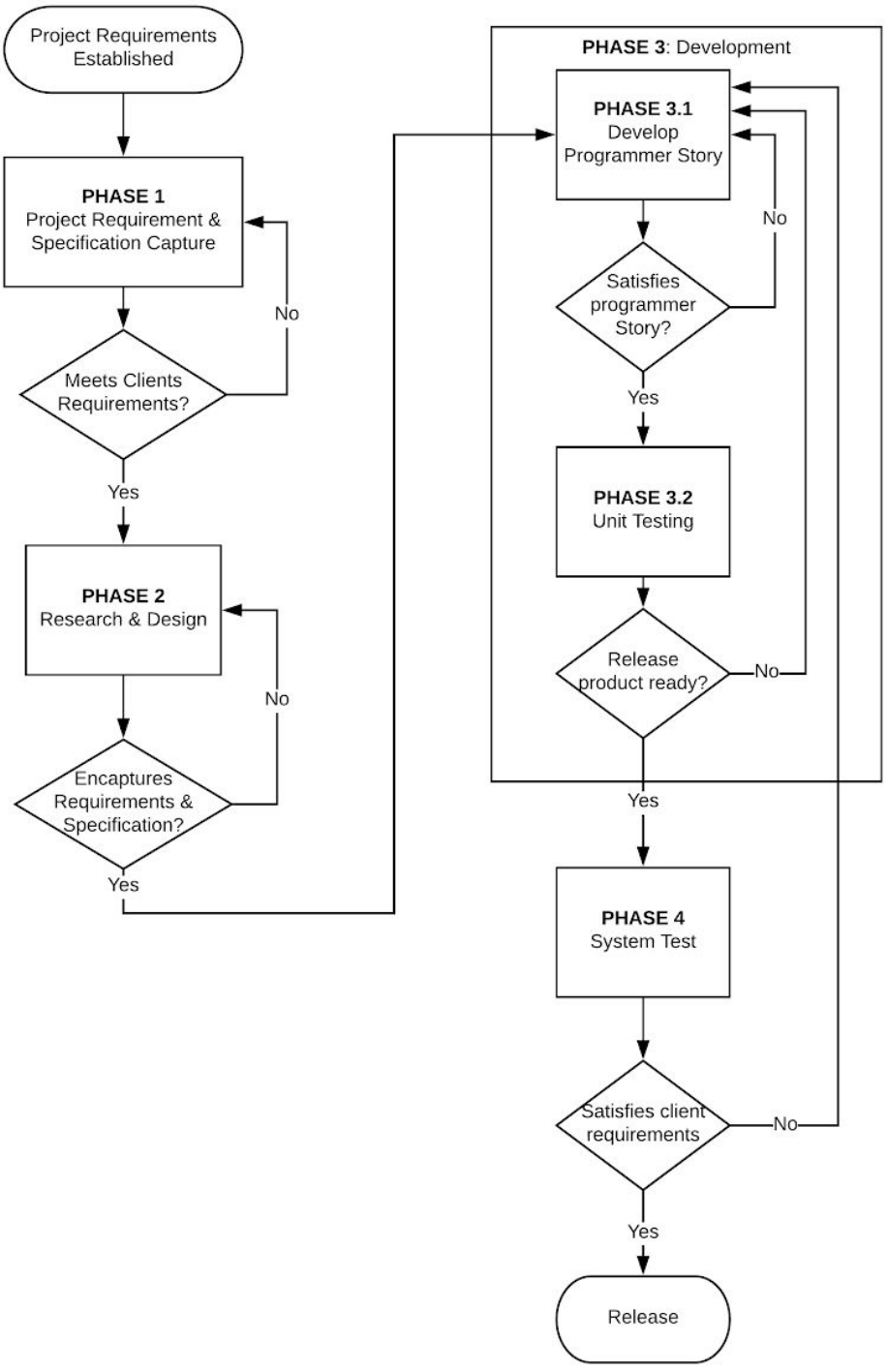
Risk Management

Risk	Severity (1-5)	Likelihood (1-5)	Solution
Group members do not upload timesheets.	3	4	Messages group members with friendly reminders the day before the weekly timesheet hand-in deadline, and on the same day, and does not accept any late timesheets (the group member receiving zero hours for that week).
Timesheets are incorrectly filled in.	3	4	Checks all timesheets and either chases up errors or amends them.
Analysis Document is incorrectly filled in.	4	3	Finance Manager checks the Analysis Document every week when the Deputy Finance Manager is finished, and any errors are immediately found and corrected.
Not enough research is carried out to successfully write a Financial Document.	4	3	The Finance manager receives regular updates from the Deputy in charge of research (weekly), either in person or via Slack, and helps with research as or when needed.
Incorrect research has been carried out or the Deputy has misunderstood the research requested by the Finance Manager.	2	3	Upon requesting research, the Finance Manager explains any terms that the Deputy doesn't understand, and answers any questions they may have.

QA Metrics

Metric	How the metric will be evaluated
Timesheets are correctly filled in by all group members and uploaded before the deadline.	The timesheets of all group members should be available before 5pm every Wednesday for the previous week and have no errors.
Financial Reports should have the correct information within them.	If sufficient research is carried out then the reports should reach the expectations of both the Finance Manager and Tony Ward.
Timesheet Analysis Document is correctly filled in.	If correctly filled in, the Analysis Document will reach the expectation of the Finance Manager.

Project Management Methodology



PHASE 1: Project Requirement & Specification Capture

Upon receiving a list of requirements from the client, it is the company's job to capture these requirements in the from of a Project Requirements Document to develop a deeper understanding of the needs of the client.

PHASE 2: Research & Design

After outlining the project requirements, research into competitor products gives us a clear view of the target audience and any gaps in the market that can be exploited. The product will then be designed in relation to the research to be familiar to new users, but unique.

Through this phase, a Functional Specification Document will be produced, outlining the core functionality of the design, and ensuring that the requirements have been met.

PHASE 3: Development

The development phase will be a continuous loop of programmer story development and unit testing. As the code is developed it will be continually tested to make sure it meets the functional specification.

PHASE 4: System Test

Once a release product is ready, the entire developed system will be tested to check for any bugs or errors, as well as compared to the Functional Specification Document and Project Requirements Document to ensure that all the client requirements are met.

Company Coding Standards and Methodology

As defined by the SOFTWARE MANAGER.
Below is a list of coding practices that must be followed during all stages of developing the app.

Development methodology

- The methodology used for the development of the app will be test-drive agile development.
- The requirements for the app are drawn from user stories alongside an acceptance criteria that must be met to match the user stories.
- During development, additional user stories may be created as well as new test cases.

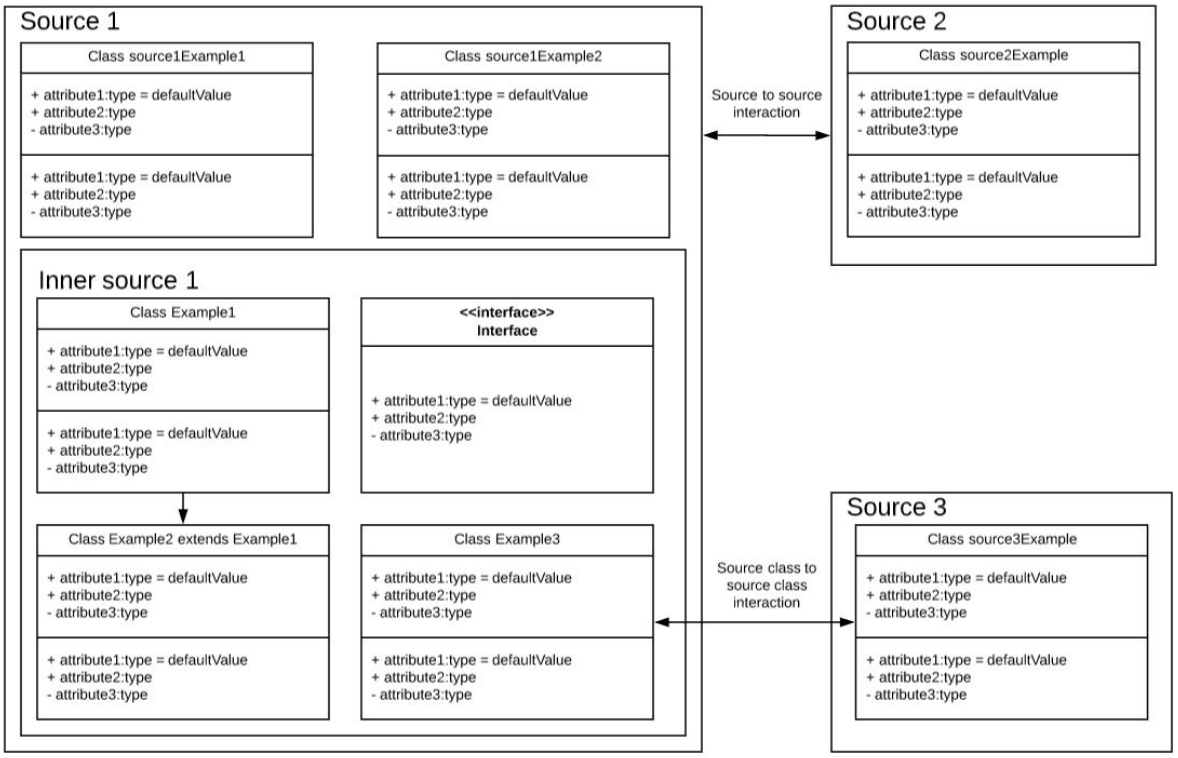
Coding

- For the Android platform, the app will be developed in the Android Studio IDE.
- The main coding language for the Android platform will be Java.
- When you are coding in Java, you must:
    - Name classes appropriately with a *noun phrase* with an *uppercase first letter and camel case*. E.g. class Customer () {...}
    - Name methods in a class with a *verb phrase* with a *lowercase first letter and camel case*. E.g void getName(){...}
    - Name variables appropriately with a *noun phrase* with an *lowercase first letter and camel case*. E.g. String customerName.
    - See camel case for reference: https://en.wikipedia.org/wiki/Camel_case.
    - Comment code when it needs to be explained in more detail.

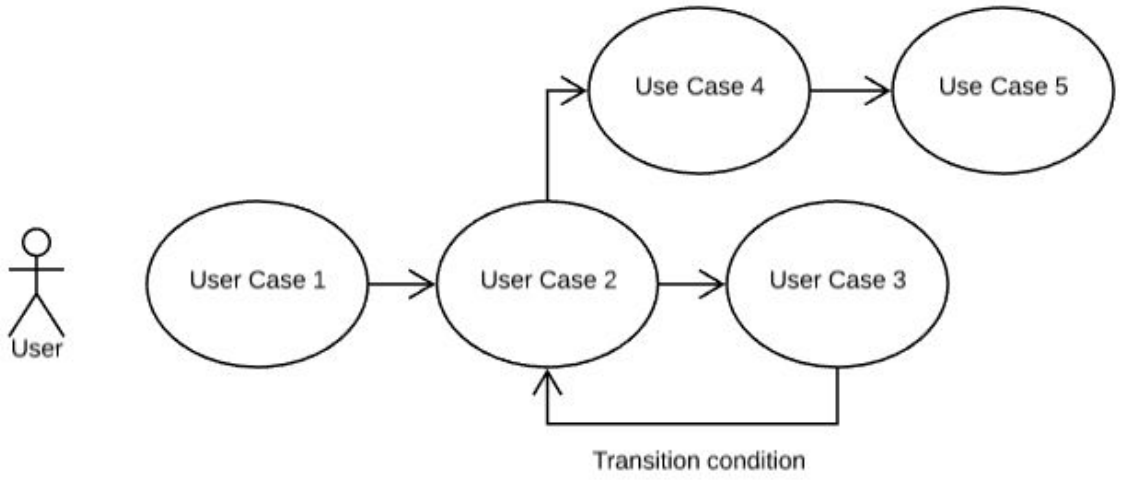
Git/GitHub

- To gain access to the repository, you must:
    - Create a GitHub account.
    - Ask the software manager for an invite to become a contributor. This will allow you to pull, commit, and push to the GitHub repository.
- When you want to add new features to the code, you must:
    - Pull from the master branch, or your own branch if you created one, in the GitHub repository (Android Studio comes with GitHub integration already).
    - Once the changes are made, create a new branch, or use your existing one, commit to the branch, and push to the GitHub repository.
- **DO NOT COMMIT TO THE MASTER BRANCH**. Once a feature is fully implemented and tested, the software manager will merge the branch with the master branch.
- Each commit/push must be reviewed and approved by at least one other person. (This will be done through GitHub, so do your usual commit and push, and it will appear as a notification in the repository for review.)
- If there are any bugs or issues with the code, raise them as an issue on GitHub.

UML Class Diagram Template



Use Case Diagram Template



Milestones

M1 Research
- M1.1 Research market & competition
- **M1.2 Research target audience**
  - M1.2.1 Research statistics online
  - M1.2.2 Generate statistics through surveys

M2 Design
- M2.1 Design user interface & interactions

M3 Documentation
- M3.1 Create functional Specification doc
- M3.2 Create QA manual
- M3.3 Create group HTML tour

M4 Finance
- **M4.1 Create Financial Business Plan**
  - M4.1.1 Research advertisement revenue
  - M4.1.2 Type up FBP document
- **M4.2 Create Financial Report 1**
  - M4.2.1 Create timesheets for Report 1
  - M4.2.2 Gather & analyse data
  - M4.2.3 Type up FR1
- **M4.3 Create Financial Report 2**
  - M4.3.1 Create timesheets for Report 2
  - M4.3.2 Gather & analyse data
  - M4.3.3 Type up FR2
- **M4.4 Create Financial Report 3**
  - M4.4.1 Create timesheets for Report 3
  - M4.4.2 Gather & analyse data
  - M4.4.3 Type up FR3
- **M4.5 Create Financial Summary Report**
  - M4.5.1 Gather & analyse data

M5 Programming & Development
- **M5.1 Create App Prototype**
  - **M5.1.1 Create Server**
    - M5.1.1.1 Write Server Code
    - M5.1.1.2 Test Server Code
  - **M5.1.2 Create App GUI**
    - M5.1.2.1 Write GUI Code
    - M5.1.2.2 Test GUI
  - **M5.1.3 Create App Data Handling**
    - M5.1.3.1 Write Data Handling Code
    - M5.1.3.2 Test App Data Handling

M5.1.4 Create App Functionality

M5.1.4.1 Write app functionality code

M5.1.4.2 Test app functionality

M5.1.5 Merge Code

M5.1.5.1 Integrate code and get it working

M5.1.5.1 Test Prototype

M5.2 Create release product

M5.2.1 Develop server

M5.2.1.1 Develop server code

M5.2.1.2 Test server

M5.2.2 Develop GUI

M5.2.2.1 Develop GUI code

M5.2.2.2 Test GUI

M5.2.3 Develop app data handling

M5.2.3.1 Develop data handling code

M5.2.3.2 Test data handling code

M5.2.4 Develop app functionality

M5.2.4.1 Develop app functionality code

M5.2.4.2 Test app functionality code

M5.2.5 Merge Code

M5.2.5.1 Merge all source code

M5.2.5.2 Test entire system

M6 Analysis

M6.1 Perform public survey on app & generate feedback

Deliverables

D1	Functional Spec to supervisor
D2	QA Manual uploaded to repository
D3	Financial Business Plan submission
D4	PWS agreed between groups
D5	Group tender presentations
D6	Financial Report 1 submission
D7	All contracts agreed and filed
D8	Financial Report 2 submission
D9	First iteration complete
D10	Final test & integration plan
D11	Financial Report 3 submission
D12	Financial summary report submission
D13	Demonstration / sales presentation
D14	HTML tour
D15	Hand in of all deliverables

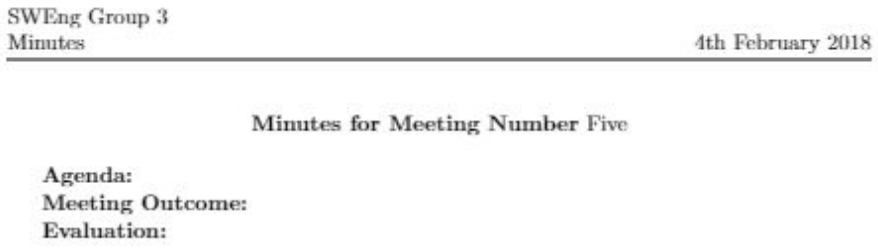
Company Documentation Standards

All documents should roughly adhere to the following:

- Use of the heading hierarchy (1,2,3) within Microsoft Word/Google Docs for all titles. This also defines font size for headings/titles.
- Figures should be labelled in a numbered style reflecting their place in the document.
- The IEEE referencing style should be used.
- Font size 11 for main bodies of text.
- Preferentially the font ‘Arial’ should be used.
- For documents that are edited by all group members Google Docs should be used.
- Individual documents meant to be read only should ideally be produced in LaTeX and uploaded as a PDF to the group repository.

Note that informal/internal documents that are not required by the client do not have to strictly follow these guidelines; the content is more important to the company.

Meeting Notes/Minutes Template



SWEng Group 3
Minutes 4th February 2018

Minutes for Meeting Number Five

Agenda:
Meeting Outcome:
Evaluation:

Timesheets Template

Section/Task	Description of Work Done	Start Time	End Time
Monday	Date: 12/02/2018		
1	Role: Description of what has been completed and any outcomes such as information that needs to be followed up.		
Team Meeting	This is how you describe the whole group meetings. If not a meeting then number the tasks. Write out the tasks in chronological order for the particular day.	15:00	18:00
Tuesday	Date: 13/02/2018		
-	-	-	-
Wednesday	Date: 14/02/2018		

Time Sheet For NAME of SG3 Enterprise For Week Starting		12/2/2018	
Day Section/Task	Time spent per Milestone/Deliverable	Total Time in Hours (Rounded to the nearest 15 minutes)	Total Wages (To be calculated by the Finance Manager)
Monday	Date: 12/02/2018		
		0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
Total		0	£0.00
Tuesday	Date: 13/02/2018		
-	-	0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
Total		0	£0.00
Wednesday	Date: 14/02/2018		
		0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
		0	£0.00
Total		0	£0.00

Expenses Template

Time Sheet For [INSERT ROLE] of Hands Off Enterprise.

Date of Payment	Method of Payment	Paid To	Description	Amount Paid