# QA Manual

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# Document Control

| Version Number | Modified By | Date | Section(s) Modified | Comments |
|---|---|---|---|---|
| 0.1 | R.Tan | - | Created | *Skeleton.* |
| 0.2 | J.Oatley | 28/01/2014 | All | *Added in title page, document control and contents, arranged/added sections, and formatted text.* |
| 0.3 | A.Gangotra | 28/01/2014 | 2.2, 3.1 | *Filled in Project Manager role and added section on deliverables.* |
| 0.4 | J.Oatley | 30/01/2014 | 2.4, 2.9, 2.10 | *Wrote section 2.4, added in sections 2.9 and 2.10.* |
| 0.5 | J.Oatley, M.Holland | 30/01/2014 | All | *Complete reformat. Note new multi-level numbering system.* |
| 0.6 | J.Oatley | 01/02/2014 | 2.2, 2.3, 4, Appendix | *Metrics added in on a per-departmental basis, section numbers modified accordingly, short sentences added to metrics sections.*<br>*Restored the missing contents page.*<br>*Added in documentation templates.*<br>*Remaining job roles and risks completed with the exception of Development Manager.*<br>*Added in Software Teams written sections.* |
| 0.7 | M.Holland | 02/02/2014 | 4, 4.5, 2.3.5 | *Updated section 4 with QA auditing notes. Added development manager roles and risks.* |
| 0.8 | J.Oatley | 02/02/2014 | All | *Merge with v0.7.*<br>*Made a few grammatical changes throughout the document.*<br>*Changed the bullet point company vision into 2 paragraphs.*<br>*Generally deleted hundreds of "in order"'s adding in new wording.*<br>*All job roles complete.* |
| 0.9 | J.Oatley | 02/02/2014 | All | *Final tidy up, ready for a review.* |
| 1.0 | J.Oatley | 03/02/2014 | All | *Gramatical and colourful.* |

Document Codes:

**OS** – Outstanding Section

**MR** – Missing Reference

# Contents

# 1 Introduction

## 1.1 Company Profile

Spoon is a developer of interactive platforms and tools. The focus of Spoon is to ensure complete customer satisfaction through intelligent design. Modern thinking and high quality standards allow us to excel above the current industry standard in the new software market. Our engineers consist of highly trained graduates with specific expertise in product design and development ensuring that our products exceed market expectations, are delivered on time and are always on budget.

## 1.2 Vision

The vision of Spoon is to bring new, innovative and useful food-based software solutions to market, primarily in the form of a student cookbook. By fully understanding the customer and market expectations for new products Spoon aims to provide products with real consumer value.

In a years' time we see ourselves as a firmly established and competitive company within the market; always delivering good quality products on time and on budget. We aim for our products to be integrated into every kitchen environment because of their competitive pricing, usability and longevity.

# 2 Roles and Responsibilities

## 2.1 Organisational Structure

For our organisation to operate to its full potential, roles and responsibilities of each personnel in the company have to be established and job descriptions written. Figure 1 below shows the organisational structure of the company.

The Project Manager carries the responsibility of ensuring that all members of the company work in concordance and harmony; and that team members adhere to company policies and procedures at all times.

To ensure that a product is being delivered on schedule, communication between teams and departments is required. To achieve this, weekly meetings are held to review the progress of tasks in each team. Regular review meetings are also held to consider the progress of major deliverables and project milestones.

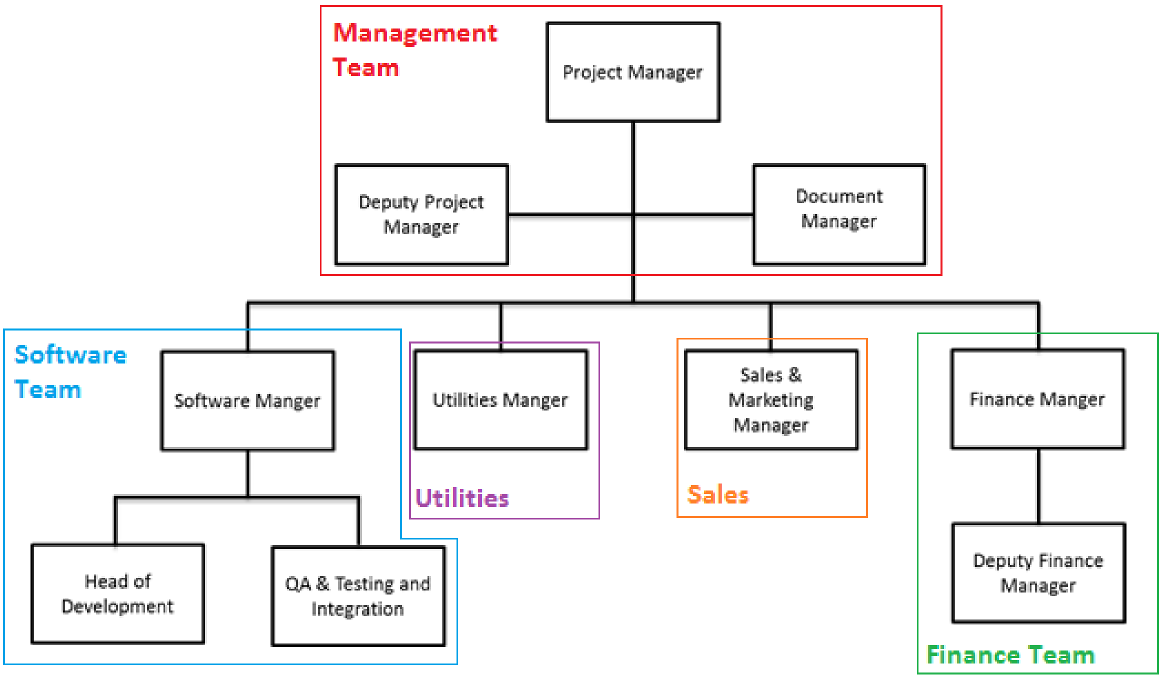


FIGURE 1: ORGANISATIONAL STRUCTURE OF THE COMPANY

## 2.2 QA Metrics

### 2.2.1 Management Team

The management team must work closely with all other teams on the project to ensure that company quality is always at an acceptable standard. The management share and review many metrics together so that they may be acted upon accordingly and quickly.

| Metric | How measured |
| --- | --- |
| Client requirements clarity. | Holding regular meetings ensuring that the client understands his/her own requirement statements and that these have been interpreted correctly by the company and finally signed off by both sides. |
| Project wide standards and contracts drawn up and adhered to. | Working with other teams to finalise PWS and liaising with the client and other teams for final contracts. |
| Complete specification. | Checking the specifications against the requirements statement to make sure all requirements are covered by the specifications team, during appropriate review meeting(s). |
| Software and Business Plan clarity. | Holding review meetings to make sure that software plans and business plans are coherent. |
| Deadlines met. | Deliverables submitted as timetabled and recorded. |

The Documentation Manager must also focus upon ensuring that all documents are up to standard and submitted on time.

| Metric | How measured |
| --- | --- |
| Documentation completed up to standard. | Working with company members to review and submit documents on time and keeping submission records. |

### 2.2.2 Finance Team

The finance team must oversee pecuniary value of the product and help control the flow of expenses and income.

| Metric | How measured |
| --- | --- |
| Assets turnover. | Sales/Average total assets.<br><br>Measure the efficiency of the |

| | |
|---|---|
| | company's use of its money. |
| Economic value added. | Net operating profit after taxes – cost.<br><br>Help determine created value. |
| Debt to equity ratio. | Debit/Equity.<br><br>Limit the ratio to less than 1 helps earn profit. |
| Return on Investment (ROI). | Optimise the efficiency at each stage. |
| Total Cost of Ownership (TCO). | Consider all costs, including energy, training, maintenance, rent etc. |
| Finance Deadlines met. | Deliverables submitted as timetabled and recorded. |
| Financial Business Plan and financial as desired. | Holding review meetings with deputy finance manager and Sales & Marketing Manager to make sure business plans and financial are up to the standard required. |
| Contribution towards and Sales and Marketing or the product | Holding review meetings with deputy finance manager and Sales & Marketing Manager to make sure business plans and financial are up to the standard required. |
| Weekly timesheets completed | Number of completed timesheets received / number expected |

### 2.2.3 Software Team

It is up to the software team to log important features of the software development so that their progress can be tracked. Code standards must also be adhered to and so metrics can be used to measure this.

| Metric | How measured |
|---|---|
| Defects opened | Number of new defects opened per week tracked |
| Defects closed | Number of defects closed per week tracked |
| Work items completed | Number of work items completed per week |

| | |
|---|---|
| Ratio of estimated time to actual time taken per task | Track these values weekly |
| Integration test results | Report/log results of integration testing |
| Repeated fails | Log repeated fails and review daily |
| Thorough testing | Check to see whether units have been tested according to the "Test Strategy" documentation |

### 2.2.4 Sales

It is expected that the marketing manager will keep track of how the product is accepted within the market so the company can adjust its strategies accordingly.

| Metric | How measured |
|---|---|
| Customer satisfaction | User feedback |
| Market interest | Surveys |

### 2.2.5 Utilities

It is important for the company that a record of tool failures and company satisfaction with tools is kept. By doing this necessary changes can be discussed and implemented as required.

| Metric | How measured |
|---|---|
| Tool failures | Keep a record of what failed and restoration time |
| Company satisfaction | Internal feedback from tools |

## 2.3 Company Personnel

This section describes the roles and responsibilities of each member of the company.

### 2.3.1 Project Manager

#### 2.3.1.1 Role Description

The Project Manager is responsible for taking an overviewing role within the company and organising the working of the team toward the desired goals. Along with the Deputy Project Manager, the Project Manager is accountable for ensuring that the design, development and implementation process runs smoothly during the project life cycle until the final product is presented to the customer. Accomplishing this involves the following tasks:

- Arranging for regular meetings with the team and chairing meetings
- Along with the Deputy Project Manager, having the ability to make the final decisions in case of a dispute, disagreement or otherwise
- Providing meeting agendas
- Signing monthly timesheets and working closely with the Finance Manager to ensure that the business plan is being conformed to
- Assigning the different roles required in the project in a way that ensures the optimal use of every member's qualifications
- Maintaining an encouraging and co-operative environment where every individual contribution is appreciated and respected
- With the help of the Software Manager, providing plans for project development and monitoring progress
- With the help of the appropriate managers, providing the timetable plan and ensuring that it is adhered to, or making appropriate modifications as required
- Ensuring that the requirements and standards are met at every stage of the project
- Granting final approval of all deliverables provided by the team
- Delivering reports to customers and acting as the interface between them and the project team
- Producing the overall project plan (with Gantt chart) and time schedule.

#### 2.3.1.2 Risk Management

| Risk | Possible Solution |
|---|---|
| Some group members don't get along with each other. | Try to resolve any issues that group members might have. If this does not work, consider assigning and delegating tasks to minimise disruption within the group as a whole. |
| The prolonged absence of a team member. | Have more than one team member trained to do any task. Be ready to adjust schedules as appropriate. |
| Deadline overdue. | Have regular project plan review meetings in which possible overruns can be identified and rescheduling can be considered if necessary. |
| Failure to meet one of the requirements. | Have regular review meetings where requirement conformity is checked. Make sure that the design and the development of the product is organised in a way that |

| | |
|---|---|
| | simplifies rollback and re-implements the missing requirements with as little modification to other parts as possible. |
| Finding out late during the project that one member has a lot more work to do than the others. | Review the workload for each member regularly to make sure there is a parity in the amount of work done by each person. |
| Certain team members producing work that is below the expected standard. | Have a system to review work done by each member (as mentioned above) and hold separate meetings with the members in question. If even after repeated counselling there is no change, talk to the board members (the supervisor and/or second supervisor) to take further action. |

### 2.3.2 Deputy Project Manager

#### 2.3.2.1 Role Description

The role of the Deputy Project Manager differs from the role of Project Manager in that the Deputy is only concerned with internal company matters, whereas the Project Manager is directly responsible for the company as a whole, and any interaction between the company and 'the outside world'. Reporting directly to the Project Manager, the Deputy is the first port of call for all sub-division managers, with the exception of the documents manager. The role is mainly supervisory, in that all sub-division activities must be overseen by the Deputy, and task progression must be tracked throughout the project. The Deputy Project Manager should know exactly what is happening in all departments of the company at all times (although this may be a top-level understanding of which tasks are in progress). In order to fulfil this role, the Deputy Project Manager should perform the following tasks:

- Define company quality standards in conjunction with the Project Manager
- Monitor QA metrics to ensure that processes are being carried out to the required standards
- Provide regular updates to the Project Manager regarding task progression and QA issues
- Ensure that all members of the company are performing in line with the defined quality standards, and that workload distribution is fair and reasonable
- Resolve sub-team disputes or disagreements, by involving the Project Manager if absolutely necessary
- Be available to assist any sub-team at any time should help be required to complete tasks on schedule and to the required standard
- Work with Project Manager to approve all deliverables before submission

- Conduct regular review meetings with sub-teams to track progress and respond to any issues raised by the sub-team manager(s)

#### 2.3.2.2 Risk Management

| **Risk** | **Possible Solution** |
|---|---|
| QA metric not met | Set up continued monitoring of team member's adherence to QA procedures and regular, monitored deadlines for metrics. |
| Dispute in sub-team | Attempt to resolve through discussion in a logical way, raising the issue to the Project Manager if necessary. |
| Procedures not being carried out to required standards | Closely monitor situation and attempt to identify cause of problem. Implement solution to problem and ensure that situation improves through appropriate measurement. |

### 2.3.3 Documentation Manager

#### 2.3.3.1 Role Description

The role of the Documentation Manager is to look after the entire projects documentation ensuring that hand-in dates are met and that all documents written comply with the correct standards. The Documentation manager can also be expected to write reports, compile resources into reports and to review documents handed over to them.

The Documentation Manager must work alongside the Project Managers to ensure that documentation content, provided by the Documentation Manager and other team members, is of sufficient quality that both internal and external project deadlines are being met. The tasks performed by Documentation Manager are as follows:

- Take minutes at meetings and upload to group repository for reference
- Create documentation templates and ensure that they are adhered to
- Working with primarily the Deputy Project Manager, sometimes the Project Manager, to review documents
- Ensure hand-in deadlines are met
- Organisation of group repository
- Keep secondary backups of important project documents
- Write up important global project documents (documents that do not fall under the responsibility of a particular department)

- Accept partial documentation from other team members and compile into one coherent document

#### 2.3.3.2 Risk Management

| Risk | Possible Solution |
|---|---|
| Other group members have not met internal deadlines | Work with Project Manager/Deputy Project Manager to ensure that the required content is obtained ASAP |
| Cannot meet hand-in date | Assign task to another group member |
| Too much work | Assign parts of the work primarily to Deputy Project Manager however, depending on circumstances, could also be assigned to other group members. |
| All documentation is lost | Retrieve backup files and use a temporary repository, collaborate with Utilities Manager to ensure smooth transition to new repository |
| Content handed over to be documented is not up to standard | Raise issue to Deputy Project Manager |

### 2.3.4 Software Manager

#### 2.3.4.1 Role Description

The software manager is responsible for leading the design and implementation of the product. They should fully understand the customer requirements and the company's functional specification of the project in order to design and develop the product. The software manager will work closely with the Deputy Manager and Documentation Manager to ensure the quality of both the software and any design documentation produced during the project.

- Decide on design and development methods.
- Lead the development of user stories from the customer requirements to produce test driven code
- Develop the architecture of the product from the specification, identifying class hierarchy, objects, and data types
- Produce appropriate documentation of the design process
- Collate product requirements for inclusion in the Project Wide Standards
- Coordinate the coding efforts of other group members and monitor its implementation

- Ensure consistency in the code and design practice carried out through the project
- Should either the Development Manager or Test manager become unavailable, to cover these roles

#### 2.3.4.2 Risk Management

| Risk | Possible Solution |
|---|---|
| Code failure at some point during the project | Ensure code is backed up to allow reverts to previously working versions of the code. Conduct regular reviews of the code and work with the Test and Integration manager to provide test cases to indicate failures. |
| Software Manager is unavailable | Ensure all designs and user stories are documented and accessible to other members of project. |
| Programmers are unavailable during the project | When user stories are assigned to an iteration allow time for delays. |

### 2.3.5 Development Manager

#### 2.3.5.1 Role Description

The Development Manager's role is to be the lead programmer on the project and is responsible for the technical implementation of the user stories created for the project. The Development Manager is also to set an example to other programmers on the project of the coding standards and practices required. If the Software Manager becomes unavailable the Development Manager will take the over their role and lead the development of the project.

Software manager's tasks include:

- Lead spikes (investigations) into new technologies or methods that may be required during the project
- Provide language/syntax based support to other programmers within the company
- Initial field queries relating to the product code from programmers
- Should the Software Manager become unavailable step up to fill the role
- Actively lead the technical implementation of the product code
- Assist the Software Manager with the design and specification process
- Verify the quality of product code produced by programmers
- Provide some level of defect and work item tracking on a weekly basis to interested parties, and formulate actions to improve metrics if required

#### 2.3.5.2 Risk Management

| Risk | Mitigation |
|---|---|
| Code inconsistencies | Produce a coding standards document and ensure that all team members are briefed on it before coding. |
| Errors or delays due to new technologies required (e.g. HTTP in Java) | Research and conduct spikes into new technologies. |
| Code produced does not meet standards | Conduct regular audits of code produced in order to give advice and instructions about code which needs to be improved. |

### 2.3.6 Testing and Integration Manager

#### 2.3.6.1 Role Description

The roles and responsibilities of a Testing and Integration Manager are to ensure that procedures involved with testing and integration of the project are being managed at the highest quality possible. They should have a comprehensive view of the testing and integration phase.

The main responsibility of the testing and integration manager is to formulate a set of testing strategies whereby the team members have to follow closely. Guiding the team members on how to write a proper and relevant tests is also a part of the testing and integration manager's responsibilities. The manager also has to come up with a general set of tests which are expected to pass when integrating the individual components together. The testing and integration plan is represented in a form of a Kanban Board using JIRA to show the progress of each task. The team members have access to the Kanban board and they are to update their progress on certain tasks regularly. Additional information such as defects or bugs has to be recorded on the Kanban board as well. With the Kanban board, the testing and integration manager can track the progress of the project and report to the software manager as following.

The key responsibilities of the testing and integration manager include:

- Manage the procedures that involve testing.
- Manage the procedures that involve integration of multiple modules.
- Formulate a set of testing strategies whereby the team members have to follow closely.
- Guide the team members on the how to write a test.
- Ensure that the test of each individual component is practical, relevant and consistent.

- Formulate a general set of tests which are expected to pass when integrating the individual components together.
- Assign various tasks to team members according to the Kanban board.
- Ensure that the team members update their progress including problems or bugs onto the Kanban board weekly.
- Report the progress to the software manager.

#### 2.3.6.2 Risk Management

| Risk | Solution |
|---|---|
| Development department unable to meet the deadline. | Allocate more time or reschedule testing and integration phase so as to accommodate for the delay. |
| Individual task during testing or integration phase overdue. | Record the problems on the Kanban board and allocate more time or more manpower for that particular task. |
| Error encountered where integrating multiple modules, but could not find a solution to that problem. | Consult the Software department to rectify the problem. |
| Member of the team decided to leave the company. | Allocate time for training a new member. Reshuffle the workload among the remaining team members. |

### 2.3.7 Utilities Manager

#### 2.3.7.1 Role Description

Utilities manager is responsible for the management of services and processes that support the core business of an organisation. Ensures that an organisation has the most suitable working environment for its employees and their activities. Also focuses on using best business practice to improve efficiency, by reducing operating costs while increasing productivity.

Responsibilities;

- Maintain general IT infrastructure required by company
- Provide frontline support for IT related queries to team members
- Secure backup of source code
- Secure backup of all documentation
- Provide and maintain a revision control system for source code and documentation
- Provide and maintain a defect tracking system
- Provide and maintain a system to track work items (user stories)

- Ensure that all tools and utilities integrate as seamlessly as possible
- Provide copies of tools required by team members:
    - Integrated Development Environment
    - Revision control system
    - Defect tracking system
    - Project management tools
    - Etc.
- Investigate the different uses and costs associated with different tools, and present these to team members

#### 2.3.7.2 Risk Management

| Risk | Possible Solution |
|---|---|
| Missing or corrupted documents. | Have a backup copy whenever any document is added or updated |
| Failure to carry out a procedure | Monitor services on a regular basis and assess their appropriateness, updating as required |
| Failure of hardware at some point | Consider during regular review meeting and assign appropriate manpower to correct failure, based on criticality of the hardware. Cooperate with Test and Integration manager to provide complete set of test cases. |

### 2.3.8 Sales and Marketing Manager

#### 2.3.8.1 Role Description

The role of the Sales and Marketing Manager is to steer the project into public awareness and demand through research, understanding and reporting on the climate of potential consumers of the product(s) to be made. They serve as an intermediary between the company and the public, gathering information and then using this data to target the product to the public.

The Sales and Marketing Manager also works closely with the finance team and is involved with the financial and contractual decisions made by the company. The exclusive roles of the Sales and Marketing Manager are:

- Research into product demand and customer needs and insights
- Detail how product will be marketed to customers
- Manage distribution channels for products
- Define target audience
- Determine viable price for product

#### 2.3.8.2 Risk Management

| **Risk** | **Possible Solution** |
|---|---|
| Product undesirable by public | Revisit project plan |
| Competition | Beat it (the competition) |
| Market failure | Beta test window and user feedback |
| Product lacking in important features | Revisit project plan, conduct survey |
| Pricing Issues | Survey prior to main release. Re-evaluate spending power of target demographic |

### 2.3.9 Finance Manager

#### 2.3.9.1 Role Description

The Finance Manager is responsible for taking an overviewing role within the finance and marketing division of the company and organising the working of members in this division toward the desired goals. They along with the Sales and Marketing Manager and Deputy Finance Manager are accountable for constructing the financial business plan, Time-sheets, budgeting, marketing strategies, and financial reports at each stage of the project until the final product is presented to the customer. Accomplishing this involves several tasks that include:

- Managing the financial part of the company, supervising marketing and finance managers
- Creating a schedule for the business to run on.
- Sign off time-sheets for employees
- Providing Budget Plans and working closely with the Project Manager for approval
- Assigning the different tasks within the finance and marketing division, making sure the contribution is equal.
- Constructing financial reports with the help of the financial manager and the Sales and Marketing Manager.
- With the help of the appropriate managers, provide the timetable plan and ensure it is adhered to, or make appropriate modifications as required.
- Making sure that the financial requirements of the other divisions of the company is met by budgeting.

#### 2.3.9.2 Risk Management

| Risk | Possible Solution |
|---|---|

| | |
|---|---|
| Some group members don't get along with each other. | Try to resolve any issues that group members might have. If this does not work, consider assigning and delegating tasks to minimise disruption within the group as a whole. |
| The prolonged absence of a member in the Business Division. | Have more than one team member trained to do any task. Report to Project Manager |
| Deadline overdue. | Have regular business plan review meetings where possible overruns can be identified and rescheduling can be considered. |
| Failure to meet one of the Business requirements. | Have regular review meetings where requirement conformity is checked. Make sure that the financing and marketing of the product is organized in a way that simplifies rollback and re-implements the missing requirements with as little modification to other parts as possible. |
| Over or Underestimated Budgeting | Review provisional budgeting with the team and then with the project manager frequently. |
| Certain team members producing work that is not up to the mark or not doing any work altogether. | Report to Project Manager. |
| Irregular Handing in of time-sheets | Designate a fixed date on which the timesheets need to be submitted. If still not consistent then report to Project Manager. |

### 2.3.10 Deputy Finance Manager

#### 2.3.10.1 Role Description

The deputy finance manager works in collaboration with the finance manager in being responsible for the oversight and management of all financial applications. They should work efficiently together in an accounting environment to ensure all financial parameters are properly implemented and cost reduction opportunities are quickly apprehended. A deputy manager must be able to step up when the team manager is away and, within the finance section, vital assets include:

- In-depth working knowledge of the whole financial industry.

- Proficiency at developing, implementing and evaluating sales policies.
- Confident and persuasive communication skills.
- Competent evaluation of budgets, prediction of quarterly forecasts/market trends.
- Provide financial information such as cost/benefit analysis, profit/loss accounts and balance sheets.
- Aptitude in meeting with clients internally and externally to maintain strong working relationships.

#### 2.3.10.2 Risk Management

| Risk | Possible Solution |
|---|---|
| Credit Risk | Thorough knowledge of customers and associated risk to create strict compliance contracts to improve overall performance and secure competitive advantage |
| Liquidity Risk | Identify and complete balance sheets. Increase stringent regulatory requirements for greater transparency and visibility of balance sheet. |
| Missed time constraint | Develop robust systems and models in association with the relevant project to ensure accurate deliverables to each individual. |
| Poor budgeting | Ensure relevant and well-thought resource allocation and administrative budgeting that encompasses rationalism. Attend key meetings to lead discussions on the financial performance of corporate departments. |

# 3. Deliverables

| Deliverable | Producer | Recipient | Due Date |
|---|---|---|---|
| *Spring Term* | | | |
| **Functional Specification** | Docs Manager, Project Team | Supervisor, Project Team Managers | 28-01-2014 [Tuesday Wk-4] |
| **QA Manual** | Deputy Project Manager, Docs Manager, Project Team | All company personnel, Supervisor | 03-02-2014 [Monday Wk-5] |
| **Financial Business Plan** | Finance Team, Sales and Marketing Manager | Financial Backer (AEW), Client (SJP), Project Manager | 07-02-2014 [Friday Wk-5] |
| **Project Wide Standards** | Other Groups, Docs Manager | Project Team | 13-02-2014 [Thursday Wk-6] |
| **Group Tender Presentation** | Docs Manager, Project Team | Financial Backer (AEW), Client (SJP), Supervisor | 18-02-2014 [Tuesday Wk-7] |
| **Financial Report 1** | Finance Team | Financial Backer (AEW) | 21-02-2014 [Friday Wk-7] |
| **Contracts Agreement** | Project Manager, Dep. Project Manager, Docs Manager | Supervisor, Client (SJP) | 25-02-2014 [Tuesday Wk-8] |
| **Financial Report 2** | Finance Team | Financial Backer (AEW) | 07-03-2014 [Friday Wk-9] |
| **First Iteration Complete** | Software Team, Project Team | Supervisor | 14-03-2014 [Friday Wk-10] |
| **Final Test and Integration Plan** | Software Team | Client (SJP) | 14-03-2014 [Friday Wk-10] |
| *Summer Term* | | | |
| **Financial Report 3** | Finance Team | Financial Backer (AEW) | 09-05-2014 [Friday Wk-3] |
| **Financial Summary Report** | Finance Team | Financial Backer (AEW) | 30-05-2014 [Friday Wk-6] |
| **Demonstrations and Sales Presentations** | Sales & Marketing Manager, Project Team | Client (SJP) | 09-06-2014 [Monday Wk-8] |
| **Final hand-in of all deliverables** | Project Team | Client (SJP), Financial Backer (AEW) | 12-06-2014 [Thursday Wk-8] |
| **Project Plan** | Project Manager | Team Mangers, Project | [Wk-5] |

| | | | |
|---|---|---|---|
| | | Team | |
| **QA Auditing and Metrics** | Dep. Project Manager | Project Manager | Audits throughout project, metrics at the end of project |
| **Timesheets** | Project Team | Finance Manager, Project Manager, Dep. Project Manager | Throughout project |
| **Progress reports** | Team Managers | Project Manager, Dep. Project Manager | Throughout project |
| **Meeting agenda** | Project Manager | Team Managers, Project Team | Prior to meeting |
| **Meeting minutes** | Docs Manager | Project Manager, Dep. Project Manager, Project Team | After meeting |

# 4. Project Management Methodology

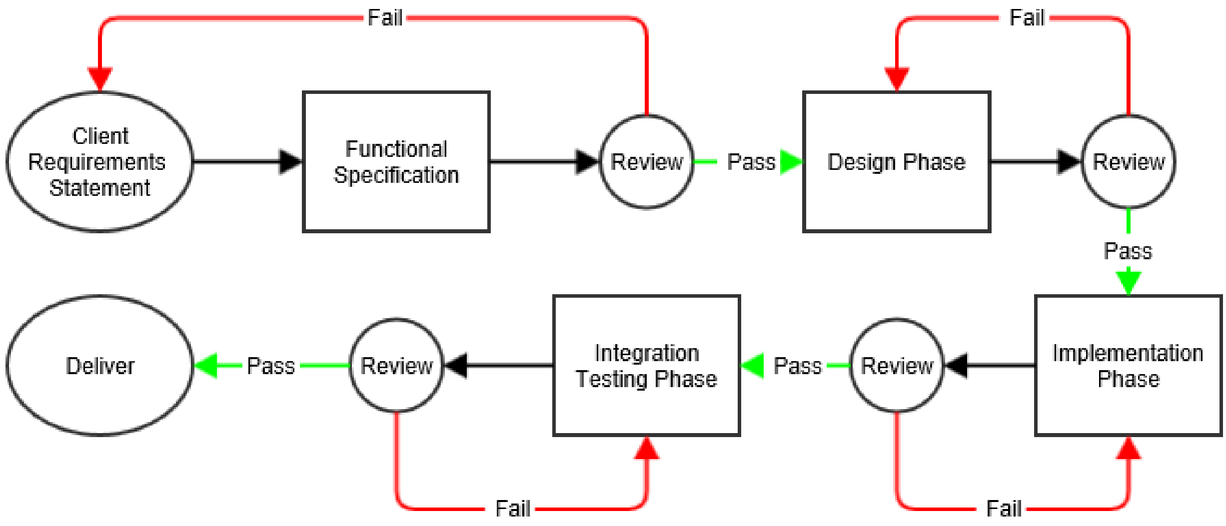


**FIGURE 2: PROJECT LIFE CYCLE**

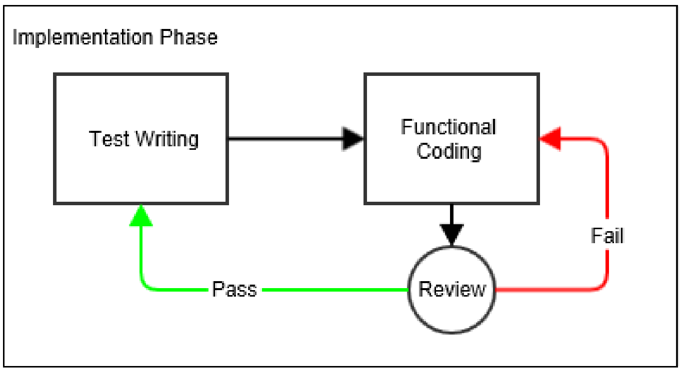


**FIGURE 3: DETAILED DESCRIPTION OF IMPLEMENTATION PHASE OF PROJECT LIFE CYCLE**

## Project Life Cycle Summary

- Customer concept or product idea provided to company.
- Functional specification written.
- Function specification checked and amended with customer.
- User stories created using Behavioural Discovery.
- User stories ranked with ignorance level.
- User stories given SWAG (time estimate).
- User stories assigned to pairs or individuals.
- For each user story;
  - Tests written (TDD)
  - Product code written
- Integration testing takes place – deterministic test pass
- Extra documentation generated if required.
- Ship product to customer.

Example Kanban Board:

| Ready | Writing Tests | Writing Source Code | Ready For Integration | Integration Testing (DTP) | Done |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

## 4.1 Requirements and Specifications Phase

The customer provides a product idea or concept to the company, who then create a functional specification based on this. The customer should then review the functional specification, identifying areas of confusion or where they feel the specification deviates from their concept. This feedback should be taken into consideration by the company, and the functional specification amended to reflect this. This loop should be iterated over until both the customer and company are agreed upon a final version of the functional specification. The functional specification provides the starting point for the design phase.

The process used to generate the functional specification, is that all members of the company should attend a planning meeting where the customers product idea or concept is outlined. The company then uses a process similar to that of Behavioural Discovery to identify the features that are required to achieve the customers end goal. This consists of rather than looking for what the customer wants from the product, looking at how the final user will use and interact with the product, and then looking for what is missing to make this work. In other words based on the features already found, why won't the product work? What is missing? What will cause problems? What vulnerabilities are created or haven't already been accounted for. This should generate quite a comprehensive list of features desired by the customer, and to some extent suggestions made by the company.

## 4.2 Design Phase

Based on the functional speciation, a series of user stories will be created which describe the functionality of the product as the user would interact with it. The whole company should be present for this stage, as people with different roles often view things from different angles, which provides a much wider perspective from the users' angle. By creating user stories this allows the work to be broken down into manageable chunks, which can then be assigned appropriately and easily tracked.

The process of generating the user stories is again very similar to that of behavioural discovery described above, however now looking at the next level of detail down the chain. This produces a series of high level user stories, from which it should be possible to implement the product. Each user story is first given an ignorance level from 1-5.

| Ignorance Level | Meaning |
|---|---|
| 1 | This task is extremely easy, and is the kind of task undertaken regularly on a daily basis. |
| 2 | This task is relatively easy, and undertaken now and again. |
| 3 | This task will provide a small challenge, but is similar to those undertaken before. |
| 4 | This task will be will challenging, and is extremely rarely undertaken. |
| 5 | This task or similar have never been undertaken before, and consequently unable to define a starting point for it. |

If an ignorance level of 5 is given to any story, this then becomes a spike (investigation) as the company does not have the required knowledge to implement this feature/use this technique, so are also unable to put an estimate on how long it will take. Meaning this story should then become the highest priority as it is extremely difficult to plan around it. Based on the ignorance level of each story, a SWAG (Silly Wild Ass Guess) or estimate of time required to implement it should be given to each story. This can vary in format depending on the working style adopted by the company. For example if pair programming is to be adopted, then the estimates should be given in “pair days”, if it is a task for an individual to complete then it should be given in “man hours”.

If for some reason the company feels unable to provide a SWAG or ignorance level for a story, then this should be further broken down into sub-stories that are able to be graded. The aim of this method is to spend as little time as possible planning upfront, but to still have planned to a fine enough grain that everyone in the company is confident of what the feature is, that the user story describes.

## 4.3 Implementation Phase

The company will use the Kanban-style board to track the progress of work items and defects, for all members. Following agile principles this will change over time, as the company feels that it needs to adapt to the working practices that best suit its employees. The Kanban board allows all employees but especially managers to get a thorough overview of the current state of each employee, and progress on items. It also allows for easy tracking of metrics such as team velocity, and reduces the need for progress documentation.

User stories will be assigned to iterations based on their ignorance level, the highest ones should be done first as they are more likely to over-run. However time estimates must also be taken into consideration, so that all stories proposed for an iteration will actually fit within the iteration timescale. Also some form of priority needs to be considered at this stage so that features with the highest value but also the most complex to implement are done first, down the scale, to features that give very little value to the product so will be implemented last.

User stories will be assigned to programmers based on experience. Depending on the working style adopted, for instance pair programming, a user story should be assigned to the individual with the most experience in this area, who are then paired with an individual who has little or no experience in this area. Although this can take slightly longer to complete the user story, it ensures that knowledge and experience is shared between programmers, which improves the team's ability to work in the long term.

A coding standards document exists within the file system. This should guide all programmers as to the quality and style of coding that should be adopted.

## 4.4 Testing and Integration Phase

Testing of each feature should take place during its implementation phase, as each function or method should be unit tested. The company is adopting the style of Test Driven Development, meaning that a failing unit test is written first, followed by the product code that makes the test pass. In this way features will be thoroughly tested before reaching the integration phase. Further guidance on this can be found in the test standards document.

Once a feature is complete the integration testing should take place. This is in the form of a deterministic test pass (DTP), meaning that the core functionality of the product is tested using a set of standard tests with pre-determined outcomes. Should any test from the DTP not achieve the pre-determined outcome, then the integration or new feature has broken the existing product, and will be removed and referred back to the original programmers for further investigation and testing. Results of DTPs should be recorded and provided to the QA Manager at the earliest possible time.

## 4.5 Quality Auditing Reviews

Generating high quality products cannot be achieved without close monitoring of quality throughout the development process. In order to realise this, QA metrics should be monitored frequently, with review sessions taking place on a regular basis. By reviewing metrics in this way, problems and issues affecting product quality and general work quality may be discovered and acted upon to ensure that the quality standards are being met. This process is known as quality auditing, and should be performed by the Deputy Project Manager, in conjunction with the Project Manager and the Documents Manager.

# Appendix

## Document Templates

All internal and external company documents must conform to the following specifications:

### Meeting Minutes & Agenda

- Date must be displayed dd/mm/yyyy in the top right of the header
- Meeting/Agenda number must be specified as Heading 1
- Week number must be specified as Heading 2
- The next heading must always be Heading 3 and contain a list of things to do before the next meeting
- Subsequent sections all fall under a Heading 3 title and contain minutes relating to their specific topics
- Font is Century Gothic 10.5pt

### Reports

All reports must conform to the standard report template which can be found within the group repository or on the following page. The documentation manager should be available to review all documents before submission to assure they comply with company standards.

Document control is essential for company documents as are contents pages for documents over the length of 2-pages long.

Documents must include a title page specifying the name of the document and our group number and a list of all contributors to the document.

Standard font is Century Gothic 10.5pt.

# <LOGO>
# TITLE

Document Contributor Names

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## Document Control

| Version Number | Modified By | Date | Section(s) Modified | Comments |
|---|---|---|---|---|
| 0.1 | J.Smith | - | Created | *This is a template.* |

Document Codes:

**OS** – Outstanding Section

**MR** – Missing Reference

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# 1 Section Heading

## 1.1 Sub-Section 1

### 1.1.1 Sub-Section 2

#### 1.1.1.1 Sub-Section 3

## Tables

All tables must comply with the company standard.

Section titles on a table must be in bold and font 10.5 Century Gothic.

- The first section of tables displaying specific information in a document (or the document control table) must have a first row background colour of 218, 234, 248 (RGB)
- The second section of tables must have a first row background colour of 229, 184, 183 (RGB)
- The third section of tables must have a first row background colour of 204, 192, 217 (RGB)
- The forth section of tables must have a first row background colour of 213, 244, 238 (RGB)
- Subsequent table properties will be discussed as required in the future