Software Quality Assurance (SQA) Plan

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0.10	**Initial Template**	**Emma**	**11/02/2020**
0.20	**Added References, Document Requirements, Standards and Review**	**Emma**	**11/02/2020**
	Added Task	**Emma**	**16/02/2020**

Contents

1. Purpose and Scope

1.1. Purpose

The purpose of this Software Quality Assurance (SQA) Plan is to establish the goals, processes, and responsibilities required to implement effective quality assurance functions for the LarkDetect project.

The Software Quality Assurance Plan provides the framework necessary to ensure a consistent approach to software quality assurance throughout the project life cycle. It defines the approach that will be used by the QAM and Software Quality (SQ) personnel to monitor and assess software development processes and products to provide objective insight into the maturity and quality of the software. The systematic monitoring of products, processes, and services will be evaluated to ensure they meet requirements and comply with policies, standards, and procedures, as well as applicable Institute of Electrical and Electronic Engineers (IEEE) and ISO standards.

1.2. Scope

The scope outlines the procedures such as standards, practices, conventions, and metrics. It also covers tools to ensure the development of the LarkDetect system does not deviate from the original intended product.

The LarkDetect system is a web application platform facilitating online Trail Making Test. Results will be used for further analysis to generate reports on demand. The Quality Assurance Plan shall identify any errors, omissions, inconsistencies, and alternatives, enhancements or improvements that can be made at any stage of development. The plan will include the responsibilities of every member of the team and ultimately the Quality Assurance team will be standardising, reviewing and auditing the method used to ensure quality of the process and product.

2. Reference Documents

- IEEE STD 730-2002, IEEE Standard for Software Quality Assurance Plans (http://standards.ieee.org/reading/ieee/std_public/description/se/730-2002_desc.html)
- ISO IEC 90003:2004 Software Standard (http://praxiom.com/iso-90003.htm)
- Project Proposal
- Project Plan
- System Requirement Specifications

3. Management

This section describes the management organizational structure, its roles and responsibilities, and the software quality tasks to be performed.

3.1. Management Organisation

The implementation of quality assurance system is the responsibility of the Quality Assurance Manager (QAM).

3.1.1. Project Management

The Project Manager will be responsible for approving:-

- The system requirement specification document
- The overall time scale for the project
- The choice of system development life cycle
- The choice of software development tools and techniques utilised
- The selection of project teams
- The training of project teams

3.1.2. Assurance Management

The QAM provides Project Management with visibility into the processes being used by the software development teams and the quality of the products being built. The QAM maintains a level of independence from the project and the software developers.

In support of software quality assurance activities, the QAM has assigned and secured Software Quality personnel from the pool of available SQ trainees to coordinate and conduct the SQ activities for the project and report back results and issues.

3.2. Tasks

This section summarizes the tasks (product and process assessments) to be performed during the development of software. These tasks are selected based on the developer's Project Plan, planned deliverables, and identified reviews.

3.2.1. Product Assessments

The following product assessments will be conducted by SQ personnel:

- Initial Prototype by 10/03/2020
- Subsequent revised prototypes
- Final Product by 17/03/2020 (Demonstration)

3.2.2. Process Assessments

The following process assessments will be conducted by SQ personnel:

Process 001	Software Quality Assurance
Entry Criteria	After a deliverable received by QA group
Process Description	This process is practicing the software quality over every releases of a deliverable from any subgroups to QA group. The QA group will be the major actors to ensure every deliverable will achieve certain pre-defined quality as defined during meetings.
Exit Criteria	Approval of deliverables from QA group Revised deliverables
Processes Procedures	
Begin **End**	While a deliverable received by QA group QA group understand the inputs of the deliverable QA group understand the pre-defined quality standards of the deliverable QA group set up testing or comparison methodologies to compare the pre-defined quality standards and deliverable quality If quality approved, Sign approval document from QA group. Else, send change requests or bugs reports to developers of the deliverable and loop back to waiting for the revised deliverable.

Process 002	Software Configuration Management
Entry Criteria	Approval of Proposal
Process Description	This process is setting up the configuration management standard for the project to follow in every stage
Exit Criteria	Configuration management standard guideline Configuration management tools
Processes Procedures	
Begin **End**	Identify configuration management goals in project Choose appropriate tool for configuration tools Define conventions for release control Define the methodologies to report bugs Define the methodologies to suggest change requests Define methodologies to maintain historical data Document the configuration management standard guideline

Process 003	Software Project Tracking
Entry Criteria	Any stages at the lifecycles
Process Description	This process is practiced over the whole software development lifecycle with the goals of tracking resources for manager references. Also, performances of the project are captured for future reference.
Exit Criteria	Finish of the project Bugs counts distribution over the life cycle Benchmarks of software performance
Processes Procedures	
Begin **End**	At every Tuesday, Receive updates from team members on jobs allocated Calculate the amount of money paid for the projects After the source codes delivered, Calculate weekly bug counts Perform performance benchmarks on software Generate weekly reports for manager reference on Saturday

Process 004	Intergroup coordination
Entry Criteria	Any stage of the lifecycle
Process Description	This process establishes a means for the software engineering group to participate actively with other engineering groups so the project is better able to satisfy the customer's needs effectively and efficiently.
Exit Criteria	Email of questions Email of answers
Processes Procedures	
Begin **End**	If sub-team A have concerns about sub-team B Sub-team A send a change request to sub-team B and manager via email Sub-team B feedbacks on the change request to manager Sub-team B works on the change request Sub-team B give a report of progress or completion of change request

3.3. Roles and Responsibilities

This section describes the roles and responsibilities for each assurance person assigned to the Project.

3.3.1. QAM

Responsibilities include, but are not limited to:

- Secure and manage SQ personnel resource levels
- Ensure that SQ personnel have office space and the appropriate tools to conduct SQ activities
- Provide general guidance and direction to the SQ personnel responsible for conducting software quality activities and assessments
- Assist SQ personnel in the resolution of any issues/concerns and/or risks identified as a result of software quality activities
- Escalate any issues/concerns/risks to project management

3.3.2. Software Quality Personnel

Responsibilities include, but are not limited to:

- Develop and maintain the project software quality assurance plan
- Generate and maintain a schedule of software quality assurance activities
- Conduct process and product assessments, as described within this plan
- Identify/report findings, observations, and risks from all software assurance related activities to the QAM

4. Documents

4.1. Purpose

This section identifies the minimum documentation governing the requirements, development, verification, validation, and maintenance of software that falls within the scope of this software quality plan. Each document below shall be assessed (reviewed) by SQ personnel.

4.2. Minimum Document Requirements

- Project Plan
- System Requirement Specifications
- Quality Management
- Software Model Prototype
- Risk Management
- Design report on software maintainability
- Configuration Management Plan
- Change Management Plan
- Release Plan
- Test Plan and Documentation

5. Standards, Practices, Conventions and Metrics

5.1. Purpose

The purpose of this section sets the standards, practices, quality requirements, and metrics to be applied to ensure a successful software quality program. By following international standards and practices, it ensures that all biases are avoided and customers requirement are accurately addressed.

5.2. Software Quality Programme

We have chosen four quality attributes deemed most important for LarkDetect: Functionality, Usability, Reliability and Integrity. These practices and conventions are tools used to ensure a consistent approach to software quality for all programs/projects.

LarkDetect is an application that aids the early detection of dementia. Hence, it is important for the app to perform its intended functionality in order for the tests to be carried out regularly and for accurate test results to be obtained, such that families can be informed ahead of time should medical attention is necessary.

Aimed towards an older user base, some potentially unfamiliar with the use of web applications, LarkDetect has to be easily understandable, learnable and usable to the user. This is to mitigate any confusion preventing the user from performing the test to the best of their ability and achieving test results that reflects as such.

Singapore has a growing aging population. LarkDetect needs to be reliable at a satisfactory performance rate to handle the increasing traffic of users undergoing the test on an annual basis.

LarkDetect records users' personal data. This information is necessary to monitor a specific user's performance over time, and to ensure sufficient data for report generation. The system must be able to maintain integrity to prevent potential data loss and/or unauthorized access to this data.

A key challenge that our group foresee would be the tight schedule which reduces the number of iterations that checks can be done. To mitigate this issue we have highlighted it in the Risk Management Plan.

5.2.1. Standard Metrics

The following standard metrics are the minimum planned metrics that will be collected, reported, and maintained in the area of software quality assurance:

- Cyclomatic complexity
- Length of identifiers
- Depth of conditional nesting
- Depth of inheritance tree
- Method fan-in/fanout
- Weighted methods per class

6. Software Reviews

6.1. Purpose

This section identifies the number and type of system/subsystem reviews and engineering peer reviews that will be supported by the SQ Personnel. The project milestone chart, and the SQ Personnel resource levels determine the reviews that are supported.

6.2. Minimum Software Reviews

For each review, SQ will assess the review products to assure that review packages are being developed according to the specified criteria, the review content is complete, accurate, and of sufficient detail, and Requests for Action are captured, reviewed, and tracked to closure. In addition, SQ will assess the processes used to conduct the reviews to determine if appropriate personnel are in attendance, correct information is presented, entry and exit criteria are met, and appropriate documents are identified for update.

The following software reviews will be assessed by SQ:

- Project Plan Review
- Requirements Analysis Review
- Software Design Review
- Test Plan Review
- Acceptance Review

7. Test

SQ personnel will assure that the test management processes and products are being implemented per Test Plan. This includes all types of testing of software system components as described in the test plan, specifically during integration testing (verification) and acceptance testing (validation). SQ personnel will monitor testing efforts to assure that test schedules are adhered to and maintained to reflect an accurate progression of the testing activities. SQ will assure that tests are conducted using approved test procedures and appropriate test tools, and that test anomalies are identified, documented, addressed, and tracked to closure. In addition, SQ will assure that assumptions, constraints, and test results are accurately recorded to substantiate the requirements verification/validation status. SQ personnel will review post-test execution related artifacts including test reports, test results, problem reports, and updated requirements verification matrices.

8. Problem Reporting and Corrective Action

8.1. Possible Problem which may arise

Document Problems:

Non-compliance between project documents (i.e. SQA, proposals)

Incompleteness

Errors on documents

Code Problems:

Non-compliance of function and customer needs

Bugs

New Requirement

8.2. Problem Reporting Procedure

When the documentation requires rectification due to non-compliance or incompleteness, the team member which discover will require to perform the following procedures:

1. Report the situation to the Project Manager and QA Manager

2. The Project Manager would provide suggestion and appoint the member which is responsible to rectify the issue.

3. When the problem is solved the team member will need to update the Project Manager or QA Manager.

4. However, if the issue couldn't be resolved, a group meeting will be held to discuss on the probable cost of action.

When there is a problem with the code or functions, the team member which discover will require to perform the following procedures.

1. Report the situation to the Project Manager and Lead Developer

2. The Project Manager would provide suggestion and guidance to the team member responsible to rectify the issue.

3. Once the issue had been resolved, the member will need to update the Project Manager and Lead Developer.

4. However, if the issue couldn't be resolved, a group meeting will be held to discuss on the probable cost of action.

In the event that there are new software requirements by the customer, the following procedures should be taken by the Project Manager.

1. A team meeting need to be set up to ensure all members are align to the new requirement.

2. Project Manager will have to assign team members to make changes on the documentations and program accordingly.

3. Once the changes are complete, the member being tasked need to notify the Project Manager and the QA Manager need to ensure all quality checked are complied.

These updates and changes are needed to be updated during weekly meetings. Any urgent changes will need to be convey through group chats and emails.

9. Tools, Techniques and Methodologies

SQ personnel will require access to the following:

9.1. Software Quality Tools

- Microsoft Office tools (i.e., Word, Excel, and PowerPoint)
- Microsoft OneDrive
- Visual Paradigm
- Unity
- Microsoft Visual Studio

10. Media Control

SQ deliverables will be documented in one of the following Microsoft software applications: Word, Excel, or PowerPoint. Deliverables will be in soft copy, with the exception of completed checklists from process and product assessments. See Section 12 for additional details on the collection and retention of key records. Software Quality personnel will request space on the project's secured server for SQ records. This server is password protected and backed up nightly.

As the project needs to be stored in the secured server, the following services are used:

1. MediaWiki

2. SVN

3. Github

11. Record Collection, Maintenance, and Retention

SQ personnel will maintain records that document assessments performed on the project. Maintaining these records will provide objective evidence and traceability of assessments performed throughout the project's life cycle. There are two types of records that will be maintained: Hardcopy and Electronic. SQ personnel will maintain electronic or hard copies of all assessment reports and findings. SQ Project folders will contain hardcopies of the assessment work products such as completed checklists, supporting objective evidence, and notes.

The table below identifies the record types that will be collected, as well as the Record Custodian and Retention period

Record Title	Record Custodian	Record Retention
SQA Assessments	SQ Personnel	One Year
SQA Checklists	SQ Personnel	One Year

Deliverable Defects	SQ Personnel	One Year

12. Training

SQ personnel have fundamental knowledge in the following areas through prior experience, training, or certification in methodologies, processes, and standards:

- Audits and Reviews (Assessments)
  - Project plan reviews
  - Software requirements analysis review
  - Test Design review
  - Before Release review
  - Project Release review
  - Documentation review
  - Process Audits
  - Code Review
- Risk Management
- Software Assurance
- Configuration Management
- Software Engineering
- ISO 9001, ISO 9000-3
- CMMI
- Verification and Validation

13. Risk Management

SQ personnel will assess the project's risk management process and participate in monthly risk management meetings and report any software risks to the QAM and the project manager.

Risk Type	Risk	Probability	Effects	Strategy
People	Staff illness at critical times	Moderate	Serious	Rearrange group so that there is more coverage of work and team member subsequently see each other's work.
Estimation	Time and cost required to develop the software is underestimated	High	Serious	The development group must attempt to locate the reusable code.

Requirements	Development error	Moderate	Serious	The development group must unit test the piece of software and must ensure that the code is free of errors and is meeting the requirements.
Organisational	Staff turnover	High	Serious	The employer should provide other social gathering and meeting opportunities to the employees, in order to establish trust and create shared identity.
Requirements	User interface uncertainties	Moderate	Serious	Prototyping

14. SQA Plan Change Procedure and History

SQ personnel are responsible for the maintenance of this plan. It is expected that this plan will be updated throughout the life cycle to reflect any changes in support levels and SQ activities. Proposed changes shall be submitted to the Quality Assurance Manager (QAM), along with supportive material justifying the proposed change.

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