Software Quality Assurance (SQA) Plan
By Runtime Terror

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Signature Page

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Document Change Record

Revision	Description of Change	Approved by	Date
1	**Preliminary Version**	**Project Manager & QA Manager**	**9 February 2020**
2	**Revise Minimum Document Requirements**	**Project Manager & QA Manager**	**9 February 2020**
3	**Refine Software Metrics**	**Project Manager & QA Manager**	**10 February 2020**
4	**Refine Development Tools**	**Project Manager & QA Manager**	**10 February 2020**
5	**Finalise Quality Plan**	**Project Manager & QA Manager**	**11 February 2020**

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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 CashTrack 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 purpose of SQA is to ensure that the software developed does not deviate from the original intended product. SQA is also concerned to identify any errors, omissions, inconsistencies, and alternatives, enhancements or improvements that can be made at any stage of development.

CashTrack is a web-based expense tracker that acts as a one stop destination to track personal expenses, ease the process of resolving shared bills and view comprehensive insights into your spending patterns. The web application would have three primary features: .

The first feature enables tracking of an individual's expenditure, more specifically how much they owe and are owed by other people, as well as their own expenditure such as food, travel, etc. Users are able to categorise these personal expense records by using category 'tags', and may also choose to use the optional feature of currency conversion.

The second feature enables users to track a group bill actively monitoring and notifying the parties involved. Users are able to add expenses with their friends and family in which they paid for everybody's bill or lent them some money. Users adding the record can choose the category of the record by selecting a category 'tag', use the automatic split by ratio/percentage/shares option, and also choose to add some comments for everyone to see.

The third feature is to provide users with insights into their spending patterns by performing data analytics on their expenses. These records are then used for data analytics and to manage the expenditure under the spending limit set by the user on the 'Settings' page.

In addition to the features of the application, the user interface of the application would have to be minimal and to a great degree instinctive in order to maximize the user experience of the patients. While this application will not be able to provide an exact finding, it can serve as a rough indication on the mental recollection ability, and hence the progress of the patient.

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 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 the 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 and planned deliverables, and identified reviews.

3.2.1. Product Assessments

The following product assessments will be conducted by SQ personnel:

- Audit
- Formal Inspection
- Review
- Analysis

3.2.2. Process Assessments

The following process assessments will be conducted by SQ personnel:

- Audit
- Assessment
- Analysis

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

4.2.1. User Experience Design Documentation (UEDD)

The UEDD is developed to provide practical guidance not just for the design team, but for everyone else involved in the development of the product. The document provides a single source of truth whereby each step of the various design phases are properly documented such that there is no room for misunderstandings or misinterpretation. By understanding the good documented design practices and processes, this knowledge can be utilised to enhance the design process in the long run.

4.2.2. Software Requirements Specification (SRS)

The SRS is a description of the software system in which the functional and non-functional requirements, use cases that describe the user interaction and the constraints for the application are stated. It comprises several items such as the class overview diagram, sequence diagrams, dialog maps which are illustrated as a form of standards for the application. Generally, this document provides a clear and thorough understanding of the application, which provides a detailed understanding for developers to correctly develop the application.

4.2.3. Software Verification and Validation Plan (SVVP)

The SVVP is developed to ensure that the *CashTrack* application is correctly verified and validated to ensure quality of the project. The document states the various review, analysis and testing techniques to determine whether the CashTrack application complies with its requirements ensuring that quality is maintained throughout the software's lifecycle.

4.2.4. Software Architecture Design Document (SADD)

The SADD is a map of the application. It helps to easily visualize the connection between the software modules and components without digging into its code. The document can also be utilized as a tool for communication between the development team, non-development team and especially users.

4.2.5. Software Maintenance Documentation (SMD)

The SMD describes the actions and measures required in order to ensure and maintain *CashTrack*'s functionality as well as its non functional attributes such as performance. The document contains the 4 types of maintenance plans, namely, corrective, adaptive, perfective, and preventive maintenance plans.

4.3. Roles and Responsibilities of Documentation Review

The documents stated above are reviewed and audited at different phases of the project by the Runtime Terror team. It is the responsibility of each and every team

member to ensure that the standards and procedures proposed in the documents are maintained and upheld throughout the development of the application and thereafter too.

5. Standards, Practices, Conventions and Metrics

5.1. Purpose

This section highlights the standards, practices, quality requirements, and metrics to be applied to ensure a successful software quality program.

5.2. Software Quality Programme

These practices and conventions are tools used to ensure a consistent approach to software quality for all programs/projects.

These are the most important qualities for this product:

- Functionality: The sum or any aspect a software application can achieve for a user.
- Usability: The sum or any aspect to achieve the quantified objectives used by users with effectiveness, efficiency, and satisfaction in a quantified context of use.lity of failure-free operation of a software application for a specified period
- Reliability: The probability in a specified environment
- Maintainability: The degree to which a software application can be understood, repaired, or enhanced.

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:

- Critical Defects Percentage
- Length of code
- Cyclomatic complexity
- Rework Effort Ratio
- Schedule slippage
- Test review efficiency

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 personnel 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 personnel:

- Project Plan Review
- Requirements Analysis Review
- Software Design Review
- Test Plan Review
- Post Implementation 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, updated requirements verification matrices, etc.

8. Problem Reporting and Corrective Action

SQ personnel generate, track, and trend assessment findings and observations in a centralized Reporting and Corrective Action System. The location of the system will be on the Team's MediaWiki, with the use of an EXCEL spreadsheet.

8.1. Problem Reporting

Development team meetings will be carried out on a weekly basis. Meeting minutes and documentations will be reviewed during the meetings and all reported problems by team members will be issued a deadline for it to be resolved.

8.2. Problem Tracking

All reported problems will be documented in the team's meeting minutes and an external EXCEL spreadsheet that will be uploaded and updated on the team's

MediaWiki “Problems Encountered” page. Each problem that is reordered will consist of various information such as team members assigned to resolve the problem, date line to resolve the problem, status of problem and the date and team member that the problem was discovered.

8.3. Problem Resolving

Team members that are assigned to problems will be tasked with generating solutions that can tackle the problems. The other team members who were not involved in the generation of solutions will be the ones evaluating the feasibility and correctness of the solutions to ensure that the solution will not induce additional problems or errors when it is being implemented into the system.

Once the evaluation of the solutions is deemed to be feasible and correct, the team members that are assigned to the problem will be given the green light to proceed and resolve the problem.

8.4. Organizational Responsibility

All members of the project must review the documentation of the reported problems, where groups of team members will have specific responsibilities throughout the entire lifecycle of the project.

8.5. Within Development Team

Project Manager will initiate team reviews and meetings, facilitate the reporting and documentation of problems encountered, as well as tracking of procedures.

The Quality Analysis team will be assigned to update the EXCEL spreadsheet on MediaWiki “Problems Encountered” page as well as ensuring that all reported problems are resolved before their scheduled deadlines.

The Development Team will be assigned to resolve problems that are reported during the problem resolving process.

8.6. Other Stakeholders

External testing teams will be hired to carry out tests on the project system to verify that all reported problems have been resolved and the solutions to the problems did not cause any negative implications to the system.

The Company's Management team will be required to approve the solutions that can bring about major changes to the project.

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)
- MediaWiki
- GitHub
- Google Docs
- DrawIO (UML Diagrams)

10. Media Control

SQ deliverables will be documented using Microsoft software as its document formats are physically portable across multiple software. All documents will be backed up bi-weekly.

Access control to documents will be necessary to prevent any unauthorized access to confidential data. Document access will be controlled by the systems administrator and will be encrypted and password protected. Development team members will be allowed to access these documents.

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)
- 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 bi-monthly risk management meetings and report any software risks to the QAM and the project manager.

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.