Software Quality Assurance (SQA) Plan
By Bookies

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Signature Page

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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 *GuessWho* 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.

GuessWho's primary purpose is to treat dementia patients by exercising their facial recognition skills. Since dementia lowers the facial recognition capability of patients, by continuously training the mind using the game, we aim to slow down and ideally counter the effects of dementia. At the same time, a patient's performance in the game can be used to track the progress of his or her treatment over time and whether or not the patient's condition is improving or deteriorating.

The web application would have three primary features - authentication, historical analysis and the game itself.

The first feature is easy to understand and would allow different accesses and roles for the three user types - administrator, caretaker and patient.

The second feature involves the visual representation of historical user performance data in the game to make it easier for caretakers to analyze the patient.

The third and primary feature, the game, would involve the flashing of facial images alongside a set of names. The patient would need to choose the right name in a restricted measure of time before the following face is flashed.

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 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. 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 of several items such as the class 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 implement the application.

4.2.2. Software Design Description (SDD)

The SDD is developed to setup the architecture for the application. The system architecture, data design, component design and the human interface design of the application are explained in this document.

This document is drafted in two phases. In the first phase, a preliminary design whereby the overall system and data architecture will be defined. The second phase involves more detailed data structures and algorithms that are to be developed for the architecture, which was defined in the first phase.

4.2.3. Software Verification and Validation Plan (SVVP)

The SVVP is developed to ensure that the *GuessWho* application is correctly verified and validated to ensure quality of the project. It outlines all verification and validation processes to be conducted by Bookies team at each phase of the software lifecycle. It covers content for review and audits, defect tracking and test techniques.

4.2.4. Software Verification and Validation Report (SVVR)

The SVVR is developed to describe the results after executing the verification and validation processes as stated in the SVVP.

4.2.5. User Documentation (UD)

The User Documentation is developed to provide assistance to the users of this application. It lists and describes the necessary items to execute the

application successfully such as the required data, inputs and outputs control, and program limitations. As the *GuessWho* application aims to be user-friendly and easily understood by users, developing this document will further enhance their knowledge on the behaviour of the application.

4.2.6. Software Configuration Management Plan (SCMP)

The SCMP is developed to maintain the integrity of the work in the project, identify and control the major changes in the product. It specifies the configuration identification rules, configuration control and configuration support activities which are to be implemented and performed by Bookies team. This document serves as a reference to ensure integrity of the application as well as determining that the application satisfies the requirements.

4.3. Roles and Responsibilities of Documentation Review

The documents mentioned above are reviewed and audited at different phases of the project by Bookies. It is the responsibility of all team members to ensure that documentations are accurately represented and developed in accordance to the IEEE standards.

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.

Some of the most important qualities for this product include:

- **Usability**: The capability of the software product to be understood, learned, used and attractive to the user, when used under specified conditions.

- **Simplicity**: The ease of use and learnability which a software can be used by specified consumers to achieve quantified objectives with effectiveness, efficiency, and satisfaction in a quantified context of use.

- **Ease of understanding**: The attributes of software concerning the user's efforts for recognizing the logical concept and its applicability.

- **Maintainability**: The capability of the software product to be modified. Modifications may include corrections, improvements or adaptations of the

software to changes to the environment and in the requirements and functional specifications.

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:

- Fan-in/Fan-out
- Length of code
- Cyclomatic complexity
- Length of identifiers
- Depth of conditional nesting
- Fog index

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

- 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 conducted on a regular weekly basis. Documentations of the project are reviewed at these meetings and all reported problems during the meetings must be resolved within a period of time specified during these meetings.

8.2. Problem Tracking

All reported problems will be documented on an EXCEL spreadsheet that will be uploaded and updated onto the team's MediaWiki page. Each problem record will consist of various information such as team assigned to resolve problem, number of days left to resolve, summary of current status, as well as the date the problem was detected and reported.

8.3. Problem Resolving

The teams assigned to respective problems will be tasked with generating of solutions. Another separate team will then evaluate the feasibility of the solution, ensuring not only the feasibility but also the side-effects to the system.

Once the team has finished the solution evaluation, the team assigned to the problem will proceed to resolve the problem reported.

8.4. Organizational Responsibilities

All participating parties of the project shall review the documentation of the report problem, where each party will have specific responsibilities throughout the whole project.

8.5. Within Development Team

Within the development team, the Project Manager will be the one to initiate the team reviews and meetings, facilitate the reporting of problems, as well as the tracking of procedures.

The QA Team will be tasked with updating the EXCEL spreadsheet on MediaWiki, as well as ensuring that the reported problems are resolved within the scheduled deadline.

The Development Team will be tasked with resolving the problems reported through the problem resolving process.

8.6. Other Stakeholders

External testing teams will be hired to conduct tests on the project to verify the reported problems has been resolved with solutions that does not bring negative side effects to the system, while the Company's Management team will be required to approve of solutions that will bring 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

10. Media Control

SQ deliverables will be documented using Microsoft software as its document format are physically portable across different softwares. All documents will be backed up regularly.

Access control to the document is necessary as to prevent unnecessary users in access confidential data. It will be controlled by the administrator and it is secured by password and relevant encryption. Users of the development team are 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 hard copies 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.