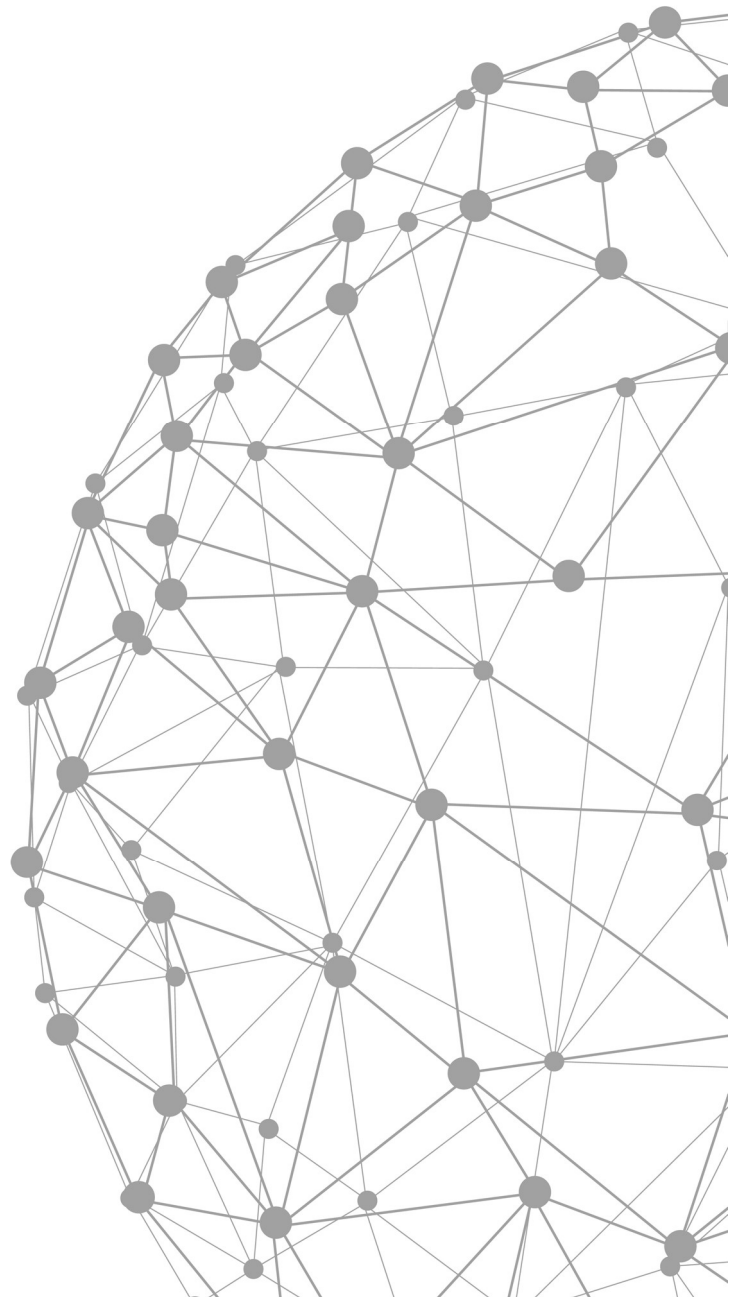

Product Specification

QualityQuest

Doc.-Number: QualityQuest_ProductSpecification
Doc.-Version: A1

Customer:
NewTec GmbH
Standort Pfaffenhofen
Buchenweg 3
89284 Pfaffenhofen a. d. Roth

Author:
Dr. Axel Neue
NewTec GmbH



Change History

Doc.-Version	Description of Modification	Date
A1	Initial revision	

Release

	Name	Responsibility	Date	Signature
Creation	Dr. Axel Newe	Product Owner	2020-08-05	i.A.
Verification	n/a			i.A.
Approval	n/a			i.A.
Release	Dr. Axel Newe	Product Owner	2020-08-07	i.A.

Table of Contents

Change History	2
Release	2
Table of Contents	3
List of Tables.....	4
List of Figures	4
1 Introduction	5
2 Purpose of Document.....	5
3 Abbreviations and Terminology	5
3.1 Abbreviations.....	5
3.2 Terminology.....	5
3.3 Related Documents.....	6
3.3.1 Typeface Conventions	6
4 Requirements for Quality Control	7
4.1 Documentation	7
4.2 Quality	7
4.2.1 Software	7
5 System Requirements	8
5.1 General Description	8
5.2 Visual Representation	8
5.3 Acoustic Representation	9
5.4 Game Content & Story	9
5.5 PlayerCharacter	10
5.6 Non-functional Requirements.....	11
5.7 Development Environment Requirements	11
5.8 Target System Requirements	11
5.9 Other Requirements	12

List of Tables

Table 1: Abbreviations 5

Table 2: Terminology 6

Table 3: Related Documents 6

Table 4: Typeface Conventions 6

List of Figures

Figure 1: NewTec logo 8

1 Introduction

Modern software engineering can be a highly complex task and involves much more than just writing code. There are many aspects to consider when developing high-quality software - from procedural models and life cycles, through legal, normative and regulatory requirements to the social aspects of distributed development across several teams, which can be scattered around the world.

Unfortunately, many aspiring software engineers still expect a good software engineer to be like a lonely programming nerd who single-handedly opens up the next Silicon Valley success story in his garage because he is just a great coder.

In order to be able to draw a more realistic picture of the large professional field of software engineering for interested students, an possibility should be created to convey the diverse aspects in an interactive and, above all, entertaining form - e.g. at career fairs or similar career information events. This goal led to the idea of developing an interactive role-playing game that, with the involvement of the audience, presents typical facets of the professional field of modern software engineering.

2 Purpose of Document

This document describes the customer's product specification of the serious game QualityQuest which is to be developed by the contractor. It provides a high-level, non-technical view of the requirements that need to be met so that the ordering party (hereafter: NewTec) can accept the final delivery of the contractor.

It describes the "what" and "why" and needs to be interpreted by the contractor and translated to a more technical System Specification which describes the "how" and "whereby".

3 Abbreviations and Terminology

3.1 Abbreviations

Abbreviation	Description
n/a	not applicable
Doxygen	A free tool for writing software reference documentation.
PlantUML	An online modelling tool for creating UML diagrams which allows to share diagrams as URL-encoded links [2].
UML	Unified Modeling Language
URL	Uniform Resource Locator

Table 1: Abbreviations

3.2 Terminology

Term	Definition
DiceRandomness	Randomness that equals the roll of a six-faced dice. I.e., the StoryFlowDecision is selected based on a random draw out of six equally distributed probabilities.
OnlineVoting	A process of collecting votes for a StoryFlowDecision by means of Internet based technologies.
PlayerCharacter	The virtual representation of the player in the game.
PlayerCharacterStatusBox	A visual presentation of the PlayerCharacter's status values and portrait.

Term	Definition
StoryFlow	The actual flow of the story (out of all possible StoryBranches) which is presented to the StoryPlayer.
StoryFlowDecision	A special event within the game where the StoryPlayer needs to take a decision which influences the further StoryFlow.
StoryPlayer	The real-life person which controls the game.
StoryBranch	A branch of the non-linear story StoryFlow of the game.
QualityQuest	The serious game software which is to be developed by the contractor.
ZeroRandomness	No randomness at all. A StoryFlowDecision shall be deterministic.

Table 2: Terminology

3.3 Related Documents

Reference	Document Identification
[1] Doxygen manual	https://www.doxygen.nl/manual/docblocks.html
[2] PlantUML	https://plantuml.com/en/
[3] Project Coding Styleguide	QualityQuest_CodingStyle.pdf
[4] Clean Code Principles	https://clean-code-developer.com/
[5] Story Draft	QualityQuest_StoryDraft.pptm

Table 3: Related Documents

3.3.1 Typeface Conventions

The following typefaces are used in this document:

Text of Document	Typeface / Font / Case
<i>Original Text [1], ...</i>	<i>Italic</i>
Normal Text	Normal, 10pt
Terms defined in the Terminology (section 3.2)	PascalCase

Table 4: Typeface Conventions

4 Requirements for Quality Control

4.1 Documentation

[Requirement A 4.1-1] Documents to be delivered

All of the following documentation shall be delivered:

- a System Specification, which comprises use case diagrams, use case descriptions and a static view of the software architecture,
- a Software Design Specification for each software component which describes both the static and the dynamic view.

[Requirement A 4.1-2] In-code documentation style

The source code shall be documented by means of Doxygen and in Javadoc style [1].

[Requirement A 4.1-3] In-code documentation content

All of the following source code elements shall be documented:

- Constants, variables and defines
- Classes and class members
- Methods and method signatures, including return values
- Functions and function signatures, including return values

[Requirement A 4.1-4] Documentation style for diagrams

All documentation diagrams shall follow the UML standard.

[Requirement A 4.1-5] Delivery of UML diagrams

All UML diagrams shall be delivered in all of the following forms:

- a diagram,
- a PlantUML [2] link.

Note: See <https://plantuml.com/> or <https://plantuml.com/de/> for details about PlantUML.

4.2 Quality

4.2.1 Software

[Requirement A 4.2.1-1] Adherence to project Coding Styleguide

The software code should adhere to the Project Coding Styleguide [3].

[Requirement A 4.2.1-2] Adherence to Clean Code Principles

The software code should adhere to Grade 1 (Red) of the Clean Code Principles [4].

5 System Requirements

5.1 General Description

[Requirement A 5.1-1] Game type

QualityQuest *shall* be a role-playing game.

[Requirement A 5.1-2] Stand-alone game

QualityQuest shall be a stand-alone game.

Notes:

- This means that the final binaries shall include everything that is needed to run the game.
- Any possibly needed framework needs to be included. The installation of additional frameworks or libraries is not acceptable.
 - This constraint excludes the Microsoft .NET Framework. Installation of the .NET Framework or related updates are acceptable.

5.2 Visual Representation

[Requirement A 5.2-1] Game presentation

QualityQuest shall be graphics-based game.

Notes:

- This means that QualityQuest shall not be a purely text-based game.
- Texts may be an element of the visual appearance of the game.
- The actual selection of the style of the visual appearance (e.g., 2D/2.5D/3D, Point-and-click/direct control, ...) is up to the contractor.

[Requirement A 5.2-2] NewTec branding

QualityQuest *shall* display the NewTec logo (figure 1) clearly visibly all the time.



Figure 1: NewTec logo

[Requirement A 5.2-3] Game language

The main language of QualityQuest shall be German.

Note: Typical software engineering terms that are commonly used in Germany do not need to be translated.

[Requirement A 5.2-4] Game language options

QualityQuest should support multiple languages.

Note: This is a technical proposal. Instead of hard-coding all texts, placeholders should be used which could then be replaced by the actual texts of a selected language.

5.3 Acoustic Representation

[Requirement A 5.3-1] Music

QualityQuest may play mood music to enhance the player experience.

Note: A selection of royalty-free music will be provided by NewTec. The contractor is free to use this music or alternative royalty-free music.

[Requirement A 5.3-2] Sound effects

QualityQuest should emphasize important events of the StoryFlow with sound effects.

Note: A selection of royalty-free sound effects will be provided by NewTec. The contractor is free to use these sound effects or alternative royalty-free sound effects.

5.4 Game Content & Story

[Requirement A 5.4-1] Game content

QualityQuest shall tell a story which mainly consists of typical elements of the software engineering profession.

Note: A first storyline will be provided by NewTec [5]. This final storyline can be negotiated with NewTec.

[Requirement A 5.4-2] Story flow

The story of QualityQuest shall be non-linear.

Note: The story shall contain elements where the StoryPlayer needs to make a StoryFlowDecision. Depending on the decision, the StoryFlow shall continue in different StoryBranches.

[Requirement A 5.4-3] Influence on the story flow by the player

The StoryPlayer shall influence the selection of StoryBranches by means of StoryFlowDecisions.

[Requirement A 5.4-4] Participation of a larger audience

QualityQuest shall enable the StoryPlayer to let a larger audience participate in StoryFlowDecisions by means of OnlineVoting.

Notes:

- The overall concept is of importance here.
- It would be highly desirable that the OnlineVoting feature is directly embedded into the game.
- If this is not realizable in the given project timeframe, another, probably pre-existing online voting method is acceptable as well.

[Requirement A 5.4-5] Random element of story flow control

The selection of a StoryBranch after a StoryFlowDecision shall be generated randomly with one of the following randomness options:

- ZeroRandomness,
- DiceRandomness.

Notes:

- The random element may be zero, i.e. a StoryFlowDecision can directly lead to the selection of a StoryBranch.
- If the random element is non-zero, a typical 6-faced dice should be used to generate the random numbers. Rolling the dice (including the final result) should be displayed on the UI.

[Requirement A 5.4-6] Visualizing the randomness

If the selection of a StoryBranch after a StoryFlowDecision is generated with DiceRandomness, QualityQuest shall display a clear visualization of the randomization process.

Note: This could e.g. be done by visually simulating a dice roll.

5.5 PlayerCharacter

[Requirement A 5.5-1] Character status values

The PlayerCharacter shall have all of the following status values:

- Gender
- Programming
- Analytics
- Communication
- Partying

[Requirement A 5.5-2] Selecting the gender

The first StoryFlowDecision shall be the selection of the gender of the PlayerCharacter.

Note: This shall be a StoryFlowDecision with ZeroRandomness .

[Requirement A 5.5-3] Presentation of character status values

QualityQuest shall display a PlayerCharacterStatusBox with all status values all the time.

[Requirement A 5.5-4] Portrait of the PlayerCharacter

QualityQuest shall display a portrait of the PlayerCharacter as part of the PlayerCharacterStatusBox all the time.

[Requirement A 5.5-5] Character levelling

The PayerCharacter shall level up its status values based on events or StoryFlowDecisions.

[Requirement A 5.5-6] Visual presentation of PlayerCharacter status changes

The change of status values of the PlayerCharacter shall be highlighted visually.

[Requirement A 5.5-7] Acoustic presentation of PlayerCharacter status changes

The change of status values of the PlayerCharacter should be highlighted acoustically.

5.6 Non-functional Requirements

[Requirement A 5.6-1] Target audience

QualityQuest shall address a target audience of university students with interest in a SW engineering career.

[Requirement A 5.6-2] Playing time

The complete story of QualityQuest shall be playable in a time frame of 15 to 20 minutes.

[Requirement A 5.6-3] Player fun

The story of QualityQuest should be humorous.

[Requirement A 5.6-4] Player motivation

The audience of QualityQuest shall be encouraged to follow the story by motivational elements.

Note: Motivational elements could be for example rewards, achievement & level upgrades.

5.7 Development Environment Requirements

[Requirement A 5.7-1] Programming language

QualityQuest shall be programmed in a C dialect (C, C++ or C#).

[Requirement A 5.7-2] Development environment

Both the source code and the build solution of QualityQuest shall be buildable in one of the following development environments:

- Microsoft Visual Studio
- Microsoft Visual Studio Code

5.8 Target System Requirements

[Requirement A 5.8-1] Operating system

QualityQuest shall run on Microsoft Windows 10 operating system.

[Requirement A 5.8-2] Usage of game engines

An existing game engine may be used, if all of the following conditions apply:

- the license conditions of the game engine allow the source code of QualityQuest to be open source,
- the license conditions of the game engine allow the usage of the game engine without license fees,
- the license conditions of the game engine allow the usage of QualityQuest as intended by NewTec without license fees.

Note: This is negotiable. If the contractor presents a proposal which would require NewTec to pay license fees (either for the development time or for the runtime) and if this proposal is later accepted by NewTec, this requirement might be adapted accordingly.

[Requirement A 5.8-3] Usage of online voting solutions

An existing online voting solution may be used, if the license conditions of the online voting solution allow the usage of the online voting solution in the context of QualityQuest as intended by NewTec without license fees.

Note: This is negotiable. If the contractor presents a proposal which would require NewTec to pay license fees and if this proposal is later accepted by NewTec, this requirement might be adapted accordingly.

5.9 Other Requirements

[Requirement A 5.9-1] Deliverable artefacts

All of the following artefacts shall be delivered to NewTec:

- Documentation as defined in section 4.1.
- Source Code of QualityQuest
- At least one of the following artefacts:
 - Running binaries of QualityQuest
 - A working installer which allows to install a running version of QualityQuest

[Requirement A 5.9-2] Type of delivery

All deliverable artifacts shall be delivered digitally.

Notes:

- The delivery can be by depositing the deliverable artefacts in a public version control system (e.g., Github).
- Documents should be delivered in both Portable Document Format (PDF) and MS Word (DOCX).

[Requirement A 5.9-3] Deadline

The deadline for the final delivery is 2021-04-28.

[Requirement A 5.9-4] Open source development

The Source Code of QualityQuest may be published open source under Creative Commons CC BY-NC 4.0 license terms.

Note: See <https://creativecommons.org/licenses/by-nc/4.0/> for details about the license.