ETH zürich

HS 2023

Software Requirements Specification

for

Lama

Version 1.0 approved

Prepared by your Software Engineering TAs

LamaDrama

10.03.2022

Table of Contents

Revision History

Name	Date	Release Description	Version
Felix Friedrich	03/04/24	Template for Software Engineering Course in ETHZ.	0.3
	03/04/24	Example SRS	1.0

Introduction

Purpose

<Identify the product whose software requirements are specified in this document, including the revision or release number. Describe the scope of the product that is covered by this SRS, particularly if this SRS describes only part of the system or a single subsystem.>

Document Conventions

<Describe any standards or typographical conventions that were followed when writing this SRS, such as fonts or highlighting that have special significance. For example, state whether priorities for higher-level requirements are assumed to be inherited by detailed requirements, or whether every requirement statement is to have its own priority.>

Intended Audience and Reading Suggestions

<Describe the different types of reader that the document is intended for, such as developers, project managers, marketing staff, users, testers, and documentation writers. Describe what the rest of this SRS contains and how it is organized. Suggest a sequence for reading the document, beginning with the overview sections and proceeding through the sections that are most pertinent to each reader type.>

Product Scope

<Provide a short description of the software being specified and its purpose, including relevant benefits, objectives, and goals. Relate the software to corporate goals or business strategies. If a separate vision and scope document is available, refer to it rather than duplicating its contents here.>

References

<List any other documents or Web addresses to which this SRS refers. These may include user interface style guides, contracts, standards, system requirements specifications, use case documents, or a vision and scope document. Provide enough information so that the reader could access a copy of each reference, including title, author, version number, date, and source or location.>

Overall Description

Product Perspective

<Describe the context and origin of the product being specified in this SRS. For example, state whether this product is a follow-on member of a product family, a replacement for certain existing systems, or a new, self-contained product. If the SRS defines a component of a larger system, relate the requirements of the larger system to the functionality of this software and identify interfaces between the two. A simple diagram that shows the major components of the overall system, subsystem interconnections, and external interfaces can be helpful.>

Product Functions

This project implements a multiplayer Lama game for 2-6 people. This concretely includes the functionality to:

- *Start a game server*
- *Join games as a player using a game client*
- *Start and play games once enough players have joined. The software will:*
  - *Track and display the state of the game (scores and cards)*
  - *Allow the players to make moves via GUI*
  - *Make sure no move violates the rules*
  - *Start and end rounds*
  - *Notify the players when the game has ended and there is a winner*

User Classes and Characteristics

User class: Normal player

- *Knows how to play Lama*
- *No technical expertise except from the basic capability to run an executable file on the defined operating system and interact with the game via GUI*
- *Can access all product functions*

Operating Environment

The software should run on an UNIX-based system on any modern computer.

Design and Implementation Constraints

<Describe any items or issues that will limit the options available to the developers. These might include: corporate or regulatory policies; hardware limitations (timing requirements, memory requirements); interfaces to other applications; specific technologies, tools, and databases to be used; parallel operations; language requirements; communications protocols; security considerations; design conventions or programming standards (for example, if the customer's organization will be responsible for maintaining the delivered software).>

User Documentation

<List the user documentation components (such as user manuals, on-line help, and tutorials) that will be delivered along with the software. Identify any known user documentation delivery formats or standards.>

Assumptions and Dependencies

<List any assumed factors (as opposed to known facts) that could affect the requirements stated in the SRS. These could include third-party or commercial components that you plan to use, issues around the development or operating environment, or constraints. The project could be affected if these assumptions are incorrect, are not shared, or change. Also identify any dependencies the project has on external factors, such as software components that you intend to reuse from another project, unless they are already documented elsewhere (for example, in the vision and scope document or the project plan).>

External Interfaces and Requirements

User Interface

The users will interact with the software via GUI. This GUI includes two main views:

1. *A login screen:*
    i. *Visible when starting the game client*
    ii. *Includes fields for connection setup to the game server and a field to choose a username*
    iii. *Provides a button for joining the game*

2. *The game screen:*
    i. *Visible when successfully joined a game*
    ii. *Shows other players*
    iii. *Shows start button when game hasn't started yet*
    iv. *Displays own hand, concealed hands of other players and the draw and discard pile*
    v. *Displays who's turn it is*
    vi. *Displays scores*
    vii. *Allows players to make moves by clicking their cards and the draw pile*

The user interacts with the GUI by clicking on cards, the draw pile, and buttons as well as by typing into text fields if required.

The following figures 1 and 2 show sketches of possible designs for the described views:

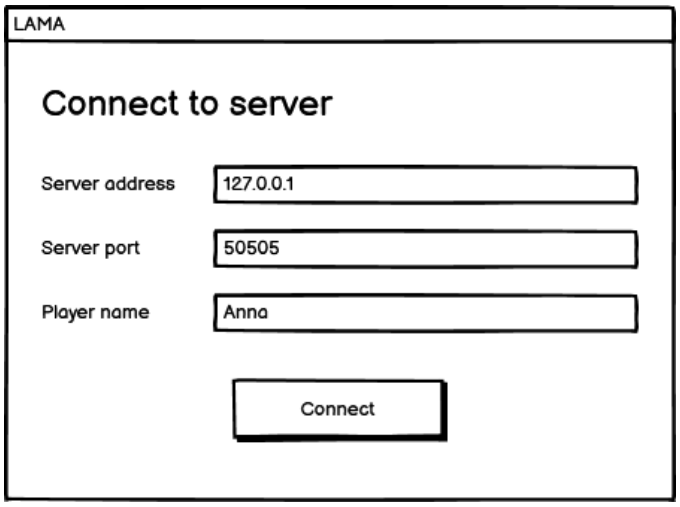


Figure 1. The login screen.

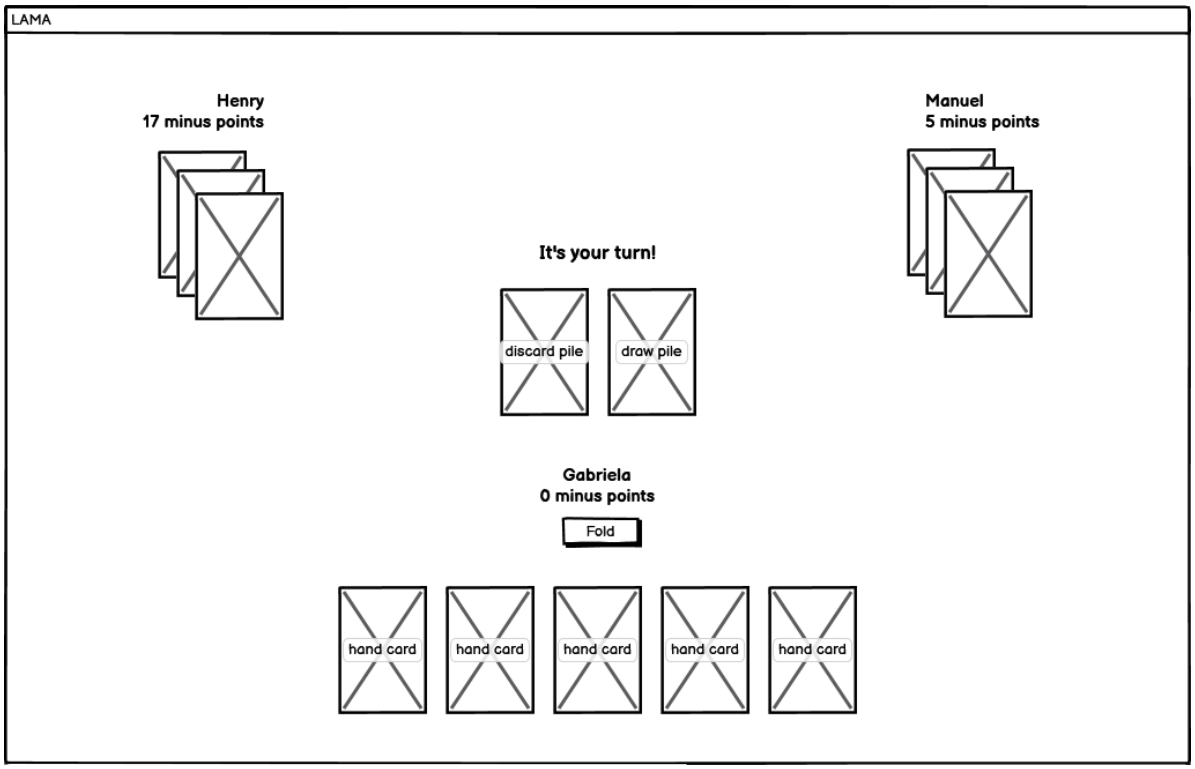


Figure 2. The game screen.

The game communicates events (for example end of game, end of round) or problems (such as rule violations) via messages to the user. Examples of such messages can be seen in figures 3-5:

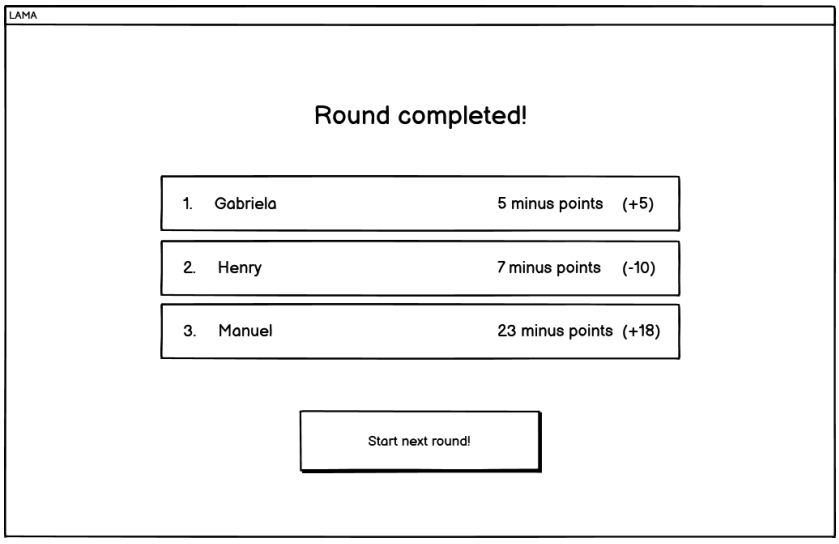


Figure 3. Round end.

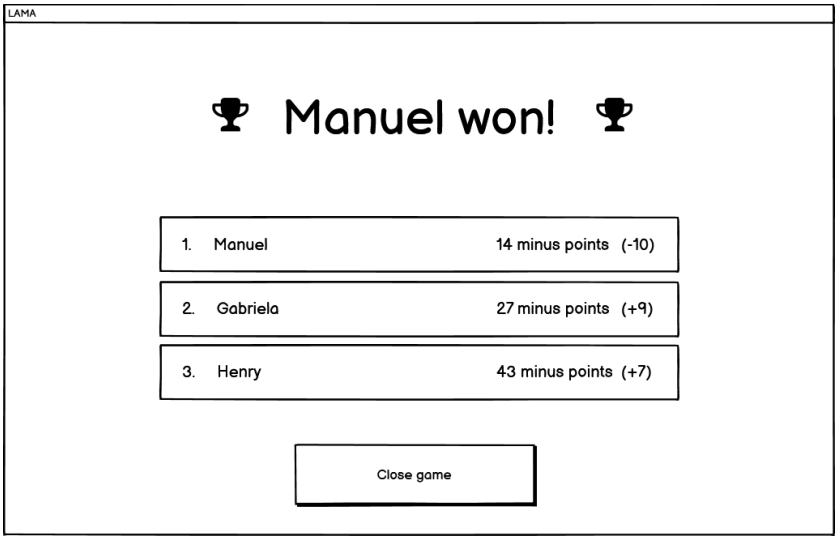


Figure 4. End of game.

Software Interfaces

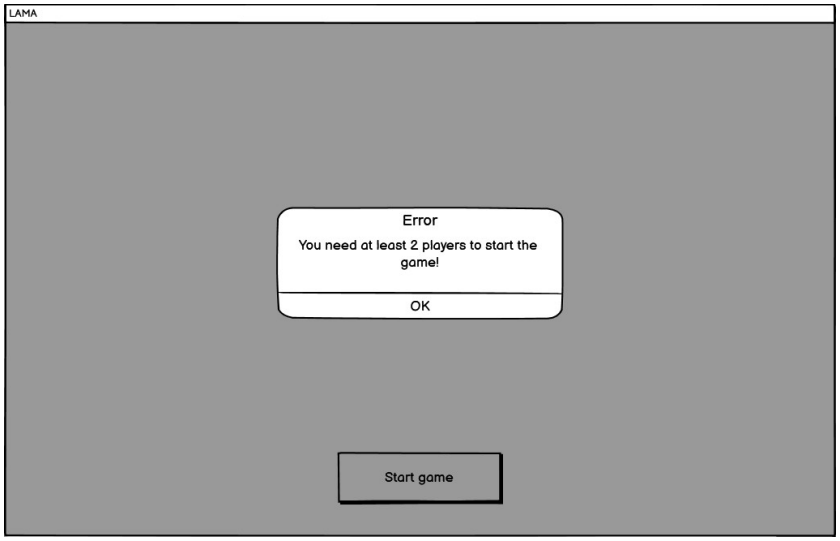


Figure 5. Rule violation message.

<Describe the connections between this product and other specific software components (name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Identify the data items or messages coming into the system and going out and describe the purpose of each. Describe the services needed and the nature of communications. Refer to documents that describe detailed application programming interface protocols. Identify data that will be shared across software components. If the data sharing mechanism must be implemented in a specific way (for example, use of a global data area in a multitasking operating system), specify this as an implementation constraint.>

Communications Interfaces

The system will implement client-server communication between one server and multiple clients. Server-client communication will use TCP to ensure correct, reliable and in-order communication between both parties. The data will be encoded in the JSON format.

System Requirements

Functional Requirements

FREQ-1: Game Server

The system should offer the functionality to start and run a server to which players can connect via client.

User Priority(5/5): *The game cannot be played without this requirement.*
Technical Priority(5/5): *The game cannot be played without this requirement.*

FREQ-2: Connection

The system should provide clients which allow the users to connect to the game server and join the game lobby.

User Priority(5/5): *The users cannot join without this requirement.*
Technical Priority(5/5): *The game cannot be played without this requirement.*

FREQ-3: GUI

The system should provide a GUI during the whole game for each user, displaying the game state (players, cards, piles and scores) and moves.

User Priority(5/5): *Makes it easier for the players to track the game.*
Technical Priority(2/5): *Not strictly necessary in order to run the game.*

...

FREQ-5: Game Start

...

FREQ-6: Round Start

...

FREQ-7: Turns

The system should keep track and display who's turn it is. Only this player should be allowed to make a move.

User Priority(4/5): *This requirement makes it easier to keep track who's move it is.*
Technical Priority(1/5): *The users could keep track of this by themselves.*

FREQ-8: Make a Move

The system should allow users to make a legal move when it is their turn and update the game state and GUI accordingly. Each turn a player must do one of the following three actions:

- Draw one card from the top of the draw pile
- Fold and sit out until the next round
- Place one card on the discard pile according to the following rules:
    - Number cards 1-6 can be placed on number cards that are smaller by one or have the same value
    - LAMA cards can only be placed on a 6 or other LAMA cards
    - Cards with the number 1 can additionally be placed on LAMA cards

User Priority(5/5): *The game cannot be played without this requirement.*
Technical Priority(5/5): *The game cannot be played without this requirement.*

FREQ-10: Round End

...

FREQ-11: Scores

...

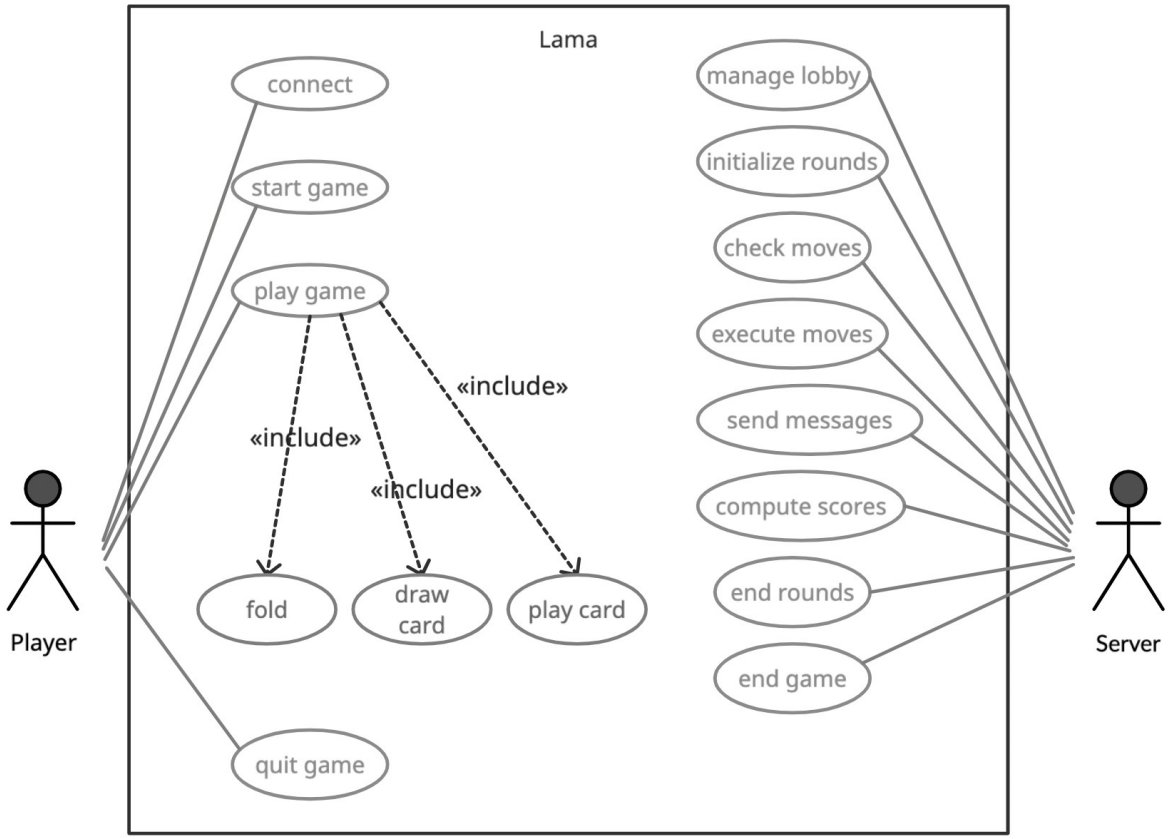
FREQ-12: Game End

The system should end the game once a player reaches 40 or more minus-points after the end of a round. The scores should be displayed. The winner should be the player with the least minus-points.

User Priority(4/5): *This is an important part of the game flow and it is convenient for the players if the system keeps track of this.*
Technical Priority(2/5): *The game needs to end at some point, but the users could keep track of this event by themselves.*

System Scenarios

Use-case Diagrams



Scenarios

SCN-1: Setting up a game

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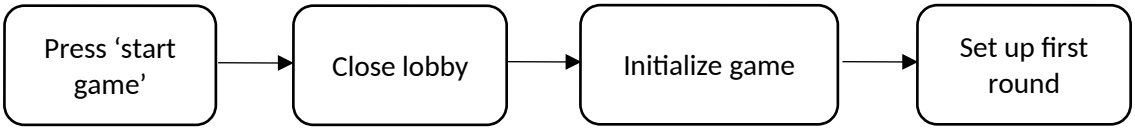
SCN-2: Starting a game

FREQ reference	*3,5,6,7*
NFREQ reference	*1,3,4*
Short Description:	*Zuzanna, Anna, Fabian, Benjamin, Jonas and Paul are waiting in the game lobby. Anna presses 'start game'. Everyone gets 6 hand cards and the draw and discard piles in the middle of the game board are initialized. The*

	top card on the discard pile is a LAMA card. It is Paul's turn.
Activation action:	*Anna presses 'start game'.*
Precondition:	*Zuzanna, Anna, Fabian, Benjamin, Jonas and Paul are waiting in the game lobby.*

Basic flow: Starting a game		
Step	**User action**	**System response**
1	*Anna presses 'start game'.*	*Closes lobby, initializes a new game, setting the scores to 0 and starting the first round by distributing the cards and setting up the card piles. Determine who's turn it is.*
Post-condition:	*All 5 players see their 6 hand cards, scores and the piles in the middle of the table. It is Paul's turn.*	

Scenario Diagram for SCN-2 Starting a game

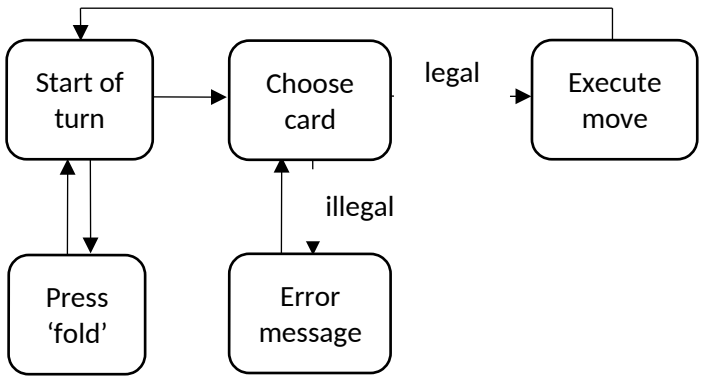


SCN-3: Playing a card

FREQ reference	*7,8*
NFREQ reference	*1,2,3,4*
Short Description:	*Marie-Louise, Alice, Damian, Andreas, Valon and Katharina are in the middle of a Lama game. Damian decides to fold; it is Valon's turn. Valon tries to play a LAMA card onto a 2, an error message is displayed. He decides to play a 2 instead, the move is executed.*
Activation action:	*Damian presses 'fold'.*
Precondition:	*Marie-Louise, Alice, Damian, Andreas, Valon and Katharina are in the middle of a Lama game, the 2 is on top of the discard pile. It is Damian's turn.*

Basic flow: Playing a card		
Step	**User action**	**System response**
1	*Damian presses 'fold'.*	*Removes Damian from round, determines and displays that it is Valon's turn.*
2	*Valon presses the LAMA card in his hand.*	*Checks move and determines that it is illegal. Displays error message to Valon.*
3	*Valon clicks the message away.*	*Removes the message.*
4	*Valon clicks on the card 2 in his hand.*	*Places the card 2 on top of the discard pile and removes it from Valon's hand. Determines and displays that it is Marie-Louise's turn.*
Post-condition:	*It is Marie-Louise's turn. The card 2 is on top of the discard pile.*	

Scenario Diagram for SCN-3 Playing a card

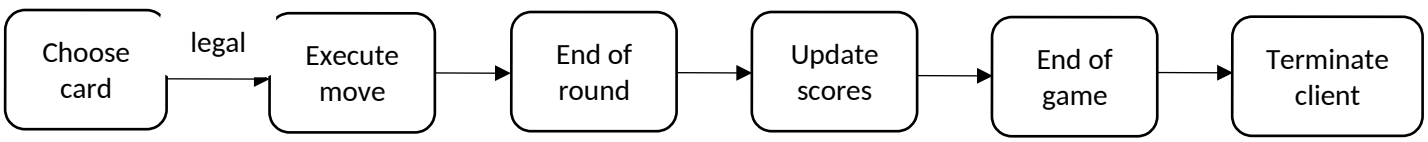


SCN-4: End of game

FREQ reference	*7,8,10,11,12*
NFREQ reference	*1,2,3,4*
Short Description:	*Katarzyna, Niels, Xenia, Tobia and Timofey are playing a game of Lama. Xenia plays a LAMA card which is the last one in her hand. The round ends and Niels' minus-points exceed 40. The game ends. Xenia wins with 0 points. Katarzyna closes the game client.*
Activation action:	*Xenia clicks on the LAMA card in her hand.*
Precondition:	*Katarzyna, Niels, Xenia, Tobia and Timofey are playing a game of Lama. It is Xenia's turn.*

Basic flow: End of game		
Step	**User action**	**System response**
1	*Xenia clicks on the LAMA card in her hand.*	*Places the LAMA card on top of the discard pile and removes it from Xenia's hand. Determines that the round has ended.*
2		*Updates scores and determines that Niels' score is over 40. Determines that Xenia won. Displays the end of game message.*
3	*Katarzyna closes the game client.*	*Closes Katarzyna's client, all other instances of the system keep running.*
Post-condition:	*The 4 remaining players see the end screen of the game.*	

Scenario Diagram for SCN-4 End of game



System Constraints

Important Nonfunctional Requirements

NFREQ-1: Server Response Time

Server should process requests within less than 1 second.

User Priority(3/5): *Longer delays will make the game less exciting to play.*
Technical Priority(2/5): *Not important for the correctness of the system and game.*

NFREQ-2: Reliability

At most 1 out of 100 games should crash due to a system failure.

User Priority(5/5): *A reliable system is necessary in order to play a game.*
Technical Priority(5/5): *A reliable system is necessary in order to play a game.*

...

Other Requirements

<Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>

Appendix A: Glossary

<Define all the terms necessary to properly interpret the SRS, including acronyms and abbreviations. You may wish to build a separate glossary that spans multiple projects or the entire organization, and just include terms specific to a single project in each SRS.>

Appendix B: Analysis Models

<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams.>

Appendix C: To Be Determined List

<Collect a numbered list of the TBD (to be determined) references that remain in the SRS so they can be tracked to closure.>