

Software Requirements Specification for Software Engineering: subtitle describing software

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September 29, 2024

Contents

1	Purpose of the Project	vi
1.1	User Business	vi
1.2	Goals of the Project	vi
2	Stakeholders	vi
2.1	Client	vi
2.2	Customer	vi
2.3	Other Stakeholders	vi
2.4	Hands-On Users of the Project	vi
2.5	Personas	vi
2.6	Priorities Assigned to Users	vi
2.7	User Participation	vii
2.8	Maintenance Users and Service Technicians	vii
3	Mandated Constraints	vii
3.1	Solution Constraints	vii
3.2	Implementation Environment of the Current System	vii
3.3	Partner or Collaborative Applications	vii
3.4	Off-the-Shelf Software	vii
3.5	Anticipated Workplace Environment	vii
3.6	Schedule Constraints	vii
3.7	Budget Constraints	vii
3.8	Enterprise Constraints	viii
4	Naming Conventions and Terminology	viii
4.1	Glossary of All Terms, Including Acronyms, Used by Stakeholders involved in the Project	viii
5	Relevant Facts And Assumptions	viii
5.1	Relevant Facts	viii
5.2	Business Rules	viii
5.3	Assumptions	viii
6	The Scope of the Work	viii
6.1	The Current Situation	viii
6.2	The Context of the Work	viii
6.3	Work Partitioning	ix

6.4	Specifying a Business Use Case (BUC)	ix
7	Business Data Model and Data Dictionary	ix
7.1	Business Data Model	ix
7.2	Data Dictionary	ix
8	The Scope of the Product	ix
8.1	Product Boundary	ix
8.2	Product Use Case Table	ix
8.3	Individual Product Use Cases (PUC's)	ix
9	Functional Requirements	ix
9.1	Data Input Requirements	ix
9.2	Data Migration and Organization Requirements	x
9.3	Data Search and Query Requirements	x
9.4	Data Visualization Requirements	xi
9.5	Data Analysis Requirements	xii
9.6	Error Tracking Requirements	xii
9.7	User Access Management Requirements	xiii
9.8	Data Export Requirements	xiii
10	Look and Feel Requirements	xiii
10.1	Appearance Requirements	xiii
10.2	Style Requirements	xiii
11	Usability and Humanity Requirements	xiii
11.1	Ease of Use Requirements	xiii
11.2	Personalization and Internationalization Requirements	xiv
11.3	Learning Requirements	xiv
11.4	Understandability and Politeness Requirements	xiv
11.5	Accessibility Requirements	xiv
12	Performance Requirements	xiv
12.1	Speed and Latency Requirements	xiv
12.2	Safety-Critical Requirements	xv
12.3	Precision or Accuracy Requirements	xv
12.4	Robustness or Fault-Tolerance Requirements	xv
12.5	Capacity Requirements	xv
12.6	Scalability or Extensibility Requirements	xvi

12.7 Longevity Requirements	xvi
13 Operational and Environmental Requirements	xvi
13.1 Expected Physical Environment	xvi
13.2 Wider Environment Requirements	xvi
13.3 Requirements for Interfacing with Adjacent Systems	xvii
13.4 Productization Requirements	xvii
13.5 Release Requirements	xvii
14 Maintainability and Support Requirements	xvii
14.1 Maintenance Requirements	xvii
14.2 Supportability Requirements	xvii
14.3 Adaptability Requirements	xviii
15 Security Requirements	xviii
15.1 Access Requirements	xviii
15.2 Integrity Requirements	xviii
15.3 Privacy Requirements	xviii
15.4 Audit Requirements	xviii
15.5 Immunity Requirements	xviii
16 Cultural Requirements	xviii
16.1 Cultural Requirements	xviii
17 Compliance Requirements	xviii
17.1 Legal Requirements	xviii
17.2 Standards Compliance Requirements	xix
18 Open Issues	xix
19 Off-the-Shelf Solutions	xix
19.1 Ready-Made Products	xix
19.2 Reusable Components	xix
19.3 Products That Can Be Copied	xix
20 New Problems	xix
20.1 Effects on the Current Environment	xix
20.2 Effects on the Installed Systems	xix
20.3 Potential User Problems	xix

20.4	Limitations in the Anticipated Implementation Environment That May Inhibit the New Product	xx
20.5	Follow-Up Problems	xx
21	Tasks	xx
21.1	Project Planning	xx
21.2	Planning of the Development Phases	xx
22	Migration to the New Product	xx
22.1	Requirements for Migration to the New Product	xx
22.2	Data That Has to be Modified or Translated for the New System	xx
23	Costs	xx
24	User Documentation and Training	xxi
24.1	User Documentation Requirements	xxi
24.2	Training Requirements	xxi
25	Waiting Room	xxi
26	Ideas for Solution	xxi

Revision History

Date	Version	Notes
Date 1	1.0	Notes
Date 2	1.1	Notes

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8.2 Product Use Case Table

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8.3 Individual Product Use Cases (PUC's)

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9 Functional Requirements

9.1 Data Input Requirements

- FR-1.** The system shall allow the user to input new experiment data or parameters.

- *Rationale:* The system needs to be kept up-to-date with ongoing experiments, which may include new parameters that did not exist previously.
- *Fit Criterion:* The user should be able to input new data and parameters with 0 errors.

FR-2. The system shall store experiment data in the database with all associated parameters and values correctly labelled.

- *Rationale:* Ensures that data retrieval and analysis will be correct and accurate.
- *Fit Criterion:* The system database parameters and values shall match the original experiment data parameters and values.

9.2 Data Migration and Organization Requirements

FR-3. The system shall read existing experiment data stored in .CSV files.

- *Rationale:* Existing experiment data is stored in Excel spreadsheets and must be integrated into the new system for continuity and analysis.
- *Fit Criterion:* The system shall read and import the data files with 0 errors.

FR-4. The system shall organize experiment data by timestamps and experiment ID for unique identification.

- *Rationale:* Each experiment needs to be separately identified for quick retrieval of data and efficiency in search or query actions.
- *Fit Criterion:* Each ID and timestamp shall be traceable to one experiment.

9.3 Data Search and Query Requirements

FR-5. The system shall allow the user to search for specific datasets based on different parameters.

- *Rationale:* Allows for quick look-ups of certain experiments and their results.

- *Fit Criterion:* The system shall retrieve the correct experiments based on the matching parameters.
- FR-6.** The system shall allow the user to query two or more parameters or datasets for comparison and analysis.
- *Rationale:* Allows for direct comparisons between different experiment parameters and/or results, which is necessary for analysis.
 - *Fit Criterion:* The system shall retrieve the correct parameters and/or experiments based on the query inputs.
- FR-7.** The system shall display the results of a user's selected search or query in a format that is readable to the user.
- *Rationale:* The user needs to see the results in a format that they can interpret.
 - *Fit Criterion:* The results shall be displayed in a table with all labels correct and legible.

9.4 Data Visualization Requirements

- FR-8.** The system shall generate visual graphs based on selected parameters and datasets.
- *Rationale:* Visual representation of the data allows for easy interpretation and graphical analysis.
 - *Fit Criterion:* The result should display a graphical plot with a title, axes, labels, and a legend.
- FR-9.** The system shall allow the user to customize the data visualization by adjusting axes, data ranges, labels, etc.
- *Rationale:* Allows the user to adjust the graphical representation to their needs for their analysis.
 - *Fit Criterion:* Modifications to axes, data ranges, labels should be reflected in the generated graph in real-time.

9.5 Data Analysis Requirements

FR-10. The system shall analyze patterns and trends in the experiment data based on the user's selected parameters.

- *Rationale:* Trend analysis is critical for the user to discover important findings pertaining to the experiment.
- *Fit Criterion:* The system shall generate a result of the analysis to display to the user.

FR-11. The system shall use machine learning algorithms to predict and interpolate the data.

- *Rationale:* Allows for future predictions of data and efficiency in running future experiments.
- *Fit Criterion:* The system shall generate a report of value predictions or interpolate a graph and provide the interpolated data points.

9.6 Error Tracking Requirements

This section outlines functional requirements for one of the project's stretch goals.

FR-12. The system shall track and log errors in the experiment data.

- *Rationale:* Helps users identify irrelevant or missing parameters.
- *Fit Criterion:* Missing values from input data should be flagged.

FR-13. The system shall remove data logged as errors.

- *Rationale:* Ensures data is organized and produce accurate results in analysis.
- *Fit Criterion:* Flagged data should be removed from the database after user confirmation.

9.7 User Access Management Requirements

This section outlines functional requirements for one of the project's stretch goals.

FR-14. The system shall allow the user to sign in with valid credentials.

- *Rationale:* Ensures the data can only be accessed and modified by authorized users.
- *Fit Criterion:* The user shall be able to log in with a username and password.

9.8 Data Export Requirements

This section outlines functional requirements for one of the project's stretch goals.

FR-15. The system shall generate a report of queries in a session for the user to save or download.

- *Rationale:* Allows user to keep a record of their findings for future use or reference.
- *Fit Criterion:* The report should be exported in CSV or PDF format.

10 Look and Feel Requirements

10.1 Appearance Requirements

Insert your content here.

10.2 Style Requirements

Insert your content here.

11 Usability and Humanity Requirements

11.1 Ease of Use Requirements

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11.4 Understandability and Politeness Requirements

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11.5 Accessibility Requirements

Insert your content here.

12 Performance Requirements

12.1 Speed and Latency Requirements

1. The system shall store new data or parameters within 60 seconds of input.
 2. The system shall retrieve data from the database within 50ms for typical search and queries.
 3. The interaction between the interface and the user shall have a maximum response time of 2 seconds.
 4. The system shall have a maximum latency of 2 seconds for typical search and queries.
 5. The system shall generate a visualization of the data within 5 seconds.
- *Rationale:* Quick response times ensure efficiency and smooth user experience without disrupting the flow of the user's thought processes.
 - *Fit Criterion:* The system shall satisfy the requirements above.

12.2 Safety-Critical Requirements

The product does not have safety-critical requirements to consider.

12.3 Precision or Accuracy Requirements

1. All parameter values shall be accurate to four decimal places.
 2. All timestamps of experiment data shall be accurate to milliseconds.
 3. Values on visual data plots shall be accurate to four decimal places.
- *Rationale:* Accuracy of the data is critical for data analysis, prediction, and interpolation.
 - *Fit Criterion:* The system shall satisfy the requirements above.

12.4 Robustness or Fault-Tolerance Requirements

1. The application shall not terminate but display an error message if it loses connection to the backend server.
 2. The application shall provide basic functionality if it loses connection to the internet.
- *Rationale:* The system should not fail or crash when experiencing unexpected circumstances.

12.5 Capacity Requirements

1. The application shall allow for up to three simultaneous users.
 2. The system shall store up to x amount of data.
- *Rationale:* The system must be capable of storing and processing large amounts of data.
 - *Fit Criterion:* The system shall satisfy the requirements above.

12.6 Scalability or Extensibility Requirements

1. The system shall be able to process and store the existing data. The amount of data going into the system is expected to grow until the experiment study comes to an end.
 2. The system shall be able to add additional parameters that did not previously exist in the database at the discretion of the user.
- *Rationale:* The system must be able to expand to keep up with future experiments.

12.7 Longevity Requirements

1. The system shall operate for the duration of the experiment study.

13 Operational and Environmental Requirements

13.1 Expected Physical Environment

1. The application shall operate in a typical office environment with reliable internet connectivity.
 2. The application shall be compatible with a desktop or laptop environment.
- *Rationale:* Ensures functionality in environments where end-users are most likely to use the application, accomodating several screen sizes and operating systems.
 - *Fit Criterion:* Testing will be conducted on the two most common operating systems, Windows and macOS.

13.2 Wider Environment Requirements

Insert your content here.

13.3 Requirements for Interfacing with Adjacent Systems

1. The application shall operate on the most recent versions of Google Chrome and Apple Safari.
 - *Rationale:* The application must be able to operate on these two most common web browsers, as these will be the primary platforms where it is hosted and accessed by users.
 - *Fit Criterion:* Performance testing shall be done to ensure the application functions correctly.

13.4 Productization Requirements

1. The system shall be distributed as a web application.
2. The system shall have an easy onboarding process with user documentation.
 - *Rationale:* Ensures that users can use the application without needing frequent support.
 - *Fit Criterion:* Usability testing shall be done to ensure users are able to onboard easily.

13.5 Release Requirements

1. The first version of the system shall be released after project completion.

14 Maintainability and Support Requirements

14.1 Maintenance Requirements

Insert your content here.

14.2 Supportability Requirements

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14.3 Adaptability Requirements

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25 Waiting Room

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26 Ideas for Solution

Insert your content here.

Appendix — Reflection

The information in this section will be used to evaluate the team members on the graduate attribute of Lifelong Learning. Please answer the following questions:

1. What knowledge and skills will the team collectively need to acquire to successfully complete this capstone project? Examples of possible knowledge to acquire include domain specific knowledge from the domain of your application, or software engineering knowledge, mechatronics knowledge or computer science knowledge. Skills may be related to technology, or writing, or presentation, or team management, etc. You should look to identify at least one item for each team member.
2. For each of the knowledge areas and skills identified in the previous question, what are at least two approaches to acquiring the knowledge or mastering the skill? Of the identified approaches, which will each team member pursue, and why did they make this choice?