Software Engineering Project Report

A Sample Document for Generating Consistent Professional Reports

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REMOVE OR REPLACE ALL TEXT IN RED ITALICS BEFORE SUBMITTING REPORT

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I Project Description

Short Version (SV): Section I of the document provides a clear detailed picture of the product to be produced, why it needs to be produced, who would use it, what they would do with it, and provides other important background information prior to developing detailed requirements or designs.

1 Project Overview

SV: Provide a brief quick description of the project, generally no more than a paragraph or two. The reader should get a good idea of what the project is all about from this opening section.

Your text goes here . . .

2 The Purpose of the Project

SV: Describe WHY this project is being done, and what one hopes to achieve from it.

2a The User Business or Background of the Project Effort

SV: Describe the client's business, e.g. the newspaper publishing business or the firefighting business, to the extent that it is relevant for this project. Note the distinction between "business" and "work" as described in section I.3 below.

Your text goes here . . .

2b Goals of the Project

*SV: Describe **WHY** this project is being carried out, from the point of view of the client. Note that the goal should be to improve the life of the client in some way, not just the development of software. (The SW is a means to an end, not the goal.)*

Your text goes here . . .

2c Measurement

SV: How will one know when the goals stated in I.2.2b have been met? What measurable result can we point to and say that the goal has been met?

Your text goes here . . .

3 The Scope of the Work

SV: The "work" is a subset of the "business", and describes the set of activities that will be addressed by the proposed product. For example, if the business is "university-level education", then the work addressed by this project might be "the production and delivery of classroom lectures". Obviously the business of running a university encompasses a lot more than just classroom lectures, but this particular project will only concern itself with that particular aspect of the overall business.

A sentence or two here can briefly state what the "work" is.

Your text goes here . . .

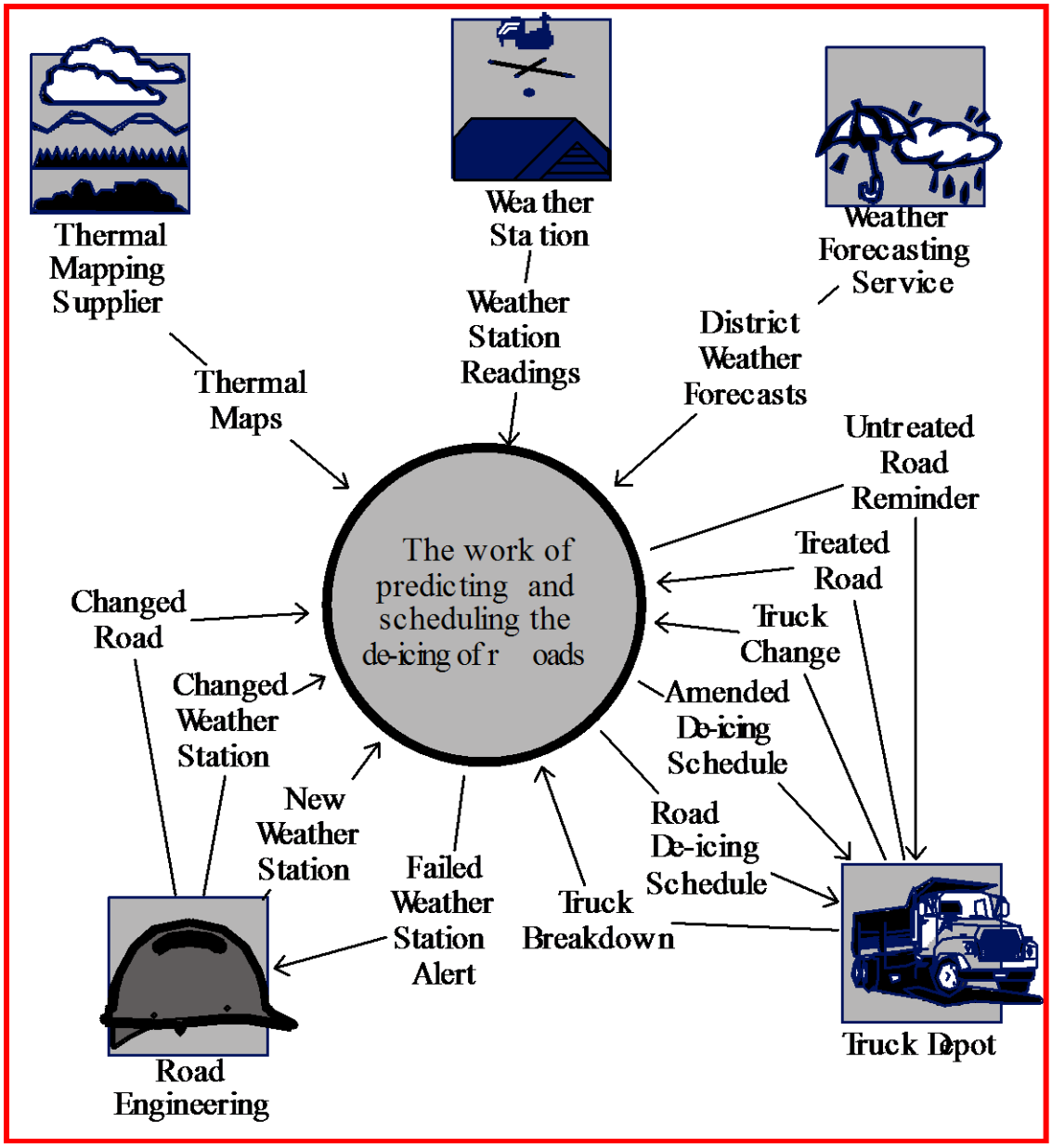
3a The Current Situation

SV: Describe how the client is conducting the work now, without the proposed product. Note that the current situation may or may not involve computers.

Your text goes here . . .

3b The Context of the Work

SV: Define the boundary between what is included in "the work" and what is not. It also defines what external entities "the work" must interact with and what those interactions entail. ***The following example diagram should be replaced with one appropriate to this project.***



Your diagram and text goes here . . .

3c Work Partitioning

SV: "The work" is often large and complex, with many different activities and concerns. One good way to break this down and organize it for analysis is to identify the different events to which the business must respond. A "business event" is an external stimulus which causes the business to take a series of actions in response.

Your text goes here. *A table is recommended . . . (See full instructions for example.)*

3d Competing Products

*SV: **IF** there are other existing products that the client could use instead of the proposed product, then they should be discussed here, along with the reasons why the proposed product is still needed / beneficial.*

Your text goes here . . .

4 The Scope of the Product

*SV: This section describes the proposed **product** as a set of short stories (scenarios) providing examples of how the product would be used in practice. This effectively documents what is and what is not included in the product, and who/what would interact with it in what ways. The opening paragraph briefly states what subset of "the work" is to be handled by the proposed product.*

Your text goes here . . .

4a Scenario Diagram(s)

SV: The scenario diagram acts as an illustrated list of the scenarios to be presented, showing the boundary of the system and what external "actors" are involved in each of the scenarios.

Your diagram goes here . . .

4b Product Scenario List

SV: A table listing the scenarios by name, external actors involved, and possibly other information if relevant.

Your text goes here . . .

4c Individual Product Scenarios

SV: This section contains the actual scenarios, the stories of the product being used.

Your text goes here . . .

5 Stakeholders

SV: Stakeholders include all persons or entities that have an interest in the proposed product or its development, either directly or indirectly.

5a The Client

SV: The client pays up front for the product to be developed, and provides guidance or other input for its development. Some projects do not have an external client, in which case the developing organization acts as the client.

Your text goes here . . .

5b The Customer

SV: The customer is the person or entity who will buy the product after it has been completed. Some projects do not have an external customer, if they are to be used in-house or for the client's use only.

Your text goes here . . .

5c Hands-On Users of the Product

SV: These are the people who will actually use the product in practice, and who may be separate from the customer or client. For example, educational software may be purchased by the school system (customer) and used by students (hands-on users.)

Your text goes here . . .

5d Maintenance Users and Service Technicians

SV: Describe users that will install, maintain, update, and otherwise service the product as needed. May not apply to all projects.

Your text goes here . . .

5e Other Stakeholders

SV: This section is a catch-all for all other stakeholders not previously mentioned. Note that some stakeholders may be negatively impacted by the proposed project, for example if their work duties change or are eliminated. Some may even object to the project all together.

Your text goes here . . .

5f User Participation

SV: To what extent can we expect users to participate during the development of the product?

Your text goes here . . .

5g Priorities Assigned to Users

SV: To the extent that some users are more important to the project than others, the relative priorities should be identified here.

Your text goes here . . .

6 Mandated Constraints

SV: Mandated constraints are requirements that are set in stone by the client before the project is really even started, and before the full set of requirements are determined. Note that not all of these sections will apply to every project, and that some constraints could be placed equally well in more than one section (but should not be duplicated.).

6a Solution Constraints

SV: These are general constraints on the product to be developed or the manner in which it is to be developed that are not covered elsewhere.

Your text goes here . . .

6b Implementation Environment of the Current System

SV: This section deals with the physical and technical environment in which the proposed product will operate, such as hardware, operating system, and communications issues.

Your text goes here . . .

6c Partner or Collaborative Applications

SV: This section documents external applications with which this product must be compatible, such as the ability to read and write Microsoft Excel format data files.

Your text goes here . . .

6d Off-the-Shelf Software

*SV: This section describes commercial off-the-shelf (COTS) software that **MUST** be included in the final product.*

Your text goes here . . .

6e Anticipated Workplace Environment

SV: This section deals with human factors regarding the environment in which the product will be used, such as noisy environments or mobile applications.

Your text goes here . . .

6f Schedule Constraints

*SV: **When** things must be done, or when they may be most/least beneficial.*

Your text goes here . . .

6g Budget Constraints

SV: Limitations on the funds and other resources available for this project.

Your text goes here . . .

7 Naming Conventions and Definitions

SV: Define terminology to avoid miscommunications or misunderstandings.

7a Definitions of Key Terms

*SV: Define **words** that may have special or multiple meanings.*

Your text goes here . . .

7b UML and Other Notation Used in This Document

*SV: Define **symbols**, **diagrams**, and other **notations** used. May refer to a standard reference, such as "UML Distilled" by Fowler. (Include in bibliography.)*

Your text goes here . . .

7c Data Dictionary for Any Included Models

*SV: Define **data structures** and **data properties** relative to this project, such as the contents of an employee record or the fact that student GPA ranges from 0.0 to 4.0 corresponding to letter grades of F to A. Data file formats may be referenced to documented standards, such as jpg or pdf.*

Your text goes here . . .

8 Relevant Facts and Assumptions

8a Facts

SV: Factual information relevant to the project, such as census data.

Your text goes here . . .

8b Assumptions

SV: Assumptions relevant to the project, such as the availability of necessary resources or abilities of the users.

Your text goes here . . .

II Requirements

SV: Sections 9 and 10 deal with functional requirements. Sections 11 to 20 are a very thorough list of possible non-functional requirements, not all of which apply to every project. You should think carefully about each of these, form requirements if applicable, or write "Not Applicable" otherwise. See section 10 for the format of individual requirements. Section 21 documents the acceptance tests planned to verify the requirements – See that section for further details, and be aware that every requirement needs at least one verifying acceptance test (though some tests may verify more than one requirement.)

9 Product Use Cases

SV: Product Use Cases are very similar to Product Scenarios, but in more formal detail. They serve as a first step towards developing functional requirements, and can aid in organizing requirements according to the use case(s) from which they were developed. See the CS 440 web site for a sample use-case form, with instructions.

9a Use Case Diagrams

SV: Use case diagrams list the use cases developed for a system, mark the boundary of what is internal or external to the system to be developed, and indicate which external entities (actors) are associated with each use case.

Examples

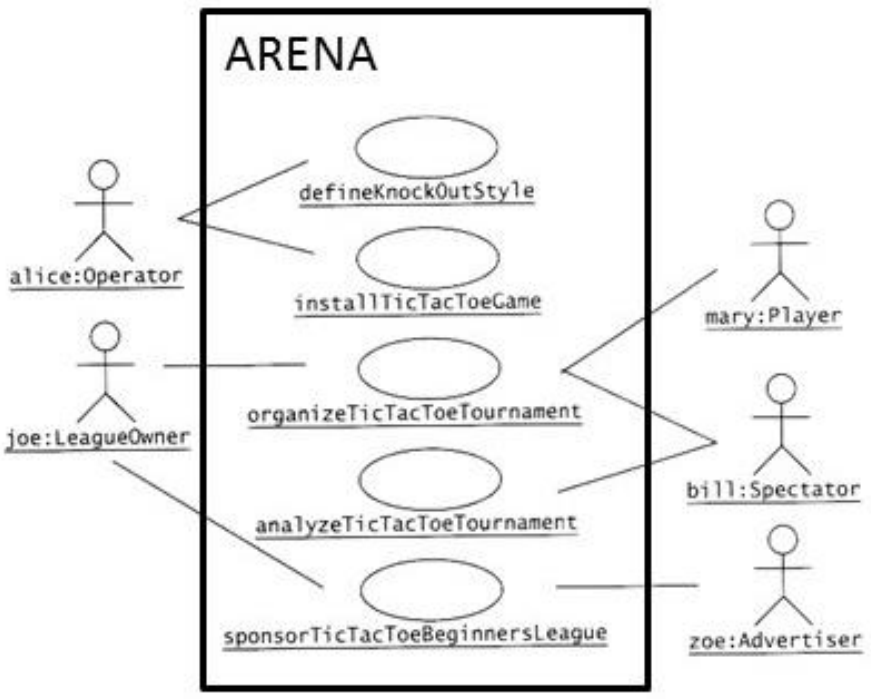


Figure 1 - Sample Use Case Diagram from Bruegge & DuToit (modified)

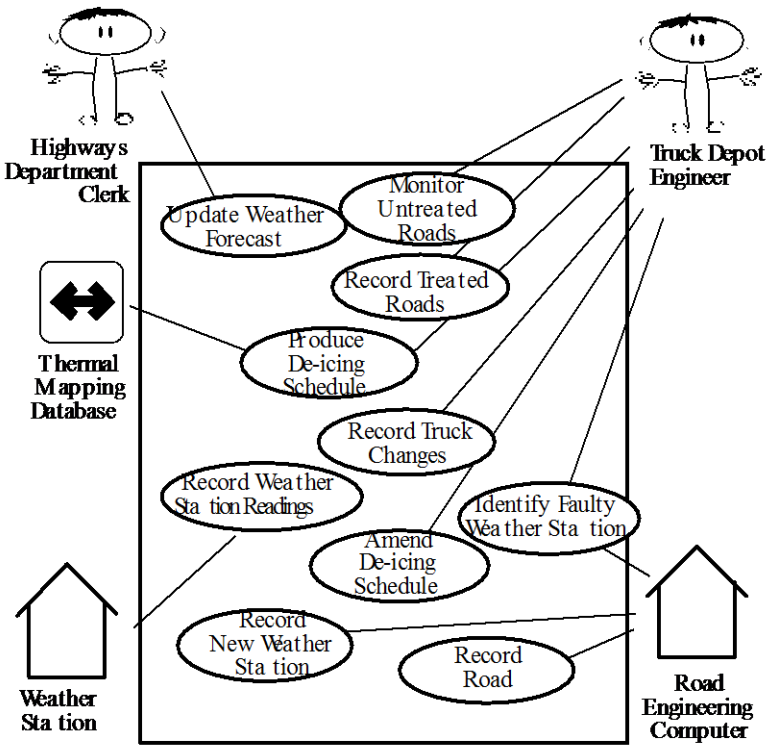


Figure 2 - Sample Use Case Diagram from Robertson and Robertson

9b Product Use Case List

SV: A list (table) of use cases is an alternative to the use case diagram, particularly when there are many use cases. There may be additional information in the table not found in the diagram, such as cross referencing to other sections or materials.

9c Individual Product Use Cases

SV: The following example was copied from "useCaseFormWithInstructions.docx", available on the CS 440 web site. (There is also a blank version available.)

Use case ID: Name: pre-conditions: post-conditions: Initiated by: Triggering Event: Additional Actors:
Sequence of Events: 1. Initiating event or action should be step 1, taken by initiating actor. 2. System response follows, indented right. 3. All external action steps are aligned with step 1. ("stimulus" style) 4. All system responses are indented right, aligned with step 2. ("response" style) 5. All steps should be expressed in the active voice, clearly indicating **who** performs each action 6. The sequence of events should show a back-and-forth stimulus-response relationship.
Alternatives: These would be normal and expected variations from the base case. Exceptions: These would be unusual variations from the base case, often caused by problems.

- *For all of the above, list as NA if not applicable.*
- *The following may be added if relevant, or omitted otherwise:*
  - *related use cases or scenarios*
  - *associated tests, systems, classes, etc.*
  - *revision history*
  - *references to other documents*
  - *author(s) / originator(s)*

- *notes*

- *Alternatives and Exceptions may be listed either as separate use cases or as notes to a base case, depending on their significance and similarity.*
- *For regularly occurring periodic events, "time" can be listed as the initiating actor.*

10 Functional Requirements

SV: Each requirement listed needs to have a unique identifier, a short name, a one- or two-sentence description, a rationale, a fit criteria, and reference to one or more acceptance tests to be used to confirm the completion of this particular requirement. The acceptance tests themselves are documented in section 0- See that section for further details. It is recommended to number the requirements according to their type, such as F-4 for the fourth functional requirement or U-2 for the second usability requirement. Functional requirements specifically deal with the functionality the system must have, and are generally derived directly from the steps the system takes during use cases.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

11 Data Requirements

SV: Data requirements deal with requirements that are somehow related to data, such as the definition of what is included in a "student record" or the acceptable form of an e-mail address or allowable range of certain data items.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

12 Performance Requirements

12a Speed and Latency Requirements

SV: Requirements specifying how fast (or slow) the product must operate or how much lag is allowable between stimulus and either initial response or task completion. Other timing-related requirements could go in this section.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

12b Precision or Accuracy Requirements

SV: Self-explanatory. How accurate or precise must the system be.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

12c Capacity Requirements

SV: Requirements regarding the largest "thing" the system must be able to handle, or perhaps how many things it can handle (at once.) Note: Requirements regarding how many things it can handle in a given time period would be a speed requirement, covered in section 12a above.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

13 Dependability Requirements

13a Reliability Requirements

SV: Reliability relates to how frequently the system fails, (either by shutting down or by delivering erroneous results), and the consequences of those failures. These requirements may also address the conditions under which it is allowed to fail (or not.), See also availability and robustness in the following sections.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

13b Availability Requirements

SV: Availability addresses the amount of time the system is running and available for use. It is affected by how often the system goes down (reliability), but also by the time required to bring the system back up again, the availability lost due to regularly scheduled maintenance down times, and the ability of the system to offer at least partial functionality in the face of failures or resource shortages. See also reliability and robustness.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

13c Robustness or Fault-Tolerance Requirements

SV: This section deals with the system's ability to provide at least partial functionality in the face of failures or resource shortages, such as operating in offline mode when network connectivity is unavailable. See also reliability and availability.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

13d Safety-Critical Requirements

SV: These requirements address potential harm to health, safety, or property, and may refer to relevant standards such as OSHA compliance.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

14 Maintainability and Supportability Requirements

14a Maintenance Requirements

SV: This section deals with the ease with which the system can be maintained, and possibly who will perform system maintenance and under what conditions. The ease of evolving the system into future versions may also be addressed here, or in a separate section (not included in this template) if that is a major concern.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

14b Supportability Requirements

SV: What ongoing support is to be provided, e.g. through a help desk. See also training requirements in section 16g below.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

14c Adaptability Requirements

SV: Description of other platforms or environments to which the product must be ported.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

14d Scalability or Extensibility Requirements

SV: The ease of expanding the system to a larger capacity as the business grows.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

14e Longevity Requirements

SV: This specifies the expected lifetime of the product.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

15 Security Requirements

SV: Security requirements address who is allowed what type of access to the system, and what areas require special protection or diligence. In practice security requirements must often be written by security experts, and may refer to standards.

15a Access Requirements

SV: These requirements address who has access to what (data or functionality) and under what conditions or restrictions.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

15b Integrity Requirements

SV: These requirements address the protection of data(bases) from intentional or accidental corruption, loss, or theft.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

15c Privacy Requirements

SV: These requirements address data that must remain confidential, such as medical records or other personally identifiable data. Laws often apply. (See also section 20.)

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

15d Audit Requirements

SV: This section applies when a system must provide support for transaction auditing, such as some financial or medical systems.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

15e Immunity Requirements

SV: This section addresses the system's ability to resist viruses, worms, Trojan Horses, etc.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16 Usability and Humanity Requirements

SV: This section is concerned with requirements that make the product usable and ergonomically acceptable to its hands-on users.

16a Ease of Use Requirements

SV: This section addresses the ease with which the intended audience can use the system properly, and conversely the difficulty with which they can use it improperly.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16b Personalization and Internationalization Requirements

SV: This section addresses the ease with which the system can be configured for personal preferences, and for things such as language, currency, units, symbols, etc.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16c Learning Requirements

SV: Requirements related to how easy it is for the intended audience to learn to use the product.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16d Understandability and Politeness Requirements

SV: These requirements relate to how intuitively the intended audience understands what the program does, what its messages mean, and how to use it. Definitely related to ease of use, (section 16a), but more specifically addressing comprehension of the program output, instructions, and other messages.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16e Accessibility Requirements

SV: Requirements related to use of the product by individuals with disabilities.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16f User Documentation Requirements

SV: List of the user documentation to be supplied as part of the product.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

16g Training Requirements

SV: A description of the training needed by users of the product.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

17 Look and Feel Requirements

17a Appearance Requirements

SV: These requirements address things such as the colors, fonts, and logos used, often to reflect corporate branding or similarity to related products. See also style in the next section.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

17b Style Requirements

SV: Style requirements address the impression the product makes upon users, such as professionalism for a tax accounting package, friendliness for a children's game, or how "cool" it is for a teenage audience. Product packaging may also be addressed here, and/or appearance in the previous section.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

18 Operational and Environmental Requirements

18a Expected Physical Environment

SV: These requirements relate to the physical environment in which the product will operate.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

18b Requirements for Interfacing with Adjacent Systems

SV: This section describes the requirements to interface with partner applications and/or devices that the product needs to successfully operate.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

18c Productization Requirements

SV: Requirements related to the distribution and/or installation of the product.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

18d Release Requirements

SV: Specification of the intended release cycle for the product and the form that the release shall take.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

19 Cultural and Political Requirements

19a Cultural Requirements

SV: This section contains requirements that are specific to the sociological factors that affect the acceptability of the product. If you are developing a product for foreign markets, then these requirements are particularly relevant. Bear in mind that "cultural groups" may also apply to population subgroups such as teenagers, the elderly, or ironworkers.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

19b Political Requirements

SV: Requirements included strictly to make "the boss" happy, either internally to the development company, or internally to the client company, or possibly an external third party.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

20 Legal Requirements

20a Compliance Requirements

SV: A statement specifying the legal requirements for this system, often referring to relevant laws and/or requiring approval by the legal department.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

20b Standards Requirements

SV: These requirements specify documented standards to which the product must conform, as opposed to legal regulations.

ID# - Name

Description: Your description here . . .

Rationale: Your rationale here . . .

Fit Criterion: Your fit criteria here . . .

Acceptance Tests: List ID# and/or names here . . .

21 Requirements Acceptance Tests

SV: Every requirement must have one or more acceptance tests associated with it, to confirm that the requirement has been met. At this point these tests are not yet completely specified – A one- or two-sentence description of each test will suffice. Note that some tests may verify more than one requirement, and that some requirements may require multiple tests for their confirmation.

21a Requirements – Test Correspondence Summary

SV: The following sample table is available from the CS 440 web site as "Sample Requirement Test Correspondence Table.xlsx" It is recommended that you work with the table in Excel, and then drag it into the document when it is completed. Depending on the number of requirements and/or tests included, it may be necessary to use multiple tables, and/or use landscape mode. Every row and every column of the table should include at least one X. Below the table list the ID #, name, and short description of each individual acceptance test.

	Requirements																			
Test	Req 1	Req 2	Req 3	Req 4	Req 5	Req 6	Req 7	Req 8	Req 9	Req 10	Req 11	Req 12	Req 13	Req 14	Req 15	Req 16	Req 17	Req 18	Req 19	Req 20
Test 1	X																			
Test 2		X				X														
Test 3			X	X																
Test 4					X	X														
Test 5																				
Test 6																				
Test 7																				
Test 8																				
Test 9																				
Test 10																				
Test 11																				
Test 12																				
Test 13																				
Test 14																				
Test 15																				

Table 1 - Requirements - Acceptance Tests Correspondence

21b Acceptance Test Descriptions

SV: Provide a brief description of each acceptance test. Detailed test specifications will appear in a separate document, which may be referenced here when available.

ID # - Name

Description: Your description here . . .

III Design

22 Design Goals

SV: Identify the important design goals that are to be optimized in the proposed design.

Your text goes here . . .

23 Current System Design

*SV: **IF** the proposed new system is to replace an existing system, then the current system should be described here. Otherwise insert a brief statement that there is no pre-existing system.*

Your text goes here . . .

24 Proposed System Design

This section will make heavy use of class diagrams, and also sequence and deployment diagrams where noted. However don't overlook finite state, activity, communication, or other diagram types as needed for effective communication.

24a Initial System Analysis and Class Identification

SV: Perform grammatical and similar analyses to identify the most import and obviously needed classes, and to organize them into an initial class structure. An initial class diagram is appropriate, containing few if any internal details.

Your text goes here . . .

24b Dynamic Modelling of Use-Cases

SV: Insert sequence diagrams of (at least the most important) use-cases, as a means of identifying other needed classes.

Your text goes here . . .

24c Proposed System Architecture

SV: Identify the Software Architecture to be applied to this project, such as Client-Server, Repository, MVC, etc., along with justification for the choice.

Your text goes here . . .

24d Initial Subsystem Decomposition

SV: A slightly more detailed class diagram, showing the classes identified in sections 24a, 24b, and 0 above, partitioned into subsystems. For each subsystem provide a brief description of the subsystem, including its key responsibilities. There should still be few if any internal details.

Your text goes here . . .

25 Additional Design Considerations

SV: The sections listed here do not need to be presented in the order given, and may not all be relevant for any particular project. Those that are relevant can help identify additional classes that are needed as a result.

25a Hardware / Software Mapping

SV: This is particularly important for distributed systems, such as those employing a client-server architecture. Use a deployment diagram to indicate which subsystems are mapped onto which piece(s) of hardware, and what communication subsystems need to be added to the system as a result.

Your text goes here . . .

25b Persistent Data Management

SV: Document the classes and perhaps subsystems necessary to store persistent data when the system shuts down, and to restore that data when the system starts back up again.

Reiterate key data structures and information as necessary for the understanding of this design phase. Refer the reader back to the data dictionary in section ***Error! Reference source not found.*** *to avoid undue repetition, while reviewing only the most relevant items here.*

Your text goes here . . .

25c Access Control and Security

SV: Identify the access control and security concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns.

Your text goes here . . .

25d Global Software Control

SV: Identify the global software control concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns.

Your text goes here . . .

25e Boundary Conditions

SV: Identify the boundary condition concerns for this system, and the new classes and/or subsystems that must be added to handle those concerns. In particular consider startup, shutdown (normal or abnormal), and the creation and/or maintenance of any configuration files, databases, or similar supporting data files.

Your text goes here . . .

25f User Interface

SV: Include a preliminary user interface design here, possibly as a rough sketch or other mockup, in order to identify additional classes needed to implement the interface.

Your text goes here . . .

25g Application of Design Patterns

SV: Any design patterns applied as a result of previous sections should have been addressed there, and identified as such at the time. Use this section to document only the additional design patterns that were not previously covered elsewhere. (If any.)

Your text goes here . . .

26 Final System Design

SV: Include here the final version of the overall system design, incorporating all the subsystems and classes added as a result of additional design considerations. Multiple diagrams may be needed, possibly starting with an overall package diagram showing all the different subsystems and the (important) classes contained within each one. Still not a lot of internal details.

Your text goes here . . .

27 Object Design

This section documents the internal details of each class, to the extent that they can be designed at this time. Included should be the class interfaces (public method signatures and responsibilities) and constraints. It is probably best to break this section up into subsections corresponding to subsystems as documented above, and/or by (Java) packages if those are designed. It may also be appropriate to address additional design pattern considerations here, but not to the point of being redundant of previous documentation.

Certain methods, such as simple getters, setters, and constructors are not always documented, unless there is something special about them such as in the Singleton or Factory Method design patterns.

27a Packages

SV: If the design involves assigning classes to packages (.e.g Java packages), then the packages to be created should be documented here.

Your text goes here . . .

27b Subsystem I

Your text goes here . . .

27c Subsystem II

Your text goes here . . .

27d etc.

Your text goes here . . .

IV Project Issues

28 Open Issues

SV: Issues that have been raised and do not yet have a conclusion.

Your text goes here . . .

29 Off-the-Shelf Solutions

SV: Discussion of products or components currently available that could either be incorporated into the new solution or simply used instead of developing (parts of) the new solution. The distinction between sections 35 a, b, and c is subtle, and not very important.

Your text goes here . . .

29a Ready-Made Products

SV: Products available for purchase that could be used either as part of a solution or instead of (a part of) a solution.

Your text goes here . . .

29b Reusable Components

SV: Similar to 35a, but for components such as libraries or toolkits instead of fully blown products.

Your text goes here . . .

29c Products That Can Be Copied

SV: Products that could legally be copied would typically be past projects developed by the same development group, provided there were no restrictions that would prevent their reuse.

Your text goes here . . .

30 New Problems

SV: The proposed new system certainly has its benefits, but it could also raise new problems. It is a good idea to identify any such potential problems early on, rather than being surprised by them later.

30a Effects on the Current Environment

SV: Could the new system have any adverse effects on the working environment, e.g. the way people do their jobs?

Your text goes here . . .

30b Effects on the Installed Systems

SV: Could the new system have any adverse effects on other hardware or software systems?

Your text goes here . . .

30c Potential User Problems

SV: Could the new system have any adverse effects on the users of the software? Could users possibly have a negative response to the new system?

Your text goes here . . .

30d Limitations in the Anticipated Implementation Environment That May Inhibit the New Product

SV: Are there any (physical) limitations in the expected environment that could inhibit the proposed product? (e.g. weather, electrical interference, radiation, lack of reliable power, etc.)

Your text goes here . . .

30e Follow-Up Problems

SV: Basically any other possible problems that could occur.

Your text goes here . . .

31 Migration to the New Product

SV: This section only applies when there is an existing system that is being replaced by a new system, particularly when data must be preserved and possibly translated / reformatted. Otherwise just write "Not Applicable" under section 38 and remove sections 38a and 38b.

31a Requirements for Migration to the New Product

SV: These are a list of requirements relevant to the migration procedures. For example a requirement that the two systems be run in parallel for a time until the client is satisfied with the new system and the users know how to use it.

Your text goes here . . .

31b Data That Has to Be Modified or Translated for the New System

*SV: This section specifically addresses **data** that must be preserved and/or translated / reformatted during the migration process.*

Your text goes here . . .

32 Risks

SV: Consideration of the potential risks that could cause the project to fail / underperform.

Your text goes here . . .

33 Costs

SV: An estimate of what it will cost to complete this project. Think not only in terms of dollars, but also time, resources, lost opportunities, etc.

Your text goes here . . .

34 Waiting Room

SV: This is a place to record ideas or wishes that will not be included in the current release of the product, but which might be worth reconsidering at a later date.

Your text goes here . . .

35 Ideas for Solutions

SV: When developing requirements only, it is not the role of the business analyst to dictate the implementation of the solution. However they can pass along any ideas they have here as suggestions to the developers. For CS 440 this report includes system and object design, so this section would make suggestions for implementation and

testing that would come after design, such as the use of a particular language, IDE, library, or other tools.

Your text goes here . . .

36 Project Retrospective

SV: At the conclusion of the (CS 440) project, reflect back on what worked well and what didn't, and how the process could be improved in the future.

Your text goes here . . .

V Glossary

SV: The glossary is a more complete and inclusive dictionary of defined terms than that found in section I.7.a, the latter of which only covered the most important key terms needed to understand the report.

Your text goes here . . .

VI References / Bibliography

This section describes the documents and other sources from which information was gathered. This sample bibliography was generated using the "Insert Citation" and "Bibliography" buttons in the "Citations & Bibliography" section under the "References" tab of MS Word. Creating new citations will not update this list unless you click on it and select "Update Field". You may need to reset the style for this paragraph to "normal" after updating.

[1] Robertson and Robertson, Mastering the Requirements Process.

[2] A. Silberschatz, P. B. Galvin and G. Gagne, Operating System Concepts, Ninth ed., Wiley, 2013.

[3] J. Bell, "Underwater Archaeological Survey Report Template: A Sample Document for Generating Consistent Professional Reports," Underwater Archaeological Society of Chicago, Chicago, 2012.

[4] M. Fowler, UML Distilled, Third Edition, Boston: Pearson Education, 2004.

VII Index

This section provides an index to the report. The sample below was generated using the "Mark Entry" and "Insert Index" items from the "Index" section on the "References" tab, and can be automatically updated by right clicking on the table below and selecting "Update Field". To

remove marked entries from the document, toggle the display of hidden paragraph marks (the paragraph button on the "Home" tab), and remove the tags shown with XE in { curly braces. }