[YourProject] Requirements Specification

Version 1.0

April 19, 2021

Use this Requirements Specification template to document the requirements for your product or service, including priority and approval. Tailor the specification to suit your project, organizing the applicable sections in a way that works best, and use the checklist to record the decisions about what is applicable and what isn't.

The format of the requirements depends on what works best for your project.

This document contains instructions and examples which are for the benefit of the person writing the document and should be removed before the document is finalized.

To regenerate the TOC, select all (CTL-A) and press F9.

**Table of Contents**

[**[YOURPROJECT] REQUIREMENTS SPECIFICATION 1**](#_heading=h.19c6y18)

[**VERSION 1.0 1**](#_heading=h.3tbugp1)

[**APRIL 19, 2021 1**](#_heading=h.28h4qwu)

[**1.**](#_heading=h.nmf14n) **EXECUTIVE SUMMARY 3**

[1.1](#_heading=h.37m2jsg) Project Overview 3

[1.2](#_heading=h.1mrcu09) Purpose and Scope of this Specification 3

[**2.**](#_heading=h.46r0co2) **PRODUCT/SERVICE DESCRIPTION 3**

[2.1](#_heading=h.2lwamvv) Product Context 3

[2.2](#_heading=h.111kx3o) User Characteristics 3

[2.3](#_heading=h.3l18frh) Assumptions 3

[2.4](#_heading=h.206ipza) Constraints 3

[2.5](#_heading=h.4k668n3) Dependencies 4

[**3.**](#_heading=h.2zbgiuw) **REQUIREMENTS 4**

[3.1](#_heading=h.1egqt2p) Functional Requirements 5

[3.2](#_heading=h.3ygebqi) Non-Functional Requirements 5

[*3.2.1*](#_heading=h.2dlolyb) *Product Requirements 5*

[**3.2.1.1**](#_heading=h.44sinio) **User Interface Requirements** 6

[**3.2.1.2**](#_heading=h.2jxsxqh) **Usability** 6

[**3.2.1.3**](#_heading=h.z337ya) **Efficiency** 6

[3.2.1.3.1](#_heading=h.3j2qqm3) Performance Requirements 6

[3.2.1.3.2](#_heading=h.1y810tw) Space Requirements 6

[**3.2.1.4**](#_heading=h.4i7ojhp) **Dependability** 6

[**3.2.1.5**](#_heading=h.2xcytpi) **Security** 7

[*3.2.2*](#_heading=h.sqyw64) *Organizational Requirements 7*

[**3.2.2.1**](#_heading=h.3whwml4) **Environmental Requirements** 7

[**3.2.2.2**](#_heading=h.2bn6wsx) **Operational Requirements** 7

[**3.2.2.3**](#_heading=h.qsh70q) **Development Requirements** 7

[*3.2.3*](#_heading=h.3cqmetx) *External Requirements 7*

[**3.2.3.1**](#_heading=h.1pxezwc) **Regulatory Requirements** 7

[**3.2.3.2**](#_heading=h.49x2ik5) **Ethical Requirements** 7

[**3.2.3.3**](#_heading=h.2p2csry) **Legislative Requirements** 7

[3.2.3.3.1](#_heading=h.147n2zr) Accounting Requirements 7

[3.2.3.3.2](#_heading=h.3o7alnk) Security Requirements 7

[3.3](#_heading=h.1rvwp1q) Domain Requirements 7

[**4.**](#_heading=h.4bvk7pj) **USER SCENARIOS/USE CASES 7**

# Executive Summary

## Project Overview

## Purpose and Scope of this Specification

# Product/Service Description

## Product Context

## User Characteristics

## Assumptions

## Constraints

## Dependencies

# Requirements

* Describe all system requirements in enough detail for designers to design a system satisfying the requirements and testers to verify that the system satisfies requirements.
* Organize these requirements in a way that works best for your project. See Appendix DAppendix D, Organizing the Requirements for different ways to organize these requirements.
* Describe every input into the system, every output from the system, and every function performed by the system in response to an input or in support of an output. (Specify what functions are to be performed on what data to produce what results at what location for whom.)
* Each requirement should be numbered (or uniquely identifiable) and prioritized.

See the sample requirements in Functional Requirements, and System Interface/Integration, as well as these example priority definitions:

**Priority Definitions**

The following definitions are intended as a guideline to prioritize requirements.

* Priority 1 – The requirement is a “must have” as outlined by policy/law
* Priority 2 – The requirement is needed for improved processing, and the fulfillment of the requirement will create immediate benefits
* Priority 3 – The requirement is a “nice to have” which may include new functionality

It may be helpful to phrase the requirement in terms of its priority, e.g., "The value of the employee status sent to DIS **must be** either A or I" or "It **would be nice** if the application warned the user that the expiration date was 3 business days away". Another approach would be to group requirements by priority category.

* A good requirement is:
* Correct
* Unambiguous (all statements have exactly one interpretation)
* Complete (where TBDs are absolutely necessary, document why the information is unknown, who is responsible for resolution, and the deadline)
* Consistent
* Ranked for importance and/or stability
* Verifiable (avoid soft descriptions like “works well”, “is user friendly”; use concrete terms and specify measurable quantities)
* Modifiable (evolve the Requirements Specification only via a formal change process, preserving a complete audit trail of changes)
* Does not specify any particular design
* Traceable (cross-reference with source documents and spawned documents).

## Functional Requirements

In the example below, the requirement numbering has a scheme - BR\_LR\_0## (BR for Business Requirement, LR for Labor Relations). For small projects simply BR-## would suffice. Keep in mind that if no prefix is used, the traceability matrix may be difficult to create (e.g., no differentiation between '02' as a business requirement vs. a test case)

The following table is an example format for requirements. Choose whatever format works best for your project.

For Example:

| **Req#** | **Requirement** | **Comments** | **Priority** | **Date Rvwd** | **SME Reviewed / Approved** |
| --- | --- | --- | --- | --- | --- |
| BR\_LR\_05 | The system should associate a supervisor indicator with each job class. | Business Process = “Maintenance | 3 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_08 | The system should handle any number of fees (existing and new) associated with unions. | Business Process = “Changing Dues in the System”  An example of a new fee is an initiation fee. | 2 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_10 | The system should capture and maintain job class status (i.e., active or inactive) | Business Process = “Maintenance”  Some job classes are old and are no longer used. However, they still need to be maintained for legal, contract and historical purposes. | 2 | 7/13/04 | Bob Dylan, Mick Jagger |
| BR\_LR\_16 | The system should assign the Supervisor Code based on the value in the Job Class table and additional criteria as specified by the clients. | April 2005 – New requirement. It is one of three new requirements from BR\_LR\_03. | 2 |  |  |
| BR\_LR\_18 | The system should provide the Labor Relations office with the ability to override the system-derived Bargaining Unit code and the Union Code for to-be-determined employee types, including hourly appointments. | April 2005 – New requirement. It is one of three new requirements from BR\_LR\_04.  5/11/2005 – Priority changed from 2 to 3. | ~~2~~  3 |  |  |

## Non-Functional Requirements

**In here try to use the Structure given at slide 13 in Requirements Engineering Lecture Slides, with main categories of:**

### Product Requirements

#### **User Interface Requirements**

#### **Usability**

Usability of the software refers to the extent to which the product can be used to efficiently achieve the goals of the intended audience. There are a couple of points that make up the usability of a software:

* Learnability: the software must be easy to learn by the three different types of users. The application will be easy to understand for all students, librarians, and the administrator of the library. There will be clear instructions to each command in the different views of the user interfaces.
* Accessibility: the software will have to be available remotely as each student may use it from their own devices. The application should be available for both pc and mobile use.
* Responsiveness: the software must be highly responsive. It must be able to successfully respond to the user’s requests in real time, therefore operating on and changing data in real time on both the student and librarian side.
* Flexibility: the program should be flexible enough to accommodate different user needs and preferences. It will allow customization on certain parts such as setting or changing passwords and adding available books to the database. The developers will also be able to maintain and update the program when needed.
* Effectiveness: The app must be simple and easy to use for both students and the librarians running it therefore making it very practical and effective. It will help digitize and modernize the process of borrowing books from the school library.
* Consistency: the application must use well known terminology, so users find it easy to understand and navigate through the system.
* Efficiency: the user should find it very easy to complete every task, with easy commands and instructions even if it is the first time the user is in contact with the application or they haven't used it in a while.
* The application should be very simple to use for all students. It will approximately only take a few minutes for a student to get up to speed with the app as it will be a very well-designed, intuitive application.
* As they are essentially administering the application, librarians and administrators may need a bit more time to become completely familiar with all of its capabilities. Although it will take some time to become familiar with the app, it should be noted that a week of use should be sufficient for librarians and administrators to become skilled in using it.

#### **Efficiency**

Efficiency of the software doesn't mean just making sure that the software completes all the tasks given to it. There are two main groups of requirements that determine how efficient a system is, performance and space requirements.

##### Performance Requirements

* Response time: the system should be able to respond to the user requests in real-time with no lag or delay.
* Throughput: the system should be able to handle a relatively high flow of data at a time as multiple students may be using the application all at once. The program should be able to respond to every single request as soon as the command is given without compromising its speed or performance.
* Compatibility: the application should be compatible with different hardware such as computers or mobiles as long as they have a connection to the internet as most functions will require it. Regardless of the device the application is being used on, the performance and functionality should not be affected.

##### Space Requirements

Our software is a web application which means users will not have to download anything to their device. This means that there is no required space needed for the application and the storage of the user's device will not be affected. They will simply have to search for the application online on a search engine to use it.

#### **Dependability**

**Availability**

**Reliability**

The software has to run correctly at all times, even at nights or weekends it should produce the expected outputs for the given inputs consistently. Since this software is going to be used by a large number of students, it must be powerful enough to withhold all the students interacting with it at a time, without crashing or slowing down. It is important that the list of books updates as the students place their requests in real time.

To make sure the system is reliable, it will undergo a lot of testing before it is publicly used and it will be continuously monitored when published. To ensure that the system meets the user expectations, it will also be updated and maintained regularly after publishing

**Monitoring** & **Maintenance**

After publishing the application the developers will continue testing out the system along with students and librarians for the upcoming days to ensure that it withholds all of the user's operating on it at a time while looking for any bugs along the way.

The developers will be in direct contact with the administrator of the system who will report any bug or fault found in the system by any user and will act on it as soon as possible with as little downtime as possible.

The system will be able to run on its own without the need of the developers and will be easily operated by the administrator and librarians. Each student can create their own account in the application and can then use the application to borrow books from the

library without the need of a librarian or developer.

**Integrity & Security**

The integrity of a software is critical for ensuring the reliability, security and trustworthiness of a software system. Therefore the developers must take steps to maintain the software throughout its life cycle.

* Users will only be able to access the given interfaces according to the group they belong to.
* Students and librarians will only be able to change their own accounts data and information.
* The administrator can grant a librarian access to use the system.
* Students will not have direct access to the book database and will not be able to change any data on it.
* Account passwords will have to follow certain rules to make them harder to guess.
* There is no sensitive personal data stored within a user's account.
* Several security measures will be implemented on the software and will be revised continuously.
* The code will be reviewed and examined for any errors or vulnerabilities that could compromise its integrity.

### Organizational Requirements

#### **Environmental Requirements**

#### **Operational Requirements**

#### **Development Requirements**

### External Requirements

#### **Regulatory Requirements**

#### **Ethical Requirements**

#### **Legislative Requirements**

##### Accounting Requirements

##### Security Requirements

## Domain Requirements

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# User Scenarios/Use Cases

APPENDIX

The appendixes are not always considered part of the actual Requirements Specification and are not always necessary. They may include

* Sample input/output formats, descriptions of cost analysis studies, or results of user surveys;
* Supporting or background information that can help the readers of the Requirements Specification;
* A description of the problems to be solved by the system;
* Special packaging instructions for the code and the media to meet security, export, initial loading, or other requirements.

When appendixes are included, the Requirements Specification should explicitly state whether or not the appendixes are to be considered part of the requirements.

1. **Definitions, Acronyms, and Abbreviations**

Define all terms, acronyms, and abbreviations used in this document.

1. **References**

List all the documents and other materials referenced in this document.

1. **Requirements Traceability Matrix**

The following trace matrix examples show one possible use of naming standards for deliverables (FunctionalArea-DocType-NN). The number has no other meaning than to keep the documents unique. For example, the Bargaining Unit Assignment Process Flow would be BUA-PF-01.

For example (1):

| **Business Requirement** | **Area** | **Deliverables** | **Status** |
| --- | --- | --- | --- |
| BR\_LR\_01  The system should validate the relationship between Bargaining Unit/Location and Job Class.---Comments: Business Process = "Assigning a Bargaining Unit to an Appointment" (Priority 1) | BUA | BUA-CD-01  Assign BU Conceptual Design | Accepted |
| BUA-PF-01  Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BUA-PF-01  Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BR\_LR\_09  The system should provide the capability for the Labor Relations Office to maintain the job class/union relationship.---Comments: Business Process = "Maintenance" (Priority 1) | BUA | BUA-CD-01  Assign BU Conceptual Design | Accepted |
| BUA-PF-02  BU Assignment Rules Maint Process Flow Diagram | ReadyForReview |

For example (2):

| **BizReqID** | **Pri** | **Major Area** | **DevTstItems DelivID** | **Deliv Name** | **Status** |
| --- | --- | --- | --- | --- | --- |
| BR\_LR\_01 | 1 | BUA | BUA-CD-01 | Assign BU Conceptual Design | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-DS-02 | Bargaining Unit Assignment DB Modification Description | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-PF-01 | Derive Bargaining Unit-Process Flow Diagram | Accepted |
| BR\_LR\_01 | 1 | BUA | BUA-UCD-01 | BU Assign LR UseCase Diagram | ReadyForReview |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-001 | BU Assignment by PC UseCase - Add Appointment and Derive UBU | Reviewed |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-002 | BU Assignment by PC UseCase - Add Appointment (UBU Not Found) | Reviewed |
| BR\_LR\_01 | 1 | BUA | BUA-UCT-006 | BU Assignment by PC UseCase - Modify Appointment (Removed UBU) | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-CD-01 | Assign BU Conceptual Design | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-DS-02 | Bargaining Unit Assignment DB Modification Description | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-PF-02 | BU Assignment Rules Maint Process Flow Diagram | Accepted |
| BR\_LR\_09 | 1 | BUA | BUA-UCD-03 | BU Assign Rules Maint UseCase Diagram | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-045 | BU Assignment Rules Maint: Successfully Add New Assignment Rule | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-051 | BU Assignment Rules MaintUseCase: Modify Rule | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-053 | BU Assignment Rules MaintUseCase - Review Assignment Rules | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UCT-057 | BU Assignment Rules MaintUseCase: Inactivate Last Rule for a BU | Reviewed |
| BR\_LR\_09 | 1 | BUA | BUA-UI-02 | BU AssignRules Maint UI Mockups | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-021 | BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Success | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-027 | BU Assignment Rules Maint TestCase: Modify Rule - Success | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-035 | BU Assignment Rules Maint TestCase: Add New Rule (Associated Job Class Does Not Exist) - Error Condition | ReadyForReview |
| BR\_LR\_09 | 1 | BUA | BUA-TC-049 | BU Assignment Rules Maint TestCase: Modify Rule - Error Condition | ReadyForReview |

For example (3):

| **BizReqID** | **CD01** | **CD02** | **CD03** | **CD04** | **UI01** | **UI02** | **UCT01** | **UCT02** | **UCT03** | **TC01** | **TC02** | **TC03** | **TC04** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BR\_LR\_01 |  |  | X |  | X |  | X |  |  | X |  | X |  |
| BR\_LR\_09 | X |  |  | X |  | X |  |  | X |  | X |  | X |
| BR\_LR\_10 | X |  |  | X |  |  |  |  | X |  | X |  |  |
| BR\_LR\_11 |  | X |  |  |  |  |  |  |  |  |  |  |  |

1. **Organizing the Requirements**

This section is for information only as an aid in preparing the requirements document.

Detailed requirements tend to be extensive. Give careful consideration to your organization scheme. Some examples of organization schemes are described below:

**By System Mode**

Some systems behave quite differently depending on the mode of operation. For example, a control system may have different sets of functions depending on its mode: training, normal, or emergency.

**By User Class**

Some systems provide different sets of functions to different classes of users. For example, an elevator control system presents different capabilities to passengers, maintenance workers, and fire fighters.

**By Objects**

Objects are real-world entities that have a counterpart within the system. For example, in a patient monitoring system, objects include patients, sensors, nurses, rooms, physicians, medicines, etc. Associated with each object is a set of attributes (of that object) and functions (performed by that object). These functions are also called services, methods, or processes. Note that sets of objects may share attributes and services. These are grouped together as classes.

**By Feature**

A feature is an externally desired service by the system that may require a sequence of inputs to affect the desired result. For example, in a telephone system, features include local call, call forwarding, and conference call. Each feature is generally described in a sequence of stimulus-response pairs, and may include validity checks on inputs, exact sequencing of operations, responses to abnormal situations, including error handling and recovery, effects of parameters, relationships of inputs to outputs, including input/output sequences and formulas for input to output.

**By Stimulus**

Some systems can be best organized by describing their functions in terms of stimuli. For example, the functions of an automatic aircraft landing system may be organized into sections for loss of power, wind shear, sudden change in roll, vertical velocity excessive, etc.

**By Response**

Some systems can be best organized by describing all the functions in support of the generation of a response. For example, the functions of a personnel system may be organized into sections corresponding to all functions associated with generating paychecks, all functions associated with generating a current list of employees, etc.

**By Functional Hierarchy**

When none of the above organizational schemes prove helpful, the overall functionality can be organized into a hierarchy of functions organized by common inputs, common outputs, or common internal data access. Data flow diagrams and data dictionaries can be used to show the relationships between and among the functions and data.

**Additional Comments**

Whenever a new Requirements Specification is contemplated, more than one of the organizational techniques given above may be appropriate. In such cases, organize the specific requirements for multiple hierarchies tailored to the specific needs of the system under specification.

There are many notations, methods, and automated support tools available to aid in the documentation of requirements. For the most part, their usefulness is a function of organization. For example, when organizing by mode, finite state machines or state charts may prove helpful; when organizing by object, object-oriented analysis may prove helpful; when organizing by feature, stimulus-response sequences may prove helpful; and when organizing by functional hierarchy, data flow diagrams and data dictionaries may prove helpful.