[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.

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# Executive Summary

## Project Overview

PharmaLine is a user-friendly, convenient and accessible application that aims to make shopping for pharmaceutical products more efficient for all its users. Our app caters to different user levels, including customers, clerks, managers and the business owner, ensuring that each user can access the functionalities they need based on their access level.

For customers, the application will allow them to browse for products and place orders quickly and easily with just a simple click, erasing the need of visiting multiple shops. They can also comment and rate a product based on their experience, view their profile which includes a purchase history of the items ordered, and have multiple payment options including credit cards, debit cards, and digital wallets to accommodate customers' different preferences. The application also offers a Wishlist feature that allows customers to order products in advance that are currently out of stock or unavailable for any other reason.

For clerks and managers, the application provides better inventory management tools and organized sales data, making it easier for them to aid clients and more. They have the option of adding and removing products, with the clerk being more involved in this role. They can also check daily sales and the list of products displayed on the page, the number of products per category, and how many products are currently available. Both the owner and manager have the option of checking monthly sales reports.

The system also includes customized recommendations based on the customer's purchase history or search history. For example, if a customer has previously purchased cold and flu medication, the system can recommend them other cold and flu-related products. The application also provides product availability notifications to customers when products they have shown interest in are back in stock or available for purchase. Customers can track the status of their orders in real-time, including when they have been shipped and estimated delivery dates. The system also allows customers to compare products side-by-side based on features, price, and other factors.

The application also includes a store locator feature that shows customers the nearest physical store location based on their location. It integrates with social media platforms to allow customers to share their favorite products or promotions with their friends and followers. Additionally, the system can integrate with chatbots to provide customers with instant support and assistance. Customers have the option of referring their friends to the store through the referral program, receiving rewards for each successful referral.

Overall, PharmaLine is designed to provide an efficient and effective solution for customers, clerks, managers and the business owner, ensuring that everyone benefits from the ease and convenience of the application. It aims to revolutionize the way people shop for pharmaceutical products, providing a more accessible, convenient, and user-friendly experience.

## Purpose and Scope of this Specification

The purpose of this specification is to assess the current state of the product design and to document the entire process based on design issues and the audience.

This specification encompasses several aspects of the process being discussed in as broad scope as possible. Thus, in this scope we address the following:

* In depth documentation of the features of the product,
* Technical overview of the system processes and views,
* This is discussed in Part 2.1 and throughout the document,
* User and System Requirements,
* Components & Functional/non-functional requirements,
* These are discussed in Part 3 in some detail,
* Definition of users’ means of using and accessing the product,
* Use cases/scenarios discussed in Part 4,
* Dependencies and Constraints,
* These are discussed in Part 2.4/5 of the Document,

Aspects not included in the scope are as follows:

* Legislative requirements for the product
* Auditing and financial considerations of the product

# Product/Service Description

This app is designed to provide an easy and efficient way for users to purchase medicine and skincare products. Users can browse through a wide selection of products and place orders with just a few taps on their phone. Additionally, users can bookmark items and set a reminder to repurchase at a later date.

For clerks, the app provides an intuitive interface for managing inventory, processing orders, and tracking shipments. The app makes it easy to add new products, update prices, and manage stock levels.

For managers and owners, the app provides access to real-time sales data, inventory reports, and customer feedback. The app also makes it easy to manage promotions and discounts, as well as track the performance of individual products. Overall, the app streamlines the process of buying and selling medicine and skincare products for both consumers and businesses.

## Product Context

## PharmaLine is a revolutionary application designed to make shopping for pharmaceutical products more accessible and convenient. Its purpose is to simplify the process of purchasing prescription medication and over-the-counter drugs, while also providing a comprehensive resource for clients and healthcare professionals.

## PharmaLine is designed with the user in mind and is focused on providing a high level of accessibility and convenience. It offers an intuitive interface that makes it easy to search for and purchase the products that clients need. The application also provides a wealth of information on the medications, including dosage, side effects, and potential interactions with other drugs.

## By offering a cloud-based solution, PharmaLine eliminates the need for patients to visit multiple pharmacies in person or make phone calls to check availability or prices. The application allows clients to easily access a wide range of pharmaceutical products.

## With PharmaLine, client can rest assured that their medical information is kept secure and private. The application is compliant with all necessary regulations and provides a safe and secure platform for clients to manage their healthcare needs.

## PharmaLine is a game-changer for the pharmaceutical industry, offering a more accessible, convenient, and user-friendly solution for clients and healthcare professionals.

## User Characteristics

**Customers:**

* Can use PharmaLine to browse and purchase pharmaceutical items
* Checks purchase history and gives feedback on items
* Rates items based on personal experience
* Uses a wishlist to pre-order items that are out of stock or unavailable
* Makes use of personalized product suggestions
* Pays using a variety of payment methods, including credit cards, debit cards, and digital wallets
* Tracks orders and compares products
* Interacts with social networking platforms through the app
* Can be use by wide range of individuals from teenagers to elderly people
* Elderly people who may have mobility or transportation issues and prefer the convenience of ordering their medications online and they can also save time by bookmarking items and setting reminders to purchase them at a later date.
* Teenagers or adults who can be more interested in skincare and want to browse for items, leave comments, and read reviews.

**Managers:**

* Add or delete offers and discounts in the blog section
* Manage the inventory and product listings
* Check daily sales and monthly sales reports
* Administer the blog section

**For Clerks:**

* Check the items bought by a single user or the list of purchasers for a particular product
* Add and delete products
* Inspect product listings and availability
* Help customers with any issues related to the app

**Business Owners:**

* Access all features available to managers and clerks
* Monitor the overall performance of the store
* Make strategic decisions based on the sales data and user feedback

## Assumptions

* It is presumed that every user is familiar with the fundamentals of handling electronic equipment (e.g., smartphones, tablets, computers, etc.).
* In order to access the webpage, the electronic device must be online.
* Electronic devices are assumed to one of the after mentioned operating systems: Microsoft Windows, Android OS and Apple IOS.
* Users of all ages should be able to quickly navigate the website thanks to its simple and user-friendly interface.
* User data that is entered or collected by the system, is assumed to only be used by the shipment company.
* It is assumed that the team won't falter along the road and that the project's cost won't fluctuate during development.

## Constraints

There are a number of items that will likely constrain the design options, including:

* The diverse age target, our system is aimed at both younger and older audiences, ranging from teenagers to the elderly, which creates issues regarding the design of a user-interface modern enough to entertain the youth, while simultaneously being easy to use for our older clientele.
* Every clerk, manager and the owner must log in/register with their personal username in order to carry out their respective duties, as aforementioned in the user characteristics section.
* There should be provided fast internet connection so the app can work properly.
* Costumer log in is optional, however required if the user is interested in notifications regarding their medicine refill, discount offers, and having a place in the ranking list.

## Dependencies

* Users must log in to access their account information and personalized features.
* The app must have access to real-time inventory data from the shops to ensure accurate product information.
* The app must be able to process multiple payment options including credit cards, debit cards, and digital wallets.
* The clerk and manager must have the ability to add and remove products from the inventory.
* The manager and owner must be able to access daily sales data, monthly reports, and manage the blog section.
* The system must provide customized recommendations to customers based on their purchase and search history.
* The system must be able to track the status of orders and provide real-time updates to customers.
* The app must have a store locator feature that shows customers the nearest physical store location based on their location.
* The system must integrate with social media platforms to allow customers to share their favorite products or promotions with their friends and followers.
* The system must integrate with chatbots to provide customers with instant support and assistance.
* The referral program should be implemented to reward customers who refer their friends to the store.
* The app must have a reliable internet connection to function properly.
* The app must be compatible with the latest mobile devices and operating systems.
* Proper training must be provided to the staff to ensure they can effectively use the inventory management tools and sales data provided by the app.

These dependencies are critical to the functionality of the app, and failure to meet these requirements can result in a negative customer experience, loss of sales, and reduced efficiency for the shop personnel. Therefore, it is essential to carefully consider these dependencies during the development and implementation process of the PharmaLine application.

# 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

| **Req#** | **Requirement** | **Comments** | **Priority** | **Date Rvwd** | **SME Reviewed / Approved** |
| --- | --- | --- | --- | --- | --- |
| R\_01 | The system must allow the user to login and register. | Logging in or creating an account by verifying the entered credentials should be done by the system. | 1 |  |  |
| R\_02 | User must be able to log in through an email and a password they have provided during registry. |  | 1 |  |  |
| R\_03 | The system must offer different views and options for different user levels. | Based on the user level the webpage will present different views/options. | 1 |  |  |
| R\_04 | All user levels must be able to search through the product list. | The webpage should have an input field, preferably a search bar, where the user can look up a product. This should be accessible even for logged off/anonymous users. | 1 |  | Bob Dylan, Mick Jagger |
| R\_05 | System should allow logged in customers to leave comments and reviews on products. |  | 2 |  |  |
| R\_06 | System should save the purchase data of an account. | Customers should have the option to check their purchase history, for products they may have purchased when they were logged in. | 3 |  |  |
| R\_07 | System must offer multiple payment options to customers. | Customers should be allowed to use credit card, debit cards, and crypto cards to make an online purchase. | 1 |  |  |
| R\_08 | Logged in customers, should be allowed to save certain products in their Wishlist. |  | 3 |  |  |
| R\_09 | Logged in customers should have the option to view their wish list. |  | 3 |  |  |
| R\_10 | Clerk and Manager users must be allowed to add products in the database. | It is expected that logged in managers and clerks will have an option available, where they can add new products into the database. The new products should be available to all user levels. | 1 |  |  |
| R\_11 | Clerk and Manager users must be allowed to make any additional changes to existing products of the database. | It is expected that logged in managers and clerks will have an option to edit a products information. | 1 |  |  |
| R\_12 | The system should be able to provide a daily sales report to Managers and Admins/Owners. | This option should be available only for these two user levels. | 2 |  |  |
| R\_13 | The system must allow Managers to access the full list of products located in the database. | Managers should be able to view all products, even those who have been flagged as out of stock. | 2 |  |  |
| R\_14 | The system must be able to provide a monthly report to Managers and Admins/Owners. | This option should be available only for these two user levels. | 1 |  |  |
| R\_15 | Admins/Owners should have an option available that allows them to edit the websites main blog. |  | 3 |  |  |
| R\_16 | Admins/Owners must have an option available that allow them to create discount codes. | Admins/Owners should be able to create discount codes and declare their active period. | 1 |  |  |
| R\_17 | Admins/Owners should have an option to flag a product as the product of the day. |  | 3 |  |  |
| R\_18 | Managers should be able to check products purchased by specific customers. | The user info accessible by the manager should only be the customers username, email and order information. | 2 |  |  |
| R\_19 | Managers should be able to check a list of buyers for a specific product. |  | 2 |  |  |
| R\_20 | The system should be able to customize a customer’s recommendations based on their searched products. |  | 2 |  |  |
| R\_21 | The system should allow the customer to flag a unavailable product. | This way the user can be notified when that product is back in stock. | 2 |  |  |
| R\_22 | The system should send a notification to a customer when a flagged product has been restocked. |  | 2 |  |  |
| R\_23 | The system should provide an order tracking option. | The customer should be able to see the status of their order | 3 |  |  |
| R\_24 | The system should have an option that allows a customer, logged in or logged out, to compare two products side by side on the screen. |  | 3 |  |  |
| R\_25 | There should be an option available on each product page, where the user can share the product in other social platforms. |  | 3 |  |  |
| R\_26 | An option should be available to all user levels, where they can report certain bugs or issues they seem to be facing. | There should be a form filled out, where the user describes the problem, they seem to be facing. The problem can be related to the backend or the frontend issues. | 1 |  |  |
| R\_27 | The system should have an AI option, where the user can ask general questions regarding a product or on how to do an action. |  | 3 |  |  |
| R\_28 | The system should provide customized product recommendations based on the customer's purchase history or search history. |  | 2 |  |  |
| R\_29 | The system should support multiple payment options, including credit cards, debit cards, and digital wallets, to accommodate customers' preferences. |  | 1 |  |  |
| R\_30 | The system should include a blog management feature where the owner can add and remove offers, choose the product of the day, and display available discounts. |  | 1 |  |  |
| R\_31 | The system should allow the manager to check the products purchased by a specific user, with only the username displayed for privacy reasons. |  | 3 |  |  |
| R\_32 | The system should allow the manager to check the list of buyers for a specific product, with only the username displayed for privacy reasons. |  | 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

* + Requirements which specify that the delivered product must behave in a particular way e.g. execution speed, reliability, etc.

#### **User Interface Requirements**

In addition to functions required, describe the characteristics of each interface between the product and its users (e.g., required screen formats/organization, report layouts, menu structures, error and other messages, or function keys).

#### **Usability**

Include any specific usability requirements, for example,

Learnability

* The user documentation and help should be complete
* The help should be context sensitive and explain how to achieve common tasks
* The system should be easy to learn

(See <http://www.usabilitynet.org/>)

#### **Efficiency**

##### Performance Requirements

Specify static and dynamic numerical requirements placed on the system or on human interaction with the system:

* Static numerical requirements may include the number of terminals to be supported, the number of simultaneous users to be supported, and the amount and type of information to be handled.
* Dynamic numerical requirements may include the number of transactions and tasks and the amount of data to be processed within certain time period for both normal and peak workload conditions.

All of these requirements should be stated in measurable form. For example, "95% of the transactions shall be processed in less than 1 second" rather than “an operator shall not have to wait for the transaction to complete”.

##### Space Requirements

#### **Dependability**

**Availability**

Include specific and measurable requirements for:

* Hours of operation
* Level of availability required
* Coverage for geographic areas
* Impact of downtime on users and business operations
* Impact of scheduled and unscheduled maintenance on uptime and maintenance communications procedures
* reliability (e.g., acceptable mean time between failures (MTBF), or the maximum permitted number of failures per hour).

**Reliability**

**Monitoring**

Include any requirements for product or service health monitoring, failure conditions, error detection, logging, and correction.

**Maintenance**

Specify attributes of the system that relate to ease of maintenance. These requirements may relate to modularity, complexity, or interface design. Requirements should not be placed here simply because they are thought to be good design practices.

**Integrity**

#### **Security**

Specify the factors that will protect the system from malicious or accidental access, modification, disclosure, destruction, or misuse. For example:

* encryption
* activity logging, historical data sets
* restrictions on intermodule communications
* data integrity checks

Specify the Authorization and Authentication factors. Consider using standard tools such as PubCookie.

### Organizational Requirements

Requirements which are a consequence of organisational policies and procedures e.g. process standards used, implementation requirements, etc

#### **Environmental Requirements**

#### **Operational Requirements**

#### **Development Requirements**

### External Requirements

* + Requirements which arise from factors which are external to the system and its development process e.g. interoperability requirements, legislative requirements, etc.

#### **Regulatory Requirements**

#### **Ethical Requirements**

#### **Legislative Requirements**

Specify the requirements derived from existing standards, policies, regulations, or laws (e.g., report format, data naming, accounting procedures, audit tracing). For example, this could specify the requirement for software to trace processing activity. Such traces are needed for some applications to meet minimum regulatory or financial standards. An audit trace requirement may, for example, state that all changes to a payroll database must be recorded in a trace file with before and after values

##### Accounting Requirements

##### Security Requirements

## Domain Requirements

Everything related to the domain that might be needed in the project shall be mentioned here. Sometimes the domain Requirements might be thought of as part of either functional or non-functional requirements.

Please provide all necessary non-functional requirements, similar to the requirements explained in the lesson slides or in the textbook.

# User Scenarios/Use Cases

* 1. ***Use Cases***
  2. ***State Machine Diagram***

1. Online customer



2. Store clerk



3. Manager



4. Admin/Owner



5. Check out



Diagram

Description automatically generated6. Wishlist

7. Checking revenue

8. Adding to CartA picture containing text, diagram, screenshot, font

Description automatically generated

9. Login



***4.2 Activity Diagram***

1. Customer creates account

1. Items check



1. Owner opens the orders
2. User log in

  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
5. Purchasing a product

6. Adding a new product   
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
7.Manager adding/removing/offering   
  
  
  
  
  
  
  
8.Managing of the reports  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
  
9. Customer order tracking and product comparison   
  


10. Clerk approve the order



11. System prepares order



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.

