Homework 4

List of Formats of writing requirements are mentioned below:

**Natural language**: The requirements are written in simple language, each sentence explains one requirement.

**Structured natural language**: The requirements are stated in simple language on a standard form or template. Each field contains information on a specific aspect of the requirement.

**Design description languages:** In this technique, any programming language is used to define requirements. It utilizes a more abstract manner to explain needs, by creating a model of the system. This method is hardly utilized nowadays.

**Graphical notations**: Graphical models, supplemented by text annotations, are used to define the functional requirements for the system. UML use case and sequence diagrams are used to specify the requirements.

**Mathematical specifications**: This model used concepts like finite-state machines or sets to define requirements. Although these unambiguous specifications can reduce the ambiguity in a requirements document, most customers don’t understand a formal specification.

The above notations are referred from “modern software engineering “.

I have decided to discuss more on below two requirements notation:

* Natural Language.
* Structured natural language.

I will be discussing more on natural language and structured natural language notations.

Natural Language:

The requirements written in natural language are easy to understand and can be understood by a wide range of stakeholders, such as clients and domain experts. This provides better communication. This document is self-explanatory. The requirements written in natural language have clarity, which creates a clear picture of what the requirements are. Although all stakeholders understand the requirements, it is difficult to know exactly what to do and how to test them. There is no need for any specialized training or knowledge to understand the requirements. The link “<https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=3e1c5d153e2f719065f60b1b869aca0a57ef94f2>” explains more about how ambiguous and inconsistent a requirement written in natural language can be.

Structured natural language:

These provide a clear and structured format for explaining a requirement, which reduces confusion and provides more details on the requirements. When compared to natural language notation, requirements are defined in a more detailed manner in this notation. It gives a clear picture of what to do and how that requirement can be tested. This follows a predefined template, ensuring the information is consistent with all the stakeholders when documenting requirements. Structured requirements can be easily integrated into tracking tools for better control and monitoring. The research paper “<https://www.academia.edu/15266447/Structured_natural_language_requirements_in_nuclear_energy_domain_towards_improving_regulatory_guidelines>” further explains how structural language is preferred while gathering the requirements.

Differences

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| Aspect | Natural Language | Structured natural language |
| Accessibility | Easily understood by various stakeholders including clients, developers, and non-technical leads. | May require technical familiarity, this is more specific to technical people. |
| Simplicity | Simple and straight forward, minimal or no training is required. | Training may require understanding the requirements. |
| Clarity | It depends on the requirement, if its more high-level requirement, there will be clarity for a non-technical person, but a developer may need more clarity to implement the requirement. | Provides clean and structed description providing what do implement. |
| Consistency | May vary in structure depends on where the requirement is mentioned such as in a complete project documentation, in a specified group documentation leading to ambiguity. | Enforces consistency through a predefined format, ensuring uniformity. This form of requirement is consistently same across the documentation. |
| Flexibility | Allows flexibility in writing with different writing styles as there is no defined format by default. | Not flexible as it has predefined template. |

After taking the above things into consideration, I have decided to write my requirements in structured natural language for following reasons:

As a developer, I need to have more details on what exactly to do to implement the requirements.

Structured natural language provides more details on this. It also specifies how to test the requirements and what needs to be achieved.

Structured natural language specifies the requirements based on who uses it. It has a field called acceptance criteria when a task is mentioned based on the user's role. For instance, if I must work on adding data into a database, I will mention it as 'As an admin, I should be able to add data to the database.' If this task is only for admins, this user story is useful only for admins.

More specific details like sample URL, sample request, and response are mentioned in the requirement.