**User Requirements & System Requirements**

The requirements for a system are the descriptions of the services that a system should provide and the constraints on its operation. These requirements reflect the needs of customers for a system that serves a certain purpose such as controlling a device, placing an order, or finding information. The process of finding out, analyzing, documenting and checking these services and constraints is called requirements engineering (RE).

Some of the problems that arise during the requirements engineering process are a result of failing to make a clear separation between these different levels of description. we distinguish between them by using the term user requirements to mean the high-level abstract requirements and system requirements to mean the detailed description of what the system should do. User requirements and system requirements may be defined as follows:

1. **User requirements** are statements, in a natural language plus diagrams, of what services the system is expected to provide to system users and the constraints under which it must operate. The user requirements may vary from broad statements of the system features required to detailed, precise descriptions of the system functionality.
2. **System requirements** are more detailed descriptions of the software system’s functions, services, and operational constraints. The system requirements document (sometimes called a functional specification) should define exactly what is to be implemented. It may be part of the contract between the system buyer and the software developers.

Different kinds of requirement are needed to communicate information about a system to different types of reader. Figure illustrates the distinction between user and system requirements.

This example from the mental health care patient information system (Mentcare) shows how a user requirement may be expanded into several system requirements. You can see from Figure that the user requirement is quite general. The system requirements provide more specific information about the services and functions of the system that is to be implemented.

You need to write requirements at different levels of detail because different types of readers use them in different ways. Figure below shows the types of readers of the user and system requirements.

The readers of the user requirements are not usually concerned with how the system will be implemented and may be managers who are not interested in the detailed facilities of the system. The readers of the system requirements need to know more precisely what the system will do because they are concerned with how it will support the business processes or because they are involved in the system implementation.

The different types of document readers shown in Figure above are examples of system stakeholders. As well as users, many other people have some kind of interest in the system. System stakeholders include anyone who is affected by the system in some way and so anyone who has a legitimate interest in it. Stakeholders range from end-users of a system through managers to external stakeholders such as regulators, who certify the acceptability of the system. For example, system stakeholders for the Mentcare system include:

1. Patients whose information is recorded in the system and relatives of these patients.
2. Doctors who are responsible for assessing and treating patients.
3. Nurses who coordinate the consultations with doctors and administer some treatments.
4. Medical receptionists who manage patients’ appointments.
5. IT staff who are responsible for installing and maintaining the system.
6. A medical ethics manager who must ensure that the system meets current ethical guidelines for patient care.
7. Health care managers who obtain management information from the system.
8. Medical records staff who are responsible for ensuring that system information can be maintained and preserved, and that record keeping procedures have been properly implemented.

Requirements engineering is usually presented as the first stage of the software engineering process. However, some understanding of the system requirements may have to be developed before a decision is made to go ahead with the procurement or development of a system. This early-stage RE establishes a high-level view of what the system might do and the benefits that it might provide. These may then be considered in a feasibility study, which tries to assess whether or not the system is technically and financially feasible. The results of that study help management decide whether or not to go ahead with the procurement or development of the system.

Pl refer the following URL for an example of UR & SR:

[Concept of User and System Requirements (collegenote.pythonanywhere.com)](https://collegenote.pythonanywhere.com/curriculum/software-engineering-csit/54/309/)

**User Requirements:**

-should describe the functional and non-functional requirements so that they are understandable by system users without detailed technical knowledge.

-they should only specify the external behaviour of the system and should avoid, as far as possible, system design characteristics.

Problems that may arise when requirements are written in natural language:

Lack of clarity

Requirements confusion

Requirements amalgamation

**System Requirements:**

-these are expanded versions of the user requirements that are used by software engineers as the starting point for system design.

-they add detail and explain how the requirements should be provided by the system.

-ideally, the system requirements should simply describe the external behaviours of the system and its operational constraints. They should not be concerned with how the system should be designed or implemented.