**Lecture: 5**
**Software Requirements**

The software requirements are description of features and functionalities of the target system. Requirements convey the expectations of users from the software product.

- The requirements for a system are the description of what the system should do- the services that it provides and the constraints on its operation.

**Functional and non-functional requirements:**

Software system requirements are often classified as functional requirements or non functional requirements:

- **Functional Requirements:**
  - Requirements which are related to functional aspect of software fall into this category. They define functions and functionality within and from the software system.
  - These are statements of services the system should provide, how the system should react to particular inputs, and how the system should behave in particular situations.
  - In some cases, the functional requirements may also explicitly state what the system should not do.
  - Examples:
    - Search option given to user to search from various invoices.
    - User should be able to mail any report to management
    - Users can be divided into groups and groups can be given separate rights

- **Non Functional Requirements:**
  - Requirements, which are not related to functional aspect of software, fall into this category.
  - They are implicit or expected characteristics of software, which users make assumption of.
  - These are basically the quality constraints that the system must satisfy according to the project contract.
  - Non functional requirements may affect the overall architecture of a system rather than the individual components. e.g. to ensure that performance requirements are met, you may have to organize the system to minimize communications between components.

- Non-functional requirements include:
  - Security
  - Storage
  - Configuration
  - Cost
  - Disaster Recovery
  - Interoprability

**Requirement Engineering:**
The process to gather the software requirements from client, analyze and document them is known as requirement engineering.
The goal of requirement engineering is to develop and maintain sophisticated and descriptive "System Requirements Specification" document.

**Requirement Engineering Process:**
It is a four step process, which includes:
- **Feasibility Study**
- **Requirement Gathering**
- **Software Requirement Specification**
- **Software Requirement Validation**

**Feasibility Study:**
- When the client approaches the organization for getting the desired product developed, it comes up with rough idea about what all functions the software must perform and which all features are expected from the software.
- Referencing to this information, the analysts does a detailed study about whether the desired system and its functionality are feasible to develop.
- This feasibility study is focused towards goal of the organization. This study analyzes whether the software product can be practically materialized in terms of implementation, contribution of project to organization, cost constraints and as per values and objectives of the organization.
- It explores technical aspects of the project and product such as usability, maintainability, productivity and integration ability.
- The output of this phase should be a feasibility study report that should contain adequate comments and recommendations for the management about whether or not the project should be undertaken.

**Requirement Gathering:**

- If the feasibility report is positive towards undertaking the project, next phase starts with gathering requirements from the user. Analysts and engineers communicate with the client and end-users to know their ideas on what the software should provide and which features they want the software to include

**Software Requirement Specification:**

- SRS is a document created by the system analyst after the requirements are collected from various stakeholders.
- SRS defines how the intended software will interact with hardware, external interfaces, speed of operation, response time of system, portability of software across various platforms, maintainability, speed of recovery after crashing, Security, Quality, Limitations etc.
- The requirements received from client are written in natural language. It is the responsibility of system analyst to document the requirements in technical language so that they can be comprehended and useful by the software development team.
- SRS should come up with following features:
    - User requirements are expressed in natural language.
    - Technical requirements are expressed in structured language, which is used inside the organization.
    - Design description should be written in pseudo code.
    - Format of Forms and GUI screen prints
    - Conditional and mathematical notations for DFDs etc.

**Software Requirement Validation:**

- After requirement specifications are developed, the requirements mentioned in this document are validated.
- User might ask for illegal, impractical solutions or experts may interpret the requirements incorrectly.
- This results in huge increase in cost if not nipped in the bud.
- Requirements can be checked against following conditions:
    - If they can be practically implemented.
    - If they are valid and as per functionality and domain of software.
    - If there are any ambiguities
    - If they are complete.
    - If they can be demonstrated.