BACHELOR OF COMPUTER APPLICATIONS
(B.C.A)
SEMESTER – IV
Software Engineering

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UNIT - II

REQUIREMENTS ANALYSIS

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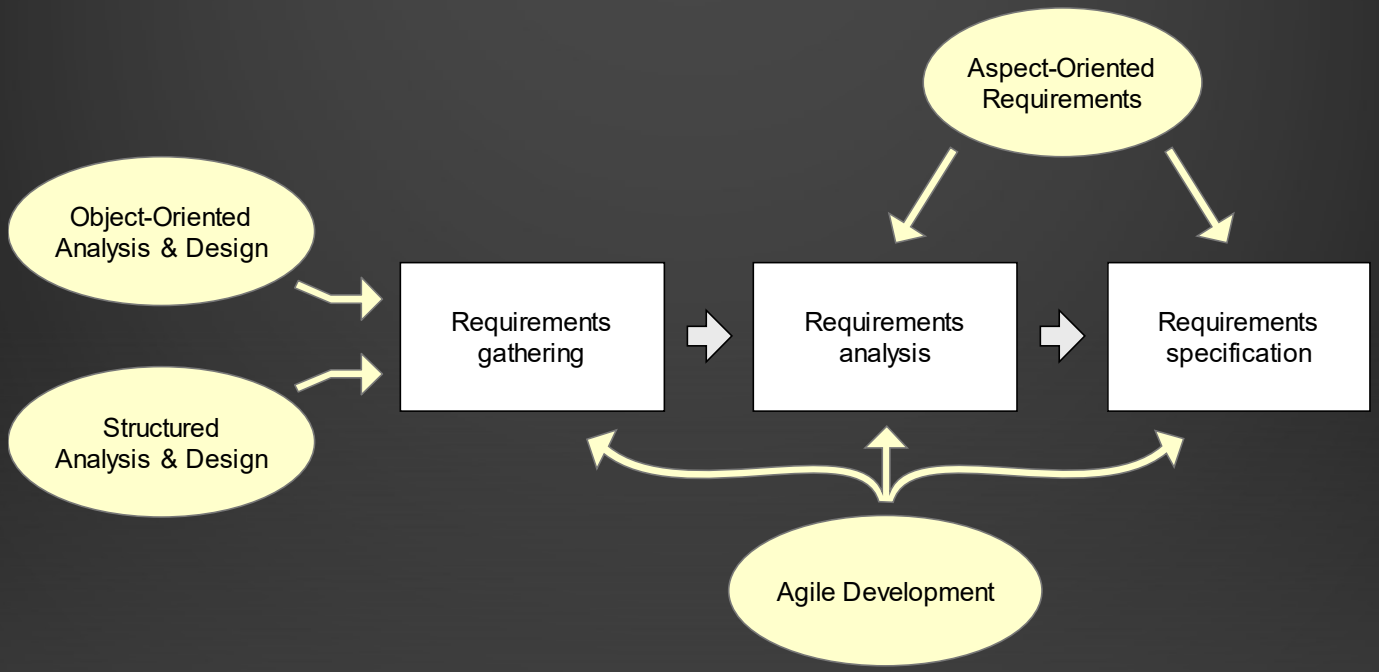
- Requirement REQ-3 states that intruders will not be able to succeed with a "dictionary attack," but many details need to be considered and many parameters determined ("business policies")
  - What distinguishes user's mistakes from "dictionary attacks"
    - The number of allowed failed attempts, relative to a predefined threshold value
      - The threshold shall be small, say three ← business policy!
  - How is the mechanical lock related to the "blocked" state?
    - Can the user use the mechanical key when the system is "blocked"?
- Requirement REQ-5 states that the keypad should be backlit when dark
  - Is it cost-effective to detect darkness vs. keep it always lit?
- Etc.

Requirements analysis should not be exhaustive,
but should neither be avoided.

SOFTWARE REQUIREMENTS

- A **requirement** specifies the business functions that the user will be able to perform using the system-to-be in different "situations" or "contexts", and the kind of experience the user will have during this work
  - Other concerns, such as how the system will manage the resources (computing, network, …), how the system will manage and protect user's data, etc.
- User requirements will often be high-level, vague and incomplete. They are more like high-level goals, or business goals, rather than software requirements needed by the developer
- When trying to achieve a given high-level goal, we will need to consider what matters, what are the important parameters, so that we can derive the detailed technical requirements
- Only based on deeper understanding of detailed issues, we can identify important "scenarios" or "situations" and identify what parameters should be considered in each situation
- Then using these parameters, we decide what the system should do, or how to respond to this situation (i.e., inputs)

REQUIREMENTS PROCESS



SYSTEM SCOPE

- System Scope describes the current systems that the required application package is expected to replace or interface with. The description contains a table that describes the functionality of each system, and relates systems to business activities that are supported and business objects that are managed (from the Business Scope).

UNDERSTAND THE PROBLEM

- *Who has a stake in the solution to the problem?* That is, who are the stakeholders?
- *What are the unknowns?* What data, functions, and features are required to properly solve the problem?
- *Can the problem be compartmentalized?* Is it possible to represent smaller problems that may be easier to understand?
- *Can the problem be represented graphically?* Can an analysis model be created?

PLAN THE SOLUTION

- *Have you seen similar problems before?* Are there patterns that are recognizable in a potential solution? Is there existing software that implements the data, functions, and features that are required?
- *Has a similar problem been solved?* If so, are elements of the solution reusable?
- *Can subproblems be defined?* If so, are solutions readily apparent for the subproblems?
- *Can you represent a solution in a manner that leads to effective implementation?* Can a design model be created?

CARRY OUT THE PLAN

- *Does the solutions conform to the plan?* Is source code traceable to the design model?
- *Is each component part of the solution provably correct?* Has the design and code been reviewed, or better, have correctness proofs been applied to algorithm?

EXAMINE THE RESULT

- *Is it possible to test each component part of the solution?* Has a reasonable testing strategy been implemented?
- *Does the solution produce results that conform to the data, functions, and features that are required?* Has the software been validated against all stakeholder requirements?

THE 3 C'S OF A GOOD SRS

- CORRECTNESS
- COMPLETENESS
- CONSISTENCY

CORRECTNESS

- User review is used to ensure the correctness of requirements stated in the SRS. SRS is said to be correct if it covers all the requirements that are actually expected from the system

COMPLETENESS

- Completeness of SRS indicates every sense of completion including the numbering of all the pages, resolving the to be determined parts to as much extent as possible as well as covering all the functional and non-functional requirements properly.

CONSISTENCY

- Requirements in SRS are said to be consistent if there are no conflicts between any set of requirements. Examples of conflict include differences in terminologies used at separate places, logical conflicts like time period of report generation, etc.

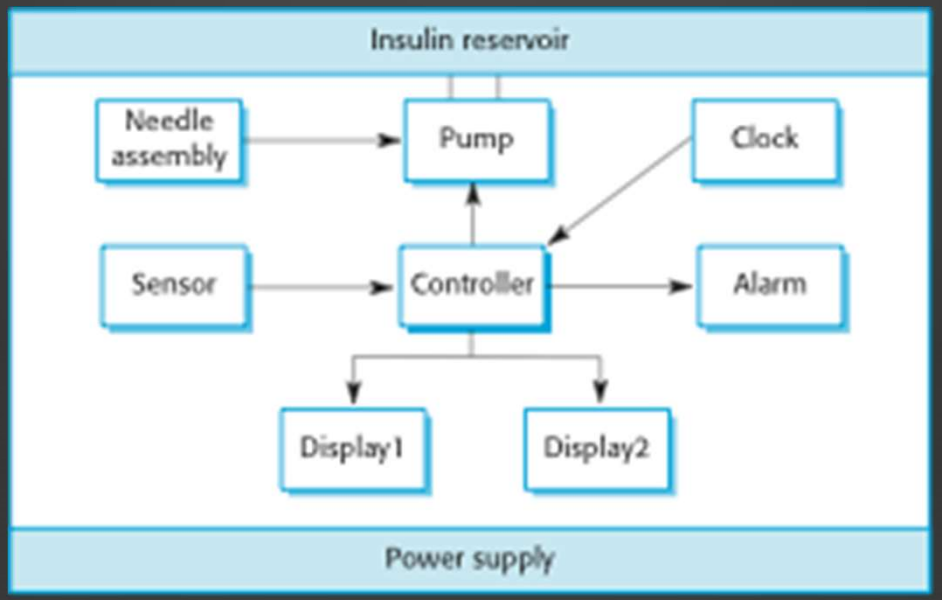
CASE - STUDY

A PERSONAL INSULIN PUMP

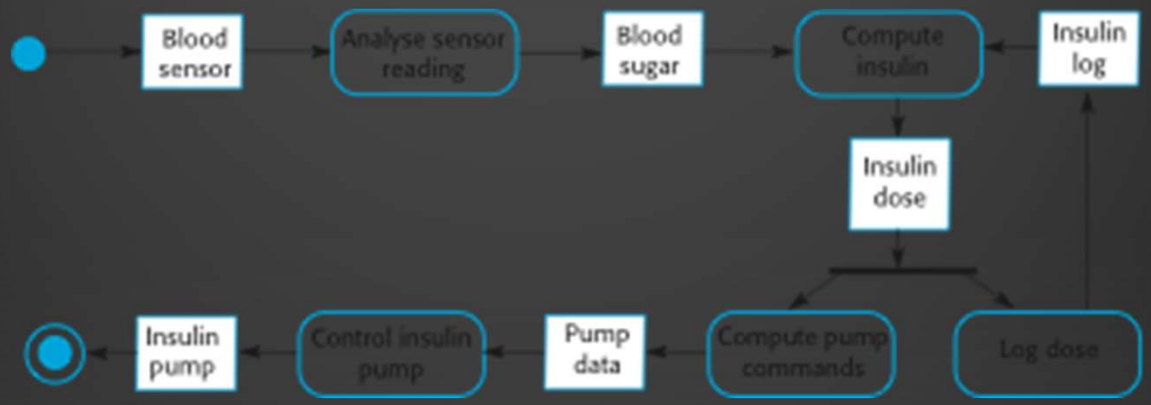
INSULIN PUMP CONTROL SYSTEM

- Collects data from a blood sugar sensor and calculates the amount of insulin required to be injected.
- Calculation based on the rate of change of blood sugar levels.
- Sends signals to a micro-pump to deliver the correct dose of insulin.
- Safety-critical system as low blood sugars can lead to brain malfunctioning, coma and death; high-blood sugar levels have long-term consequences such as eye and kidney damage.

INSULIN PUMP HARDWARE ARCHITECTURE



ACTIVITY MODEL OF THE INSULIN PUMP



ESSENTIAL HIGH-LEVEL REQUIREMENTS

- The system shall be available to deliver insulin when required.
- The system shall perform reliably and deliver the correct amount of insulin to counteract the current level of blood sugar.
- The system must therefore be designed and implemented to ensure that the system always meets these requirements.

DECLARATION

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THANK YOU!!!