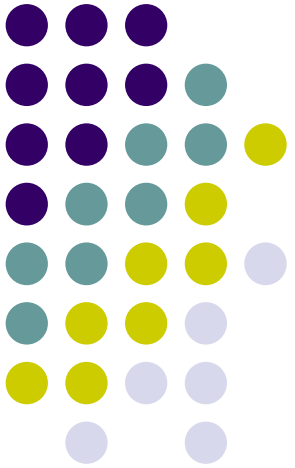
Software Requirements

-Pete Sawyer



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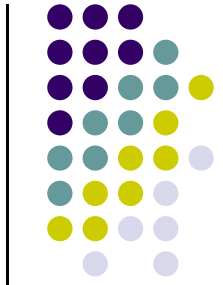
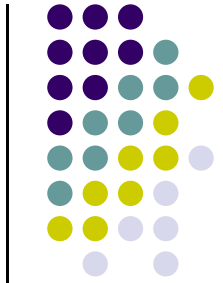
200312136
Computer Engineering

The Context of Software Requirements



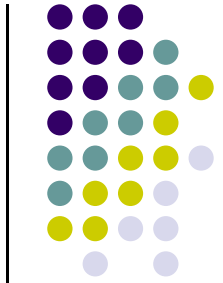
- Software Requirements
  - Concern the specification of software system
- Requirements Engineering (RE)
  - Deal with all aspects of problem and solution
  - Very close with Software Requirements

Requirements and Constraints



- What is the Requirement?
  - Define a property or capability
  - Functional requirement
    - Function the software must perform
  - Nonfunctional requirement
    - Describe qualities of a system (How well)
    - Reliability, Availability, Security, Safety, Usability and performance requirements

Requirements and Constraints

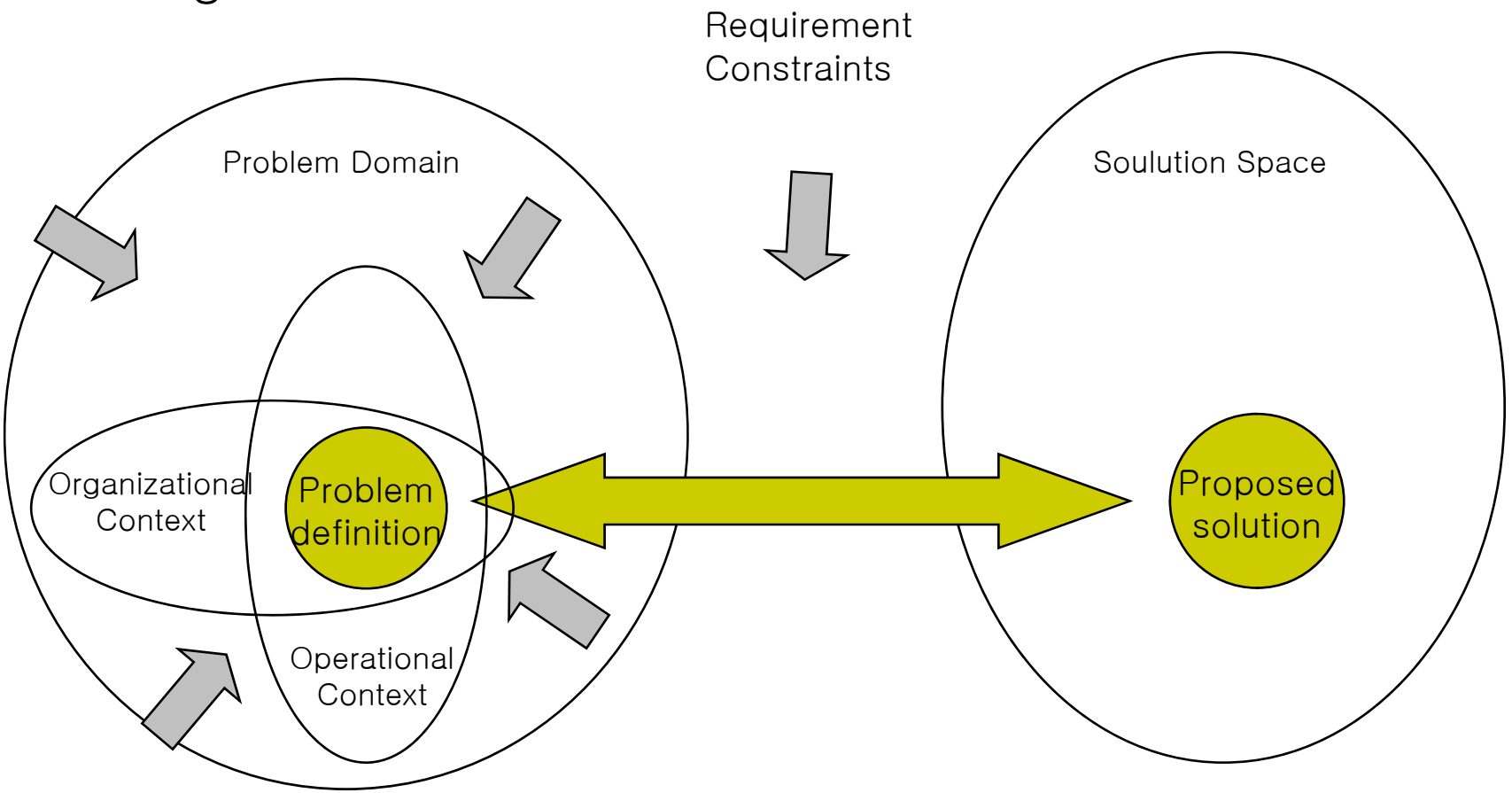


- Some are emergent properties
  - Depend on a wide range of factors
  - Hard to analyze and control

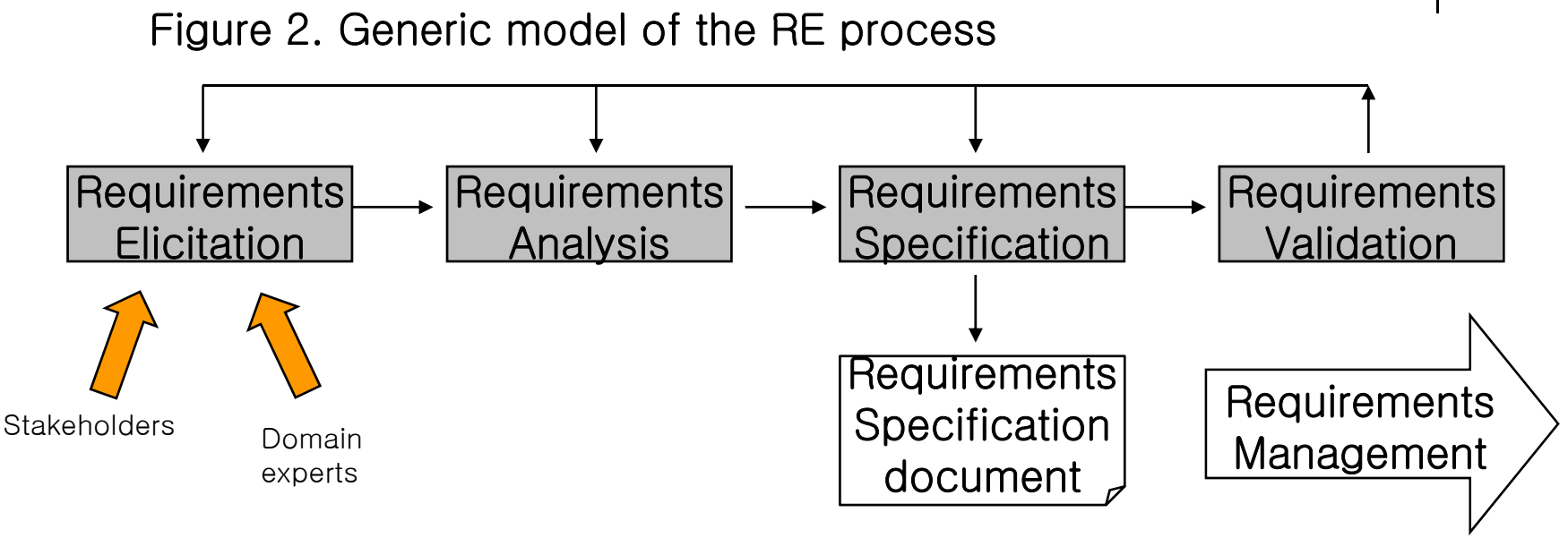
- Constraint
  - Negative requirement
  - Limit possible solutions to the business problem

Requirements and Constraints

- Figure 1

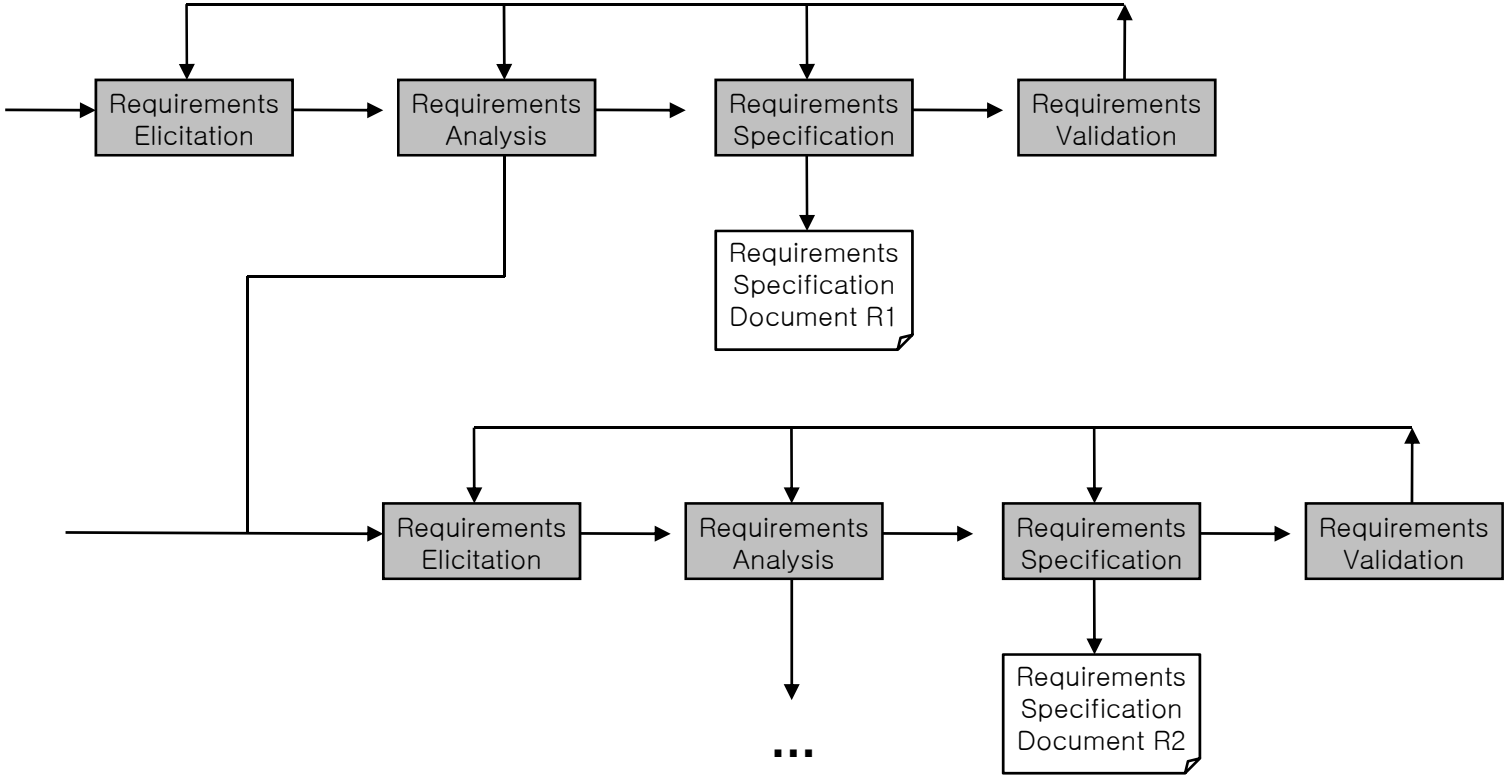


Requirements Engineering Process



- Elicit – Analysis – Specification – Validate – Manage
- Software Requirements Specification(SRS)

Requirements Engineering Process



- Not a simple front-end activity but lasts the whole product life cycle

Requirements Elicitation

- Process of discovering the requirements
- Require iterant process
  - Collecting information
  - Clarify
  - Correcting
  - Reformulating
- Explicit definition of the project scope help elicitation

Requirements Elicitation –Requirements Sources

- Primary sources are stakeholders
  - Identifying the stakeholders is crucial
  - Stakeholder have own viewpoints
  - Stakeholders are not the only sources
  - Often come from application domain
  - Domain experise do a crucial role
  - Engineers may have sufficient domain experise

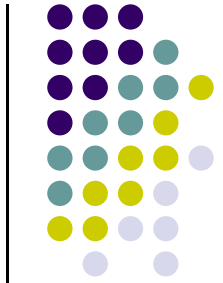
Requirements Elicitation – Elicitation Techniques

- Need to find an effective way to get what they need
  - User's story or scenario
  - Use cases
  - Workshop
  - Observation of users
  - Competing products and emerging trends and technologies

Requirements Analysis

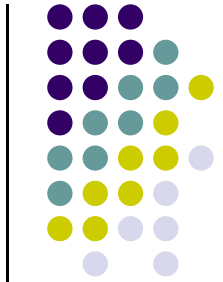
- About understanding the problem and requirements
- Yield a baseline set of requirements
- Should not include any requirements that do not contribute to the goals

Requirements Analysis – The System Boundary



- The System Boundary
  - Concern with identifying which elements of the problem are to be addressed by the proposed system
- Inside the system boundary
  vs Outside the system boundary

Requirements Analysis – The System Boundary



- Case Diagram

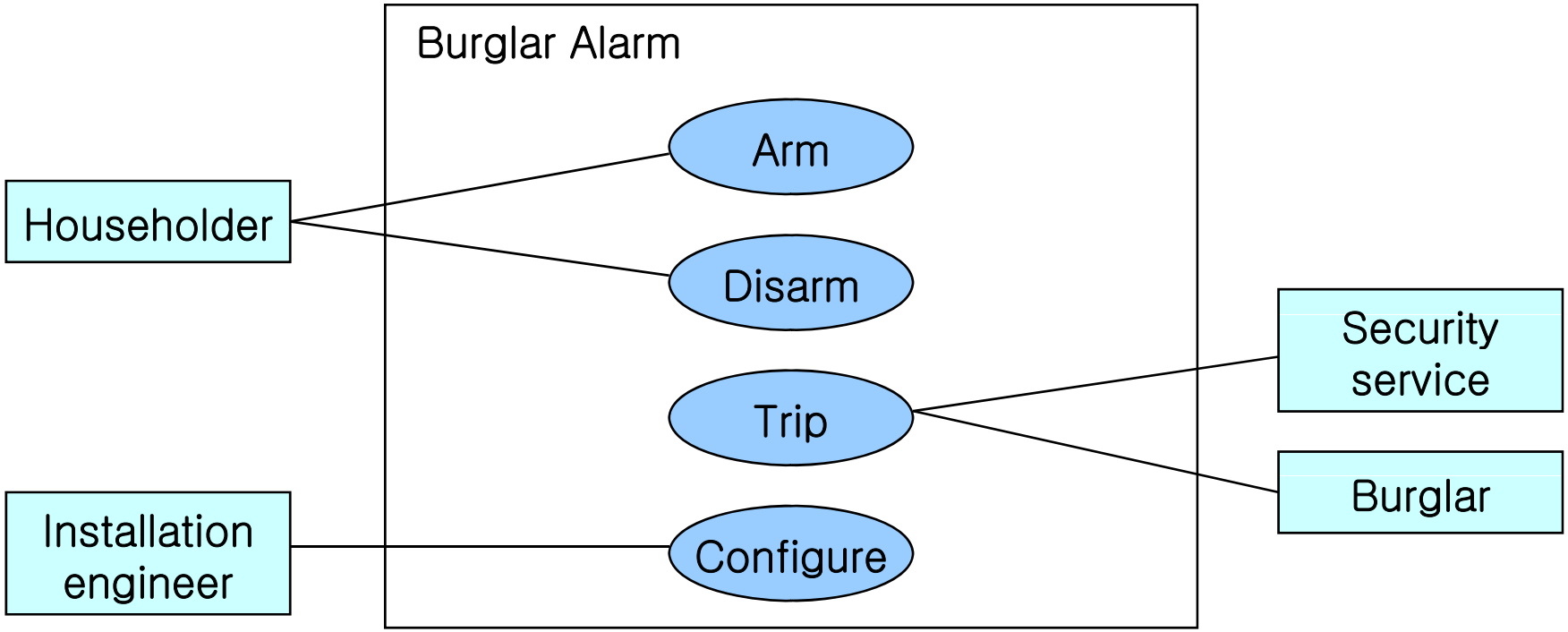
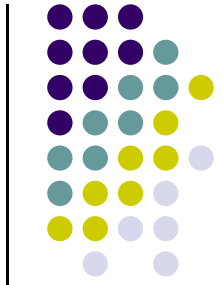


Figure 4. Use case defining the system boundary for a domestic burglar alarm

Requirements Analysis – Requirements Modeling

- Help to make sense complex information
  - Ex) Graphical model, UML sequence diagram
- Use notation
  - Ex) Z, CSP, UML's OCL

Requirements Analysis – Derived Requirements



Ex) Deived Requirements in a case model

Arm primary scenario

Precondition: Alarm is unarmed

- Householder initates arming procedure
- Timer countdown commences
- Householder exits premises
- Timer countdown finished
- Arming procedure completes

Postcondition: Alarm is armed

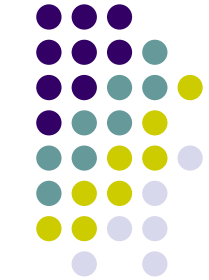
Requirements Analysis – Requirements Attributes

- Kind of Attributes for Requirements
  - Identifier
  - Source
  - Date
  - Rationale
  - Type
  - Priority
  - Stability
  - Verification procedure
  - Status

Requirements Analysis – Requirement Trade-offs

- Some requirements will be cut
  - Because of insufficient resources
- Requirements' priorities helps the trade-off
- But Not all the high-priority requirements

Software Requirements Specification

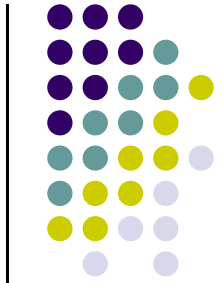


- A concept of operations document
- System specification
- Software Requirements Specification(SRS)

ex)

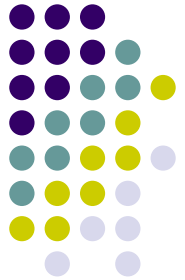
Arm 011	On completion of the arming sequence, there shall be a time delay equal to the escape period before the alarm enters the armed state

Requirements Validation



- Concern correctness, completeness, and consistency of the specification
- Conform to appropreate standard, guidelines, and conventions

Requirements Management



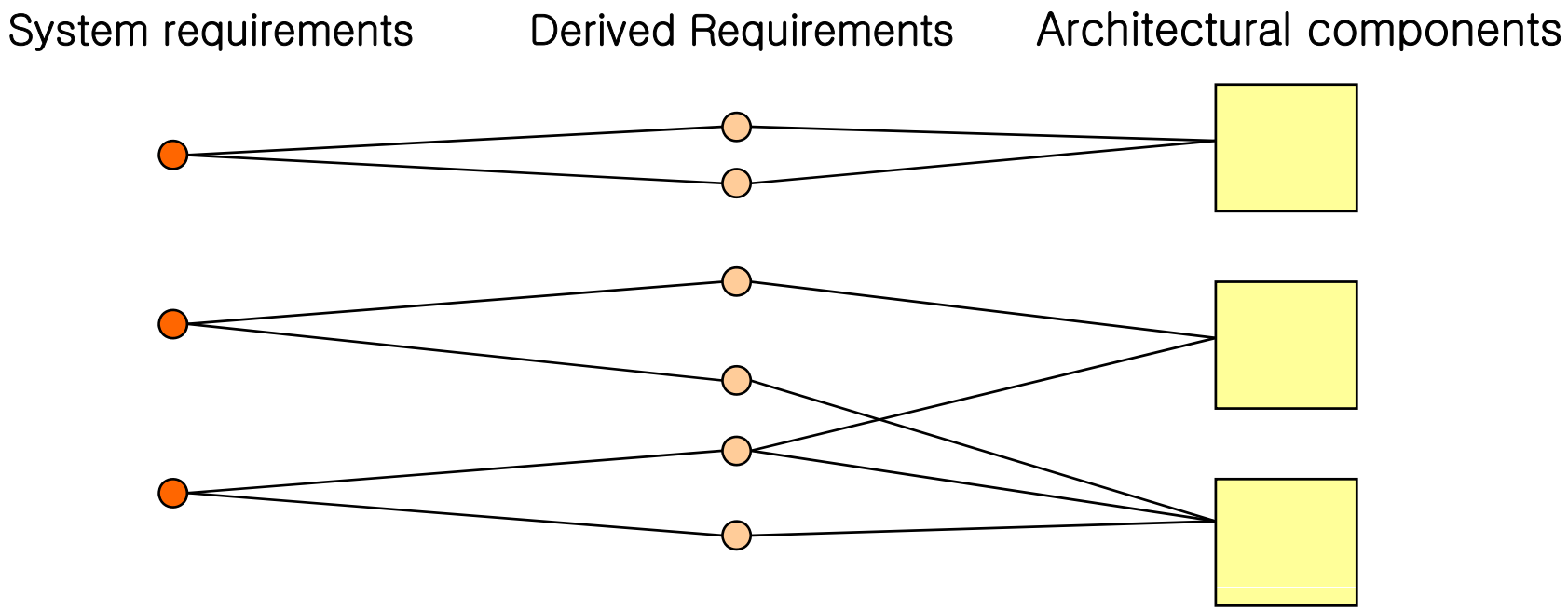
- Change Control
- Version Control
- Requirements Tracing
- Status Tracking

Requirements Management

- Change Control
  - Change is not permitted to occur without control
- Version Control
  - Should include
    - Details of the change
    - Date of approval
    - Rationale for the change and decision to approve
- Status Tracking
  - Maintaining information on the processing and implementation of requirements

Requirements Management

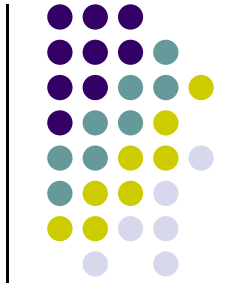
- Requirements Tracing
  - Show the derivation relationships



Fugure 5. Requirements trace

Summery

- Re is a crucial part of any process
- If neglected it, the project will subside
- RE process is need for any successful project
- Essential maintain awareness of the fundamental precepts of RE and of good RE practice



Thanks!