Information Technology University of the Punjab
Quiz 2 Solution
CLO-2 V1

1. **What are some common problems in requirements that don't reflect the real needs of the customer?**
   (Slide 4, Lecture-3)(03-Introduction To SRE ...)
   • The requirements don't reflect the real needs of the customer for the system
   • Requirements are inconsistent and/or incomplete
   • It is expensive to make changes to requirements after they have been agreed upon

2. **Why is it challenging to use natural language for writing requirements?**
   (Slide 6, Lecture-3)(03-Introduction To SRE ...)
   • Lack of clarity
   • Requirements confusion
   • Requirements amalgamation

3. **What are the six team skills essential for effective requirements management?**
   (Slide 3, Lecture-5)(05-Introduction To SRE ...)
   • Team Skill 1, Analyzing the Problem
   • TeamSkill 2, Understanding User and Stakeholder Needs
   • Team Skill 3, Defining the System
   • Team Skill 4, Managing Scope
   • Team Skill 5, Refining the System Definition
   • Team Skill 6, Building the Right System

4. **What features were identified in the HOLIS system to address the problem domain?**
   (Slide 11, Lecture-4)(04-Introduction To SRE ...)
   A feature is a service provided by the system that fulfills one or more stakeholder needs.
   These are simple descriptions, in the user's language, that we will use as labels to communicate with the user how our system addresses the problem.
   Examples:
   a. "The car will have power windows."
   b. "The program will allow Web-enabled entry of sales orders."

5. **What are the key purposes of business modeling in the context of software engineering?**
   (Slide 6, Lecture-6)(06-Introduction To SRE ...)
   • To understand the structure and dynamics of the existing organization

- To ensure customers, end users and developers have a common understanding of the organization
- To understand how to deploy new systems and which existing systems may be affected by that new system

6. **How did the HOLIS team manage scope during the requirements phase?**
   (Slide 21, Lecture-5)(05-Introduction To SRE …)
   Stakeholder:
   a. *Anyone who could be materially affected by the implementation of a new system or application*
   b. Many stakeholders are users of the system, and their needs are easy to focus on
   c. However, some stakeholders are only indirect users

   Non-user stakeholder needs must also be identified and addressed

7. **What are the benefits of using the Unified Modeling Language (UML) for software systems development?**
   (Slide 7, Lecture-7)(07-Introduction To SRE …)
   UML was created to forge a common, semantically and syntactically <u>rich visual modeling language</u> for the architecture, design, and implementation of complex software systems both structurally and behaviorally
   UML has applications beyond software development, such as process flow in manufacturing

8. **How were derived requirements used in the HOLIS case study to enhance system functionality?**
   (Slide 23, Lecture-6)(06-Introduction To SRE …)
   There are two subclasses of derived requirements: -

- **Subsystem requirements** are those that must be imposed on the subsystems themselves but do not necessarily provide a direct benefit to the end user.
  - For **example**, "Subsystem A must execute the algorithm that computes the wind speed of the aircraft."

- **Interface requirements** may arise when the subsystems need to communicate with one another to accomplish an overall result. They will need to share data, power, or a useful computing algorithm. In these cases, the creation of subsystems also further provokes the creation of interfaces between subsystems

- **Example:** *"Subsystem A delivers the results of the wind speed computation in the following format: …."*

9. **What problems arise from misunderstanding stakeholders' needs in software development?**
(Slide 7, Lecture-4)(04-Introduction To SRE …)
Within the problem domain, we use a set of team skills to understand the problem to be solved.
While we are here, we need to gain an understanding of the problem and the **needs** that must be fulfilled to address this problem

10. **How does the Capability Maturity Model (CMM) help in formal requirements management?**
(Slide 4, Lecture-4)(04-Introduction To SRE …)
Organized and formal processes of requirements management can be found in
- Capability Maturity Model (CMM): The Capability Maturity Model (CMM) helps in formal requirements management by providing a structured framework to assess and improve an organization's software development processes. It ensures that requirements are well-documented, consistently tracked, and managed throughout the project lifecycle, reducing the risk of errors and changes. CMM promotes better communication, control, and alignment of requirements with project goals at different maturity levels.
- ISO 9000 for quality management standards

CLO-2 V2

1. **What was the main business goal for Lumenations when they decided to enter the high-end residential systems market?**
(Slide 17, Lecture-4)(04-Introduction To SRE …)
   - Lumenations, Ltd. has been a worldwide supplier of commercial lighting systems for use in professional theater and amateur stage productions for more than 40 years.
   - Lumenations is a public company and the lack of growth in sales.
   - What's needed is a new marketplace
   - The company has decided to enter a new market: lighting automation for high-end residential systems.

2. **Describe the composition of the HOLIS software development team. Why was it important to have members from different divisions?**
(Slide 18, Lecture-4)(04-Introduction To SRE …)
HOLIS, - HOme LIghting automation System

The HOLIS team is typical in its size and scope à15 team members
Lumenations has set up a new division, the Home Lighting Automation Division.
The HOLIS team has been assembled mostly from new hires, although a few team members have been transferred from the Commercial Lighting Division

3. **What are some key user needs identified for the HOLIS system from the case study?**
(Slide 8, Lecture-4)(04-Introduction To SRE ...)
Need Examples from HOLIS case study
   a. A reasonable system cost, with low switch costs
   b. Easy and inexpensive to fix
   c. Flexible switch configurations (from one to seven "buttons" per switch)
   d. 100 percent reliability
   e. Vacation security settings

4. **Explain the steps involved in understanding the root causes of a problem during requirements analysis.**
(Slide 9, Lecture-5)(05-Introduction To SRE ...)
Once you understand the larger problem, your team can use a variety of techniques to gain an understanding of its causes.
One such technique is root cause analysis, which is a systematic way of uncovering the root, or underlying, cause of an identified problem or a symptom of a problem

5. **What role did system requirements play in ensuring the success of the HOLIS project?**
(Slide 12, Lecture-4)(04-Introduction To SRE ...)
   • Once we have established the feature set and have reached agreement with the customer, we move to defining the more specific requirements needed in the solution.
   • Then we can be certain that the system we develop will deliver the features we promised.
   • Since the features address one or more stakeholder needs, we will have addressed those needs directly in the solution.

6. **How does a business object model differ from a business use-case model in business modeling?**
(Slide 9, Lecture-6)(06-Introduction To SRE ...)

A business use-case model is a   model of the intended(planned)   functions of the business and is   used as an essential input to identify roles and deliverables in the organization
Business use-case model consists of the business actors (users and systems that interact with the business) and the use cases (sequences of events through which the actors interact with the business elements to get their jobs done)

- **The business object model** describes the entities: departments, paychecks, systems and how they interact to deliver the functionality necessary to realize the business use cases.
- The actor-circle icon represents a   business worker such as a payroll clerk or a system administrator
- The slashed circle without an actor represents a business entity or something that business   workers produce, such as a paycheck or a source file

7. **What challenges did the HOLIS team face in defining the solution system boundary?**
   (Slide 24, Lecture-5)(05-Introduction To SRE ...)
   Actor:
   a. someone or something outside the system that interacts with the system
   b. Plays a **ROLE**
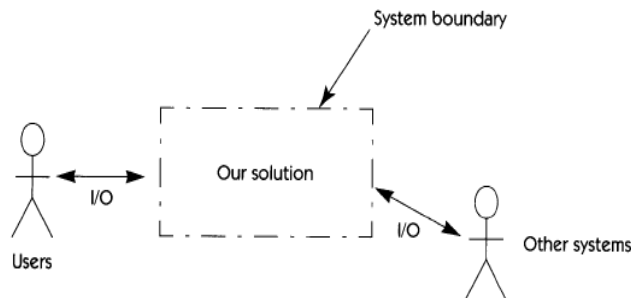
8. **What types of diagrams are used to represent the structural aspects of a system in UML?**
   (Slide 14, Lecture-7)(07-Introduction To SRE ...)
   Class Diagram, Object Diagram, Component Diagram, Deployment Diagram, Composite Structure Diagram, Package Diagram, Profile Diagram.
9. **What were some of the subsystems identified in the HOLIS project, and how did they   contribute   to   the   overall   system   design?**
   (Slide 32, Lecture-6)(06-Introduction To SRE ...)

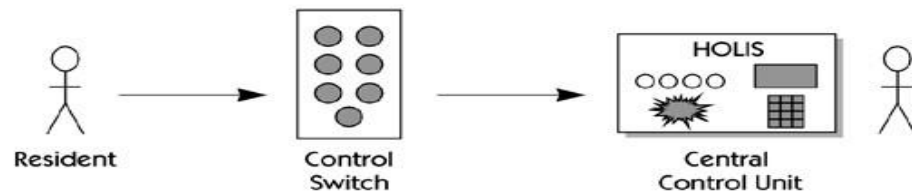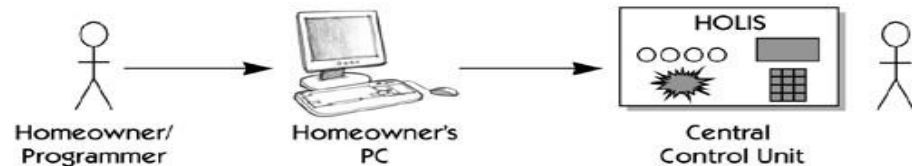**Figure 7-8. Control Switch subsystem with actors**

Figure 7-9. PC Programmer subsystem with actors

10. **What strategies were employed to avoid creating stovepipe systems in the HOLIS project?**

(Slide 28, Lecture-6)(06-Introduction To SRE ...)

- Develop, understand, and maintain the high-level requirements and use cases that span the subsystems and that describe the overall system functionality
- Do the best possible job of partitioning and isolating functionality within subsystems
- If possible, develop software as a whole, not as several individual pieces, one for each physical subsystem.
- When coding the interfaces, use common code on both sides of the interface.
- Develop Subsystems with High cohesion and Low coupling.
- Take help of experienced people, if possible.