

SE3821 Software Requirements and Specification

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You may use 1 8.5 x 11 inch sheet of paper with notes and other supporting material for the exam.

1 Exam Scenario

On the exam, questions may be based upon the following scenario. In preparing for the exam, it would be wise to read this scenario and think of the requirements related questions (scenarios, diagrams, etc.) that might be asked. The scenario will be printed on the exam as well.

The Milwaukee School of Engineering is in need of a new management system. The system is intended to aid intermural groups in scheduling the usage of athletic fields for intramural games. In the given system, the athletic department has first priority to use the fields. However, whenever the varsity teams are not using the fields, then the intramural teams may use them.

The system must allow intramural teams to be formed and register with the system. These teams may compete in any number of existing sports. The system will also take input from the national weather service. Per the athletic department, fields may not be used if inclement weather is predicted or if the current readings at the location are unacceptable. The athletic department may reschedule games at any time, superseding any intramural activities scheduled.

The system will generate a schedule of intramural activities whenever a change occurs. The system will also automatically send an updated schedule to the hub every 24 hours so that a current schedule is always available on the hub. The system also will send a copy of the schedule to the facilities department so that field maintenance can occur outside of scheduled intramural activities. However, in the event that a field or other location needs to be taken out of service, the facilities department can indicate that a given venue is unavailable.

Teams begin by entering the players that are on their team. Each player who is registered with the system then enters the times which they are available to play a match. Once all of the players have entered their information, the administrator for the intramural sport can make a schedule for the sport. Making a new schedule involves the administrator logging onto the system, determining the number of teams that are present in the sport, determining the minimum number of matches so that every team plays every other team at least once, and then creating a schedule which allows the teams to play every other team at least once. The system will automatically ensure that all players are available.

2 Detailed Outcomes for the Exam

1. Week #1
 - (a) Lecture #1 Introduction
 - i. Explain the importance of consistent requirements in a software system.
 - (b) Lecture #2 What are Requirements
 - i. Understand the relationship between MSOE courses and development activities
 - ii. List reasons why software fails to be successful.
 - iii. Explain the key purpose for the requirements activity.
 - iv. Compare and contrast constraints with requirements.
 - v. List common sources for constraints.
 - (c) Lecture #3 What are Requirements - Part 2
 - i. Explain the steps of the Volere Requirements Process
 - ii. Explain what happens during Project Blastoff

- iii. Explain the concept of a context diagram
- iv. Explain the concept of requirements trawling
- v. Explain how prototypes can be used in the requirements trawling process.
- vi. Define rationale.
- vii. Define fit criterion.

2. Week #2

- (a) Lecture #1 Project Blastoff
 - i. Explain the rabbit, horse, and elephant analogy to software development
 - ii. Define the trinity of scope, stakeholders, and goals
 - iii. Define stakeholders and determine the stakeholders for a project from a project description
 - iv. Identify different sponsors for a project
 - v. Explain the concept of a persona
- (b) Lecture #2 Goals and Planned Achievements
 - i. Develop a persona for a project user.
 - ii. Define the goals for a project using a purpose, advantage, and measurement technique
 - iii. Define a set of constraints for a project
 - iv. Explain how one would estimate the cost of a software development project.
- (c) Lecture #3 - No Class due to travel by the professor.

3. Week #3

- (a) Lecture #1 Business Use Cases and Use Case Diagrams
 - i. Construct a context diagram for a given problem.
 - ii. Define business events based on a problem.
 - iii. Explain the relationship between work and business events.
 - iv. Explain the difference between business events and time triggered business events
 - v. Explain the relationship between input and output and business events.
 - vi. Explain the relationship between business use cases and product use cases
- (b) Lecture #2 Use Cases and Use Case Diagrams
 - i. List the 14 types of UML diagrams
 - ii. Define Actor
 - iii. Define a use case
 - iv. Interpret the meaning of a use case diagram.
 - v. Explain the relationship between Use Case Diagrams and Use Case Scenarios
- (c) Lecture #3 Trawling for Requirements - Part 1
 - i. Define Business Event
 - ii. Define time triggered business events
 - iii. Translate a context diagram into a list of business events and input and output views
 - iv. Explain the relationship between work response and use cases.

4. Week #4

- (a) Lecture #1 Trawling for Requirements
 - i. Explain what is meant by the concept of trawling for requirements.
 - ii. Explain where requirements come from
 - iii. List the roles of the requirements analyst.
 - iv. Define unconscious requirements
 - v. Define undreamed of requirements
 - vi. Explain the concept of a brown cow model
- (b) Lecture #2 Trawling for Requirements - Part 2
 - i. Define the concept of an apprenticeship
 - ii. Explain how observation can be used to determine requirements

- iii. Explain the concept of a mind map
- iv. Construct a mind map for a system
 - v. Explain how a mind map may help to determine requirements for a product
- vi. Derive requirements for a system based upon a persona.
- vii. Explain how to construct a quick and dirty process model.

(c) Lecture #3 Trawling for Requirements - Part 3

- i. Explain the essence of requirements gathering
- ii. List guidelines for making interviews more effective
- iii. List guidelines for holding effective interviews
- iv. Derive requirements for a system based upon a persona.
- v. Critique a trawling techniques, and select the appropriate method based upon the projects needs.

5. Week #5

(a) Lecture #1 Scenarios and Requirements

- i. Explain why we use scenarios as part of the requirements process
- ii. Define Scenario
- iii. Explain how to translate a story into a scenario.
- iv. Construct a use case scenario from a story.
 - v. List the symbols used on an activity diagram.
- vi. Explain how one can draw an activity diagram from a use case scenario.
- vii. Explain the concept of a Misuse Case and a Negative Scenario

(b) Lecture #2 Understanding the Real Problem

- i. Explain why capturing the essence of the problem is important to rabbit projects
- ii. Critique a requirement as to whether it captures the essence of the problem or a solution to a problem.
- iii. Explain the concept of a swimlane
- iv. Explain how removing swimlanes can help to capture the essence of the problem.
 - v. Explain the risk of not innovating
- vi. Define systemic thinking
- vii. Define value demand and failure demand
- viii. Explain how to run an innovation workshop

(c) Lecture #3 Midterm Exam