Requirements & Business Events
SE3A04 – Tutorial

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Outline

1. **Requirements**
   - Functional Requirements
   - Non-Functional Requirements
   - Examples of Requirements
   - Constraints
   - Avoiding Ambiguity in Requirements

2. **Business Events**
   - Why Use Business Events?
   - Examples of Business Events

3. **Questions**

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What Are Requirements?

- The requirements analysis phase is the first major step towards the solution of a data processing problem
- During this phase, the user's requirements with respect to the future system are carefully identified and documented
- The focus in the requirements analysis phase is on the **what** not the **how**

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Why Do We Need Requirements?

- The cost of good requirements gathering is minor compared to the cost of poor requirements gathering
- The requirements are an important aspect of the overall documentation of a system
- The **Software Requirements and Specification (SRS)** documentation is often a mutual agreement between the developers and clients of a software system outlining the expectations of the system

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Requirements

Definition (Functional Requirement)

A **functional requirement** is an action or feature that must be included in a system in order to satisfy the business needs and be acceptable to the system users.

Definition (Non-Functional Requirement)

A **non-functional requirement** specifies properties or qualities of a system that can be used to judge the operation of the system.

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Functional Requirements

- Functional requirements arise from the work that needs to be done
- Almost any action, such as *calculate*, *inspect*, *publish*, or most other **active verbs**, can be functional requirements

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Non-Functional Requirements

- Non-functional requirements describe such properties as look and feel, usability, security, and legal restrictions
- Non-functional requirements are usually, *but not always*, determined after the product's functionality
- Once we know what the product is supposed to do, we can determine how it is supposed to behave

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Examples of Requirements

Example

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

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Examples of Requirements

Example

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

1. The system shall identify each reservation by a sequential number.

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Examples of Requirements

Example

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

1. The system shall identify each reservation by a sequential number.
   FUNCTIONAL

2. The system must be unavailable from midnight until 1:00am for backups.

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Examples of Requirements

Example

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

1. The system shall identify each reservation by a sequential number.
   FUNCTIONAL

2. The system must be unavailable from midnight until 1:00am for backups.
   NON-FUNCTIONAL (Availability)

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Examples of Requirements

Example (. . . continued)

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

3. All numeric outputs of the system must be accurate to two decimal places.

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Examples of Requirements

Example (. . . continued)

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

3. All numeric outputs of the system must be accurate to two decimal places.
   NON-FUNCTIONAL (Precision)

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Examples of Requirements

Example (... continued)

For each of the following requirements, indicate whether they are *functional* or *non-functional* requirements.

3. All numeric outputs of the system must be accurate to two decimal places.
   NON-FUNCTIONAL (Precision)

4. The system must generate a log file which keeps a record of events.

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Example (...continued)

For each of the following requirements, indicate whether they are
functional or *non-functional* requirements.

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   NON-FUNCTIONAL (Precision)

4. The system must generate a log file which keeps a record of
   events.
   FUNCTIONAL

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Constraints

Definition (Constraint)

A **constraint** is a global issue that shapes the requirements.

- Constraints can be on the product itself or restrictions on the eventual design of the product
- Generally speaking, constraints often deal with project timelines, costs, etc.

Example

- The product must be available at the beginning of the new tax year.
- The product shall operate on a 3G telephone.

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What to Remember?

Remember

- **Functional Requirement**: something that the system must *do*

- **Non**-**Functional Requirement**: a property or quality that the system must *have*

- **Constraint**: a global issue that *shapes* the requirements

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Example (Ambiguous Requirements)

1. The product shall be <u>fast</u>.
2. The product shall show the weather for the <u>next</u> 24 hours.
3. The product shall allow access to users with a <u>valid</u> username and password.
4. The trucks shall de-ice the roads before <u>they</u> freeze.

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Avoiding Ambiguity in Requirements

- We want to avoid ambiguous requirements at all costs
- Ambiguity can arise from the existence of homonyms and multiple contexts, among others
- Often ambiguity can be eliminated by
  - Avoiding the use of ambiguous terms
  - Replacing pronouns with the subject or object to which they refer
  - Grouping requirements by business events or use cases to clarify context
  - Defining special terms and notations

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Example (Better Requirements)

1. The product shall be complete the calculation of the average in less than 50 milliseconds.

2. The product shall show the expected weather for the forthcoming 24 hours.

3. The product shall allow access to users that enter a username and password pair that is exists in the security access database.

4. The trucks shall de-ice the roads before the roads freeze.

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Business Events

> ### Definition (Business Event)
>
> A **business event** is an event initiated outside the scope of the system that triggers the system to perform some action or to do some work.

- Normally, a system will have some pre-planned response to business events
- Once a business event happens, the system initiates its response
- **IMPORTANT**: Business events are in fact **events**, i.e., something happens!

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Why Use Business Events?

- Business events often point out things that belong together
- As a result, they deliver cohesive partitions of the work with minimal interfaces between them
- This ensures the principles of **high cohesion** and **low coupling**

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Example (Road De-Icing System)

Consider a system that predicts and schedules the de-icing of roads. The system components include a weather station, a truck depot, and road engineers, for example. What are some of the business events?

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1. Weather station transmits reading

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1 Weather station transmits reading

2 Truck treats a road

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1. Weather station transmits reading
2. Truck treats a road
3. Road engineer advises road repairs

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Example (Road De-Icing System)

Consider a system that predicts and schedules the de-icing of roads. The system components include a weather station, a truck depot, and road engineers, for example. What are some of the business events?

1. Weather station transmits reading
2. Truck treats a road
3. Road engineer advises road repairs
4. Time to test weather station

Questions

- Questions?