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# Software Requirements Engineering

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## Chapter 6

Functional Requirements

ความต้องการเชิงฟังก์ชัน

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## Outline

- Understanding Functional Requirements
- Core Components
- Examples of Functional Requirements
- How to Write Effective Functional Requirements

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## Understanding Functional Requirements

### Definition

Functional Requirements are detailed descriptions of the system's specific behaviors, functions, and capabilities that a software system must be able to perform.

### Key Characteristics

- **Precise and Testable:** Clearly defined statements about what the system should do
- **Measurable:** Can be verified and validated
- **Specific:** Describe exact functionalities expected from the system



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## Core Components

1. Input Requirements
  - What data the system will accept
  - How the system will process input
  - Validation and transformation of input data
2. Processing Requirements
  - Specific operations the system must perform
  - Algorithmic behaviors
  - Data manipulation processes
3. Output Requirements
  - What information the system will produce
  - Format and presentation of results
  - Destination of outputs



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## Examples of Functional Requirements (E-commerce Website)

1. The system shall allow users to browse products by category.
2. The system shall allow users to add products to their shopping cart.
3. The system shall calculate the total cost of items in the shopping cart, including taxes and shipping fees.
4. The system shall allow users to pay for their orders using various payment methods (e.g., credit card, PayPal).
5. The system shall send a confirmation email to the user after an order is placed.
6. The system shall allow administrators to manage product inventory.



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## Examples of Functional Requirements (Library Management System)

1. The system shall allow users to search for books by title, author, or ISBN.
2. The system shall allow users to borrow and return books. 
3. The system shall track the availability of each book. 
4. The system shall generate reports on overdue books.
5. The system shall allow librarians to add and remove books from the catalog.

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## How to Write Effective Functional Requirements?

1. Define the Purpose of the Requirement
2. Use a Clear and Consistent Format
3. Write in Simple, Unambiguous Language
4. Be Specific and Measurable
5. Avoid Mixing Functional and Non-Functional Requirements
6. Use Diagrams and Use Cases
7. Prioritize Requirements
8. Ensure Traceability
9. Review and Validate with Stakeholders
10. Maintain Version Control

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## Common Notation Formats

1. Use case descriptions
2. User stories
3. Requirement specification documents
4. Formal requirement statements



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## Example of a Well-Defined Functional Requirement

"The system shall allow registered users to reset their password by:

- Clicking 'Forgot Password' link
- Receiving a unique 6-digit reset code via email
- Entering the code within 15 minutes
- Creating a new password meeting complexity requirements"



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## Common Challenges

- Incomplete requirement gathering
- Ambiguous language
- Changing business needs
- Miscommunication between stakeholders



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## Conclusion

Functional Requirements are critical in defining the expected behavior of a software system, serving as a blueprint for development and a contract between stakeholders and development team.



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Thank You

