

Software Requirements Engineering (SE2001)



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Requirements Engineering Processes

What is a Process?

- ❖ A process is an organized set of activities, which transforms inputs to outputs.
- ❖ We can use synonyms of process such as: procedure, method, course of action, etc.
- ❖ Processes are essential for dealing with complexity in real world.

Process Model

4

- ❖ A process model is a simplified description of a process presented from a particular perspective.
- ❖ There may be several different models of the same process.
- ❖ No single model gives a complete understanding of the process being modeled.

Process Model

5

A process model is produced on the anticipated need for that model. We may need

- A model to help explain how process information has been organized.
- A model to help understand and improve a process.
- A model to satisfy some quality management standard.

Types of Process Models⁶

- Coarse-grain activity models
- Fine-grain activity models
- Role-action models
- Entity-relation models

Coarse-grain activity models

7

- ❖ This type of model provides an overall picture of the process.
- ❖ Describes the context of different activities in the process.
- ❖ Shows the principal RE process activities and their approximate sequencing.
- ❖ It doesn't document how to enact a process.



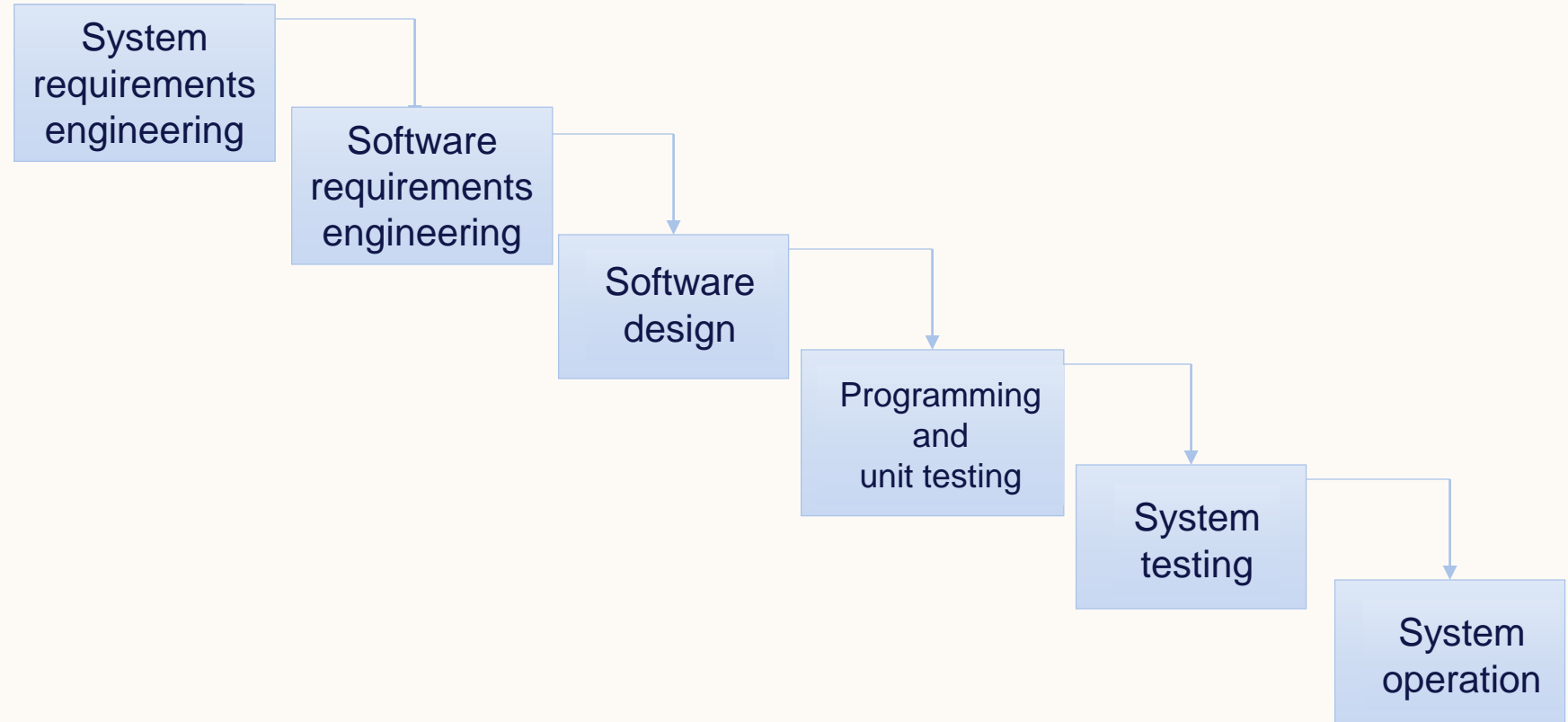
Context of Requirements Engineering

8

- ❖ Software requirements follow the “**system requirements**” and “**system design**”.
- ❖ The primary goal is understanding.
- ❖ **Software requirements** are followed by **software design** in a software development life cycle.

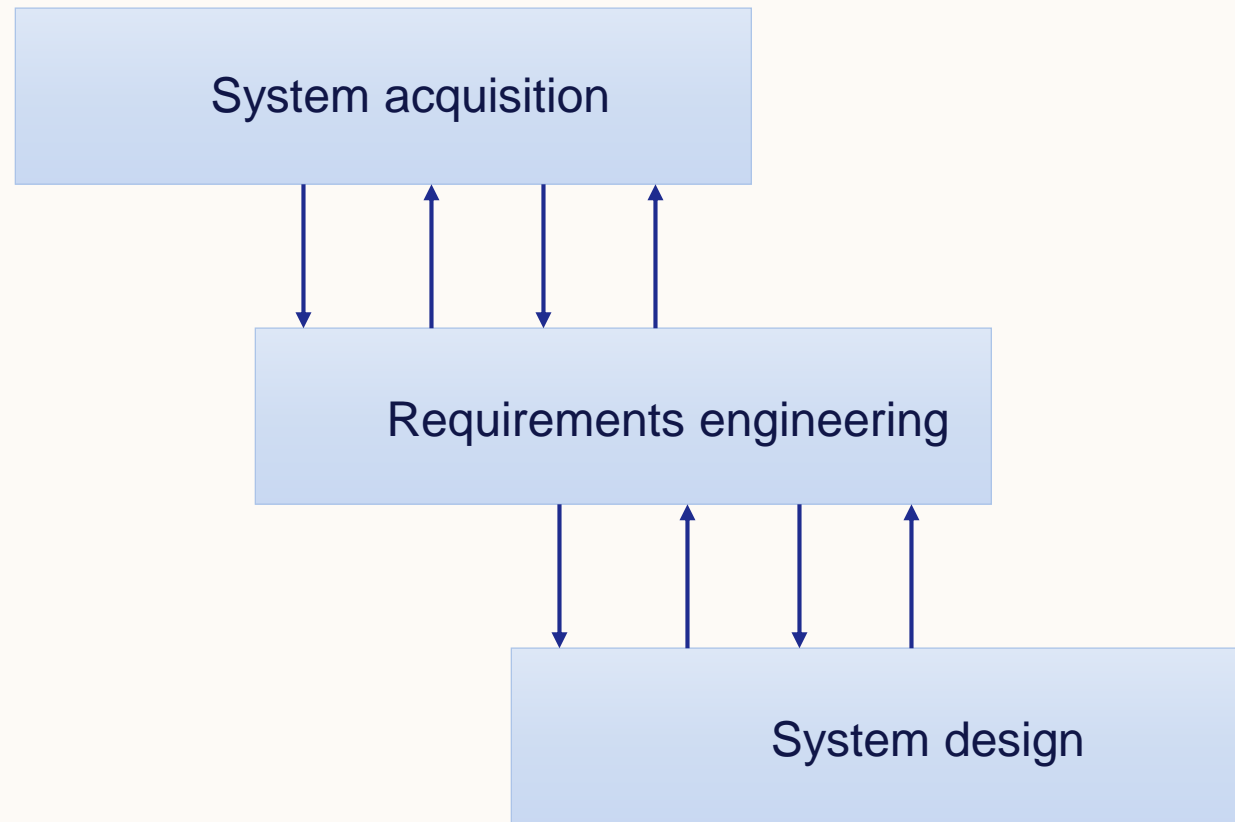
Context of Requirements Engineering

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Context of Requirements Engineering

10



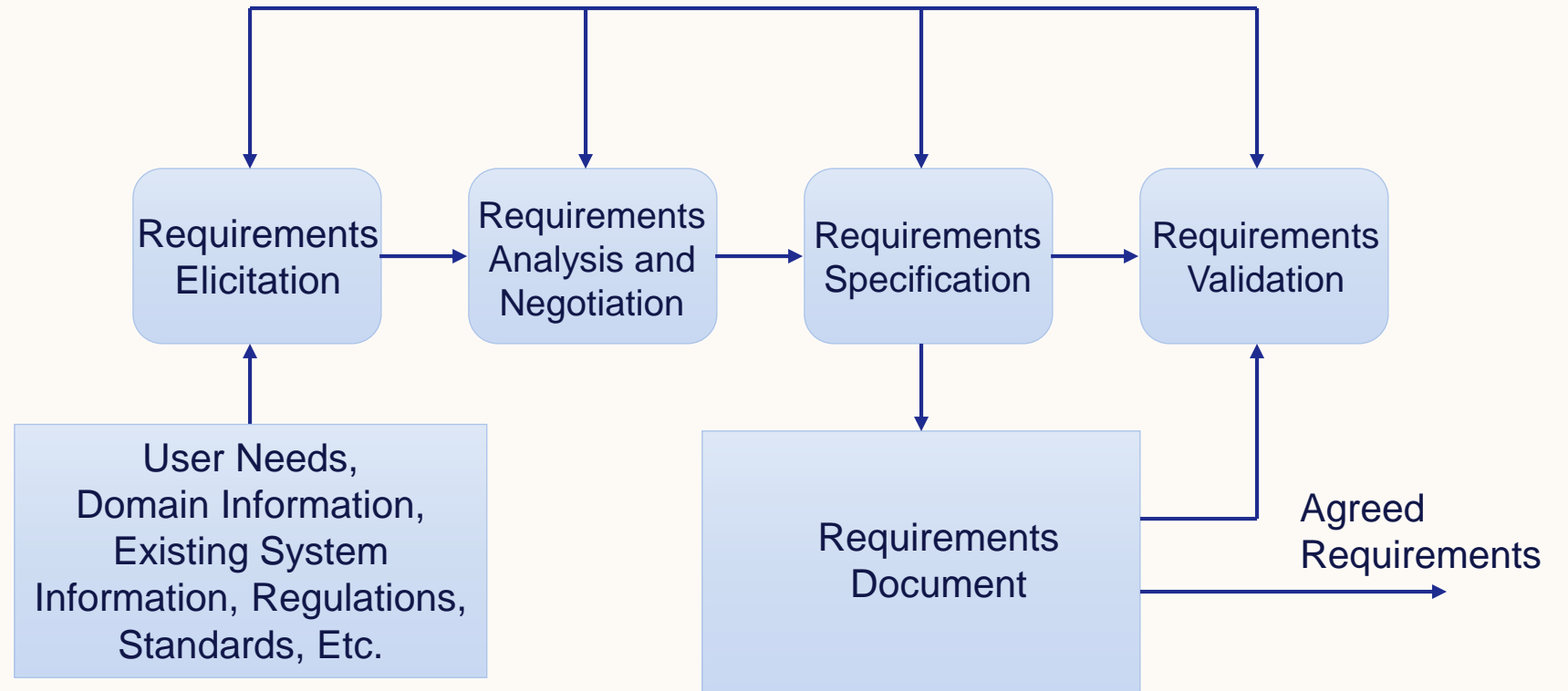


Coarse-grain Activity Model of the RE Process

11

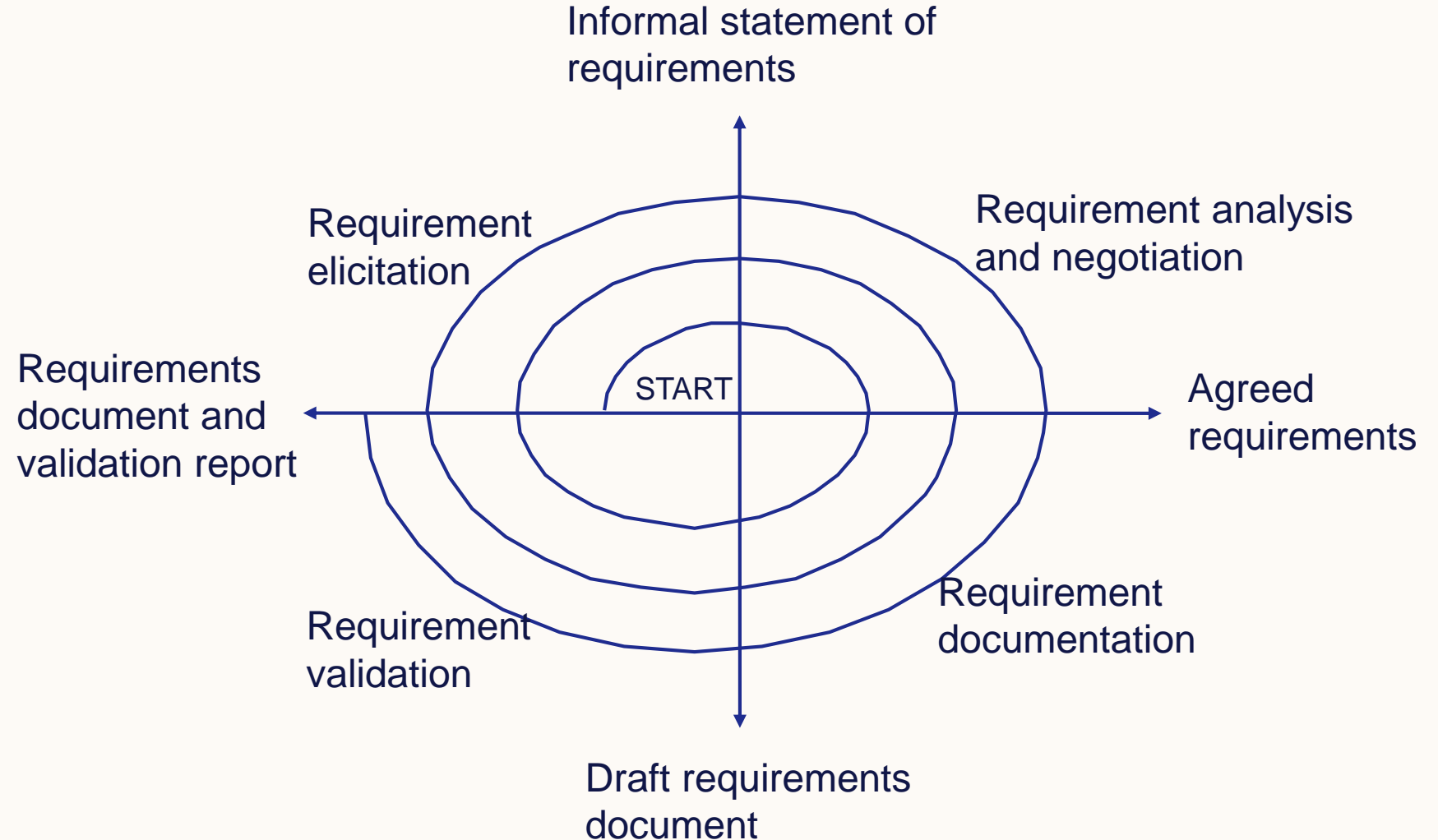
Requirements engineering process is an example of coarse-grain activity model.

Coarse-grain Activity Model of the RE Process ¹²



Spiral Model of RE Process

13



Fine-grain Activity Models

14

- ❖ These are more detailed models of a specific process:
 - Used for understanding and improving existing processes.
- ❖ We'll discuss some fine-grain processes within the general requirements engineering processes in later lectures.

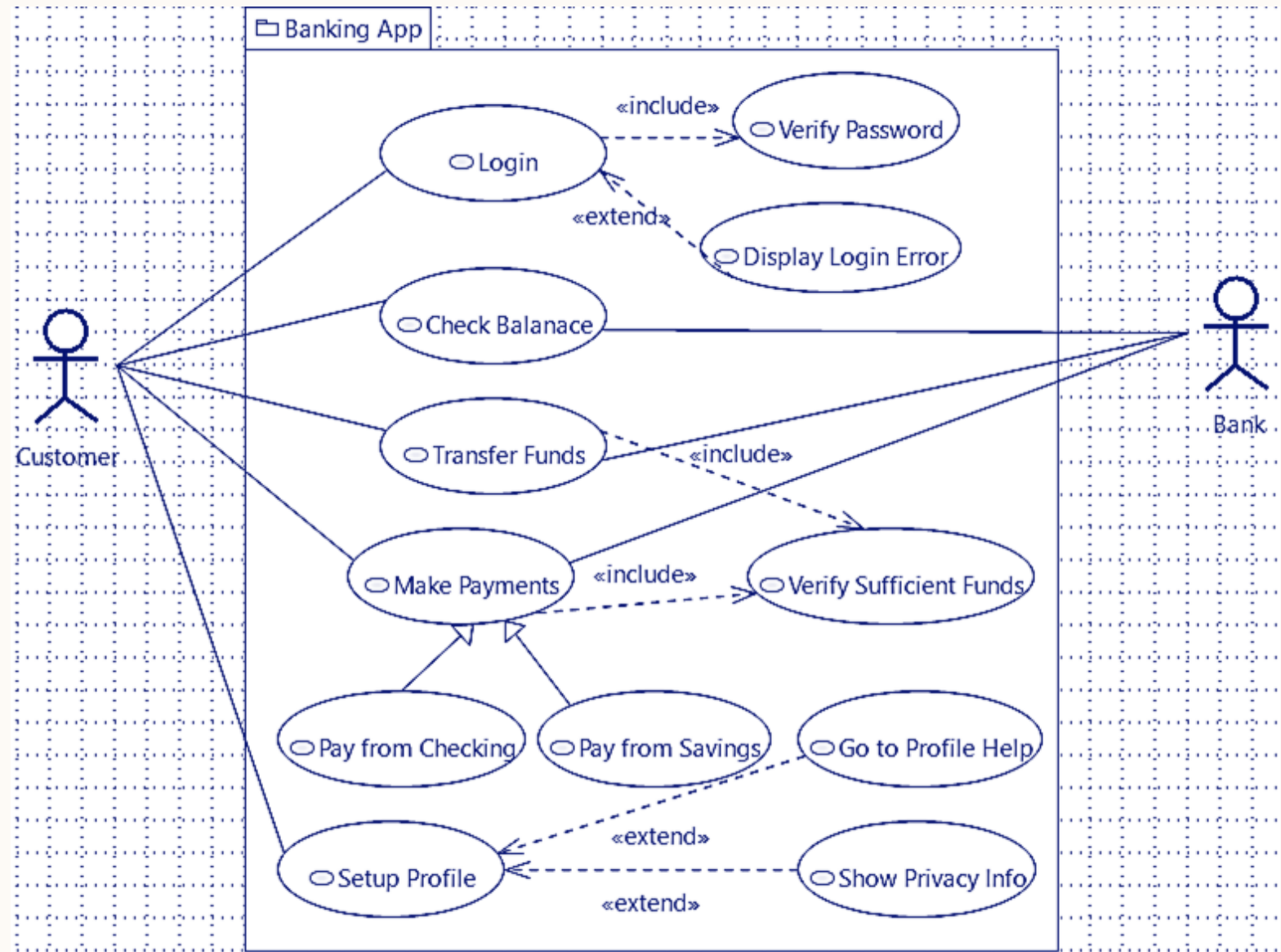
Role-action Models

15

- ❖ These are models, which show the roles of different people involved in the process and the actions which they take.
- ❖ They are useful for process understanding and automation.

Role-action Models

16



Entity-relation Models

17

- ❖ The models show the process inputs, outputs, and intermediate results and the relationships between them.
- ❖ They are useful in quality management systems.

Entity-relation Models

18

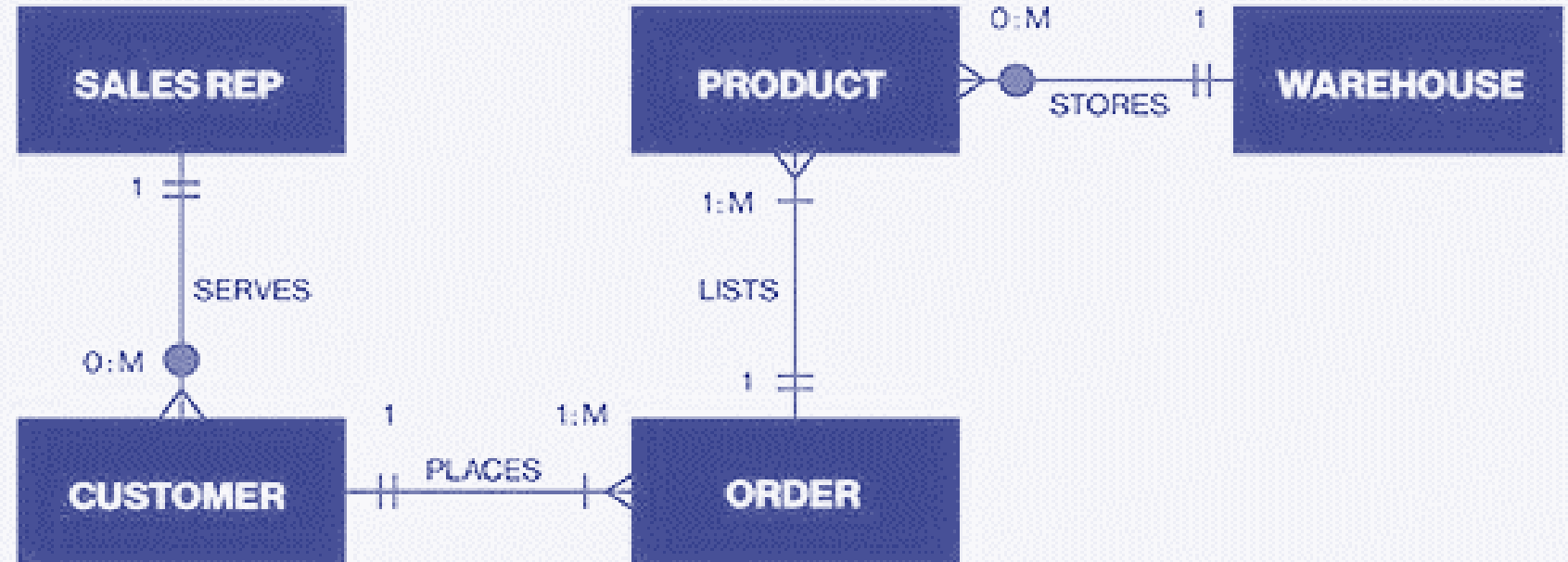


Figure 1. Entity-Relationship Diagram

- *1 INSTANCE OF A SALES REP SERVES 1 TO MANY CUSTOMERS
- *1 INSTANCE OF A CUSTOMER PLACES 1 TO MANY ORDERS
- *1 INSTANCE OF AN ORDER LISTS 1 TO MANY PRODUCTS
- *1 INSTANCE OF A WAREHOUSE STORES 0 TO MANY PRODUCTS



RE Process

19

Requirement Engineering Process has a formal starting and ending point in the overall software development life cycle.

RE Process

20

Requirement Engineering Process has a formal starting and ending point in the overall software development life cycle.

❖ Begins

- There is recognition that a problem exists and requires a solution.
- A new software idea arises.

❖ Ends

- With a *complete* description of the external behavior of the software to be built.

RE Process

21

- ❖ It is a continuous process in which the related activities are repeated until requirements are of acceptable quality.
- ❖ It is one of the most critical processes of system development.

RE Process

22

- ❖ Based on the need of individual software projects and organizational needs, requirements engineering processes are tailored.

*An important point to remember is that
“There is no ideal requirements engineering
process!”*

Two Main Tasks of RE

23

- ❖ There are two main tasks which needs to be performed in the requirements engineering process.

Problem analysis:

- Analysis of a software problem

Product description:

- Complete specification of the desired external behavior of the software system to be built. Also known as functional description, functional requirements, or specifications

Problem Analysis

24

Problem analysis is the first and foremost task of requirements engineering process. It includes:

- ❖ Brainstorming, interviewing, eliciting requirements
- ❖ Identifying all possible constraints
- ❖ Expansion of information

Problem Analysis

25

- ❖ Trading off constraints and organizing information.
- ❖ Complete understanding should be achieved.

Problem Description

26

- ❖ Product description is another task of requirements engineering process. In this task we:
 - Make decisions to define the external behavior of the software product.
 - Organize ideas, resolve conflicting views, and eliminate inconsistencies and ambiguities.



THANK YOU

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