

# CSCI375

# Systems Analysis

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# Outline

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Motivating example

Systems Analysis

- Requirements Analysis and Gathering
- Modeling
- Stakeholders
- Information gathering

# Systems Analysis

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Requirements Analysis

Requirements Gathering

A quick look at diagramming

# RMO Consolidated Sales and Marketing System (CSMS) Project

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Existing RMO Information System and Architecture:

- forward thinking
- have adopted new technology when cost effective

# RMO (CSMS): Technology Architecture

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different makes/models of computers located at:

- home office
- retail stores
- phone centers
- shipping centers
- warehouses

Connected by:

- LANs
- WANs
- VPNs

# Technology Architecture

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Definition: Set of computer hardware, network hardware and topology, and system software used by an organization

# RMO (CSMS): Application Architecture

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Supply Chain Management (SCM) system

Phone/Mail order system

Retail Store system

Customer Support System

# Application Architecture

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Definition: Set of software applications the organization needs to support its strategic plan

# RMO (CSMS): Issues with the system

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There are a number of issues with this system, including:

- phone/mail, web, and retail order systems are not integrated
- uses outdated web-based technology
- doesn't support modern technology including mobile devices
- doesn't support modern customer interaction technologies

# RMO (CSMS): Goal of new system

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modernize technology

modernize functionality

- add more customer-oriented functionality
- incorporate more current web technology
- use high bandwidth connections
- use high resolution displays
- support mobile technology

# RMO (CSMS): Key additions

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Mobile device support

Incorporate customer feedback and comments into product information

Integrate social media

Support mobile devices with dedicated apps

Mine customer feedback from social media and its own site

# RMO (CSMS): Four Subsystems of New CSMS

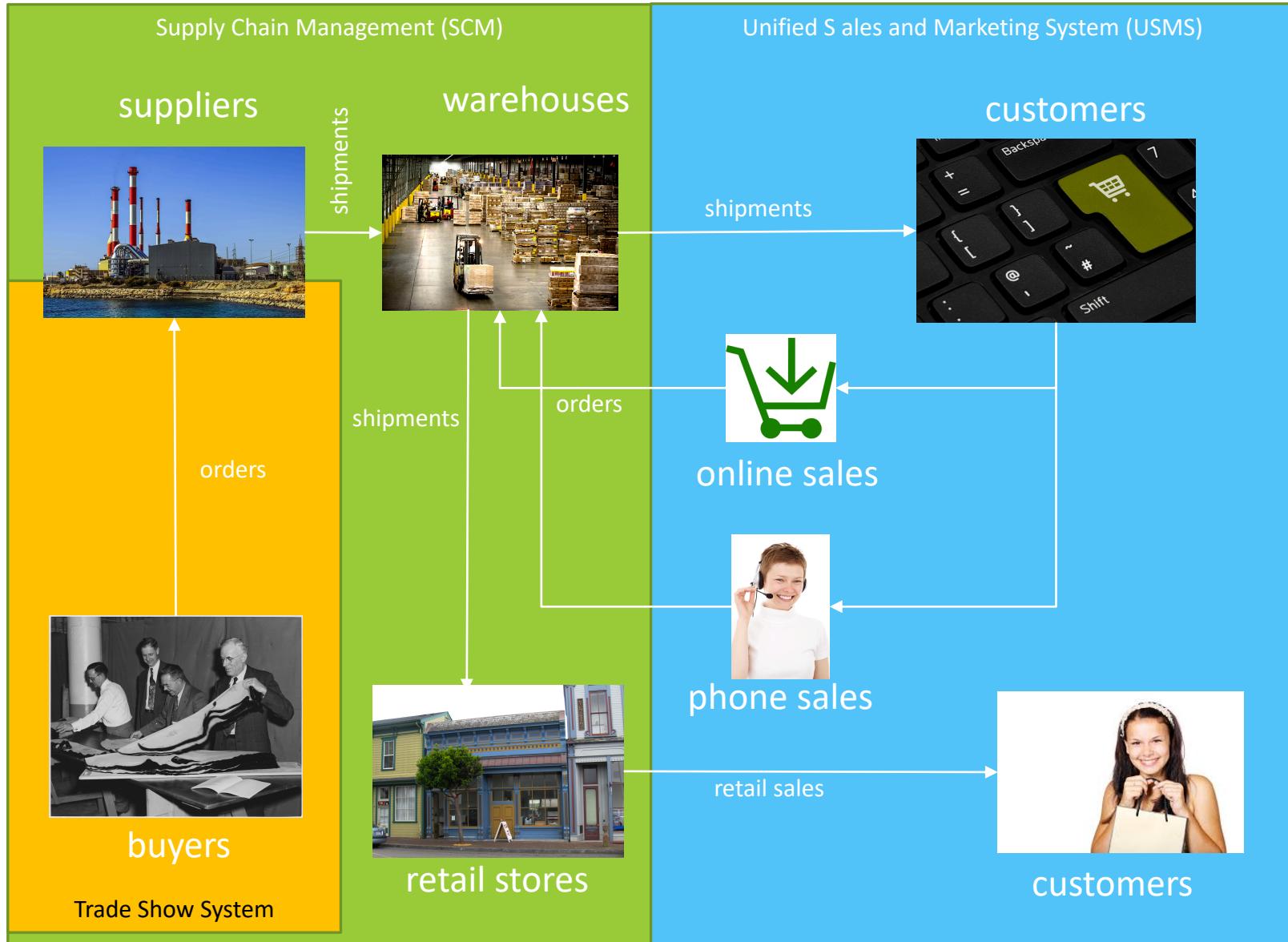
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Sales subsystem

Order-fulfillment subsystem

Customer Account subsystem

Marketing subsystem



# Gathering Requirements

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Regardless of what we want to do:

- Improve
- Update
- Replace

We need to gain a deep understanding of the requirements

- be systematic
- document and communicate these requirements
- refine the requirements

# Gather details about the system

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What does the system need to do?

- This is called systems analysis

Multiple passes will likely be required

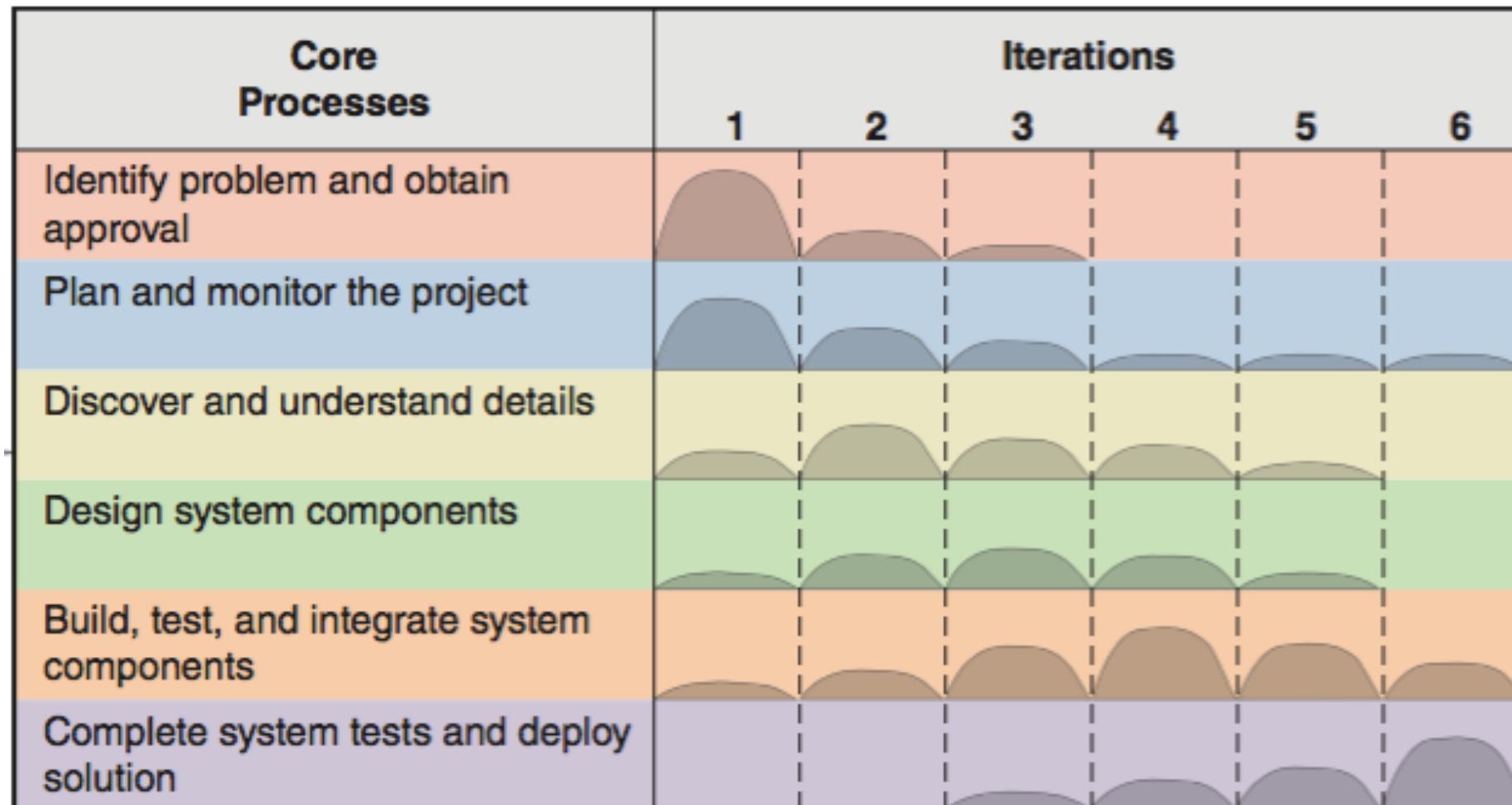
- first pass: is an update needed? Possible?
- second pass: gather detailed information about what the system does
- subsequent passes: refine and correct requirements

# Overview of the Systems Analysis Process

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## Analysis Activities

- Gather Detailed Information
- Define Requirements
- Prioritize Requirements
- Develop UI Dialogs
- User-evaluation



# Gathering Detailed Information

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1. What kinds of information should we gather?
2. How should we gather it?
3. From whom?

# Gathering Detailed Information

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## Techniques:

- Interview users of the system
- Observe users of the system
- Review documentation
- Review organization policies
- Study existing solutions (outside of org.)
- Study how other companies have dealt with similar change

# Defining Requirements

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## Functional requirements

- functions the system must perform

## Non-functional requirements

- UI formats
- Performance needs
- Security needs
- Reliability needs

# Prioritizing Requirements

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Just like it sounds:

- which are most important?
- which are least important?

Weed out “requirements” that aren’t really necessary

# Develop some UI dialogs

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Users' input is necessary to ensure the system works

- prototypes
- storyboards

Need a way to test the system to see:

- if it makes sense to users
- if it meets the users' needs

UI dialogs are a good approach because:

- they will elicit more feedback than just asking questions
- users should be able to make sense of it

Should represent all working portions of this iteration

# User-evaluation

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## Done iteratively

- you should get feedback
- inform changes
- users' time is valuable
  - will likely only get short sessions

## Early iterations

- quick and dirty
  - paper prototypes, storyboards

## Later iterations

- higher-fidelity
- more interactional

# Kinds of Requirements

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## System requirements

- Functional requirements
- Non-functional requirements (FURPS)
- Additional non-functional requirements (FURPS+)

# Functional Requirements

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Activities of the system that must be performed

Business Uses:

- calculate payroll taxes
- generate timesheets

Based on the rules and processes of the organization

Discovering all these requirements is **vital and difficult**

- If you don't get it right, your solution will not be well received

# Non-functional Requirements (FURPS)

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Functionality (Functional requirements)

Usability

Reliability

Performance

Supportability

# Usability

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User Interface

Related work procedures

Online help and documentation

# Reliability

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How often do service interruptions or outages occur?

How does the system detect and cope with errors?

# Performance Requirements

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Workload

Throughput

Response time

# Security requirements

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How will application control:

- access to data
  - levels
- storage of data
- transmission of data
- passwords and logins
- encryption
- authentication

# FURPS+

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An extension of FURP

Additional constraints added:

- Design constraints
- Implementation requirements
- Interface requirements
- physical requirements
- Supportability requirements

# Stakeholders

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Anyone with an interest in the success of system

- Users
- Customers
- Suppliers
- Auditors
- Investors

# Identifying Stakeholders

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## Internal Stakeholders

- employees
- people who use the system
- people whose job is impacted by the system

## External Stakeholders

- suppliers
- partners
- shipping companies
- students

# Identifying Stakeholders

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## Operational stakeholders

- direct users of the system

## Executive stakeholders

- don't interact with the system

# Stakeholders

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# Stakeholders Activity

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Based on RMO example we went over:

- Identify all CSMS Stakeholders
- What would be an appropriate technique to *model* these stakeholders?

# Information Gathering Techniques

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Interviews

Questionnaires

System inputs and outputs

Documentation

Observation

Research other solutions

Gather user comments and suggestions

# Information Gathering Activity

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Based on RMO example, and previous activity

- Identify how you'd gather information from all the stakeholders you identified

# Asking the right questions

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## How to develop good questions:

- Identify important themes
- Create questions that target each theme
- Have both open and closed ended questions

## How to get an interview right:

- prepare, prepare, prepare
- plan ahead
- arrive with enough time
- keep interview short
- pay attention for exceptions or problems
- details, details, details
- take good notes
- follow up on the interview

# RMO Activity

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Pick a theme

Design 2 open questions, and 2 closed questions

identify important themes

- What are the business processes?
  - keep in mind difference between existing and new system
  - the system may take over steps that the worker used to do
- How should business operations be performed?
  - how will new system change these operations?
  - how will new system support these operations?
  - how can new tech/systems make processes more efficient
- What info is needed to perform business operations?
  - formal and informal information
  - look for exceptions and unusual situations
  - identify non-routine information requirements

# Models and Modeling

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Models are useful for:

- communicating ideas to others
- showing that you understand the system
- finding errors
- learning about the system
- dealing with complexity
- documentation for later:
  - maintenance
  - updates
  - upgrades

# Models and Modeling

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What is a model?

What are some examples of models that could be useful in Systems Analysis?

# Kinds of Model

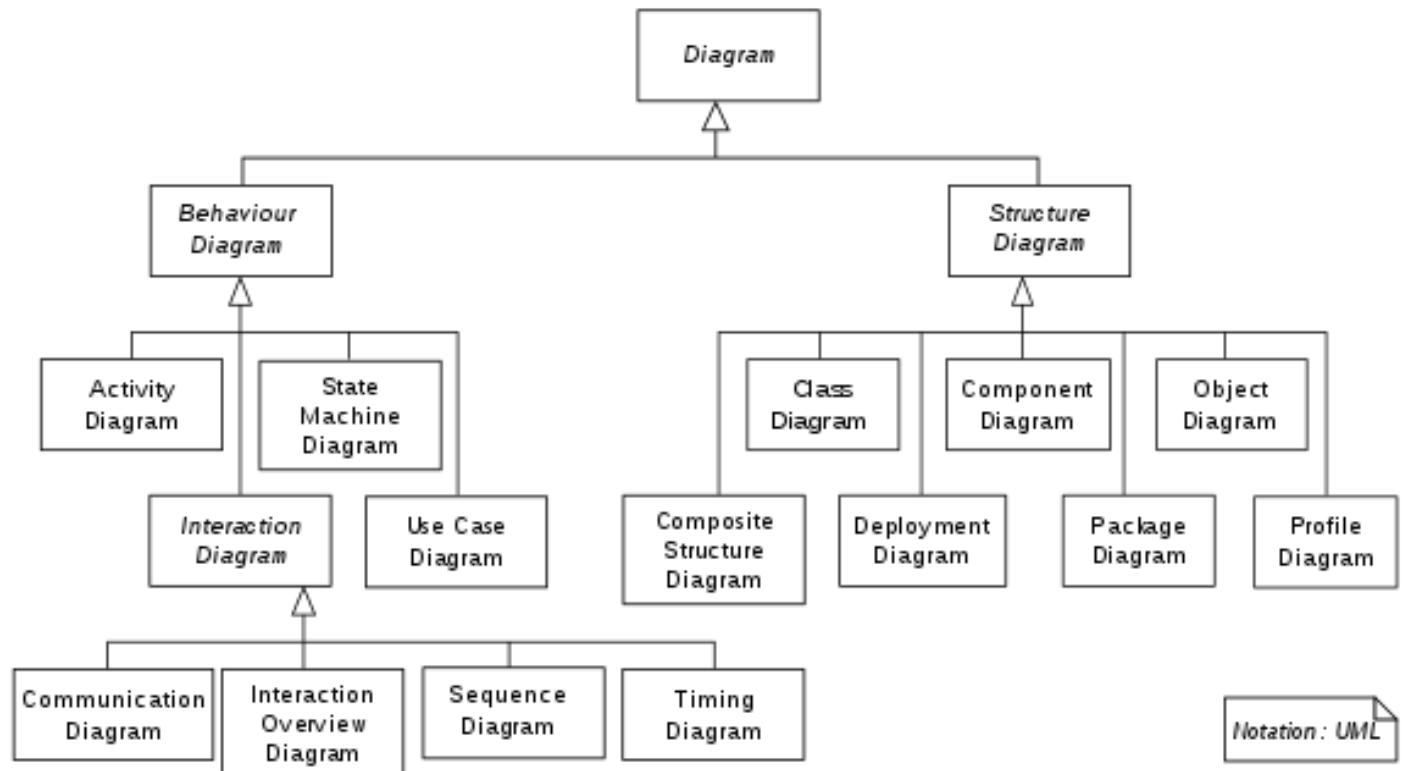
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Textual model

Graphical models

- UML

Mathematical models



# Practice Questions

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MLS Case study: Requirements Gathering

The real estate business relies on an extensive amount of information used in the buying and selling of real property. Most communities of real estate agents and brokers have formed cooperative organizations to help consolidate and distribute information on the real estate profession, real estate trends, properties in the community, historical records of property sales, and current listings of properties for sale. These organizations are usually referred to as the Community Board of Realtors.

### **Try to answer these questions:**

1. Who are the stakeholders for the issues related to real estate in your community, and what are their main interests?
2. What types of information do you think the board collects and make available to its members and to the community?
3. What are some cultural and legal issues that impact real estate in Canada.
4. If you were working on support for an international real estate cooperative system, in what ways would the information collection activity process be complicated?

# Readings

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- Chapter 3: Identifying User Stories and Use Cases