

# *MIS*

## *(Management Information System)*

### *(21-972)*

*Department of Industrial Engineering*  
*Sharif University of Technology*

*Session #15*

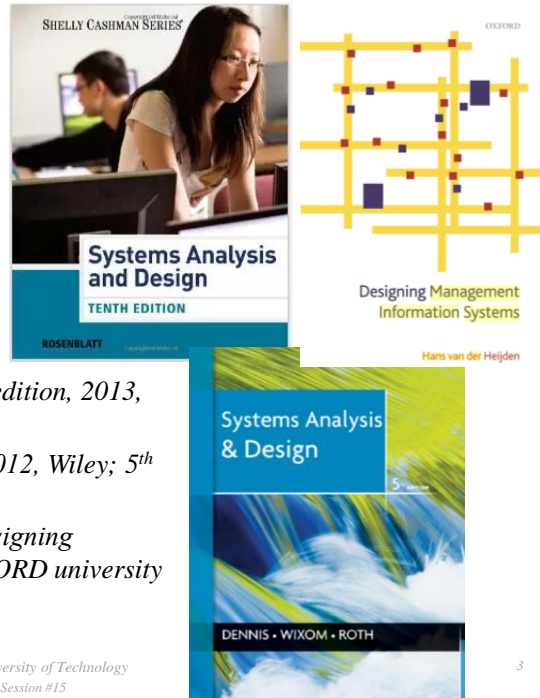


## *Course Description*

- *Instructor*
  - *Omid Fatahi Valilai, Ph.D. Industrial Engineering Department, Sharif University of Technology*
  - *Email: [Fvalilai@sharif.edu](mailto:Fvalilai@sharif.edu), Tel: 021-6616-5706*
  - *Website: <http://sharif.edu/~fvalilai>*
- *Class time*
  - *Saturday-Monday*                      *10:30~12:00*
- *Course evaluation*
  - *Mid-term*                                      *(20%)*
  - *Final exam*                                    *(20%)*
  - *Quiz*    *(10%)*
  - *Exercise-Projects*                          *(30%)*

## Course Description (Continued ...)

- **Mid-term session:**
  - Saturday, 7<sup>th</sup>, Azar 1394
- **Final session:**
  - Monday, 28<sup>th</sup>, Dey 1394
- **Reference:**
  - Rosenbalt, “System Analysis and Design”, 10<sup>th</sup> edition, 2013, Course Technology
  - Dennis, Lan; “Systems Analysis and Design”, 2012, Wiley; 5<sup>th</sup> edition
  - Johannes Govardus Maria van der Heijde; “Designing Management Information Systems”, 2009, OXFORD university press

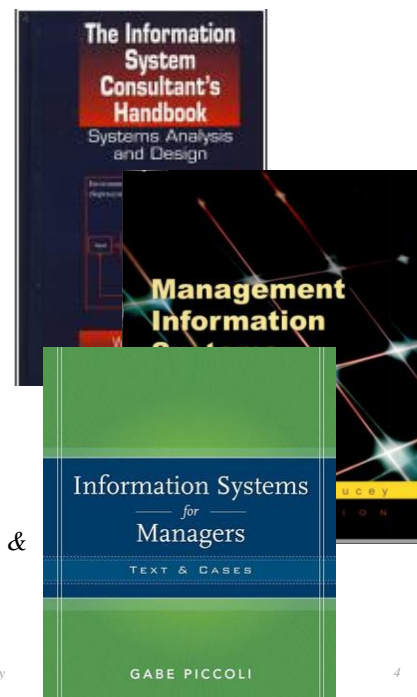


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## Course Description (Continued ...)

- **Reference:**
  - William S. Davis, David C. Yen, “The information system consultant’s handbook: system analysis and design”, 2010, Taylor and Francis
  - Terence Lucey; “Management Information Systems”, 2004, Cengage Learning EMEA
  - Gabriele Piccoli; “Information systems for managers: texts & cases”, 2007, John Wiley & Sons Inc



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## *Course Description (Continued..)*

- *Contents:*
  - *Introduction to Systems Analysis and Design*
  - *Analyzing the Business Case*
  - *Managing Systems Projects*
  - *Requirements Modeling*
  - *Data and Process Modeling*
  - *Object Modeling*
  - *Development Strategies*
  - *User Interface Design*
  - *Data Design*
  - *System Architecture*
  - *Managing Systems Implementation*

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## *Course Description (Continued..)*

- *Contents:*
  - *Object Modeling*
    - *Relationships Among Objects and Classes*
    - *Object Modeling with the Unified Modeling Language*
    - *Organizing the Object Model*

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## Object Modeling

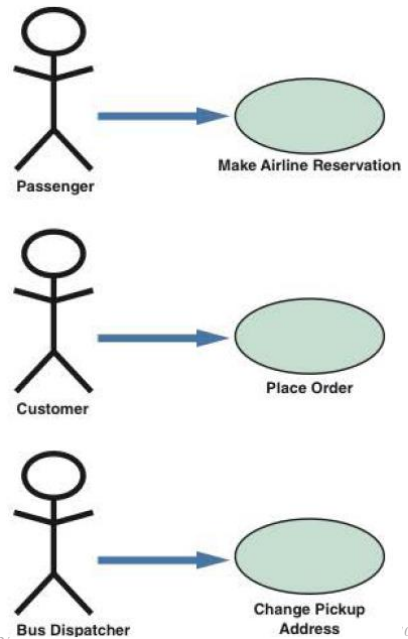
- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *RUP is made up of three model types:*
      - *Business system models --- Use Case Diagrams*
      - *Static structure models --- Class Inheritance Diagrams*
      - *Dynamic behavior models --- State Transition Diagrams*

## Object Modeling

- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *Use Case Modeling*
      - *A use case represents the steps in a specific business function or process.*
        - *An external entity, called an actor, initiates a use case by requesting the system to perform a function or process. The UML symbol for a use case is an oval with a label that describes the action or event.*
        - *The actor is shown as a stick figure, with a label that identifies the actor's role.*
        - *The line from the actor to the use case is called an association, because it links a particular actor to a use case.*

# Object Modeling

- Object Modeling with the Unified Modeling Language
  - Object-Oriented Models
  - Use Case Modeling



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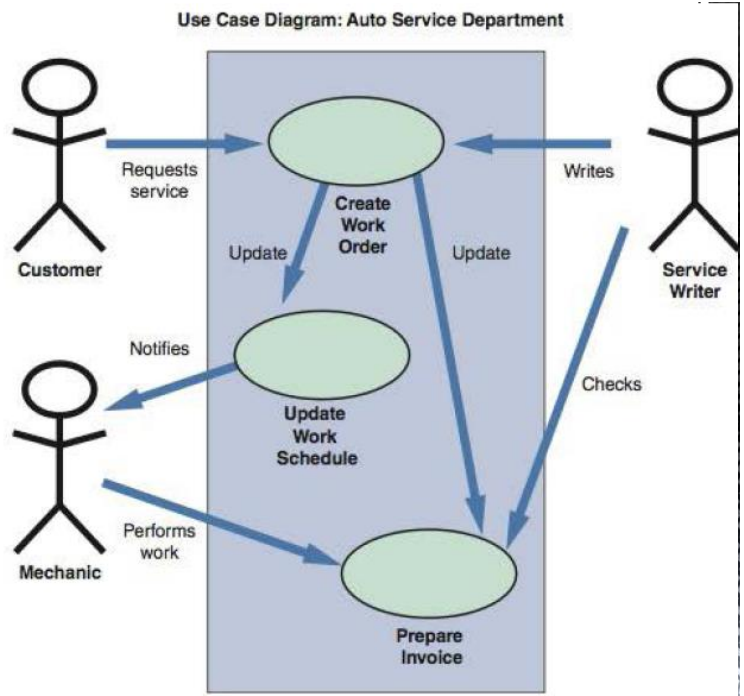
	<b>Add New Student</b>
<b>ADD NEW STUDENT Use Case</b>	
<b>Name:</b>	Add New Student
<b>Actor:</b>	Student/Manager
<b>Description:</b>	Describes the process used to add a student to a fitness-class
<b>Successful completion:</b>	<ol style="list-style-type: none"> <li>1. Manager checks FITNESS-CLASS SCHEDULE object for availability</li> <li>2. Manager notifies student</li> <li>3. Fitness-class is open and student pays fee</li> <li>4. Manager registers student</li> </ol>
<b>Alternative:</b>	<ol style="list-style-type: none"> <li>1. Manager checks FITNESS-CLASS SCHEDULE object for availability</li> <li>2. Fitness-class is full</li> <li>3. Manager notifies student</li> </ol>
<b>Precondition:</b>	Student requests fitness-class
<b>Postcondition:</b>	Student is enrolled in fitness-class and fees have been paid
<b>Assumptions:</b>	None

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## Object Modeling

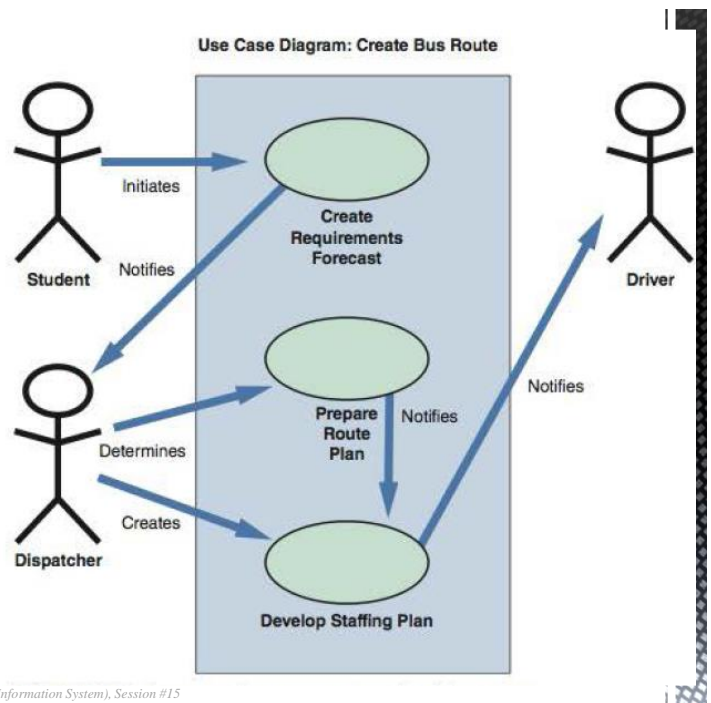
- Object Modeling with the Unifed Modeling Language
  - Object-Oriented Models
  - Use Case Modeling



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## Object Modeling

- Object Modeling with the Unified Modeling Language
  - Object-Oriented Models
  - Use Case Modeling



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## Object Modeling

- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *Class Diagrams*
    - *A class diagram shows the object classes and relationships involved in a use case.*
      - *Like a DFD, a class diagram is a logical model, which evolves into a physical model and finally becomes a functioning information system.*
  - *In a class diagram, each class appears as a rectangle, with the class name at the top, followed by the class's attributes and methods.*
    - *Lines show relationships between classes and have labels identifying the action that relates the two classes.*

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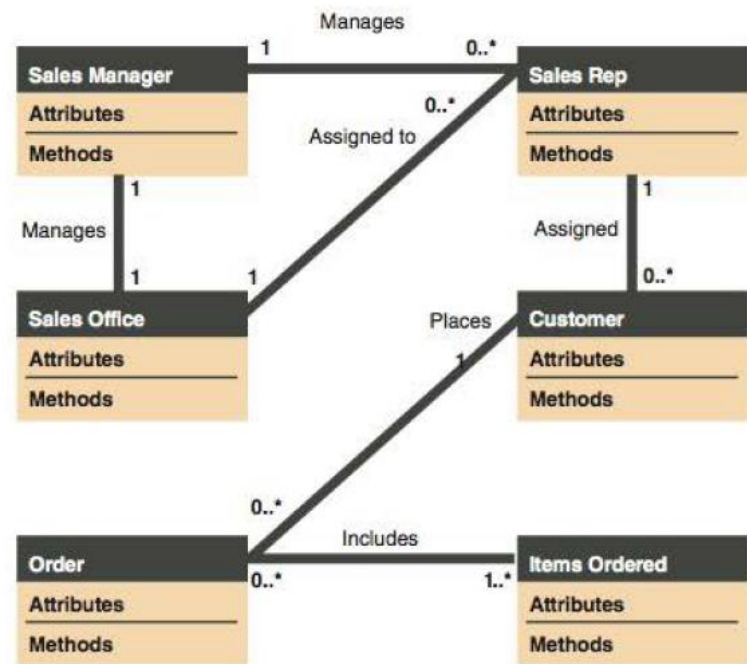
## Object Modeling

- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *Class Diagram*

UML Notation	Nature of the Relationship	Example	Description
0..*	Zero or many		An employee can have no payroll deductions or many deductions.
0..1	Zero or one		An employee can have no spouse or one spouse.
1	One and only one		An office manager manages one and only one office.
1..*	One or many		One order can include one or many items ordered.

## Object Modeling

- Object Modeling with the Unified Modeling Language
  - Object-Oriented Models
    - Class Diagram



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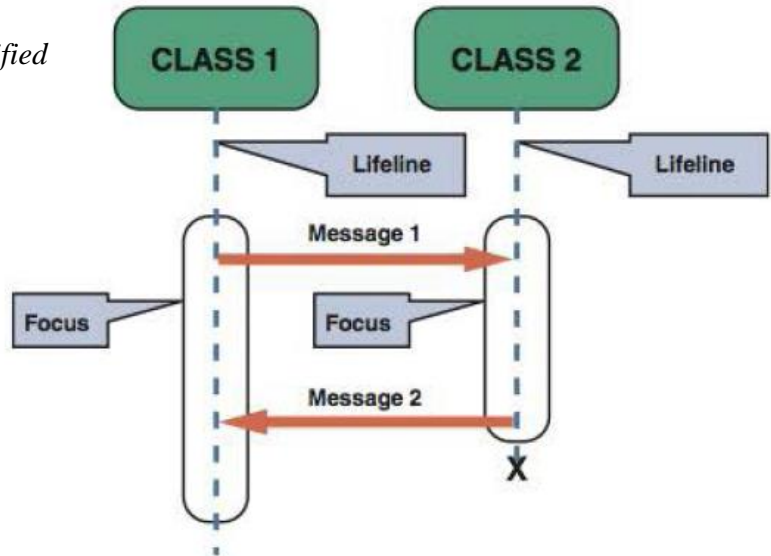
## Object Modeling

- Object Modeling with the Unified Modeling Language
  - Object-Oriented Models
    - Sequence Diagram
    - A sequence diagram is a dynamic model of a use case, showing the interaction among classes during a specified time period.
    - A sequence diagram graphically documents the use case by showing the classes, the messages, and the timing of the messages.
    - Sequence diagrams include symbols that represent classes, lifelines, messages, and focuses.

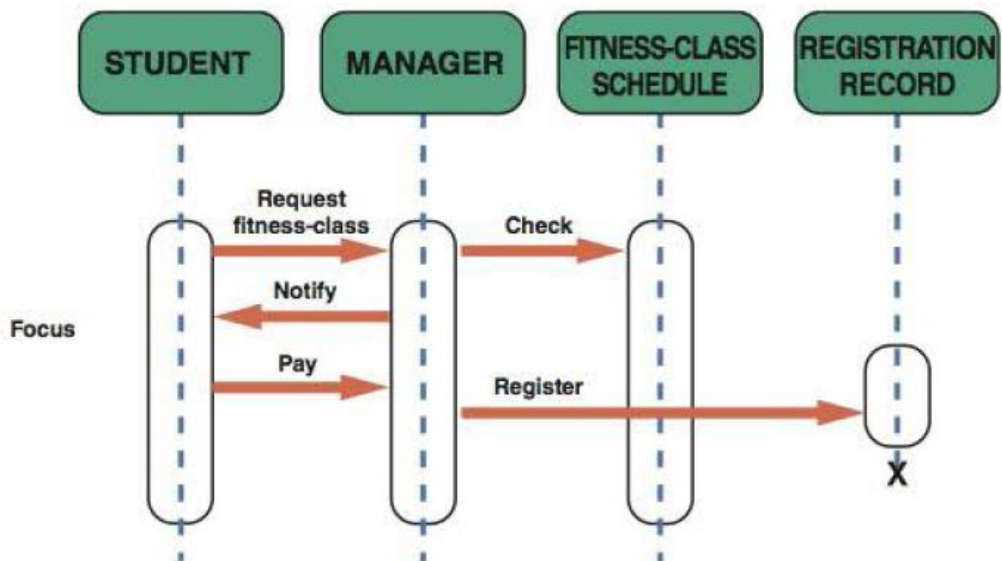


## Object Modeling

- Object Modeling with the Unified Modeling Language
  - Object-Oriented Models
  - Sequence Diagram



## Object Modeling



## Object Modeling

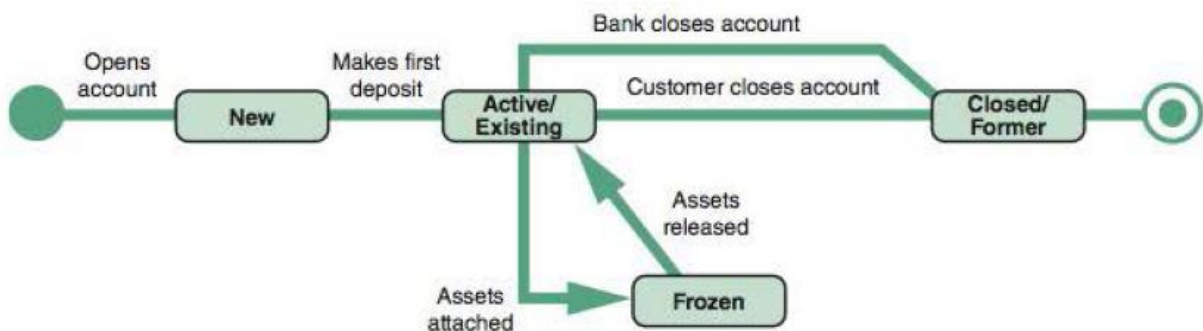
- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *State Transition Diagram*
      - *A state transition diagram shows how an object changes from one state to another, depending on events that affect the object.*
      - *All possible states must be documented in the state transition diagram.*
      - *In a state transition diagram, the states appear as rounded rectangles with the state names inside.*
      - *The small circle to the left is the initial state, or the point where the object first interacts with the system.*
      - *Reading from left to right, the lines show direction and describe the action or event that causes a transition from one state to another. The circle at the right with a hollow border is the final state.*

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## Object Modeling

- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *State Transition Diagram*



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## Object Modeling

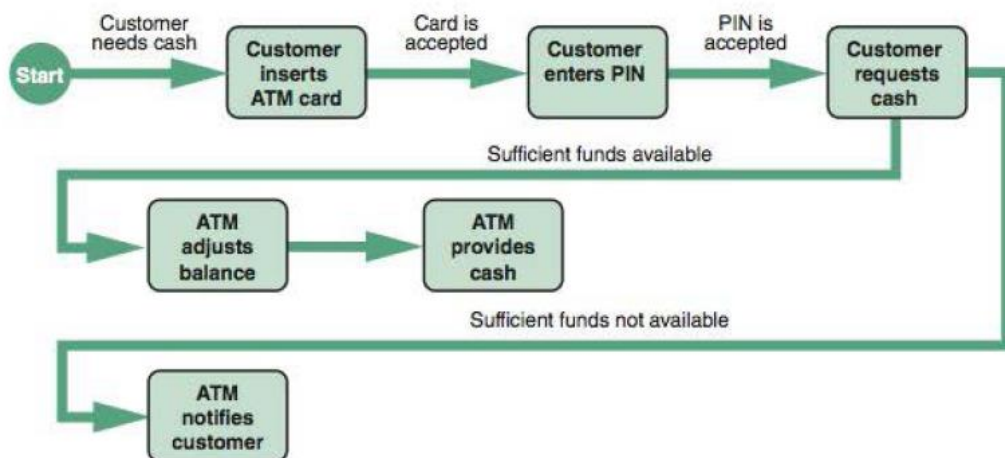
- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *Activity Diagrams*
      - *An activity diagram resembles a horizontal flowchart that shows the actions and events as they occur.*
      - *Activity diagrams show the order in which the actions take place and identify the outcomes.*
      - *Activity diagrams also can display multiple use cases in the form of a grid, where classes are shown as vertical bars and actions appear as horizontal arrows*

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## Object Modeling

- *Object Modeling with the Unified Modeling Language*



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## Object Modeling

- *Object Modeling with the Unified Modeling Language*
  - *Object-Oriented Models*
    - *Business Process Modeling*
      - *In addition to sequence diagrams and activity diagrams, you can use business process modeling (BPM) to represent the people, events, and interaction in a system.*
      - *BPM initially as a requirements modeling tool, works well with object modeling, because both methods focus on the actors and the way they behave.*
      - *In a typical BPM diagram, the outside rectangle is called a pool, and designated swim lanes show specific actions and events. The swim lanes can interact when certain events*