

Sequence Diagrams

- A *Sequence Diagram* shows object interactions arranged in time sequence
 - It depicts
 - the objects and classes involved in the scenario, and
 - the sequence of messages exchanged between the objects needed to carry the functionality of the scenario
- *Sequence Diagrams* are typically associated with *use case realizations* in the *Logical View* of the system under development

Sequence Diagrams

- In the UML, an object in a sequence diagram is drawn as a rectangle containing the name of the object, underlined
- An object can be named in one of three ways:
 - The object name,
 - The object name and its class, or just
 - The class name (anonymous object)
- Often, an anonymous object (class name, only) may be used to represent any object in the class
- Each object also has its timeline represented by a dashed line below the object
- Messages between objects are represented by arrows that point from the client (sender of the message) to the supplier (receiver of the message)

Naming Objects in a Sequence Diagram

Object Name

History 101 - Section 2

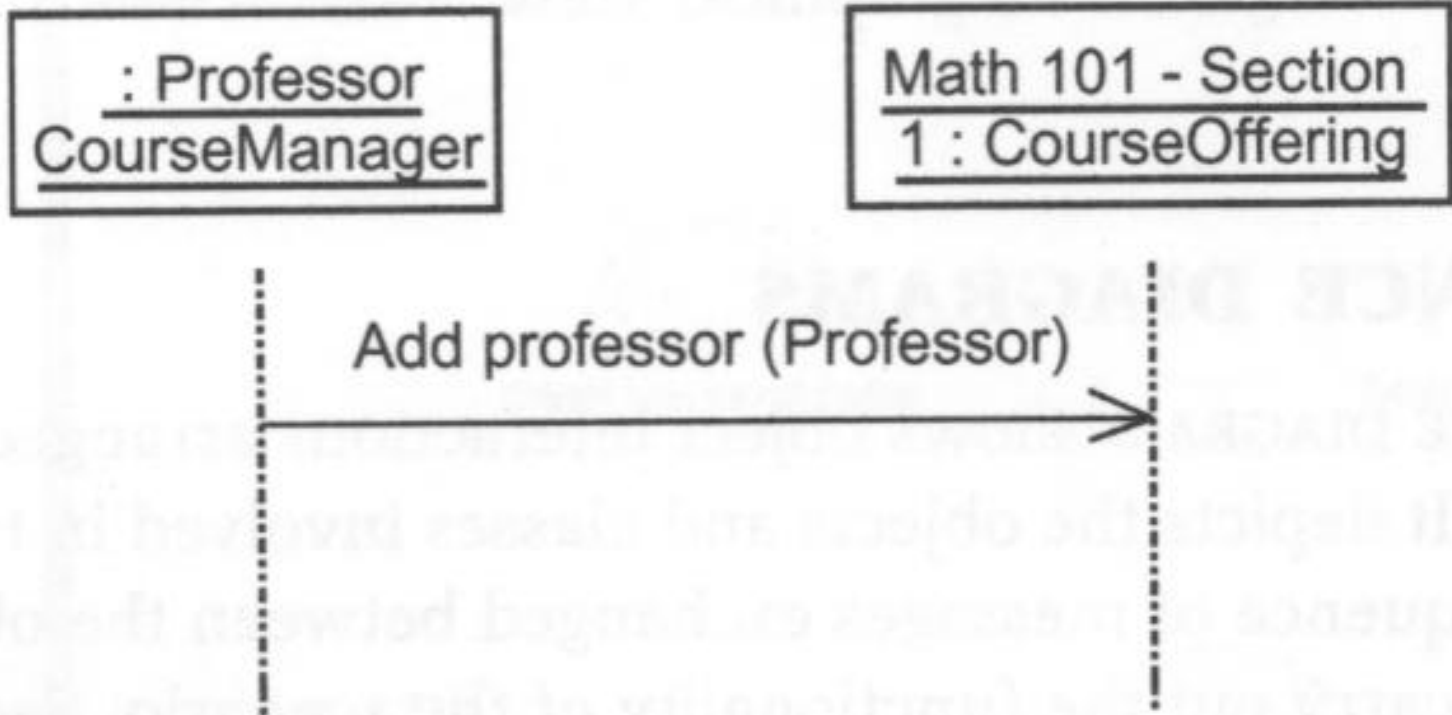
Object Name and Class

History 101 - Section 7 : CourseOffering

Class Name

: CourseOffering

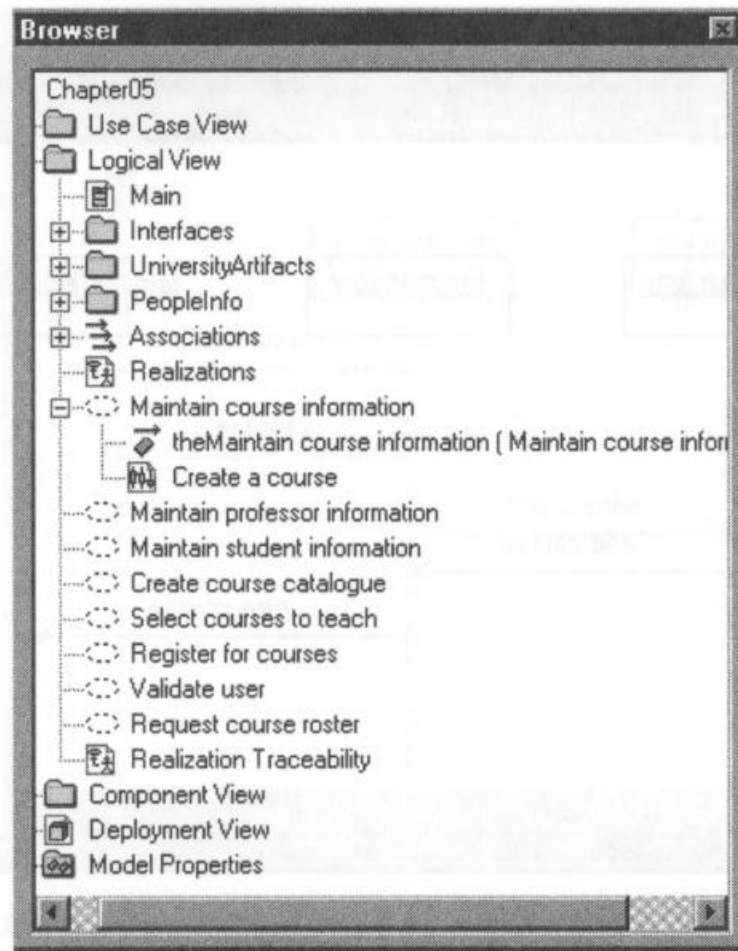
UML Notation for Objects and Messages in a Sequence Diagram



Sequence Diagrams

- **Creating a Sequence Diagram in Rational Rose**
 1. Right-click to select the use case realization in the Logical View of the browser and make the shortcut menu visible
 2. Select the New:Sequence Diagram menu choice. An unnamed sequence diagram is added to the browser
 3. With the new sequence diagram selected, enter the name of the sequence diagram

Browser View of a Sequence Diagram



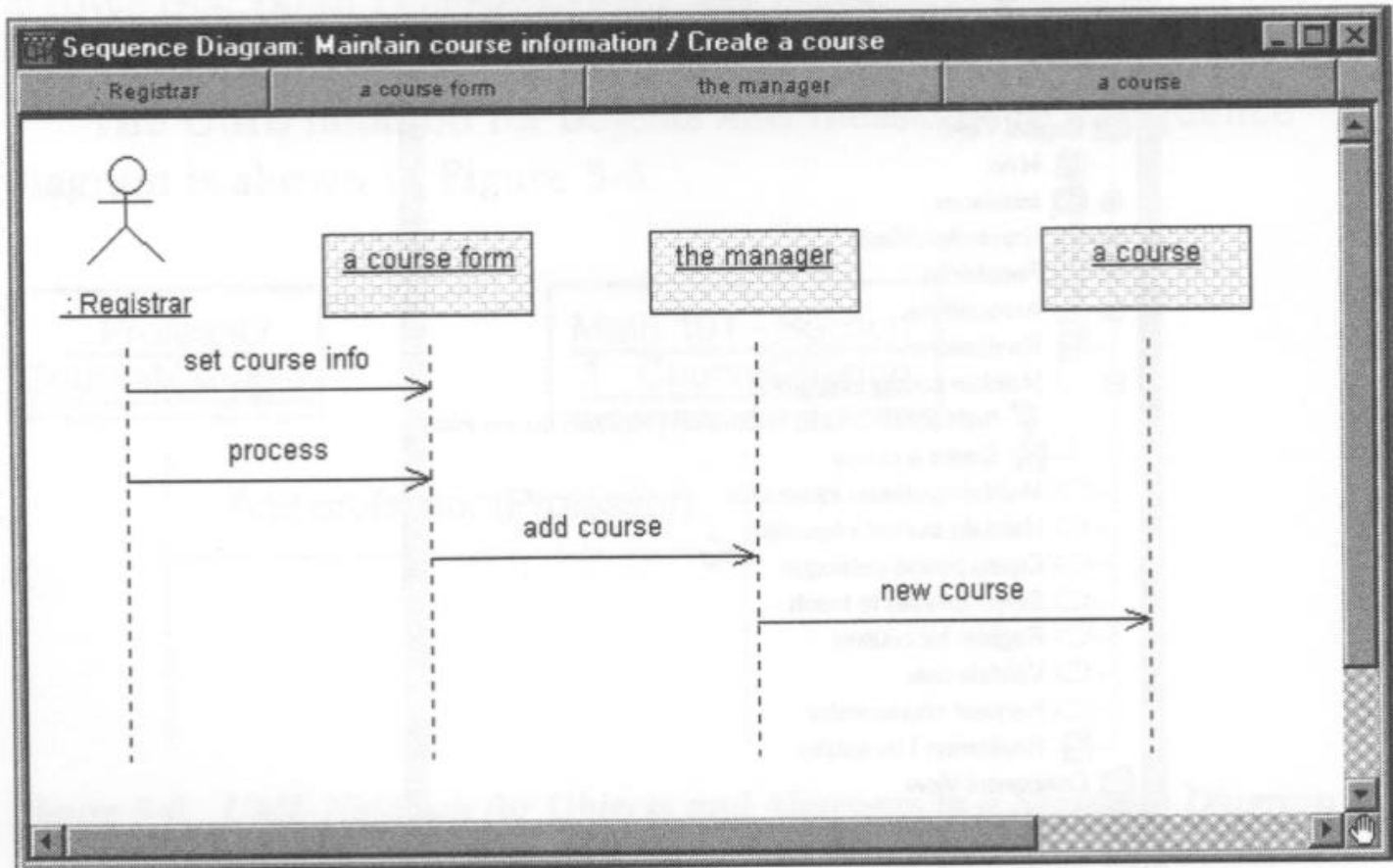
Sequence Diagrams

- **Creating Objects and Messages in Sequence Diagrams in Rational Rose**
 1. Double-click on the sequence diagram in the browser to open the diagram
 2. Click to select the actor in the browser
 3. Drag the actor onto the sequence diagram
 4. Click to select the Object icon from the toolbar
 5. Click on the sequence diagram window to place the object
 6. While the object is still selected, enter the name of the object

Sequence Diagrams

- **Creating Objects and Messages in Sequence Diagrams in Rational Rose**
 7. Repeat the preceding steps for each object and actor in the scenario
 8. Click to select the Object message icon from the toolbar
 9. Click on the actor or object receiving the message
 10. While the message line is still selected, enter the name of the message
 11. Repeat steps 7 through 9 for each message in the scenario

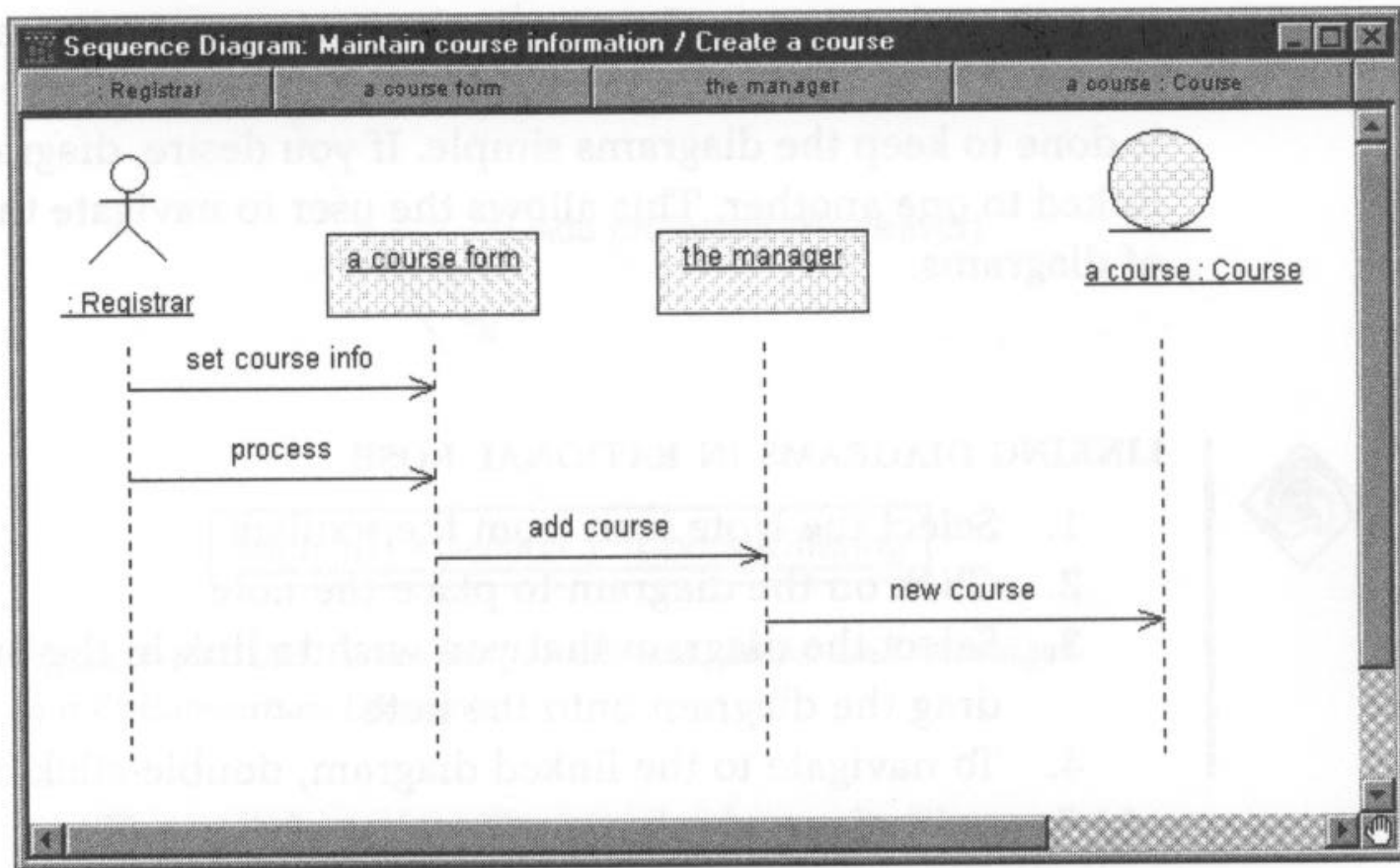
Sequence Diagrams



Sequence Diagrams

- Assigning Objects in a Sequence Diagram to Classes in Rational Rose
 1. Click to select the class in the browser
 2. Drag the class onto the object in the sequence diagram
 - Rose will add the class name preceded by a colon (:) to the object name
 - If the object is unnamed, the name is set to :className
 - If the stereotype display for a class is set to icon, and
 - If an icon exists,
 - then the icon will be used in the sequence diagram

Sequence Diagram with an Object Assigned to a Class



Sequence Diagrams & Boundary Classes

- *Boundary Classes* are added to sequence diagrams to show the interaction with the user or another system
- In the early analysis phases, the purpose of showing boundary classes on a sequence diagram is to capture and document the interface requirements, not to show how the interface will be implemented

Complexity & Sequence Diagrams

- Keep the *sequence diagrams* as simple as possible
 - It should be very easy to see the objects, and the functionality captured by the scenario
- If the associated conditional logic (all the *if*, *then*, *else* logic that exists in the real world) is simple,
 - add the logic to one diagram, and
 - use notes and scripts to communicate the choices to be made

Complexity & Sequence Diagrams

- If the associated conditional logic (all the *if*, *then*, *else* logic that exists in the real world) involves many complicated messages,
 - draw separate diagrams
 - One for the *if* case,
 - One for the *then* case, and
 - One for the *else* case
 - link the diagrams together

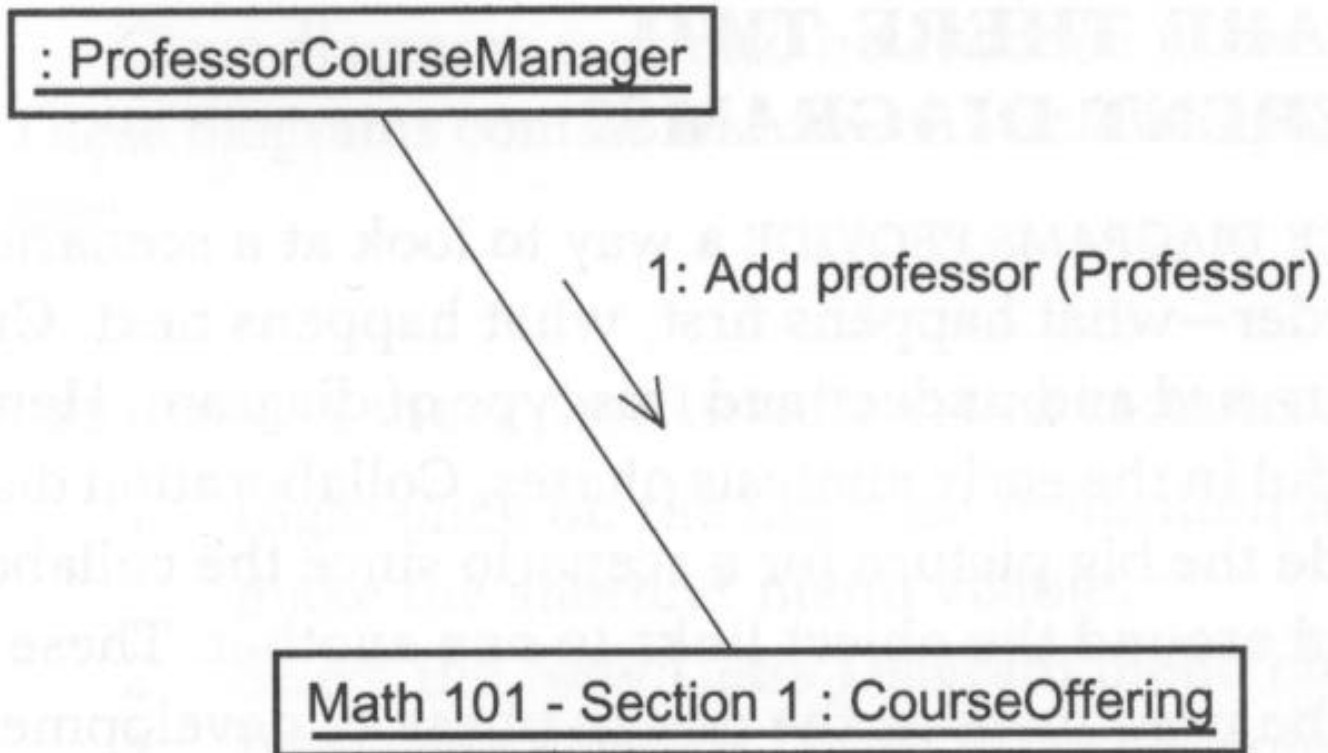
Linking Diagrams

- Linking Diagrams in Rational Rose
 1. Select the Note icon from the toolbar
 2. Click on the diagram to place the note
 3. Select the diagram that you wish to link in the browser and drag the diagram onto the note
 4. To navigate to the linked diagram, double-click on the note

Collaboration Diagrams

- A *Collaboration Diagram* is an alternate way to show a scenario
 - This type of diagram shows:
 - object interactions organized around the objects, and
 - their links to each other
- A *collaboration diagram* contains:
 - *Objects* drawn as *rectangles*
 - *Links* between objects shown as *lines* connecting the linked objects
 - *Messages* shown as text, and
 - an *arrow* that points from the *client* to the *supplier*

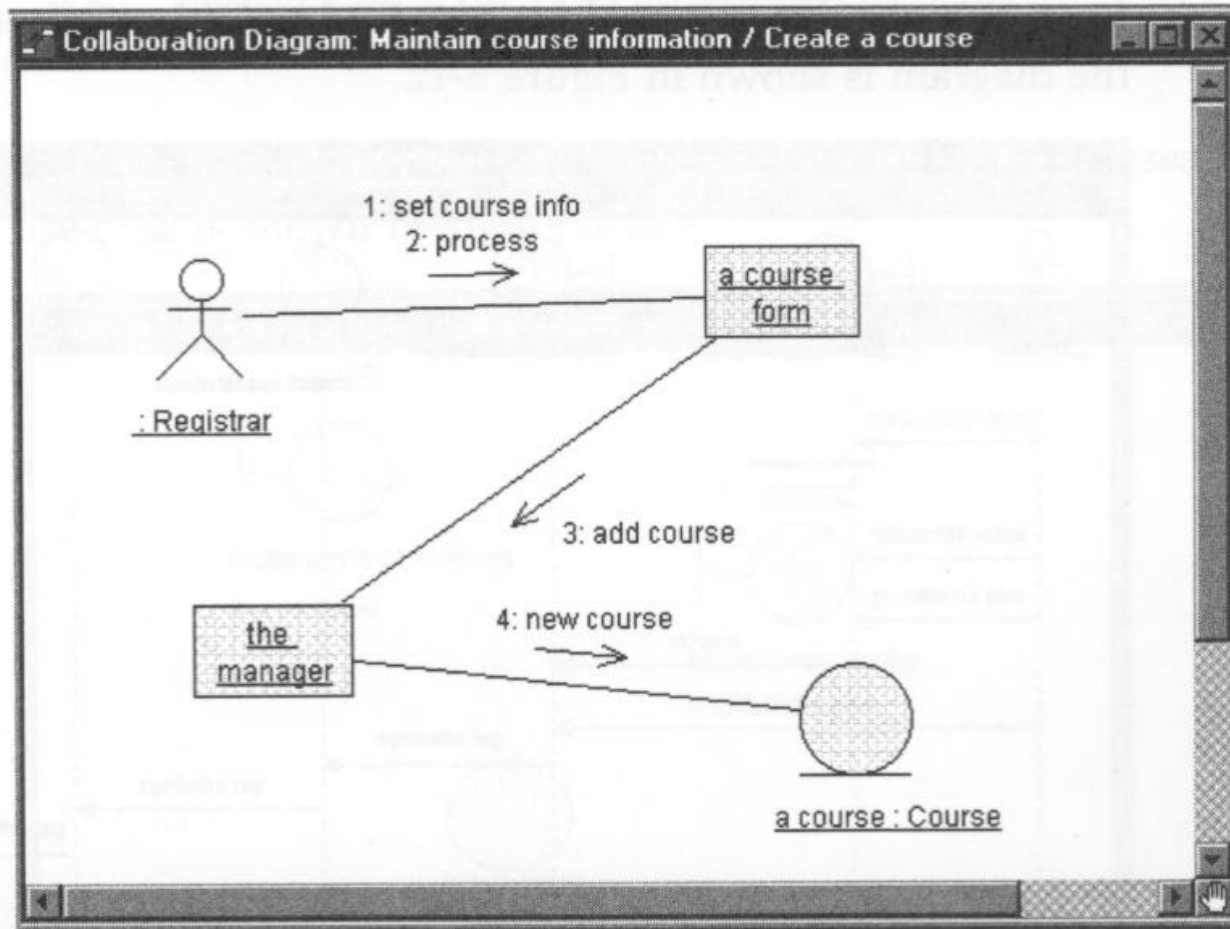
UML Notation for Objects, Links, and Messages in a Collaboration Diagram



Collaboration Diagrams

- Creating Collaboration Diagrams from Sequence Diagrams in Rational Rose
 1. Double-click on the sequence diagram in the browser to open the diagram
 2. Choose the Browse>Create Collaboration Diagram menu choice or press the F5 key
 3. Rearrange the object and messages on the diagram as needed

Collaboration Diagrams



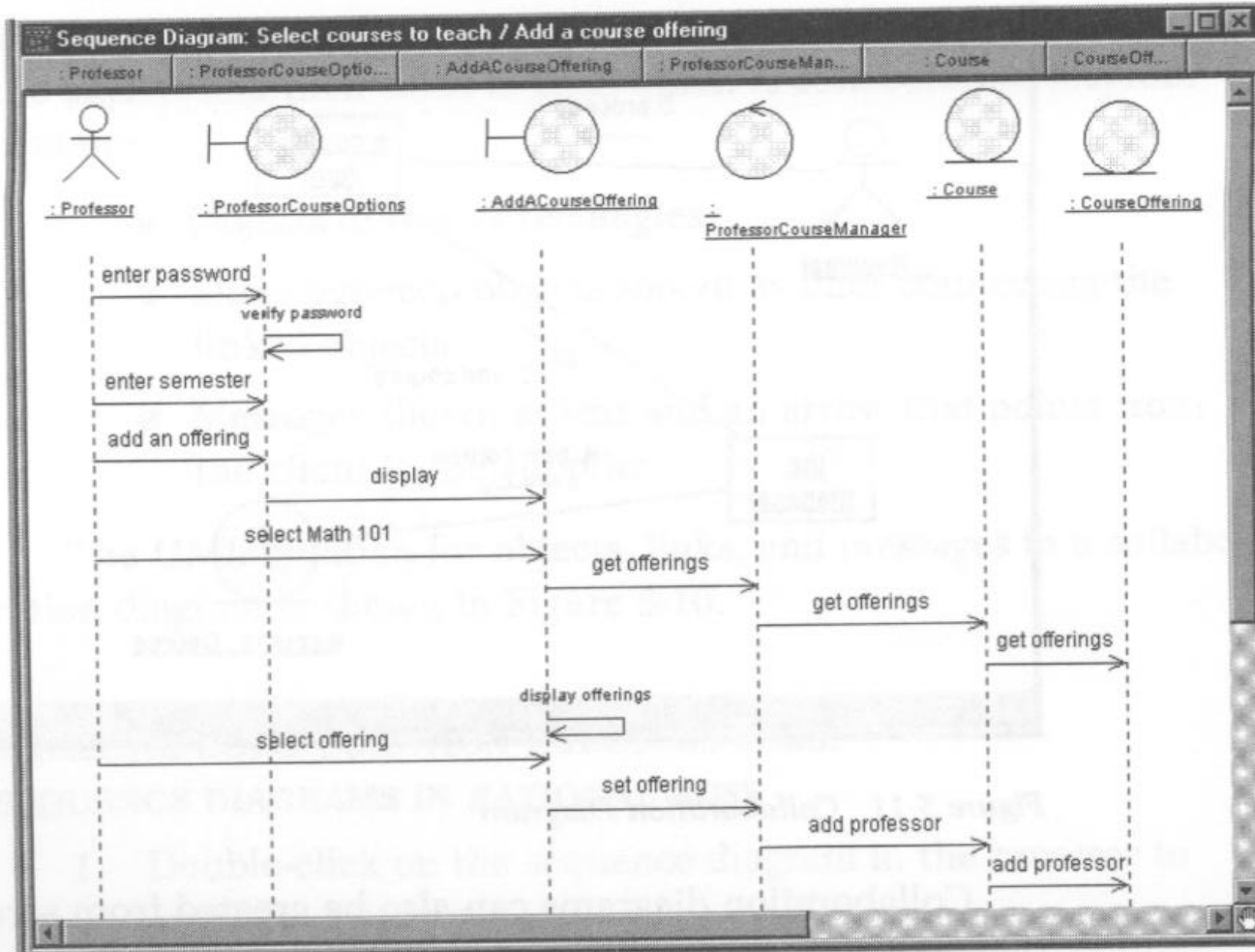
Collaboration Diagrams

- *Collaboration diagrams* can also be created from scratch
- In that case, a sequence diagram can be created from the collaboration diagram by
 - selecting the Browse>Create Sequence Diagram menu choice, or
 - by pressing the F5 key

Collaboration Diagrams & Sequence Diagrams

- *Sequence Diagrams* provide a way to look at a scenario in a time-based order
 - Customers easily can read and understand this type of diagram
 - They favor the early analysis phases of a project
- *Collaboration Diagrams* tend to provide the big picture for a scenario
 - The collaborations are organized around how the objects link to one another
 - They favor the design phase of development when you are designing the implementation of the relationships

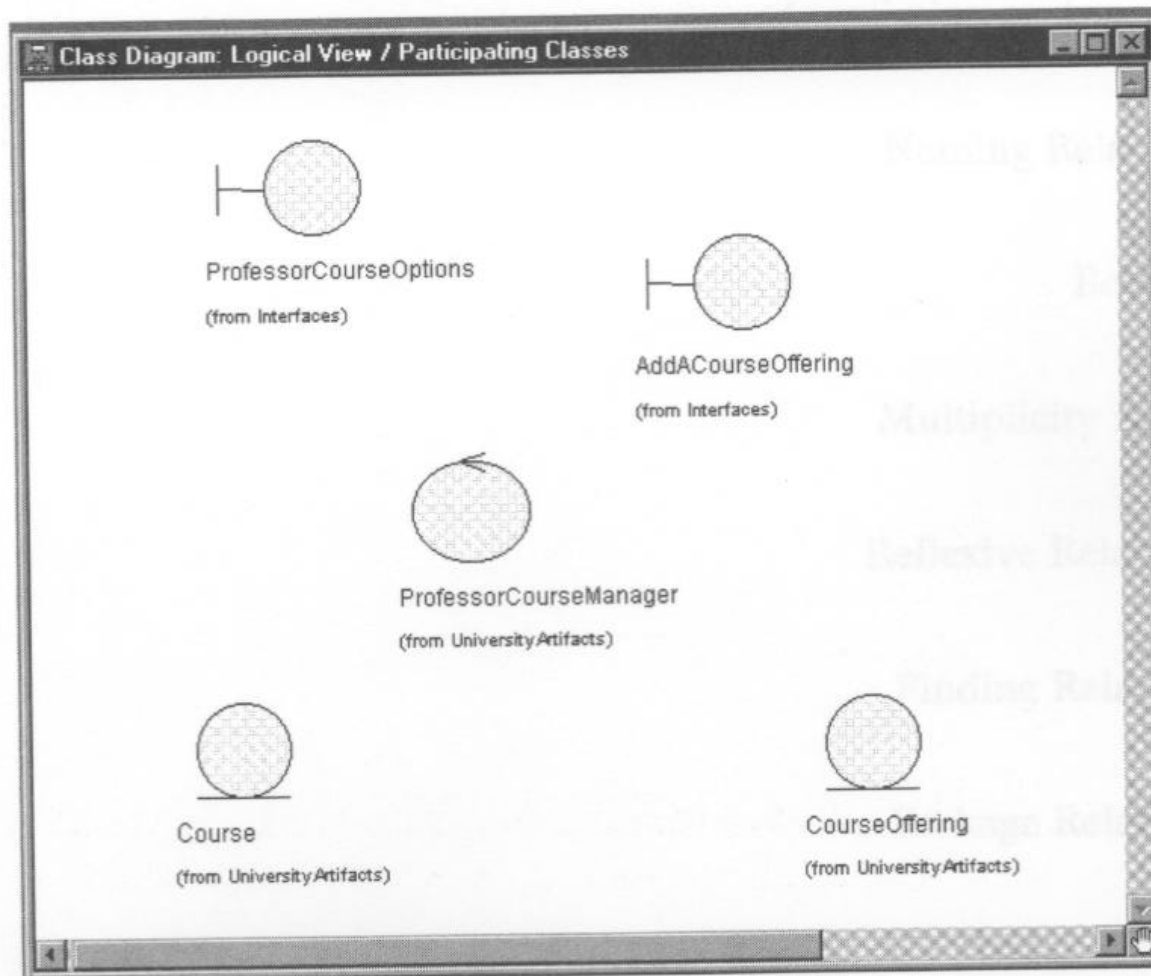
Collaboration Diagrams & Sequence Diagrams



Views in Rational Rose

- Creating a View of Participating Classes in Rational Rose
 1. Right-click on the use case realization in the browser to make the shortcut menu visible
 2. Select the New:Class diagram menu choice
 3. While the diagram is still selected, enter the name of the class diagram
 4. Double-click on the diagram in the browser to open the diagram
 5. Click to select a class in the logical view of the browser and drag the class onto the diagram
 6. Repeat step 5 for additional class that is to be placed onto the diagram

Views in Rational Rose



Primary Reference

- Primary Reference:
 - Visual Modeling with Rational Rose 2000 and UML by Terry Quatrani, Addison-Wesley, 2000