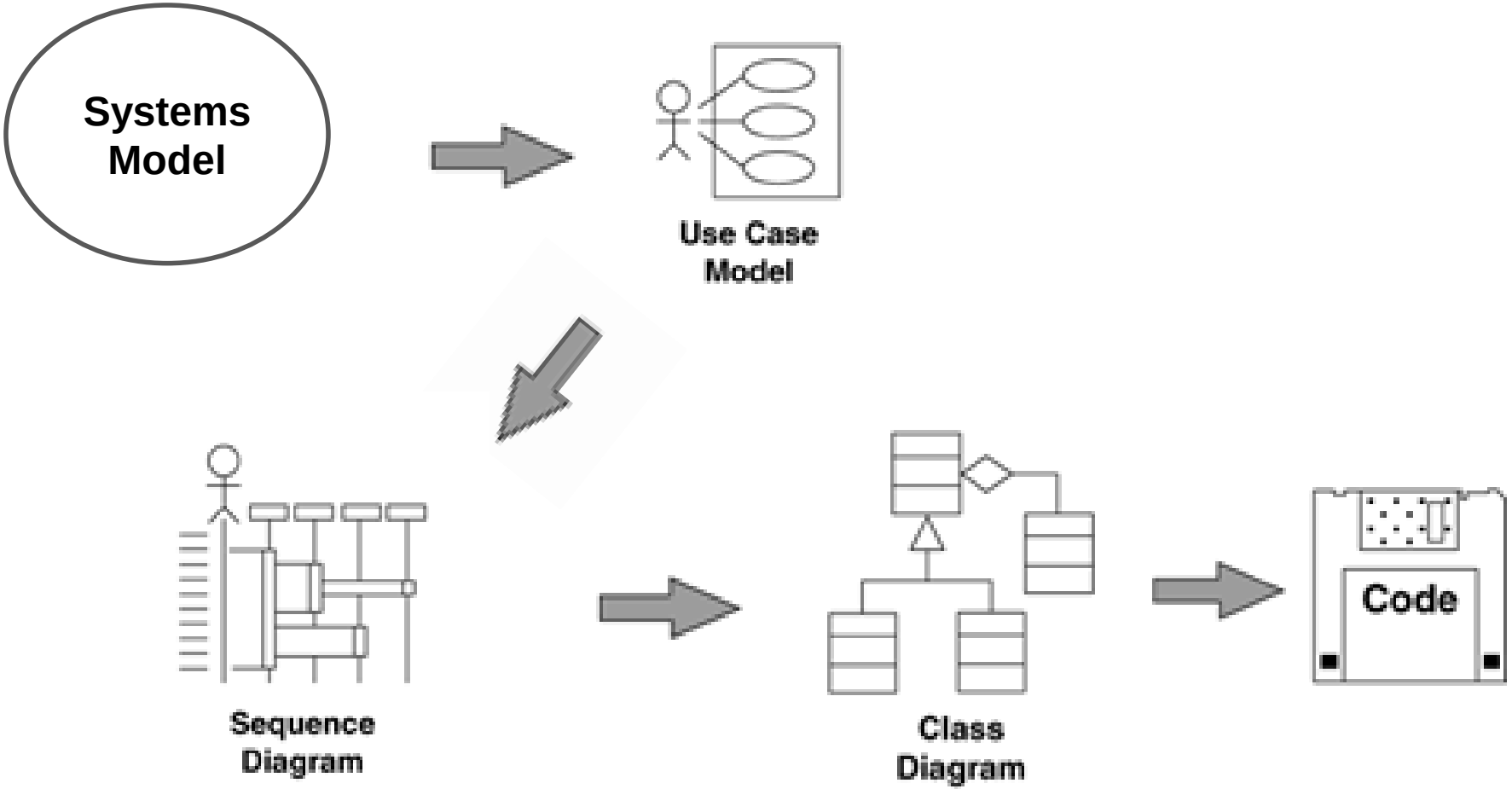
CSE291 - Introduction To Software Engineering (Fall 2018)

Lecture 11

Sequence Diagrams

Beginnings of a Method



Interaction Models

All systems involve interaction of some kind…

- This can be user interaction, which involves user inputs and outputs

- Interaction between the system being developed and other systems
- Or **interaction between the components of the system**

Use case modeling, which is mostly used to model interactions between a system and external actors (users or other systems).

Sequence diagrams, which are used to model interactions between system components, although external agents may also be included.

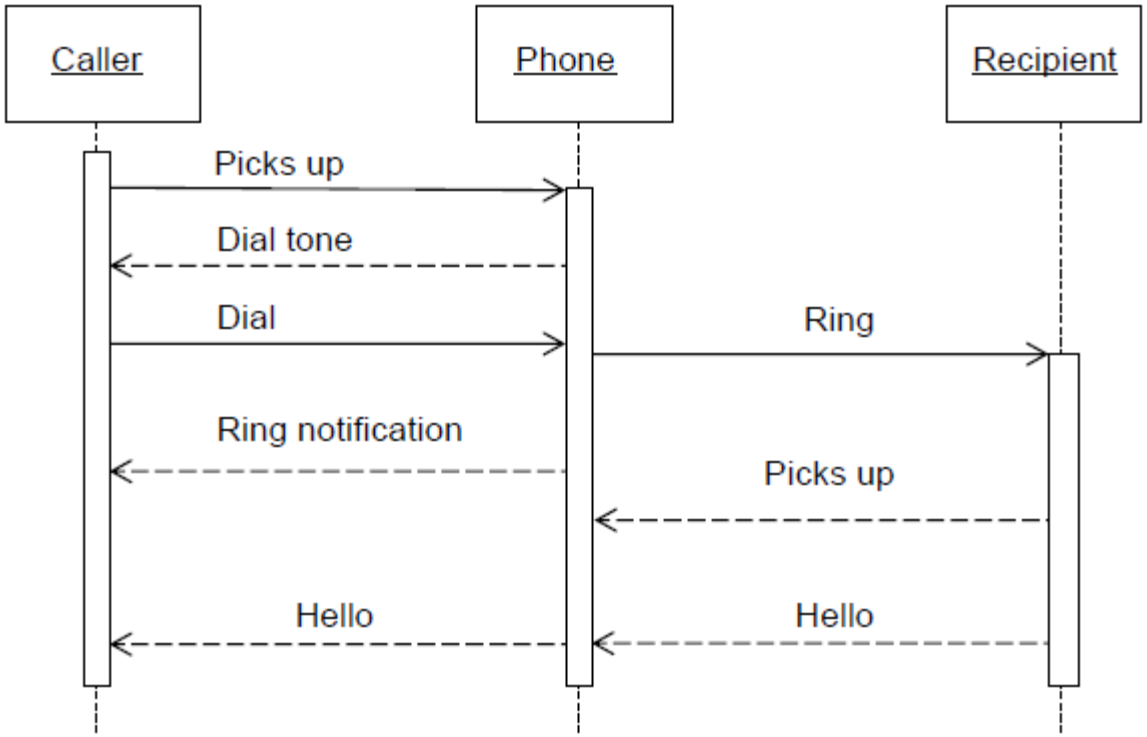
UML Sequence Diagrams

- Sequence diagrams are used to model interactions between the actors and the objects in a system and the interaction between the objects themselves.
- It shows the sequence of interactions that take place during particular use case.
- Typically used to understand the logical flow of system

Sequence Diagram Key Parts

- In a sequence diagram, objects and actors are listed along the top of the diagram, with a dotted line drawn vertically from these.
- Interactions between objects are indicated by annotated arrows/ Labelled arrows
  - The annotations on the arrows indicate the calls to the objects
- The rectangle on the dotted line indicates the life line of object concerned (the time that object involved in computation)
- Read the sequence of interactions from top to bottom.

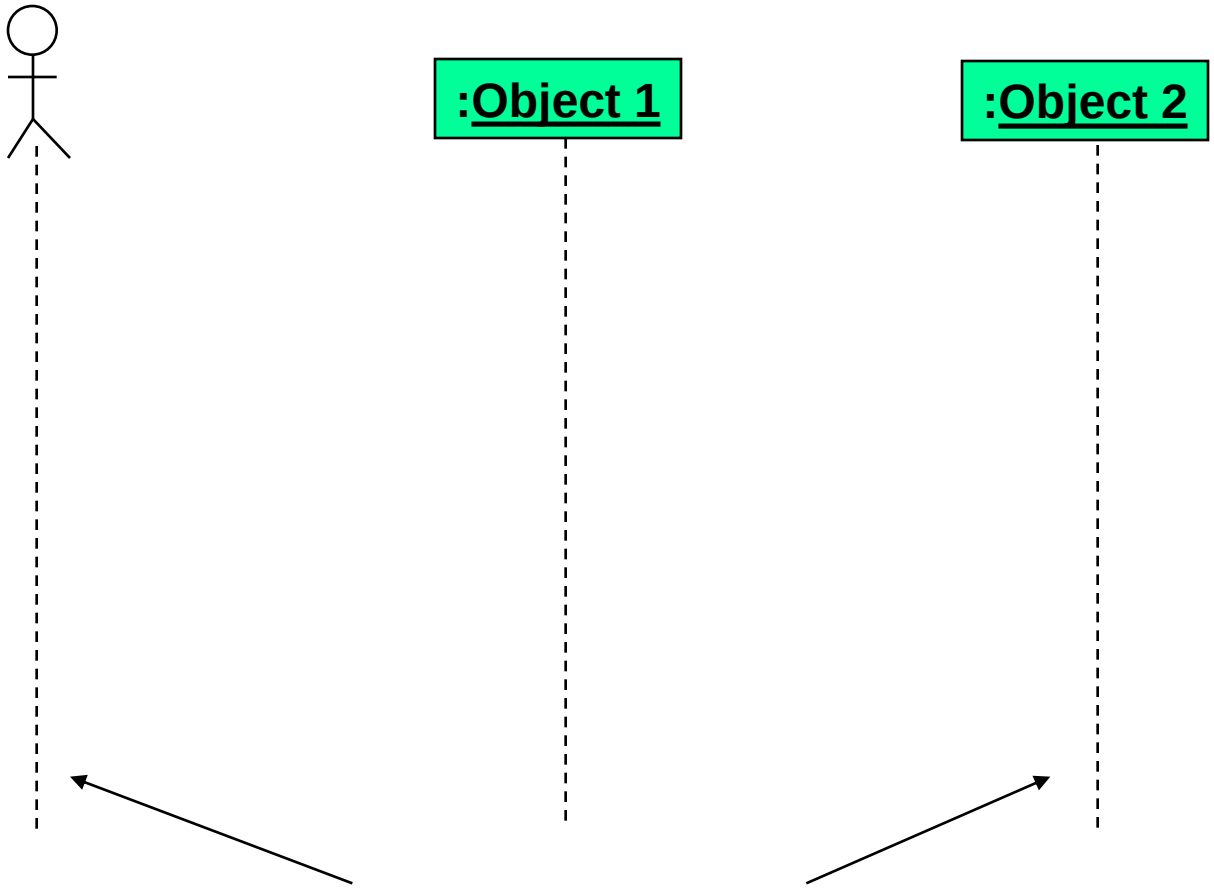
Sequence Diagram (make a phone call)



Developing Sequence Diagrams

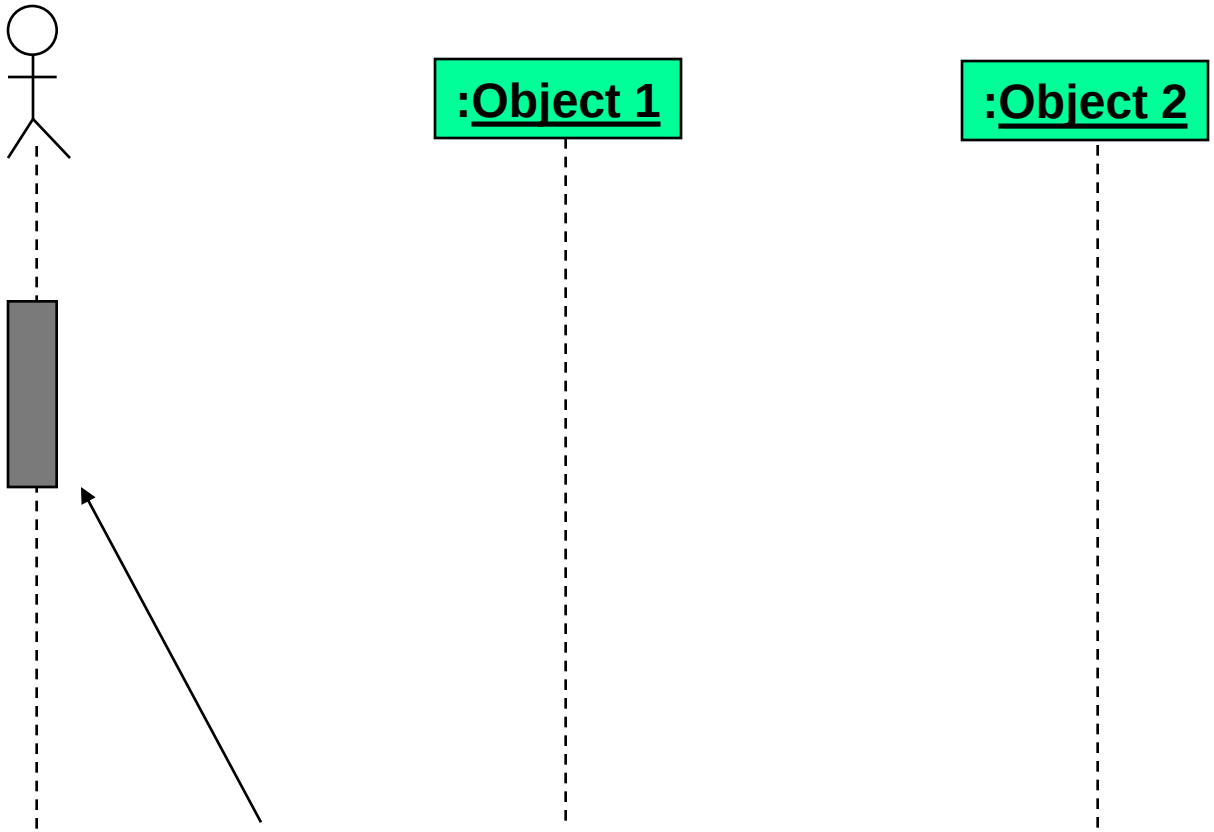
- Identify the relevant objects involved in the computation
- Establish the role of each object
- Decide messages between objects

Sequence Diagram Notation



Identify the existence of the object over time.

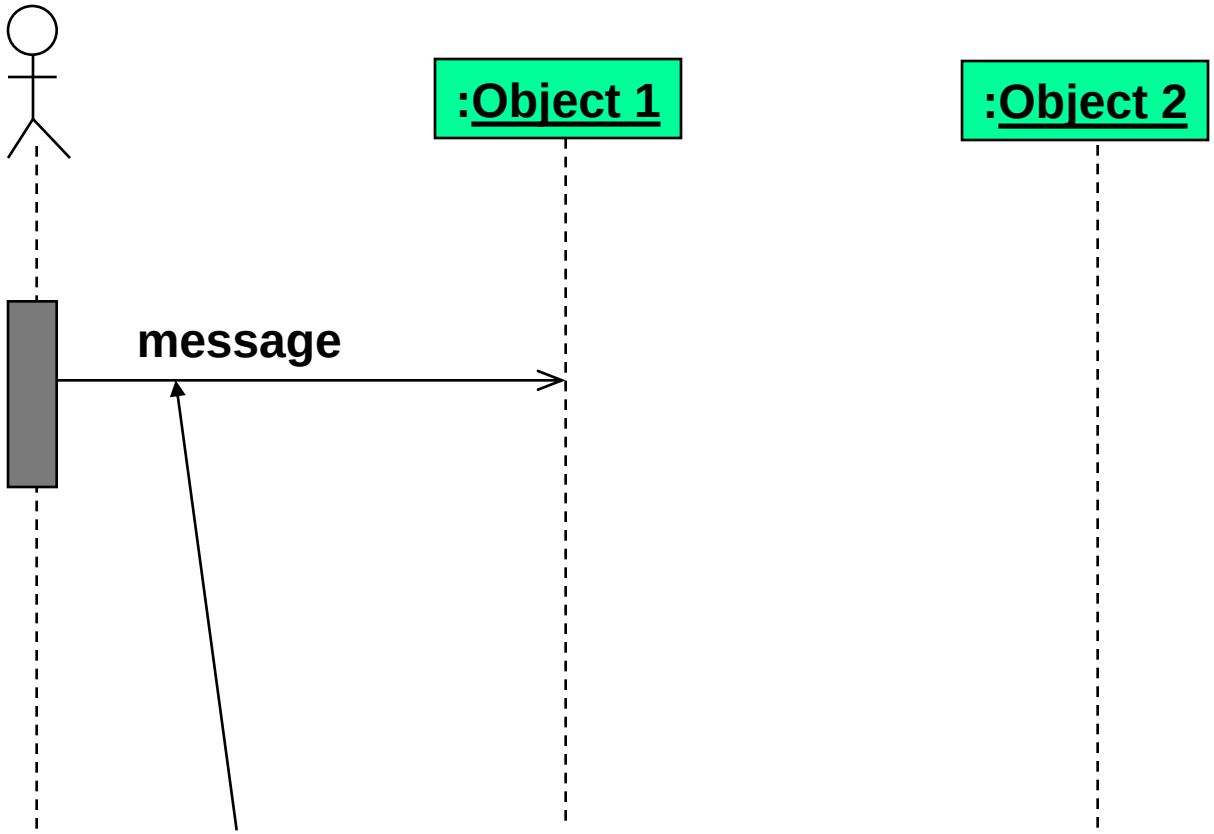
Sequence Diagram Notation



Activations/Life lines

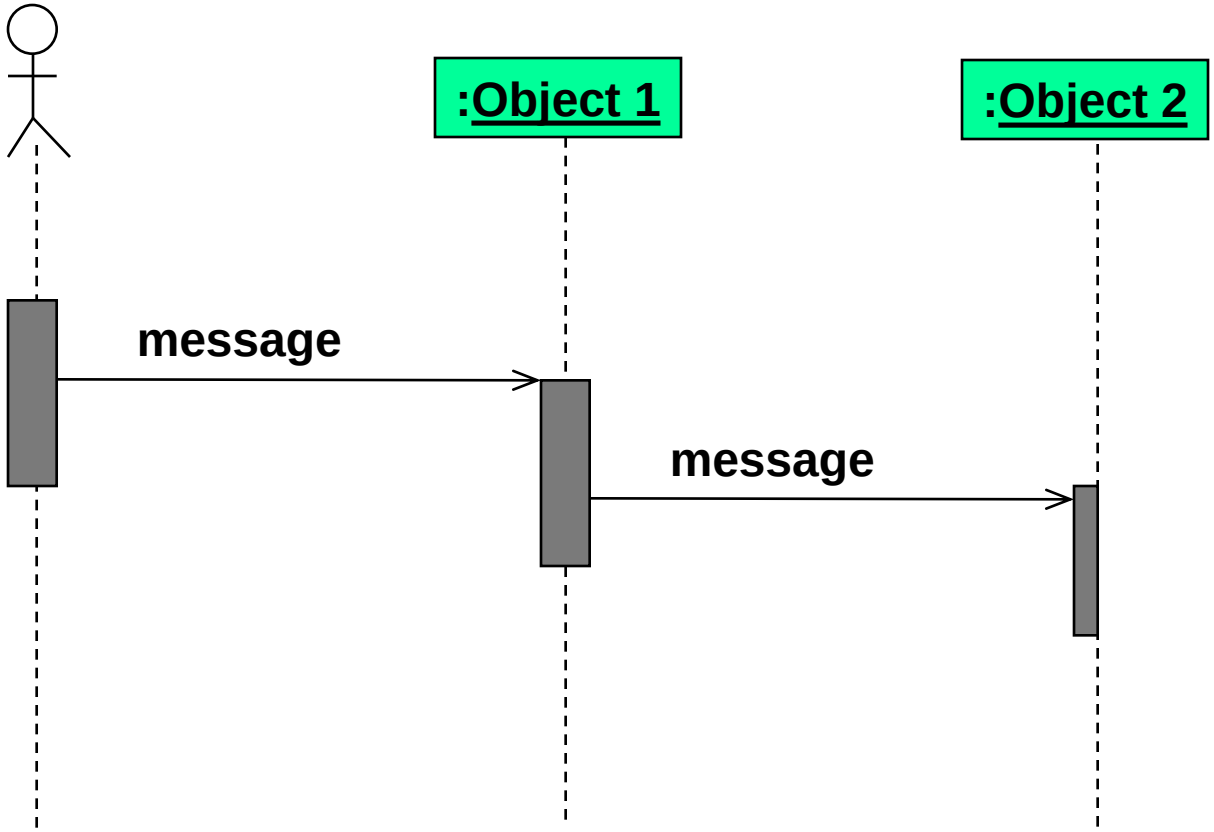
Indicate when an object is performing an action

Sequence Diagram Notation



Indicate the communications between objects

Sequence Diagram Notation

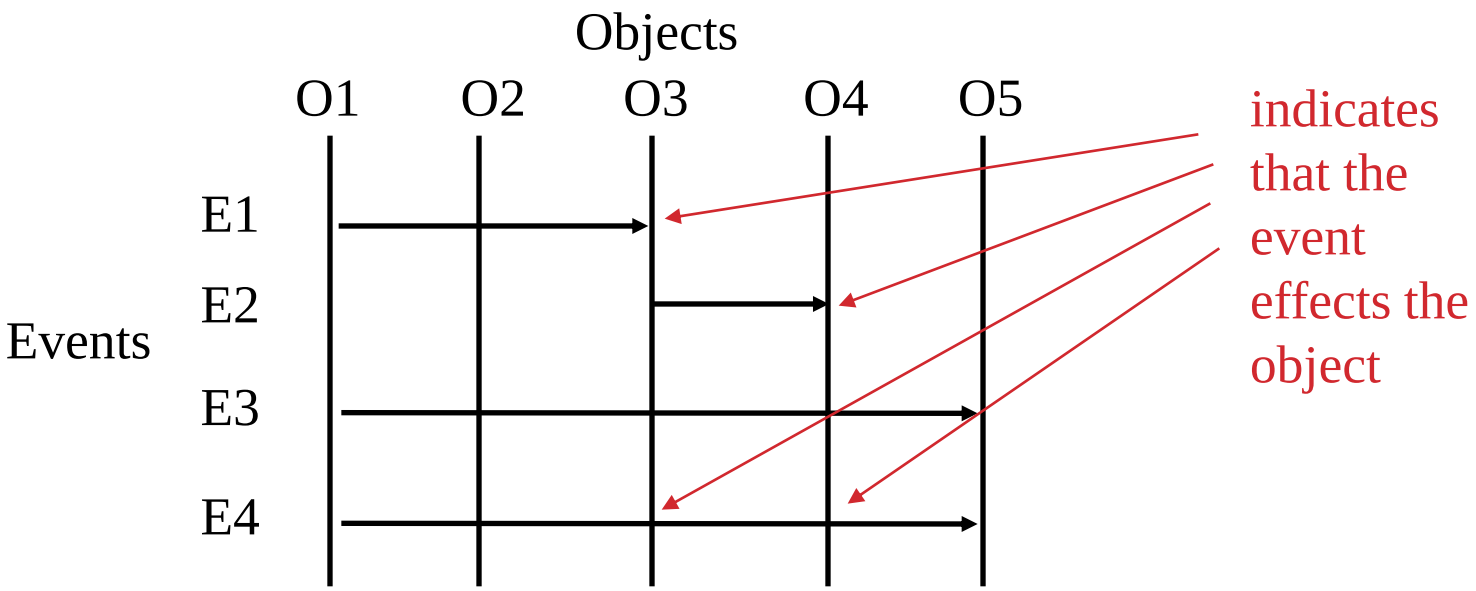


Sequence

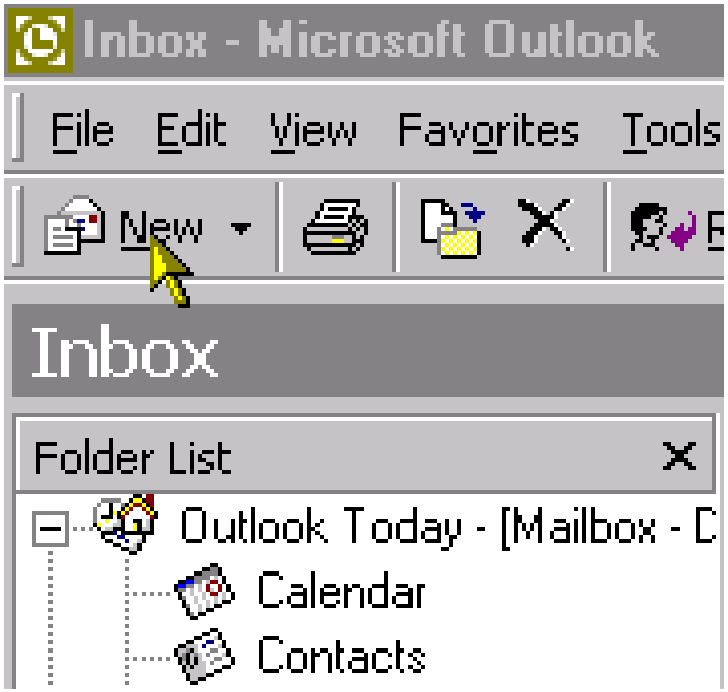
Vertical position signifies sequence – earlier messages appear nearer the top.

Sequence Diagram

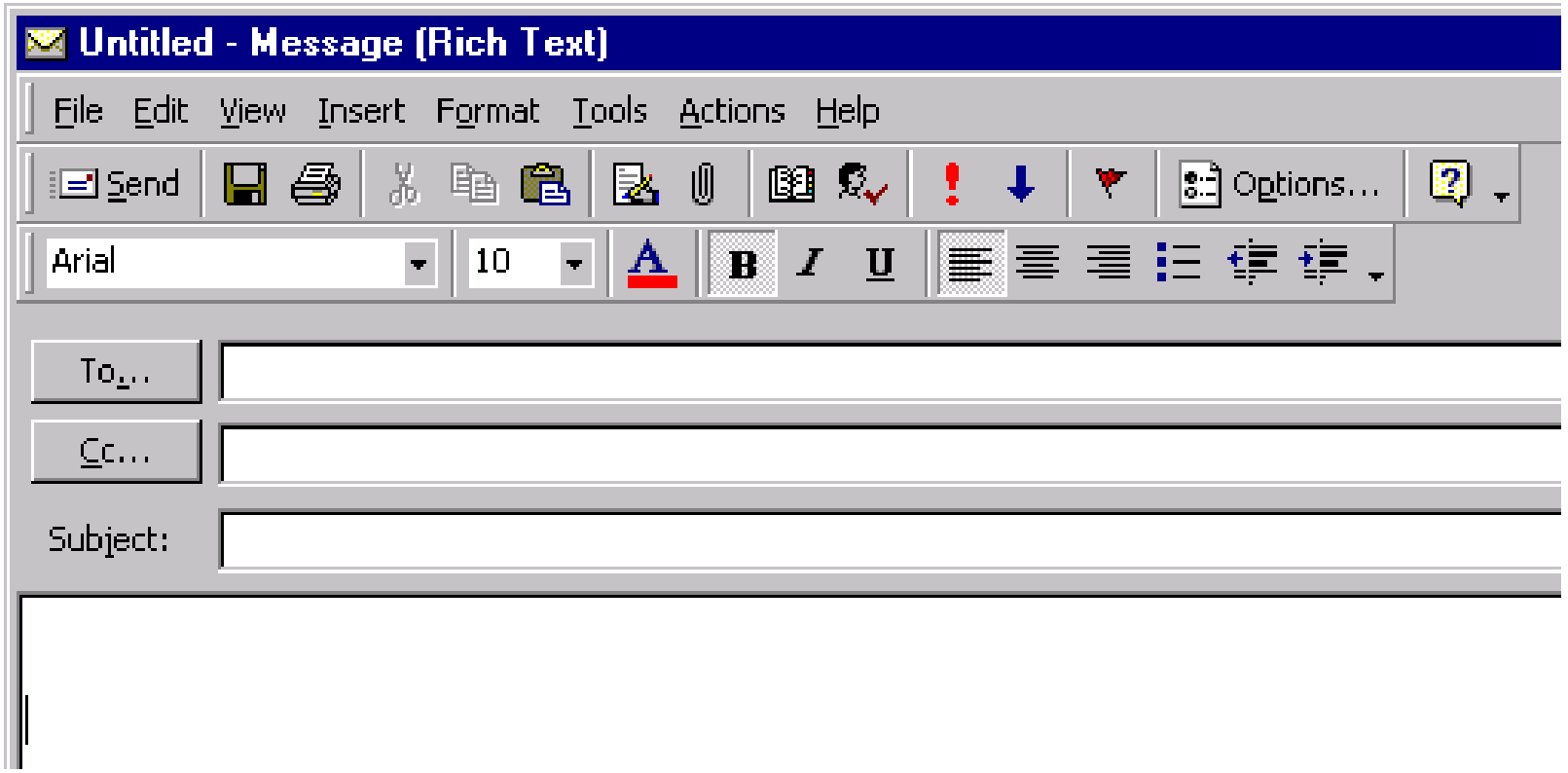
- Tracks a sequence of events in a scenario
- Identifies all objects involved



A Simpler Example - Sending an email



E-mail Interface



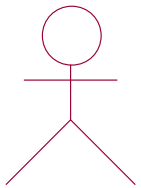
Working From a Scenario

Sending an email

1. Press “New ” email icon
2. Enter person’s name in “To” section
3. Type subject
4. Type contents
5. Press Send button
6. System looks up email address in address book
7. System submits the email to the email server

Starting The Diagram

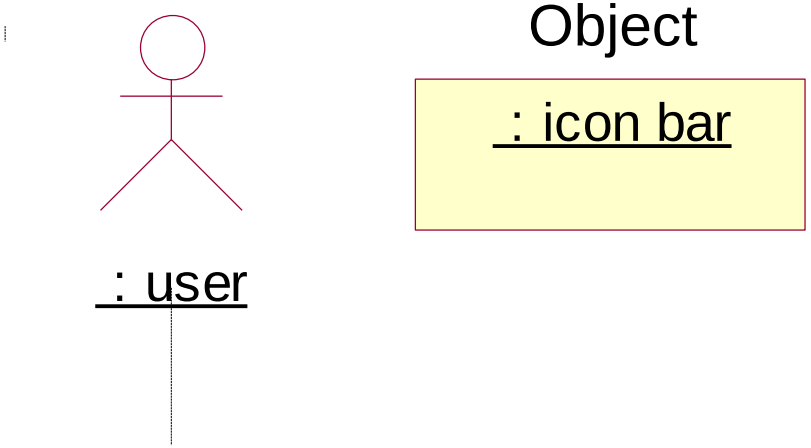
- If this is an interactive scenario, we always have an actor driving it



: user

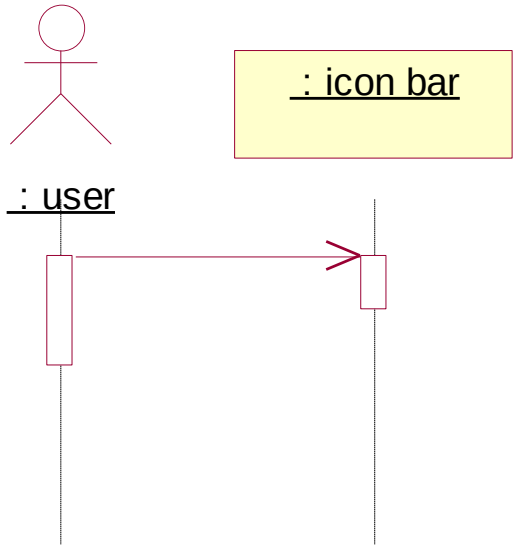
Add Objects

The first interaction is with the icon bar, which we can treat as an Object

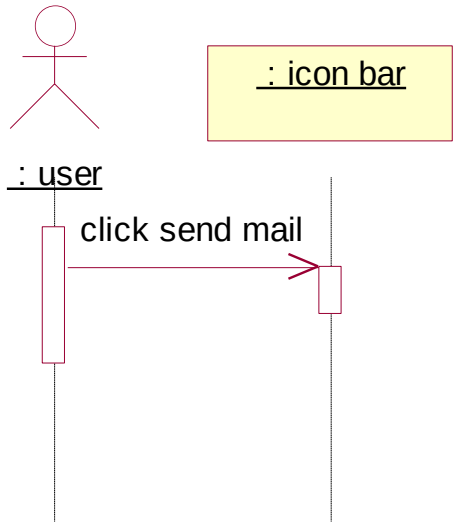


Add Message

The user talks to the icon bar



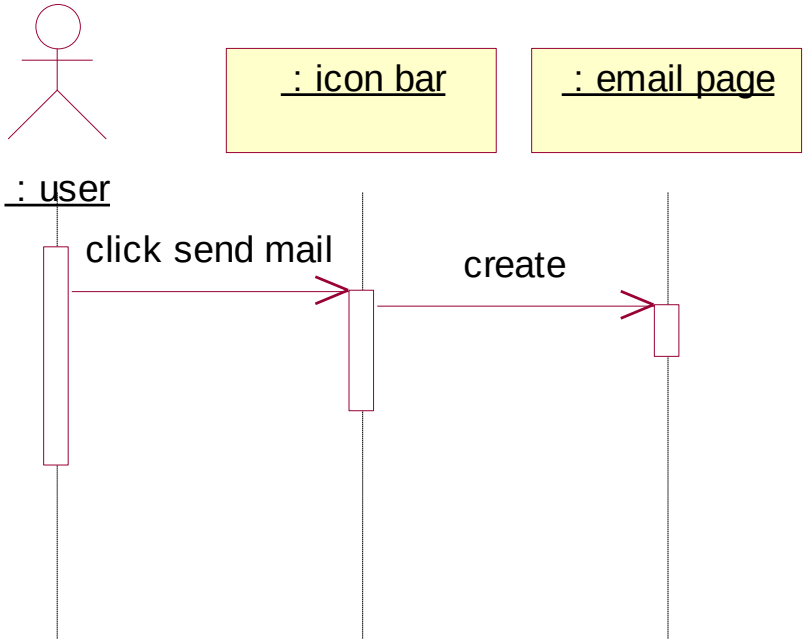
Label The Communication



Remember that actors can only communicate with interface objects such as screens, menus and icon bars.

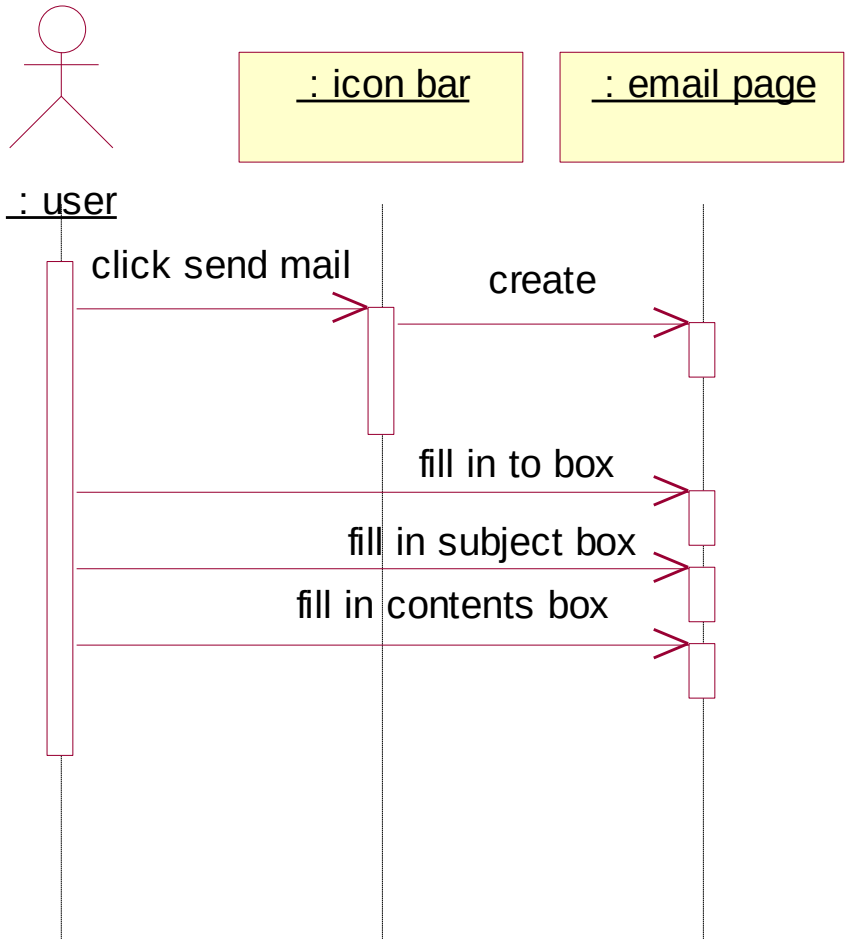
The icon bar has some work to do.

It creates an email page.

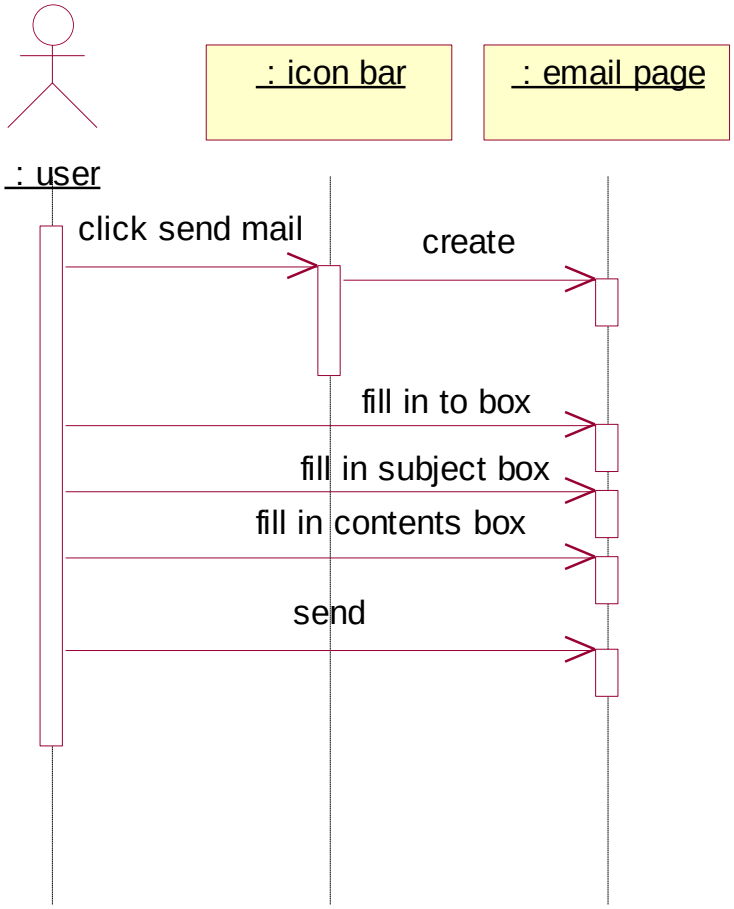


Now the user can see the email page and use it.

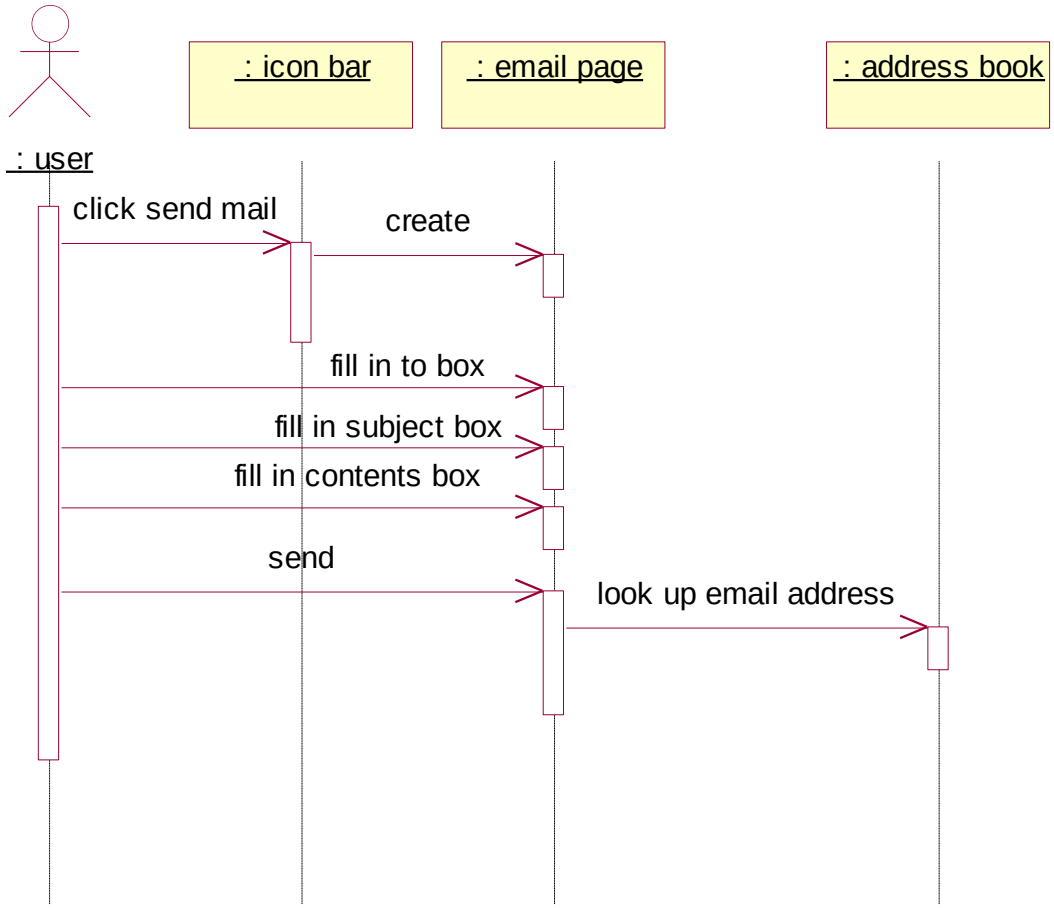
The next three steps are filling in the details on the email page



The User then clicks Send

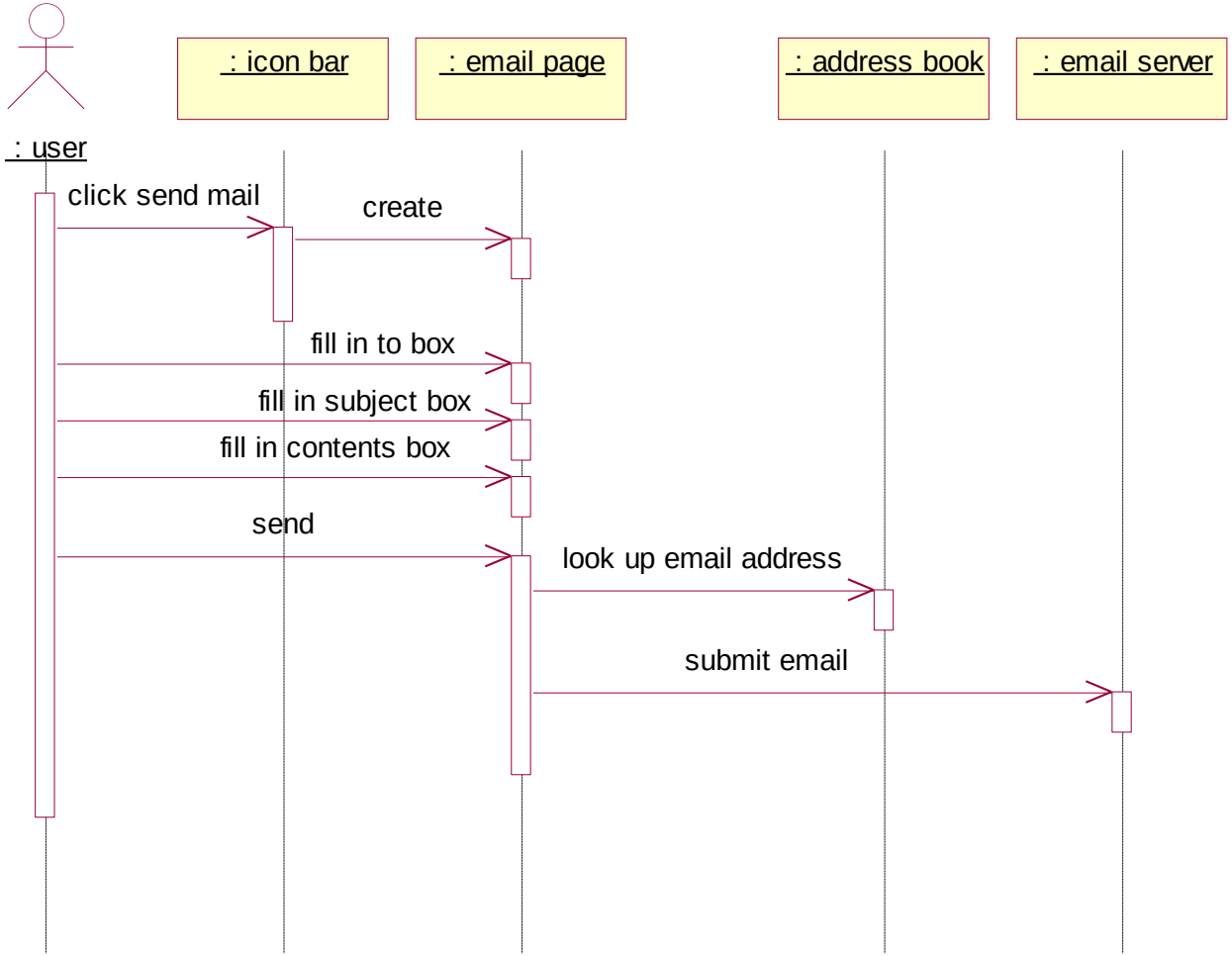


Now consider how to do the sending

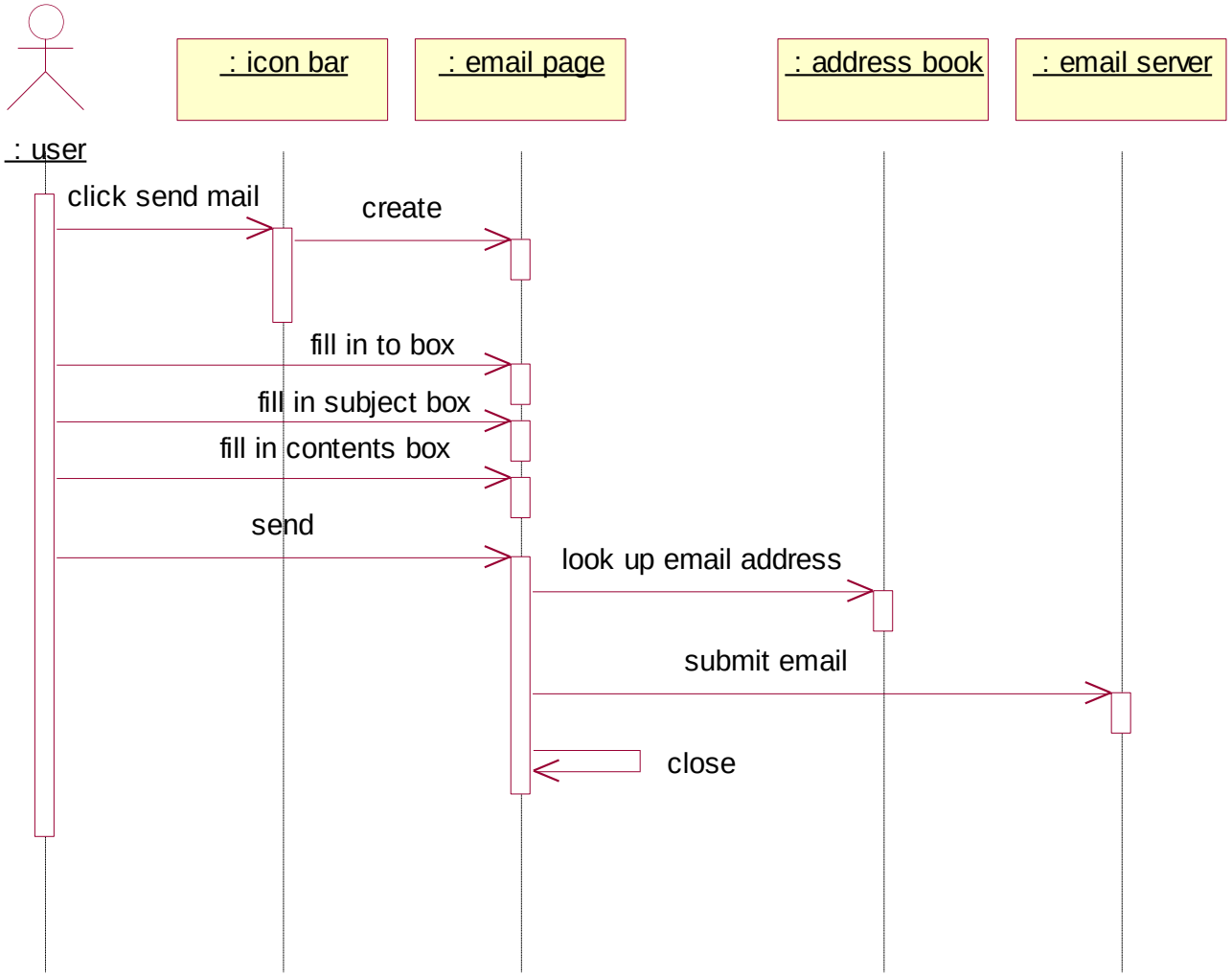


We can choose to get the email page to look up the email address from an address book object

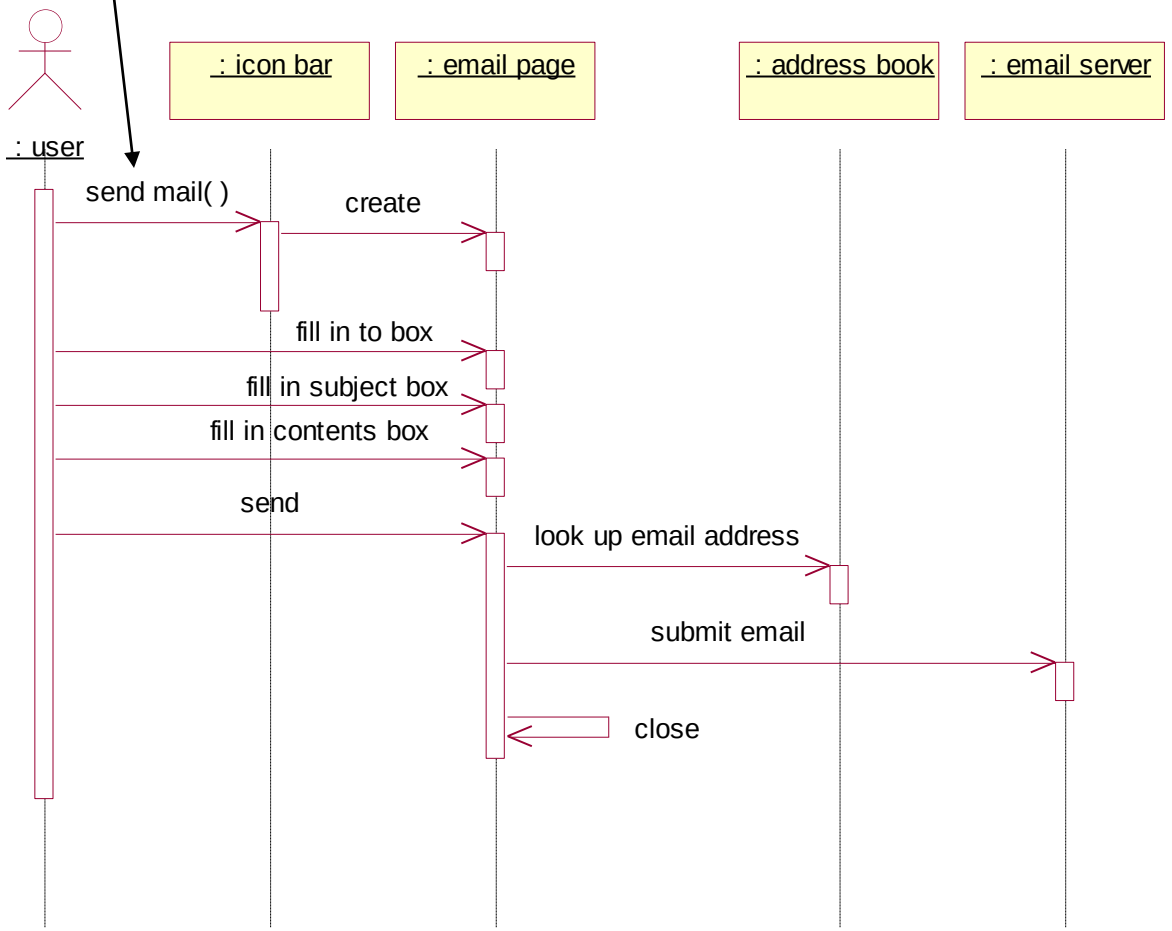
We can choose to get the email page to submit the email to the email server



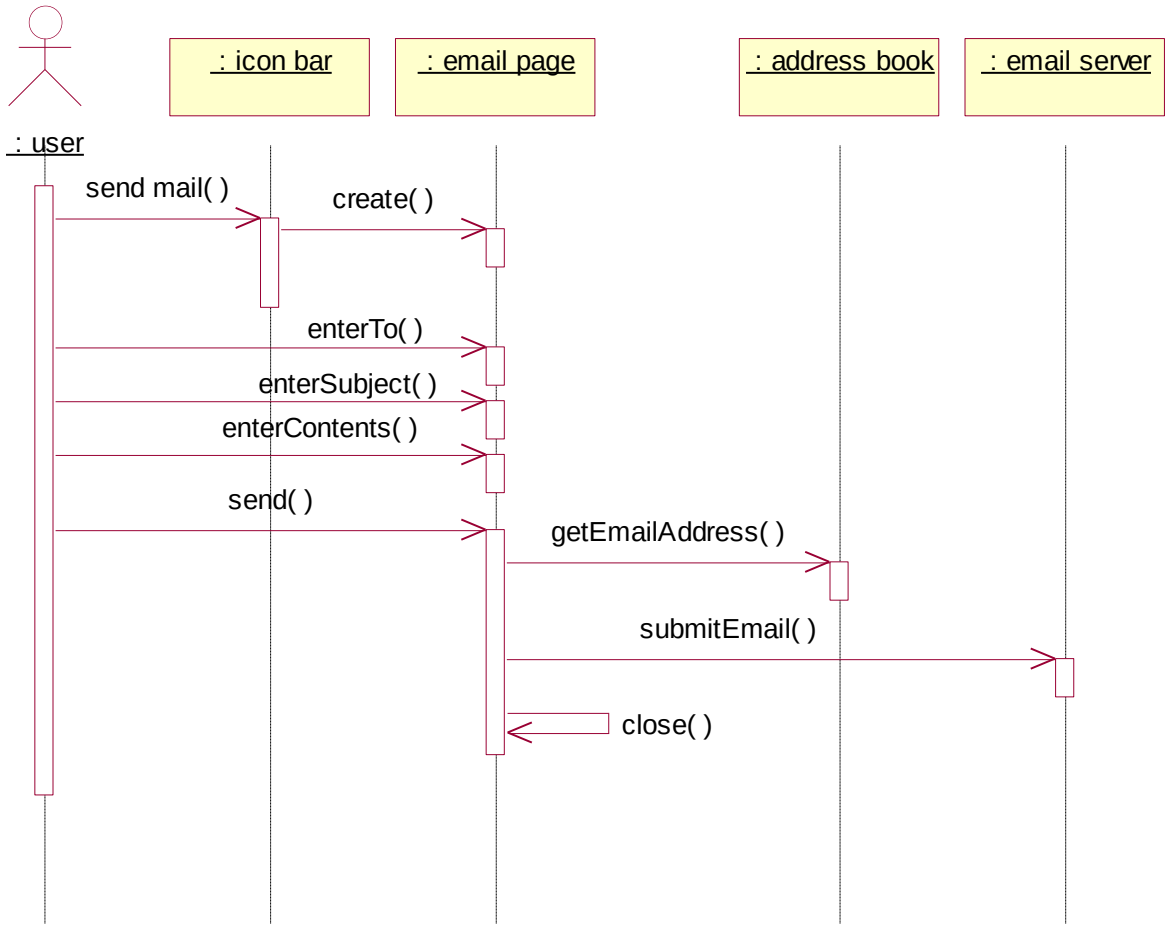
And if we think carefully, the email page always closes after the send.



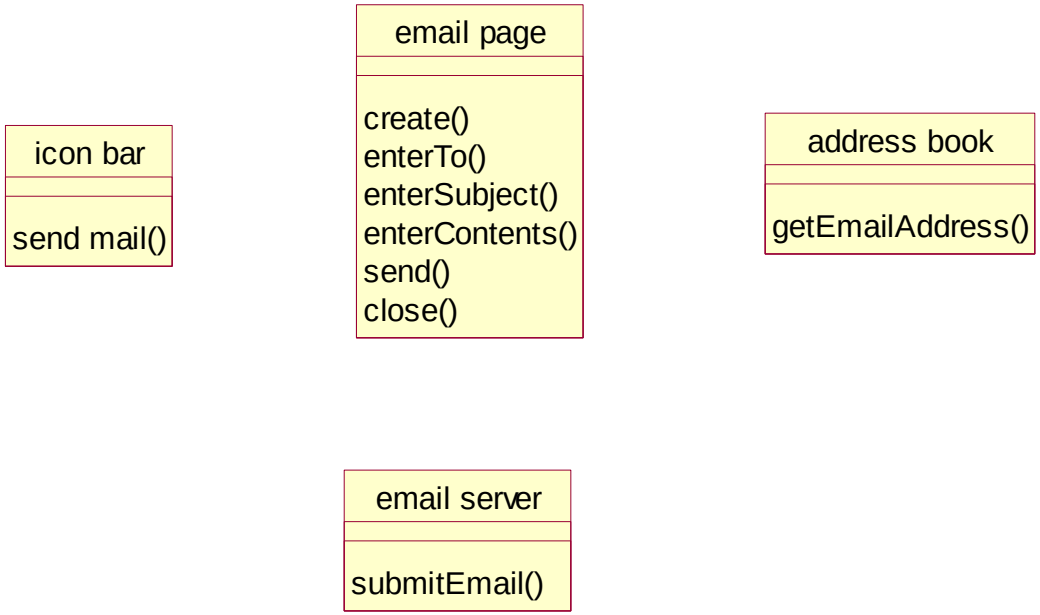
Now we go through and change the messages to operations on the object



And so on, all the way through



And now we have found our objects, and the operations on them



So we drag them onto a class diagram

Exercise

Consider the following scenario and draw sequence diagram for online book shop.

“Online customer can search book catalog, view description of a selected book, add book to shopping cart, do checkout”.