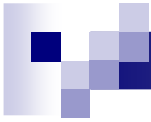# Unit 1
Requirements

Software Analysis and Design Project

Computer Science

Universidad Autónoma de Madrid

Index

- **Introduction**
  - ☐ Phases and Software life-cycle model
- **Requirements**
  - ☐ Requirement elicitation techniques
  - ☐ Requirement representation techniques

Requirement representation

- **Structured Analysis**
  - □ Data oriented techniques: Data Dictionary, Entity-Relationship Diagrams, DFD
  - □ Function oriented techniques: Structure chart
  - □ State oriented techniques

- ***Object Oriented Analysis***
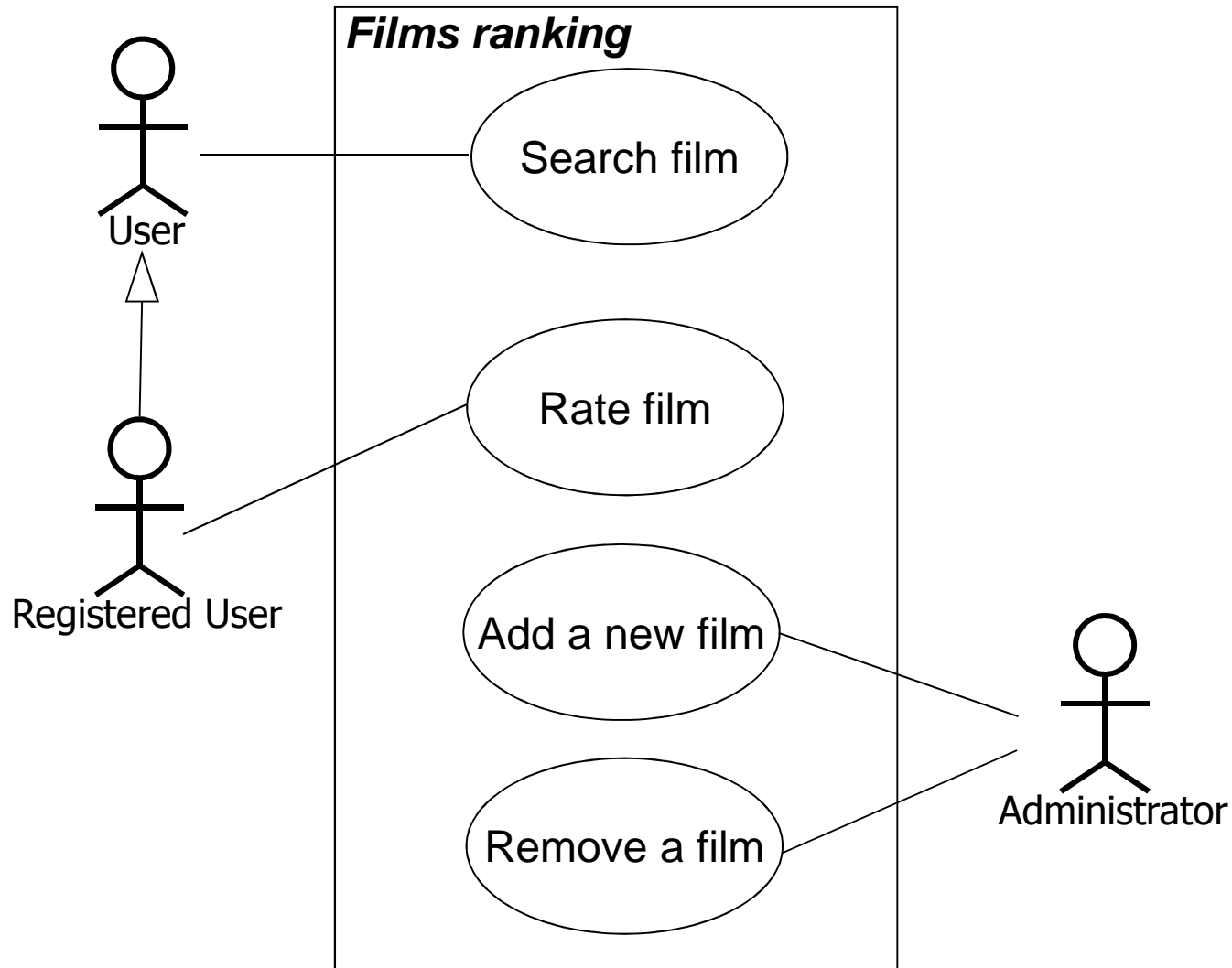
- **Formal Languages**

- ***Mockups***

Object oriented analysis

- **Use Case**: A set of scenarios describing different ways to use the software, from the point of view of each user type

- **Scenarios**: sequences of interactions that describe conditions of success or failure (e.g. errors)

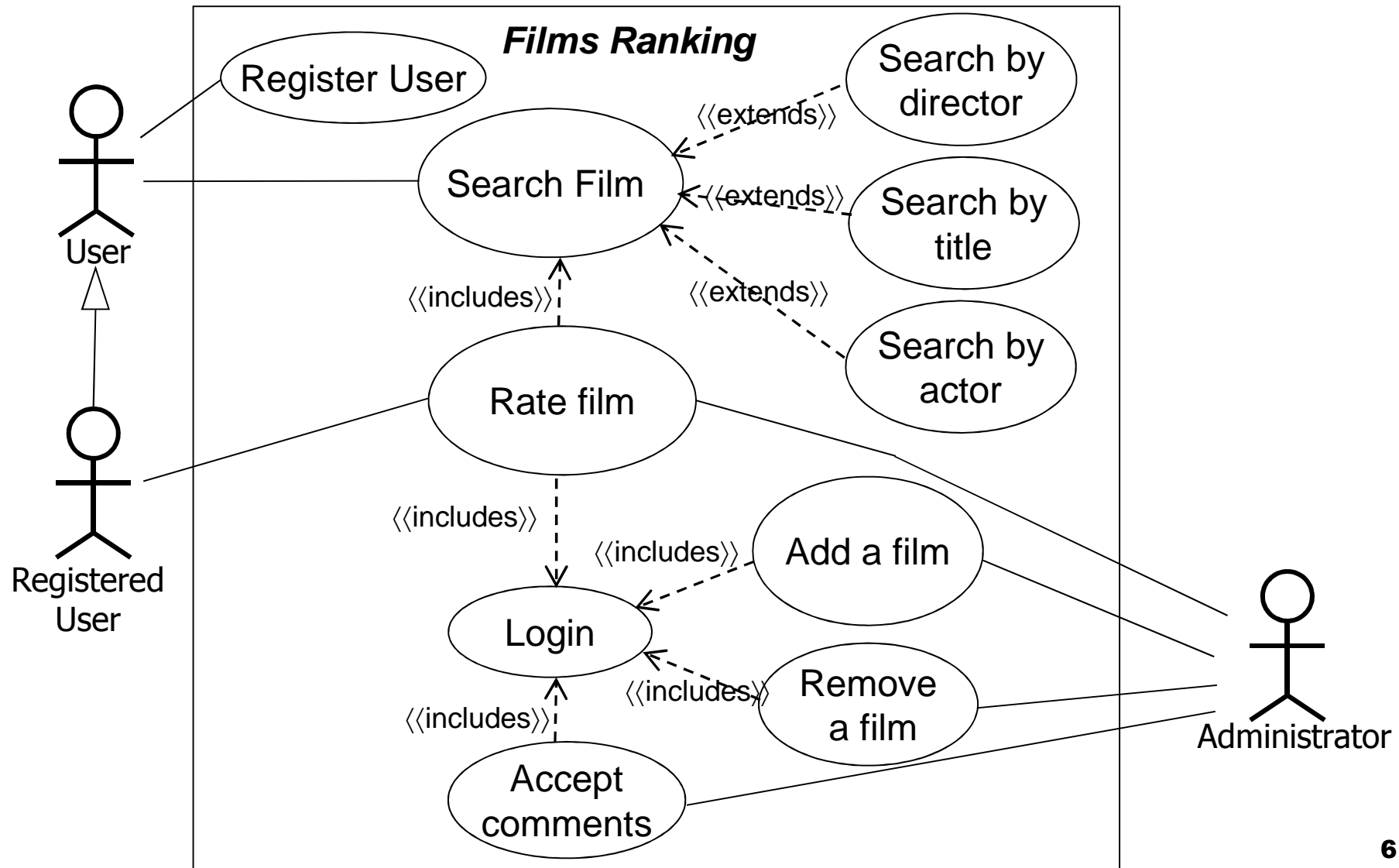- **Actors**: External elements (users, other systems) that interact with the system.

Use Cases

An online film ranking system

Use Cases

Relationships between use cases

Films Ranking

Register User

Search by director

Search Film

⟨⟨extends⟩⟩

⟨⟨extends⟩⟩ Search by title

User

⟨⟨includes⟩⟩

⟨⟨extends⟩⟩ Search by actor

Rate film

Registered User

⟨⟨includes⟩⟩

⟨⟨includes⟩⟩ Add a film

Login

Remove a film

⟨⟨includes⟩⟩

⟨⟨includes⟩⟩

Administrator

Accept comments

6

Use Case Description

Use case 1: Rate film

Primary Actor: Registered User.

Stakeholders and Goals:
- **Registered User:** To enter an evaluation and/or a review for a movie that he previously sought.
- **Administrator** : Wants to check user comments to approve or forbid them.

Preconditions: The user is identified and authenticated, and has sought a movie.

Success Guarantee (Postconditions): The evaluation is recorded in the system as well as the comment (if any). The average score of the film is recalculated. A notification is sent to the administrator to approve (or not) the comment.

Main Success Scenario:
1. The user selects "rate film".
2. The user enter a rating between 0 and 10.
3. The system saves this evaluation, and updates the average rating.
4. The system offers the possibility to enter a comment.
5. The user enters a comment.
6. The system saves the comment and notifies the administrator for approval.

Use Cases

Extensions (Alternative paths):

    5a. The user does not enter a comment

        5a.1. The system does not save the comment or notify the administrator.

Special Requirements:
- Quick response and update (<0.1 sec) to enter the value.
- Internationalization (i18n): name and information of the films in different languages, as well as different versions of the application in different languages.

Technology & Data Variations List:
- Option to upload comments in word or PDF documents.

Frequency:
- Very high, in the order of thousands of concurrent users.

Open Issues:
- Ability to evaluate different aspects of the movie (script, direction, actors) in step 2.
- Can reviews and ratings be obtained automatically from various media, such as reviews in newspapers or magazines?.

Mockups

- Requirements gathering in the form of interfaces, which allow a better understanding with the user.

- From drawing programs (powerpoint, visio) to specialized applications (e.g. Mockup Screens, Balsamiq, etc.).

Mockups: life-cycle

Make / review mockup

Evaluate with users

Define new requirements

Discard
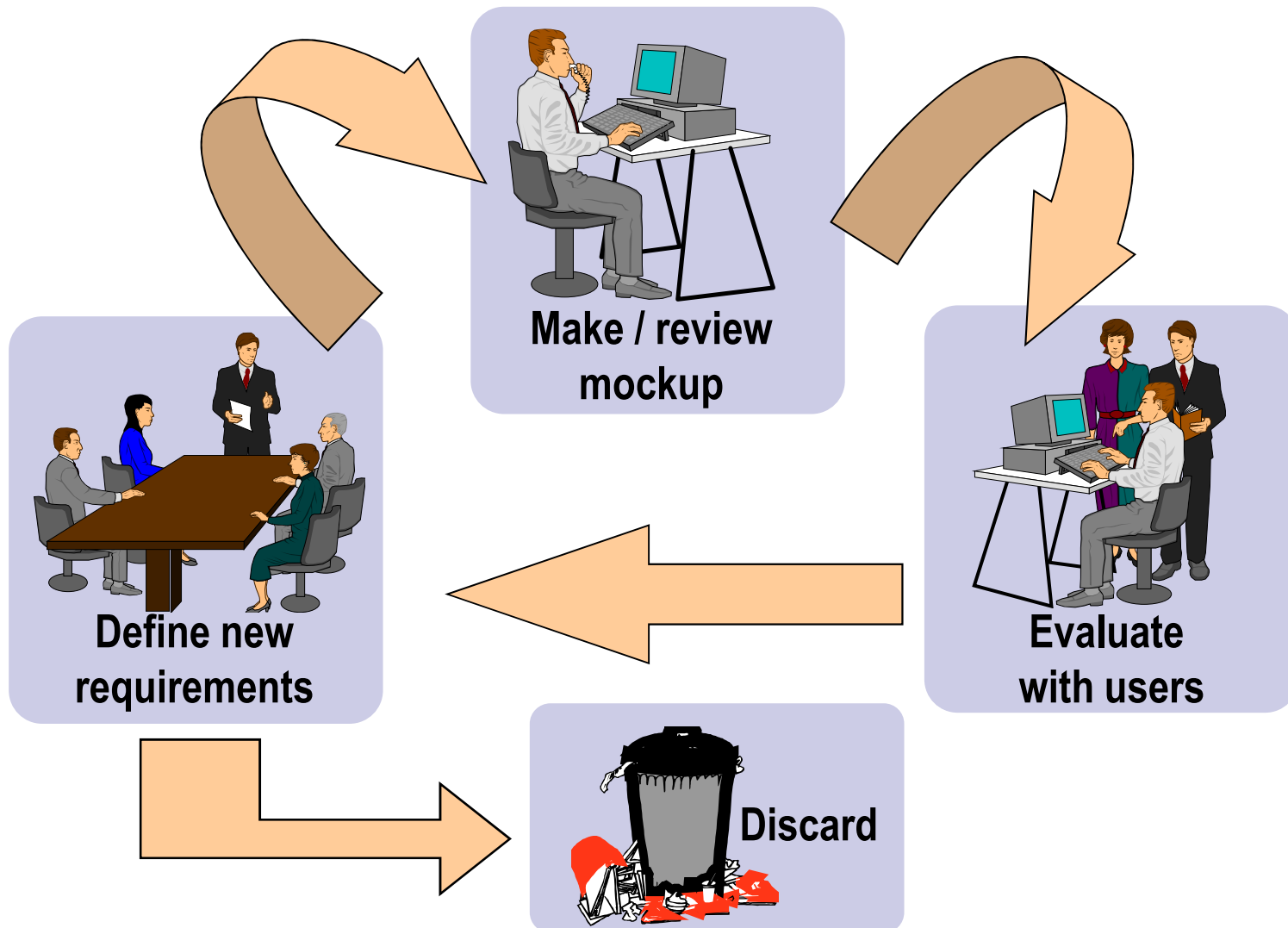
Example

Initial window

Example
Search Result

The Internet Movie Database (IMDb) - Mozilla Firefox

Archivo   Editar   Ver   Historial   Marcadores   Herramientas   Ayuda

http://www.imdb.es/   Google

Más visitados   Comenzar a usar Firef...   Últimas noticias   Personal Docente e In...

Login
User:

Password:

new user?

Register

Movies Info

24 films found with Luis García Berlanga as Director

1. *El sueño de la maestra* (2002)   5,9/10 41 votes
2. *París Tombuctú* (1999)   5,3/10 247 votes
3. *Blasco Ibáñez* (1997)   4,2/10 21 votes
4. *Todos a la cárcel* (1993)   5,7/10 170 votes
5. *Moros y Cristianos* (1987)   5,5/10 133 votes
6. *La vaquilla* (1985)   7,3/10 413 votes
7. *Nacional III* (1982)   6,5/10 94 votes
8. *Patrimonio Nacional* (1981)   6,7/10 146 votes
....

Some mockup tools

- With free trial version:
  - Balsamiq: http://www.balsamiq.com/products/mockups
  - Mockupscreens: http://mockupscreens.com/

- Free:
  - Lumzy (on-line): http://lumzy.com/app
  - Mockingbird (on-line): http://gomockingbird.com/mockingbird/
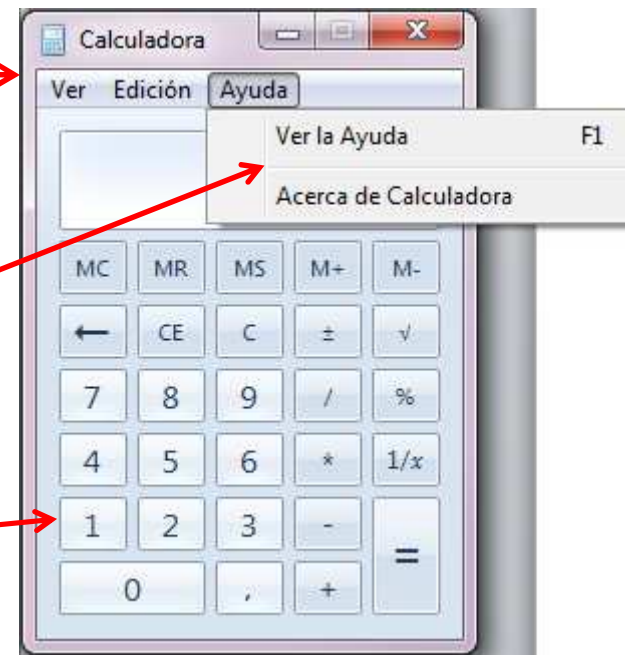 - Pencil: http://pencil.evolus.vn/
  - Cacoo (on-line): https://cacoo.com/

Graphical user interfaces
Some common graphic elements

- **Window**

- **Pop up menu**
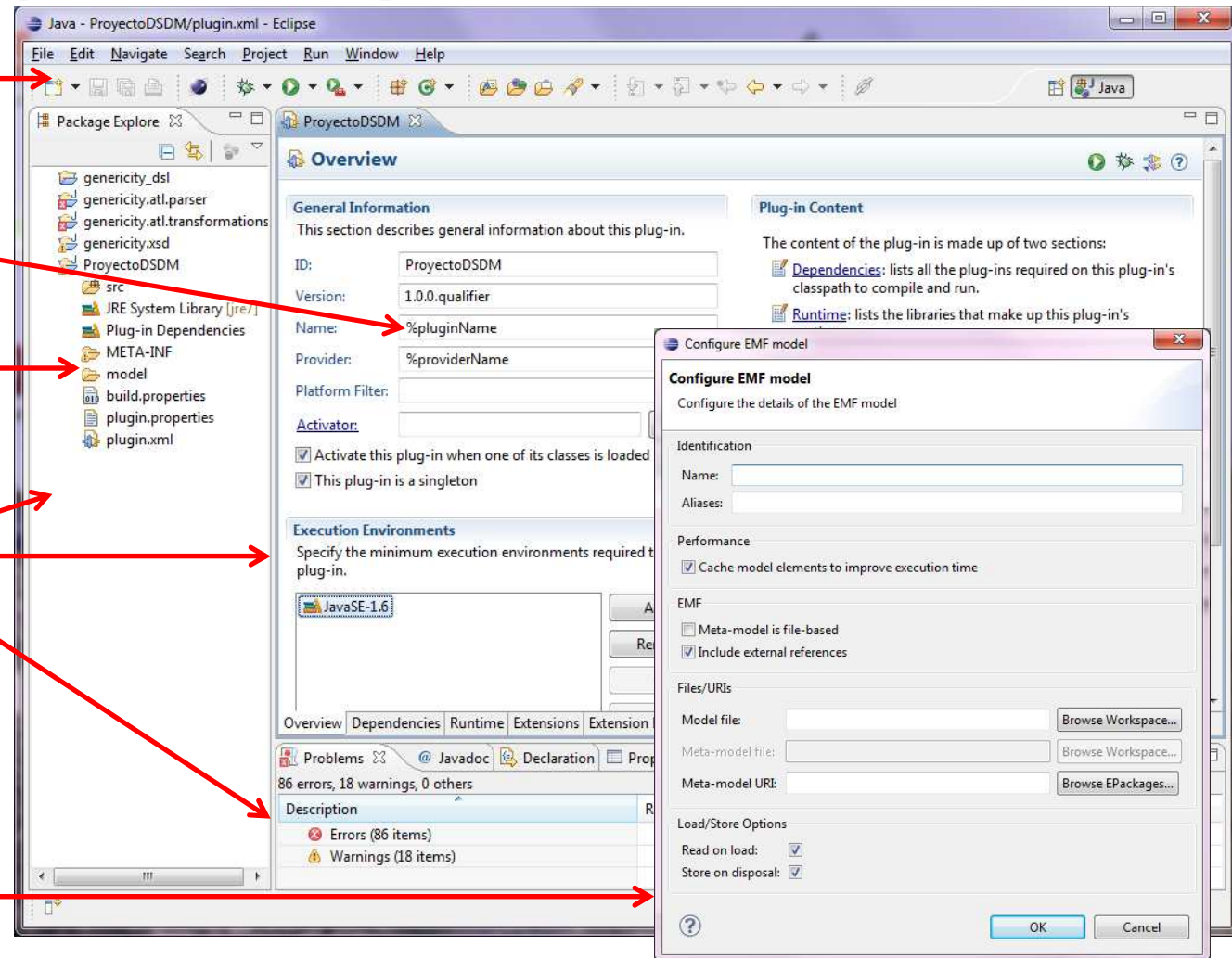
- **Buttons**

Graphical User Interfaces
Common graphical components

Usability
Some usability rules

- Present information consistently (terminology, colors, layout, etc.)

- Reduce errors: choose the right component
  - ☐ Use a list instead of a text field, to choose between several options
  - ☐ Use *checkboxes* for binary options
  - ☐ Use *radiobuttons* for mutually exclusive options

  ☑ This plug-in is a singleton

  8) Age:
  _____

  9) ☑ Female **?**
     ☑ Male

- Reduce the need for users to memorize:
  - ☐ Don't make users remember information introduced in a previous screen

Usability

8 Golden Rules of interface design

- Strive for Consistency
- Cater to Universal Usability
- Offer Informative feedback
- Design Dialogs to yield closure (step by step, wizards, etc.)
- Prevent Errors
- Permit easy reversal of actions
- Support internal locus of control (users feel that they are in control)
- Reduce short term memory

Usability
Example of bad practice

■ Difficult to follow information flow

  ☐ Align options vertically.

  ☐ Ensure that fields are long enough to display the information.

  ☐ Group labels on the left, and put fields in a group

  ☐ Assign shortcuts to significant letters ('a' for Wait? 'i' for Fine?).
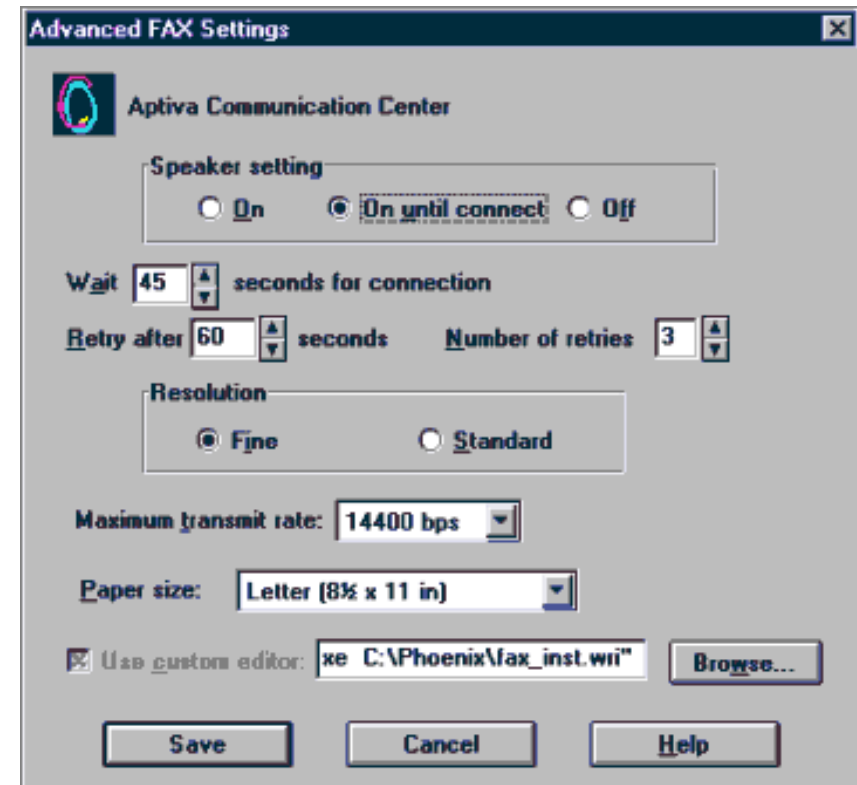
Usability
Example of bad practice

Select your State

- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Georgia
- Kansas
- Kentucky
- Maine
- Maryland
- Massachuset
- Michigan
- Minnesota
- Mississippi
- Missouri

- Can we use a better component?
- Yes: A combo box

Usability
Example of bad practice
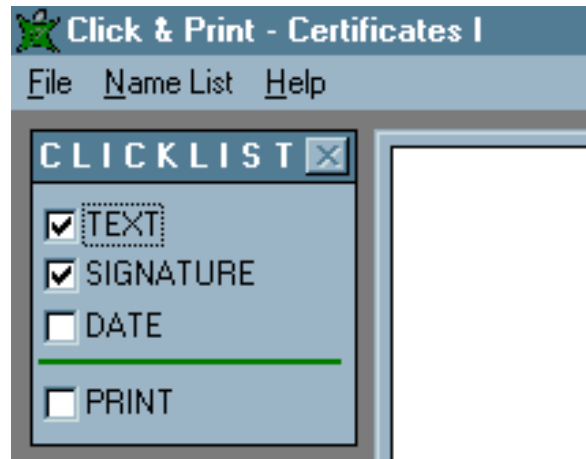
- Printing starts when the user marks "PRINT".

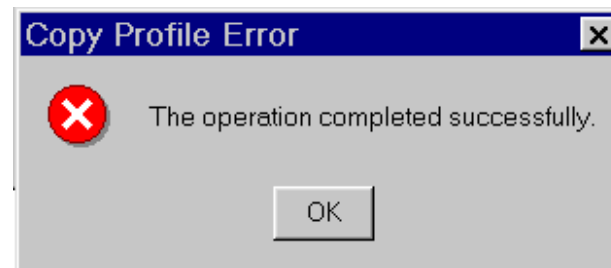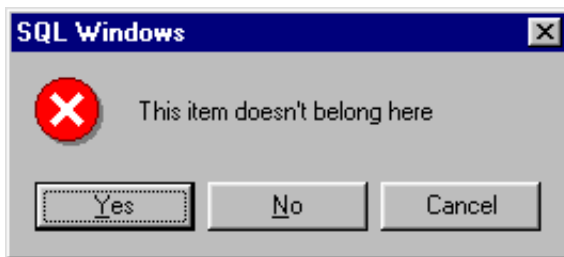- It is a bad practice: better use commands (button, menu option) in order to start actions.
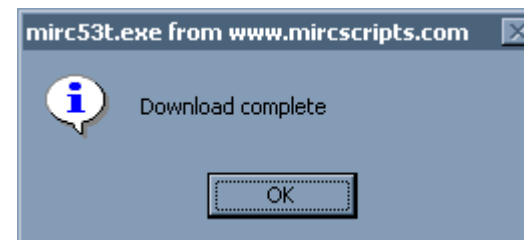
Usability
Error messages

- Show relevant information (useful for users) in error messages.
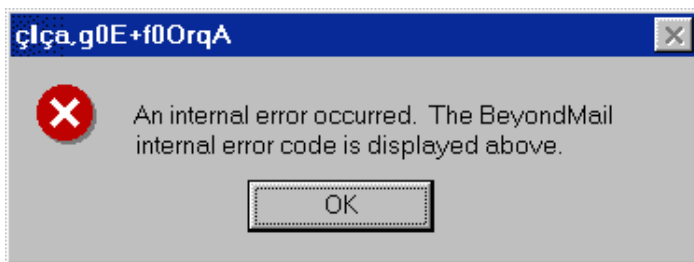
- Avoid unnecessary buttons or contradictory information

- Avoid unnecessary error messages (breaking users' flow or obstructing it).
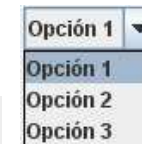
Basic Java Widgets
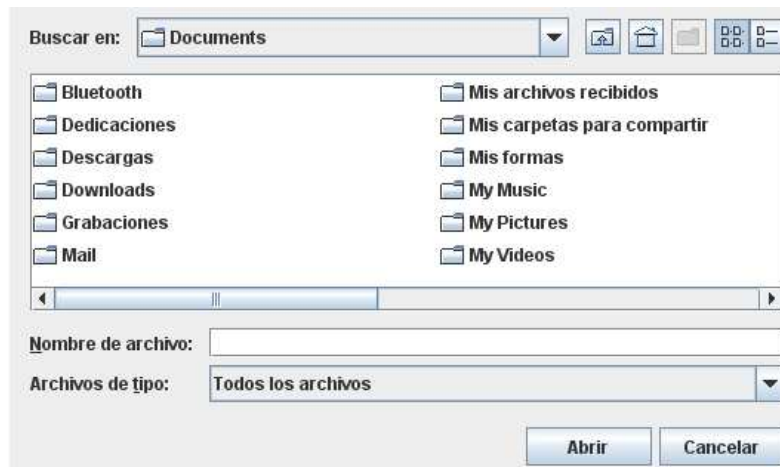
■ **Action components**

■ **Input fields**

■ **Complex data entry**

■ **Structured information**

Project

- Draw the use case diagram.

- Describe 3 use cases, that you consider most relevant, with the format shown in the slides.

- Make a Mockup of the application.

- Use the document template that you can find in Moodle.

Bibliography

- **Basic bibliography:**
  - ☐ Software engineering a practitioner's approach, 7ªed. Roger Pressman. McGraw Hill Higher Education, 2010. INF/681.3.06/PRE

  - ☐ Software engineering, 9ª ed. Addison Wesley. Ian Sommerville. INF/681.3.06/SOM

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  - ☐ Writing Effective Use Cases. A. Cockburn. Addison-Wesley Professional, 2000. INF/D5000/COC

  - ☐ Designing the User Interface: Strategies for Effective Human-Computer Interaction (5th Edition). Addison Wesley. Shneiderman, Plaisant , Cohen, Jacobs