

XXIV. Interface Objects

Three-Tier Architectures

The Presentation layer

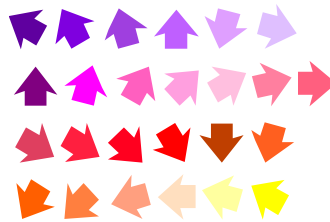
Sequence Diagrams for User Interface Classes

Prototyping the User Interface

User Interface Class and Package Diagrams

Model-View-Controller Architecture Revisited

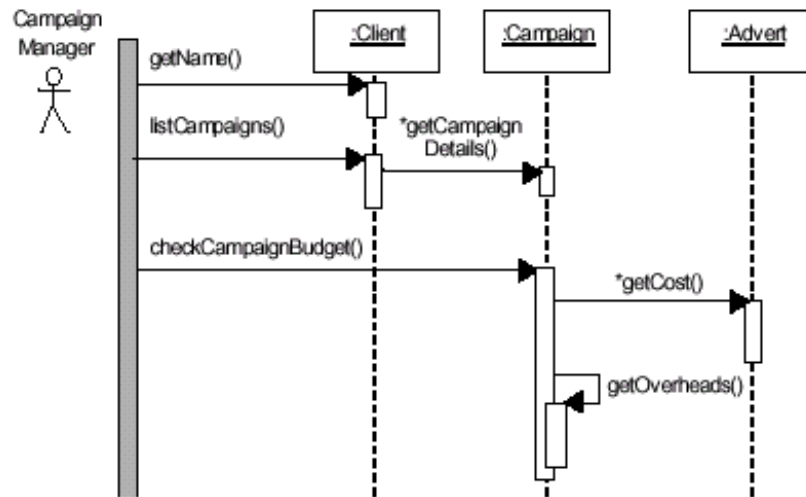
Statechart Diagrams for Dialogue Dynamics



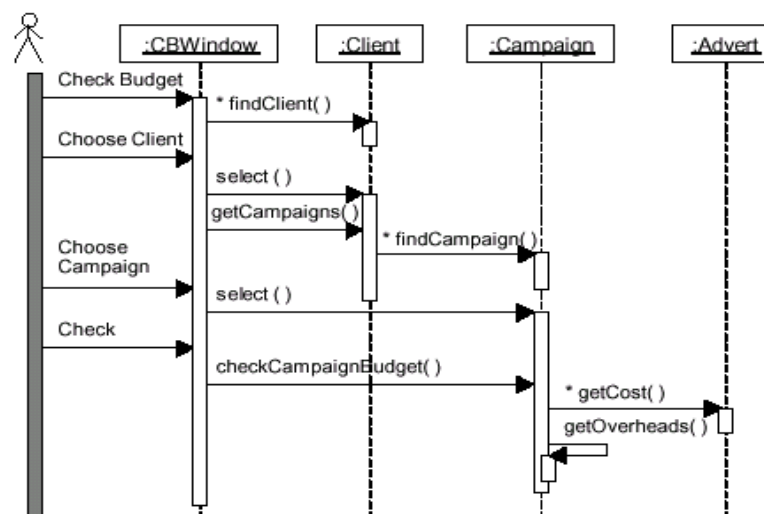
The Three-Tier Architecture, Revisited

- User interfaces for an information system are part of the presentation layer in a three-tier architecture.
- The three-tier architecture separates cleanly **user interfaces** from **application logic/business classes** and from **data storage components** of the system.
- Business classes “know nothing” about how their (business) objects will be presented to the users.

Check Campaign Budget

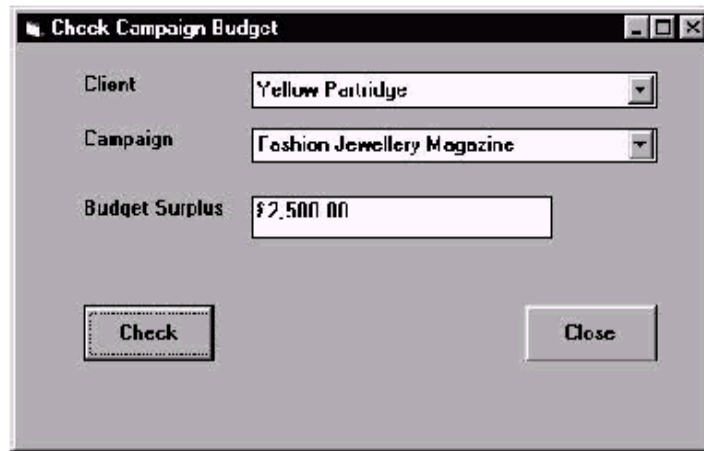


Add a Dialog Box Object



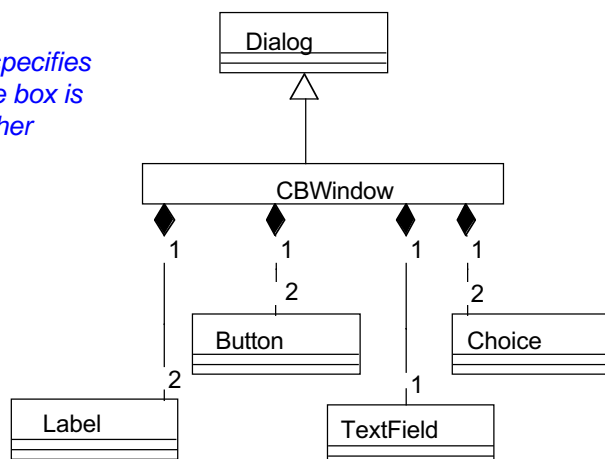
Prototyping the Dialogue

- Prototyping can be used to determine what the interface will look like.



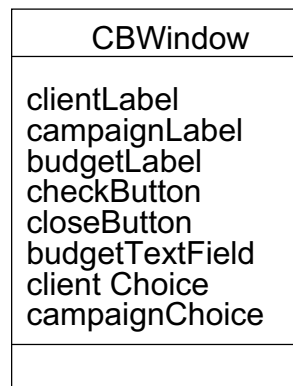
Class Diagram for Interface Classes

Composition specifies that a dialogue box is made up of other components



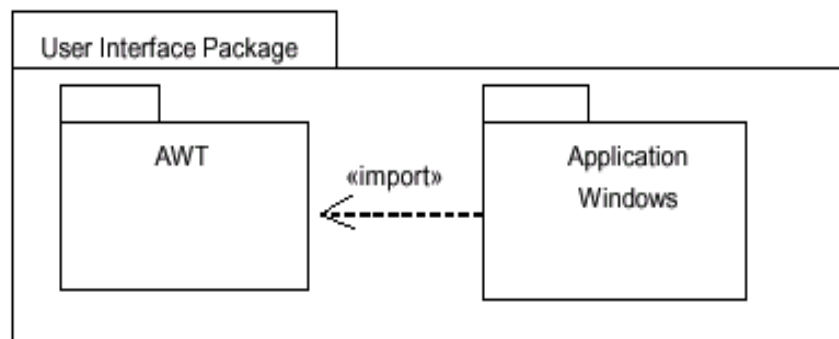
Another Class Diagram

CBWindow can also be represented as a class with the graphical components that make it up as attributes.



Packages for Interface Classes

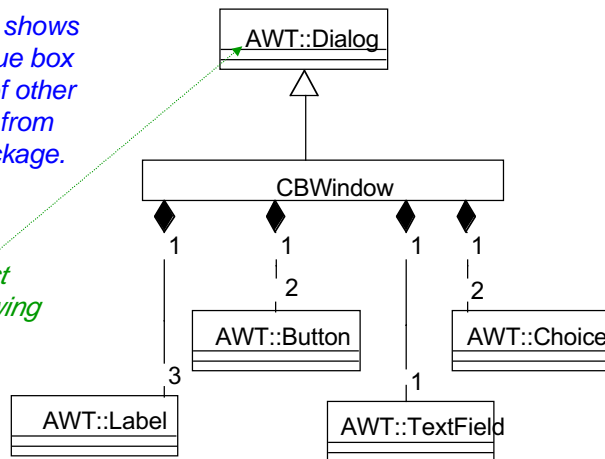
- Package diagrams show the dependencies among interface classes in different packages.



Revised Class Diagram

- Composition shows that a dialogue box is made up of other components from the AWT package.

(Java)
Abstract
Windowing
Toolkit

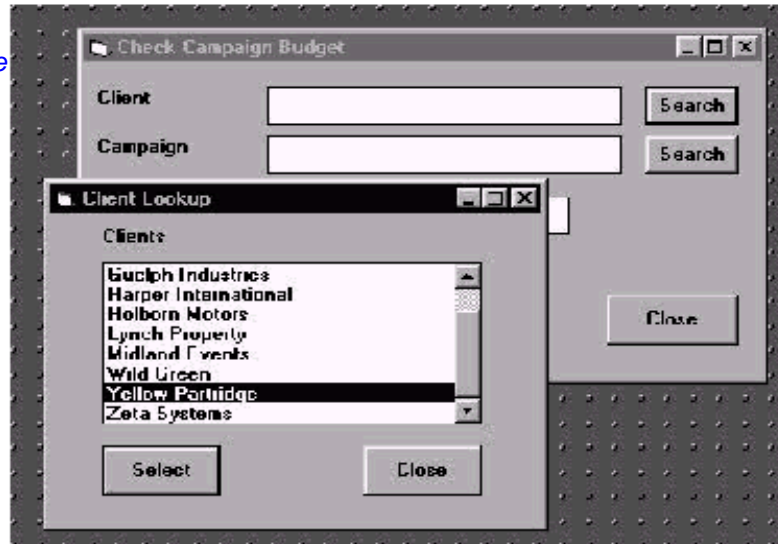


Prototyping the Dialogue

- There are several ways for entering the Client and Campaign name:
 - ✓ Use a separate look-up window for each class;
 - ✓ Allow the user to enter a part of a name, then have the system return a list of close matches;
 - ✓ Use a tree data structure to show clients and campaigns in a tree-like hierarchy.

Alternative Dialogue Prototypes

- Separate window for look-up

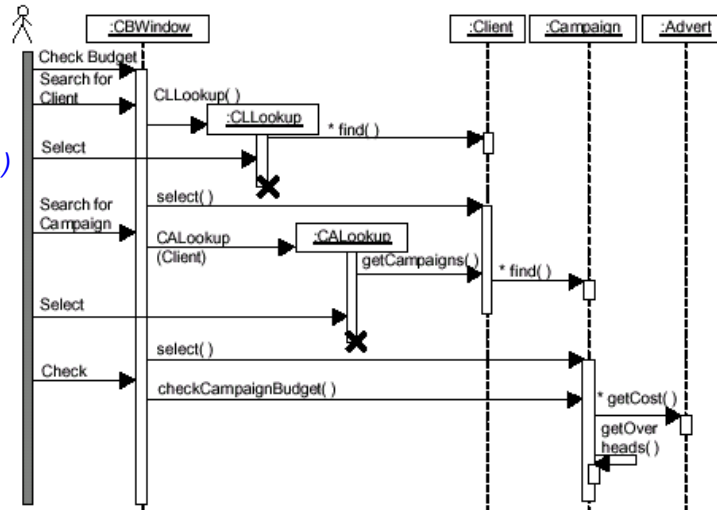


Alternative Dialogue Prototypes: Three View Control

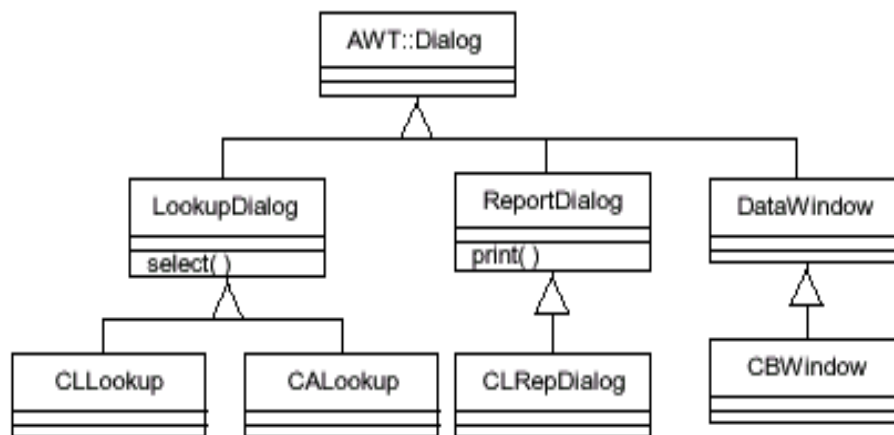


Updating the Sequence Diagram

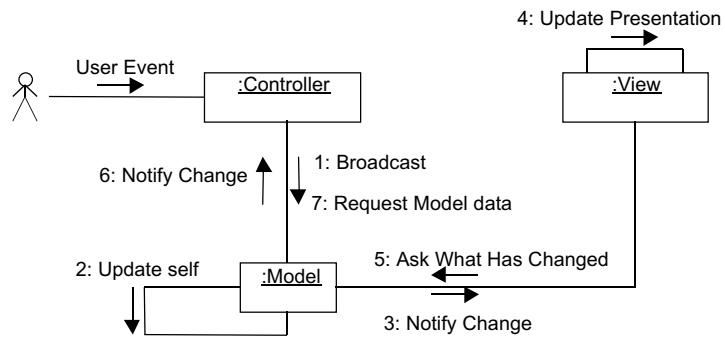
- Choice:
- Client (CL)
- Campaign (CA)
- Lookup



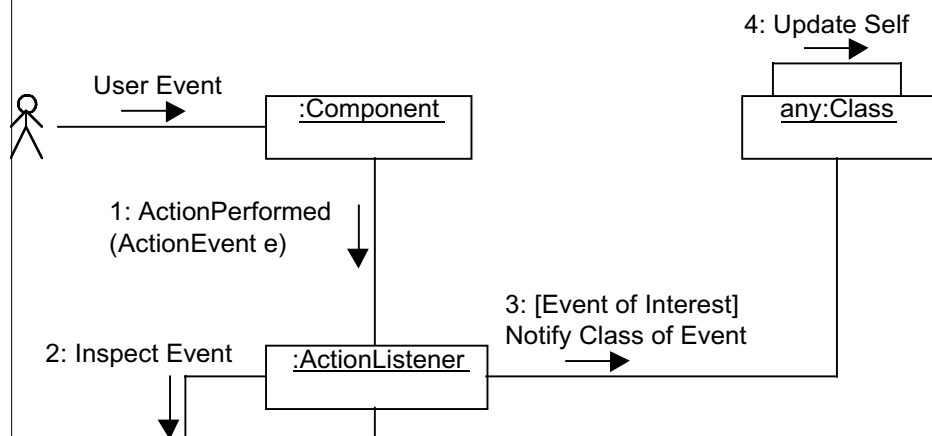
Updating the Class Diagram



Model-View-Controller



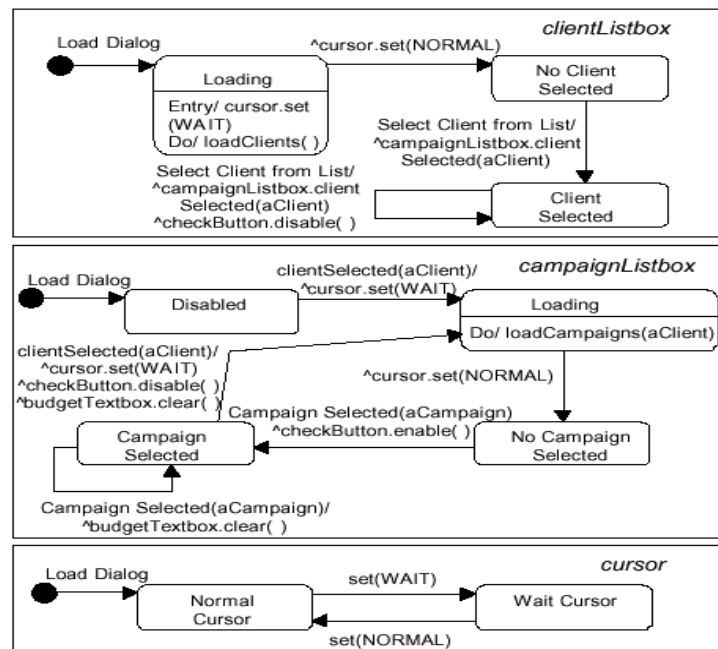
The Java ActionListener Approach



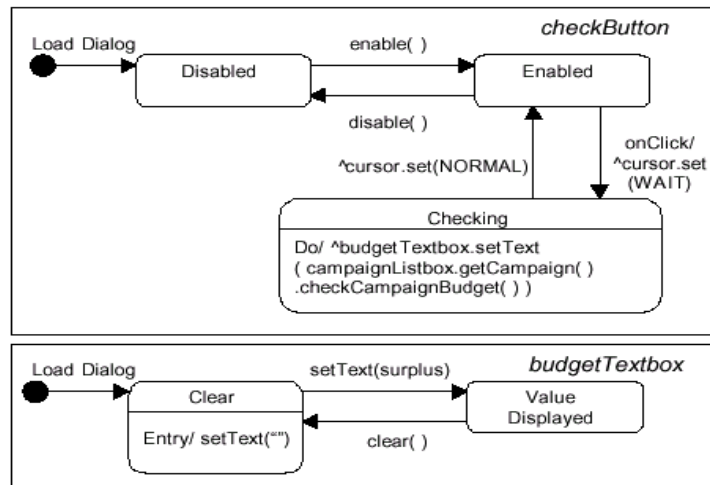
Modelling the Dynamic Behaviour of the Interface

- The sequence diagrams show the sequential view of the user working through the fields on the screen from top to bottom.
- But in GUI interfaces the user can click on the interface object out of sequence.
- What happens if the user clicks on the Check button before a client and a campaign have been selected?
- To specify what happens, we can use Statechart diagrams!

Client listbox, Campaign Listbox, Cursor



CheckButton, BudgetTextbox



Additional Readings

- Bennett S, Farmer R and McRobb S (1999) *Object-Oriented Systems Analysis and Design Using UML*. McGraw-Hill. Chapter 16 - Designing interface objects.
- Larman C (1998) *Applying UML and Patterns*. Prentice-Hall. Chapter 22 - Issues in System Design.