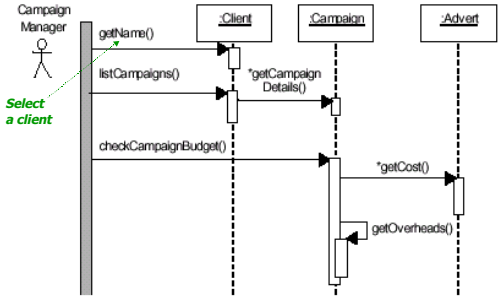
XXII. Interface Objects

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

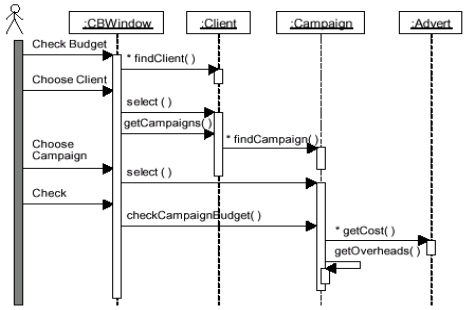
The Three-Tier Architecture, Revisited

- *(Remember that..) User interfaces for 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

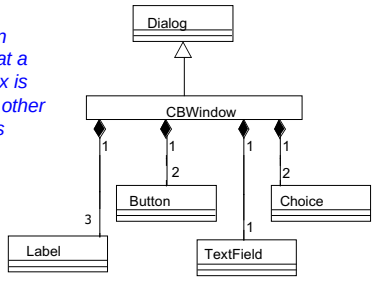


Prototyping the Dialogue

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

Class Diagram for Interface Classes

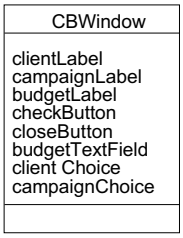
Composition specifies that a dialogue box is made up of other components



Another Class Diagram

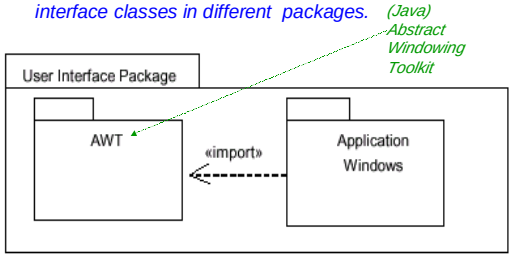
CBWindow can also be represented as a class with the graphical components that make it up as attributes.

[This is OK only if you don't want to say much about the different elements of CBWindow.]



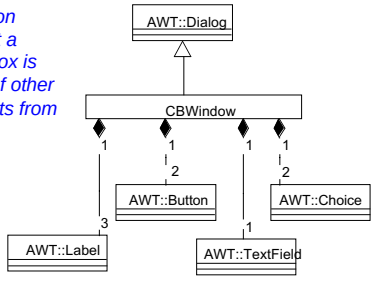
Packages for Interface Classes

- *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.*

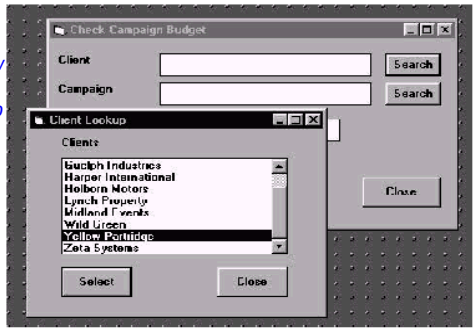


Prototyping the Dialogue

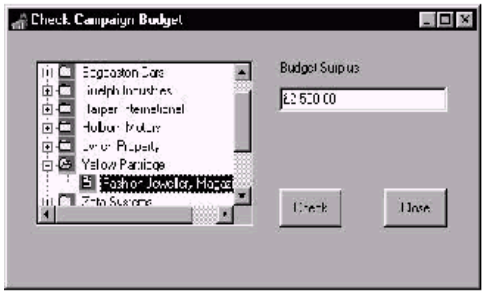
- *There are several ways for entering the Client and Campaign name:*
  - ✓ *Use a separate look-up window for each class;*
  - ✓ *Allow the user to enter a part of a name, then have the system return a list of close matches;*
  - ✓ *Use a tree data structure to show clients and campaigns in a tree-like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

Alternative Dialogue Prototypes

Separate window for look-up

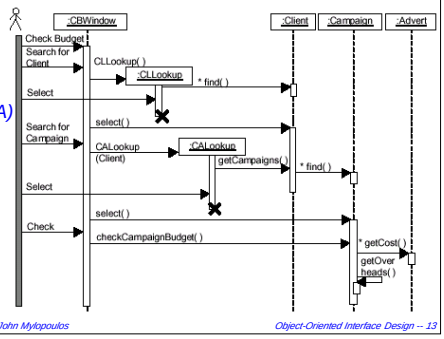


Alternative Dialogue Prototypes: Tree View Control

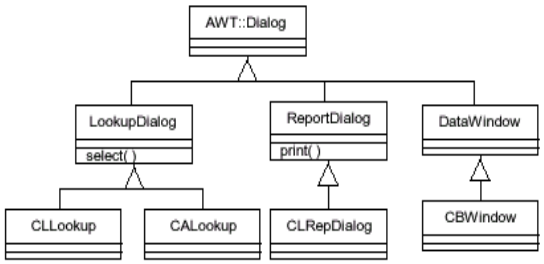


Updating the Sequence Diagram

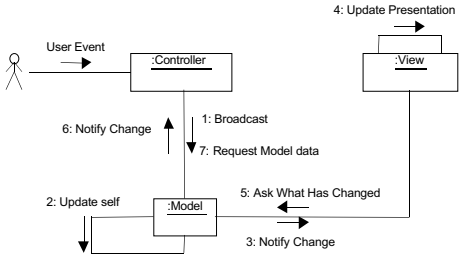
Choice:
Client (CL)
Campaign (CA)
Lookup



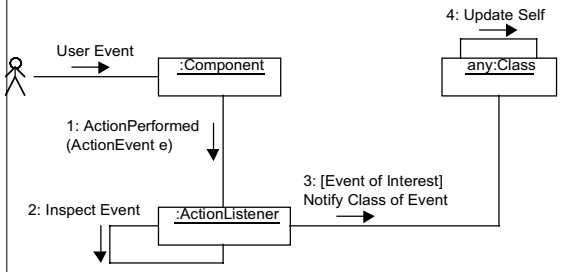
Updating the Class Diagram



Model-View-Controller



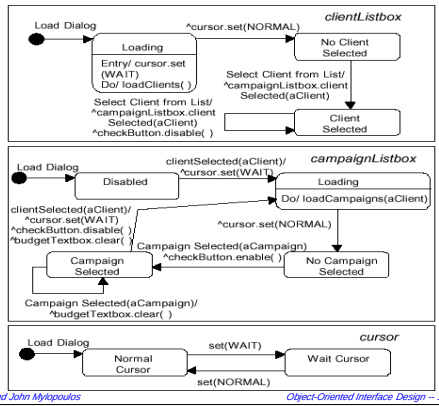
The Java ActionListener Approach



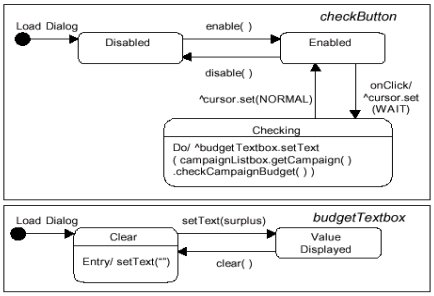
Modeling the Dynamic Behaviour of the Interface

- 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 state 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.*