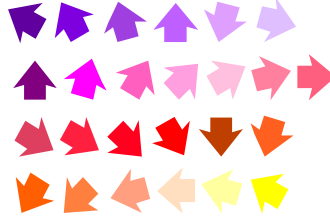




XXII. Interface Objects

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

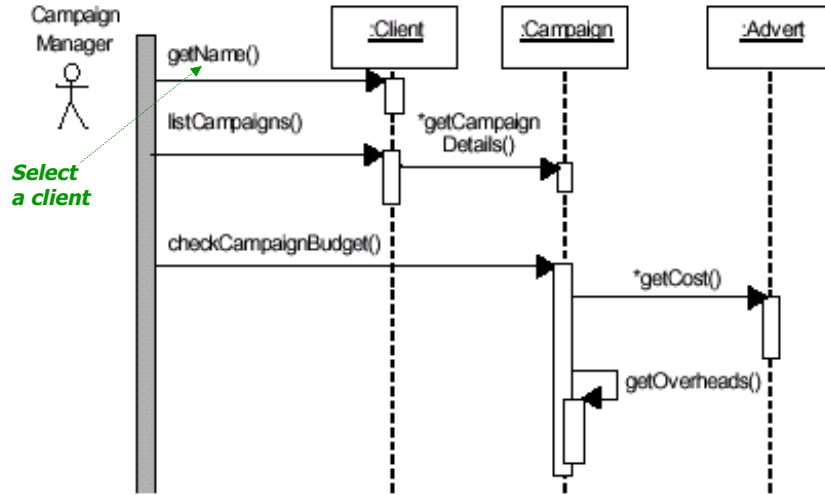


The Three-Tier Architecture, Revisited

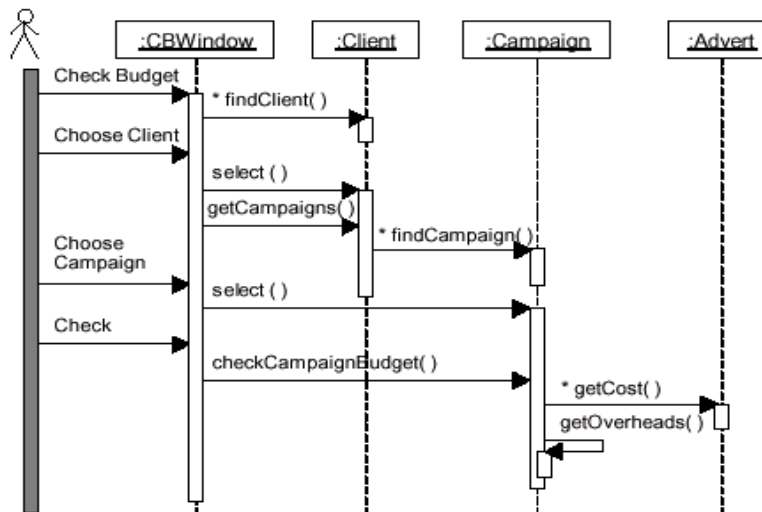
- (Remember that..) User interfaces for are part of the presentation layer in a three-tier architecture.
- The three-tier architecture separates cleanly ***user interfaces*** from ***application logic/business classes*** and from ***data storage components*** of the system.
- ***Business classes*** “know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



Check Campaign Budget



Add a Dialog Box Object





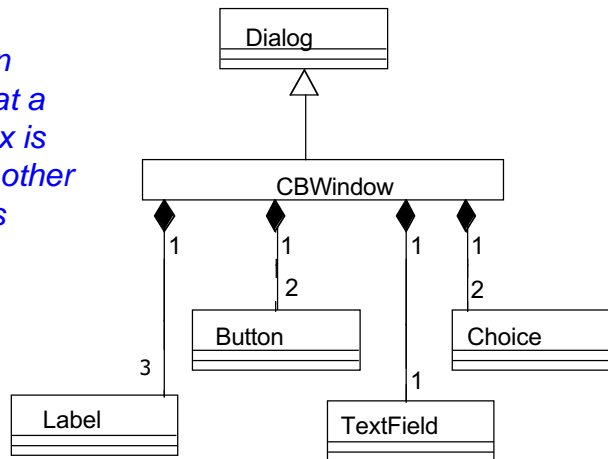
Prototyping the Dialogue

- 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

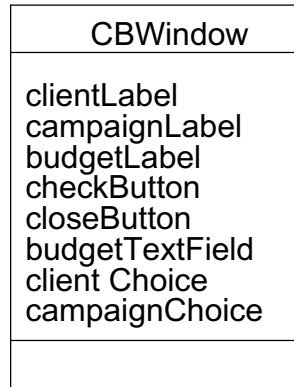




Another Class Diagram

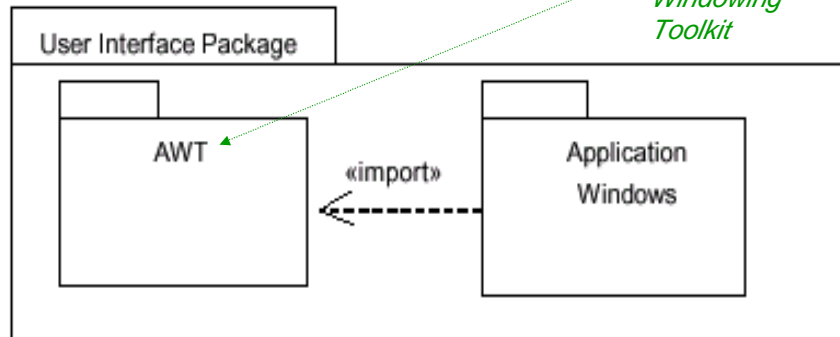
CBWindow can also be represented as a class with the graphical components that make it up as attributes.

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



Packages for Interface Classes

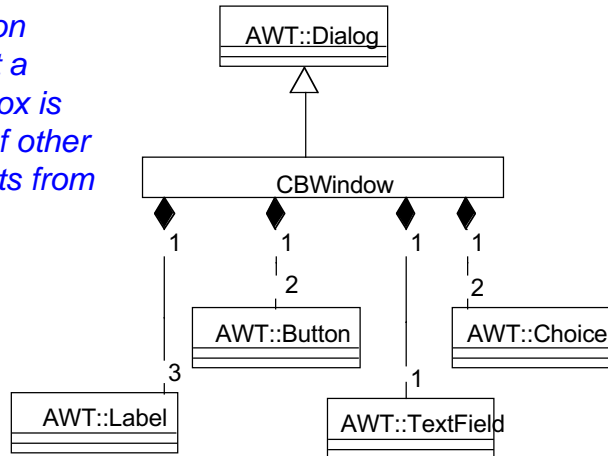
- Package diagrams show the dependencies among interface classes in different packages. (Java)





Revised Class Diagram

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



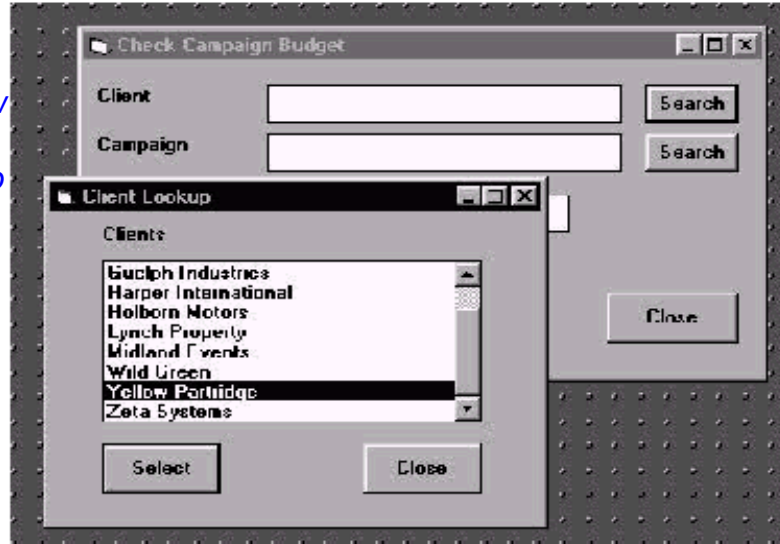
Prototyping the Dialogue

- 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



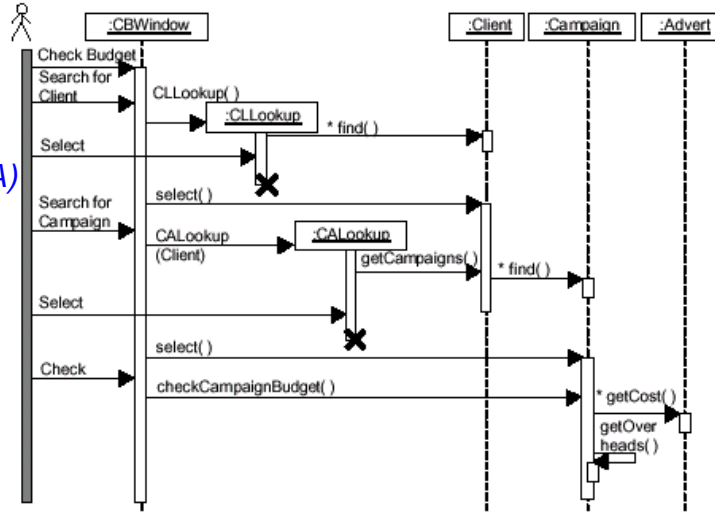
Alternative Dialogue Prototypes: Tree View Control



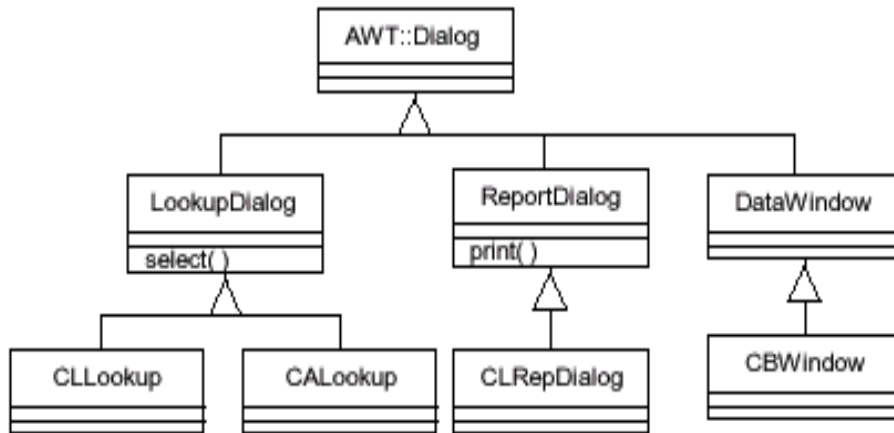


Updating the Sequence Diagram

Choice:
Client (CL)
Campaign (CA)
Lookup

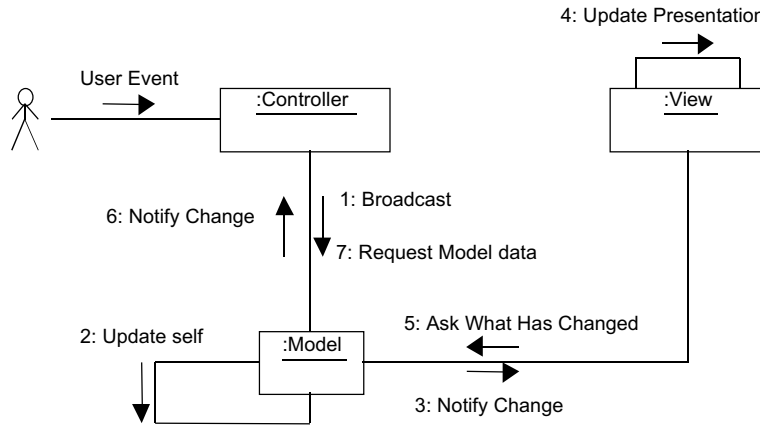


Updating the Class Diagram

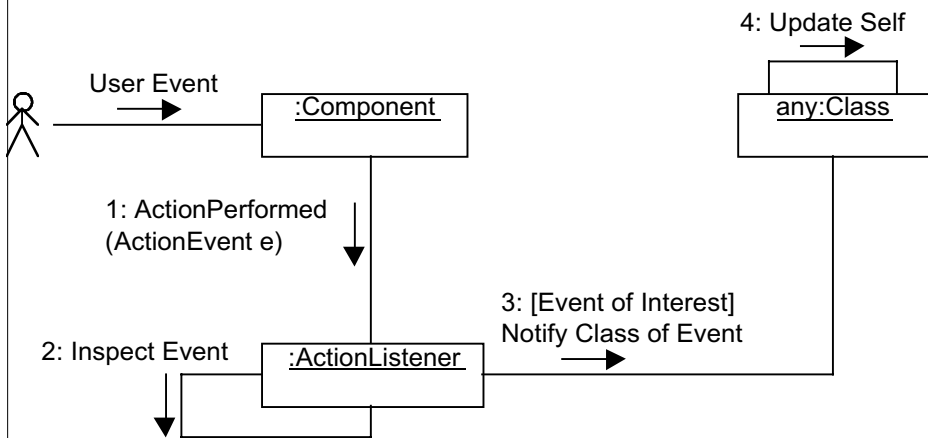




Model-View-Controller



The Java ActionListener Approach



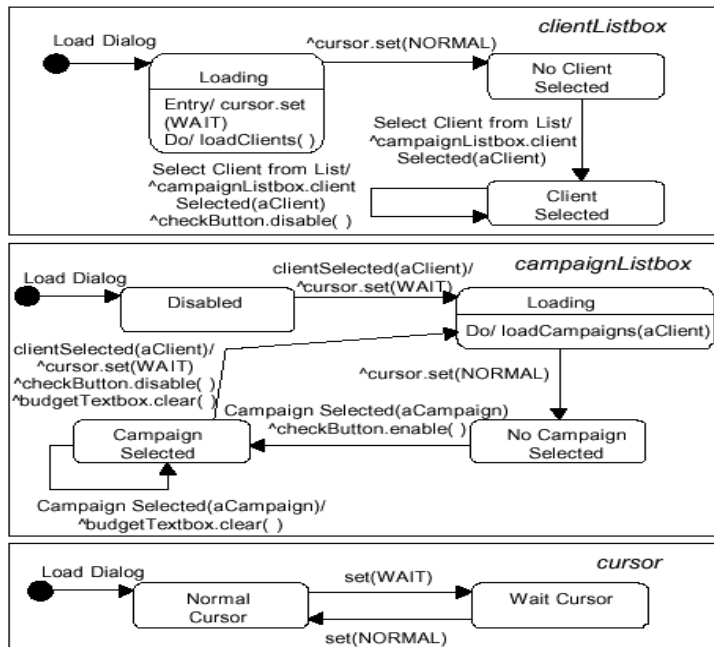


Modeling the Dynamic Behaviour of the Interface

- 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!

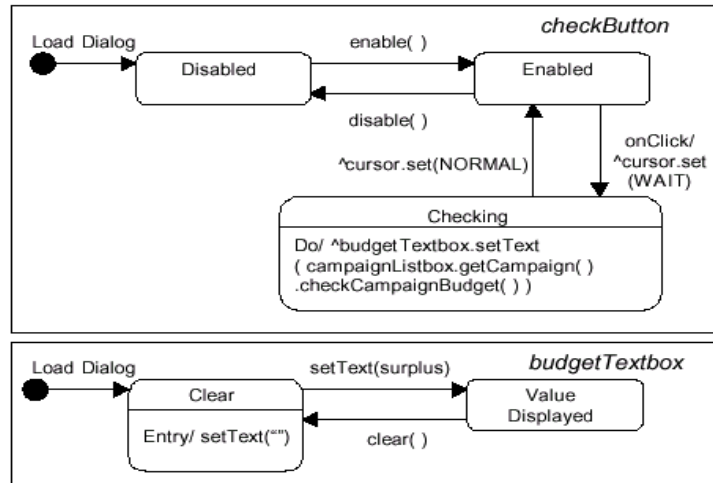


Client listbox, Campaign Listbox, Cursor





CheckBox, 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.