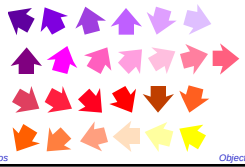
XXV. Interface Objects

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



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The Three-Tier Architecture Revisited

- User interfaces for an information system are part of the presentation layer in the 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" of how their (business) objects will be presented to the users.

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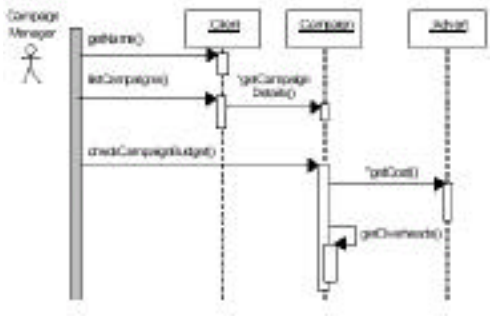
Ex: Check Campaign Budget



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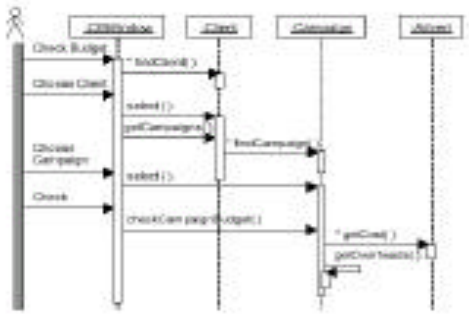
Add a Dialog Box Object



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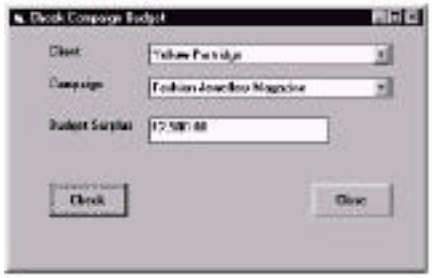
Prototyping the Dialogue

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



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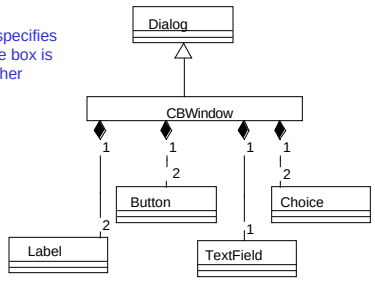
Class Diagram for Interface Classes

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



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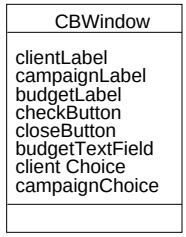
Another Class Diagram

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



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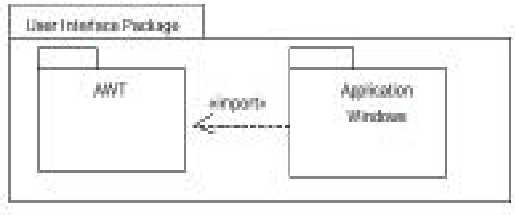
Packages for Interface Classes

- Package diagram shows the dependencies between interface classes in different packages.



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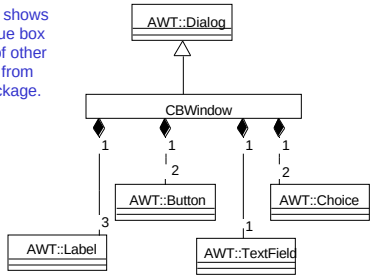
Revised Class Diagram

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



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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.

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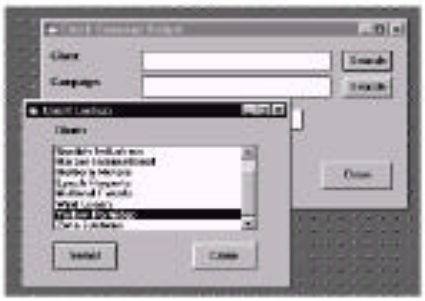
Alternative Dialogue Prototypes

- Separate window for look-up



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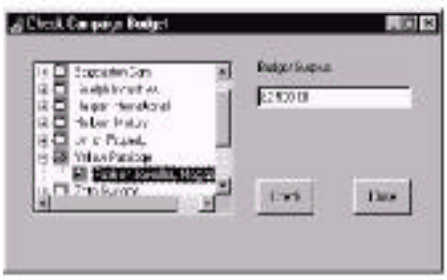
Alternative Dialogue Prototypes: Three View Control



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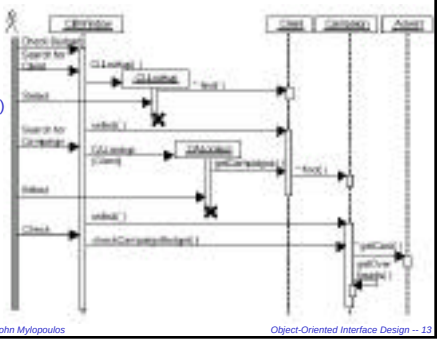
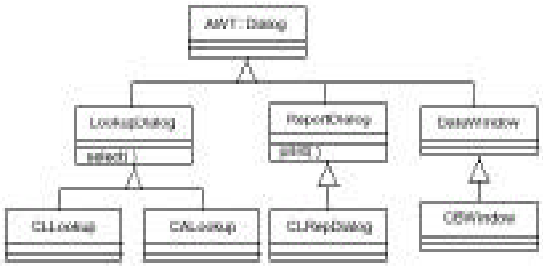
Updating the Sequence Diagram

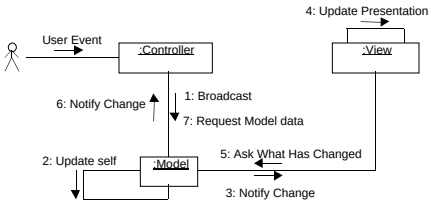
- Choice:
  Client (CL)
  Campaign (CA)
  Lookup



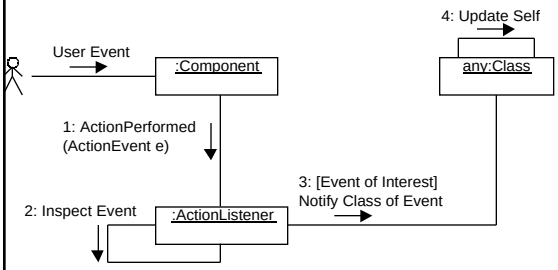
Updating the Class Diagram



Model-View-Controller



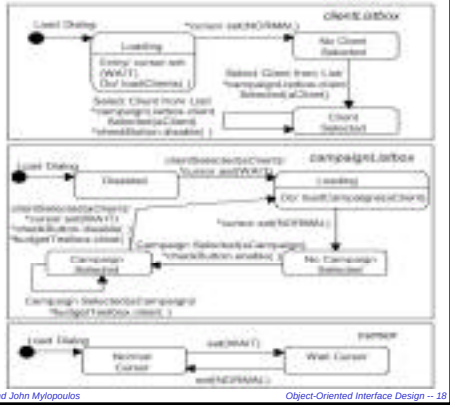
The ActionListener Approach



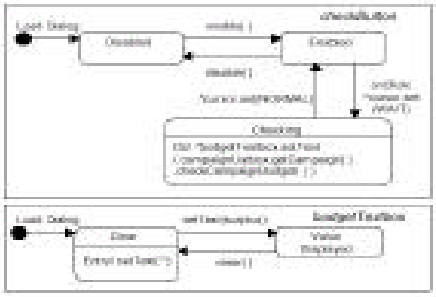
Modelling the Dynamic Behaviour of the Interface

- 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.