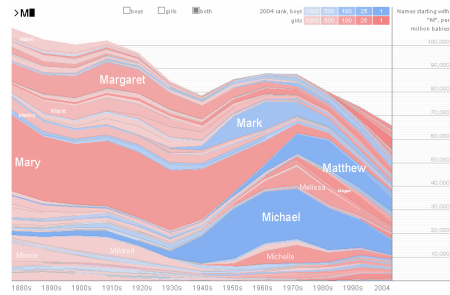


Lecture 12: GUI Builders

UI Hall of Fame or Shame?

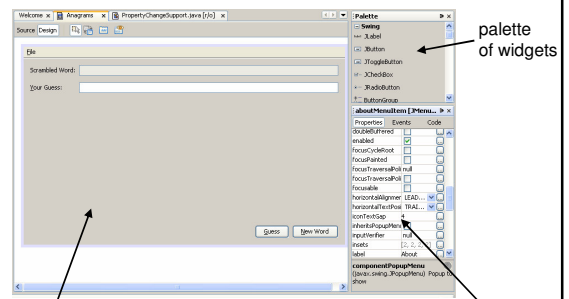


Suggested by Casey Dugan

UI Construction Techniques

- Procedural
 - writing Java code
- Declarative
 - specifying component hierarchy
 - automatic layout, constraints
 - UIML, SUPPLE
- Direct manipulation
 - GUI builders

GUI Builders



visual representation of UI

property editor

Examples of GUI Builders

- NetBeans
 - Java Swing
- Eclipse Visual Editor
 - Java Swing & SWT
- Visual Studio
 - .NET (for C#, C++, VB)
- Interface Builder
 - Mac OS X
- Qt Designer
 - Qt toolkit (used by KDE)
- Glade
 - GTK (used by Gnome)

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Output

- Mostly components
 - Palette of built-in widgets
- To use strokes, you have to write a custom component
- To use static pixel images, pick the image widget (or a JLabel)

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Input

- Coding
 - choose events from a menu
 - bring up code editor to write handler
- Making connections by menus & forms
 - Event from a source component ("signal")
 - Triggers a method or property change on another component ("slot")
 - NetBeans, Qt Designer, Mac Interface Builder all support connections to some extent

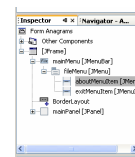
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Component Hierarchy

- Sometimes visually represented
 - NetBeans, Eclipse VE
- Sometimes implicit
 - Dragging a component into a container's bounding box makes it a child
 - Bring to Front / Send to Back control sibling order
 - Visual Studio, Qt Designer



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Layout

- Absolute positioning
 - usually the default
 - gridding for easier alignment
 - one-time alignment commands
 - Mac IB: "Align to Aqua guides"
- Layout managers
 - Pick the layout manager
 - Use property editor to configure it, or (sometimes) drag & drop components to snapping locations
 - Java GUI builders; also Visual Studio docking (border layout)
- Struts & springs
 - Component edges are connected to container edges with either struts (fixed-size) or springs (variable-size)
 - Mac IB, Visual Studio
- Persistent alignment commands (Qt Designer)
 - Align horizontally, vertically, grid
 - Visible affordances after alignment (can be selected, edited to add padding, deleted)
 - "Spacer" components (visible during design, not at runtime)
- Snapping (Hudson & Yeatts, NetBeans 5.0)

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Widget Interface Conventions

- Java "Beans" convention was designed for GUI builders
 - getX(), setX()
 - addYListener(), removeYListener()
- GUI builder can inspect the methods of a class to create editable property list and event menu

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Modes

- Design mode
 - Clicking selects controls
 - Designer affordances are visible (e.g., selection handles)
- Test mode
 - Clicking operates the controls, but no backend (no event handlers)
 - Only user affordances are visible
- Run mode
 - Running the whole program, so backend works too

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Storing the UI

- Code generation
 - automatic variable naming
 - label1, jMenuItem2
 - initialization code for property & listener assignments
 - DON'T EDIT HERE (NetBeans) vs. closing the loop (Eclipse VE)
- Serialization
 - UI description is stored in a separate format, loaded and instantiated at runtime (Mac IB, NetBeans XML serialization)

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