CS 349 - User Interfaces **Winter 2018**

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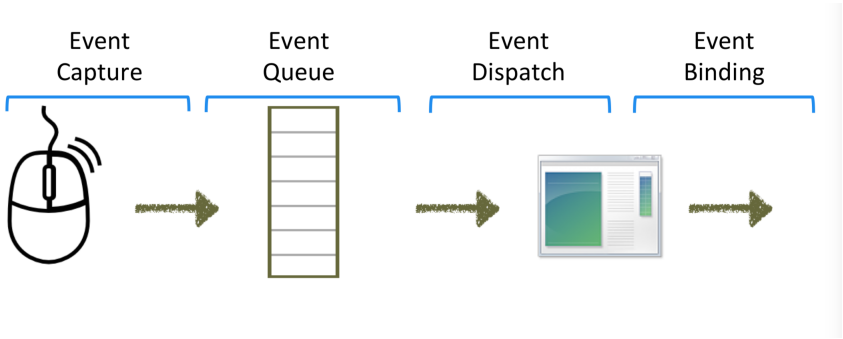
7.1 Event Dispatch

7.1.1 Event Architecture

- A pipeline
  - Capture and Queue low-level hardware events
  - Dispatch events correct window and widget
  - Bind event with application code

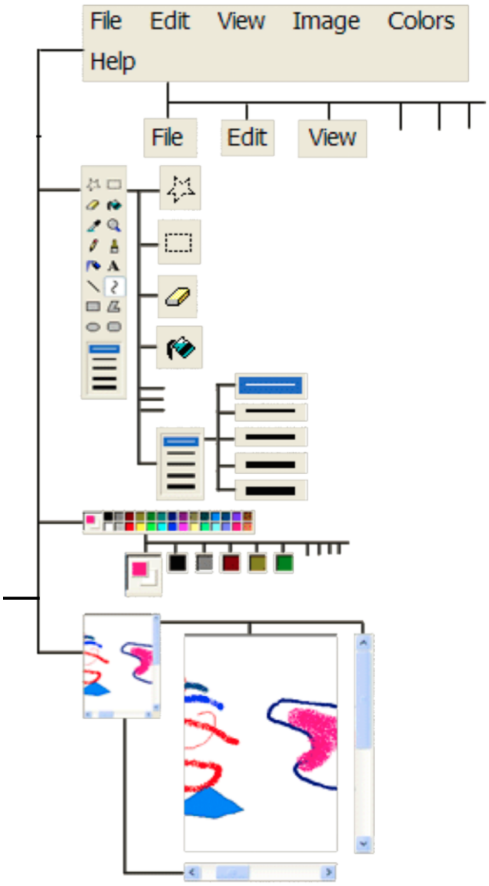


7.1.2 Event Loop

- Iterate through event queue, and dispatch event to handler(s) - Low-level mechanism for event dispatch
- BWS event queue always dispatches to an application window
  - what window triggered the event
  - what window has mouse or keyboard focus
- Final dispatch depends on what manages application-level events:
  - BWS could dispatch to widget level (heavyweight)
  - application could manage dispatch (lightweight, e.g. Xlib)
  - toolkit could dispatch to widgets (lightweight, JVM/Swing)

7.1.3 Interactor Tree

- 2D layout of widgets forms a hierarchy
- COntainer widgets are ancestors of simple widgets
- Dispatching an event is done by traversing the interactor tree



7.1.4 Lightweight vs Heavyweight Widgets

- Heavyweight widgets
  - Widget toolkit wraps native-OS widgets
  - BWS/OS provides a hierarchical windowing system for all widgets across all applications, and treats a widget essentially as a window
  - BWS can dispatch events to a specific widget
  - e.g. nested X Windows, Javas AWT, HTML forms, Windows MFC
- Lightweight widgets

- The widget toolkit draws its own widgets and is responsible for mapping incoming events to widgets
- BWS/OS dispatches to the window (NOT the widget)
- e.g. Java Swing, JQuery UI, Windows WPF