Determining the Adequacy of GUI Test Cases

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Coverage Criteria

- Two purposes
  - Test data selection criteria
  - Rules used to select test cases
- Test data adequacy criteria
  - Rules used to determine how much testing has been done
- Common Examples for Conventional Software
  - Statement coverage
  - Branch coverage
  - Path coverage

Structural Representation of the Code

Coverage Criteria for GUIs

- Cannot use code-based coverage
  - Source code not always available
  - Event-based input
  - Different level of abstraction
- Our Contribution
  - Hierarchical structure of the GUI in terms of events
  - Coverage criteria based on events

Model GUI Hierarchically

- Hierarchy
  - GUIs are decomposed into a hierarchy of components
  - Hierarchical decomposition makes testing intuitive and efficient
  - Several hierarchical views of GUIs
- We examine Modal Dialogs to create the hierarchical model

Coverage Criteria

- Intuitively
  - Each component is a unit of testing
  - Test events within each component
  - Test events across components
  - Inter-component coverage criteria

Coverage Criteria for GUIs

- Intra-component Coverage
  - Event coverage
    - Individual events
    - Each node in the event-flow graph
    - Event-interaction coverage
    - Each pair of events
    - Each edge in the event-flow graph
    - Length-n event sequence coverage
      - Sequences of events
      - Bounded by length
      - Length-1 event sequences
      - Length-2, length-3 event sequences
      - Paths in the event-flow graph

GUI Representation

- Motivation
  - GUI testing needs a “Unit of Testing”
    - Manageable
    - Test the unit comprehensively
    - Test interactions among units
  - GUIs are created using library elements
    - Need to test these elements before packaging them for reuse
    - Certain level of confidence that the element has been adequately tested
    - User of these elements should be able to test the element in its context of use

Role of the Coverage Criteria

- Intuitively
  - Hierarchical Decomposition of the GUI
  - Different level of abstraction
  - Source code not always available
  - Test data selection criteria
  - Rules used to select test cases
  - Coverage criteria based on events

Further Reading: Publications