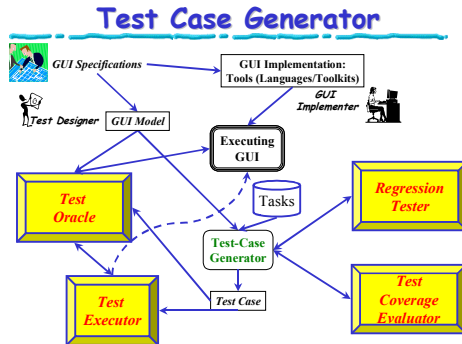


A Planning-based Approach to Testing GUIs

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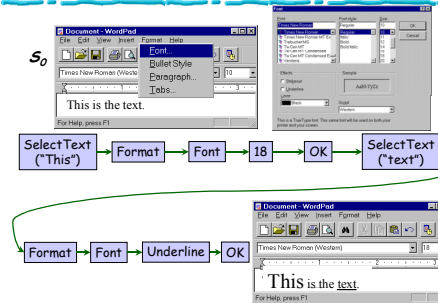
Department of
Computer Science



Definition: GUI Test Case

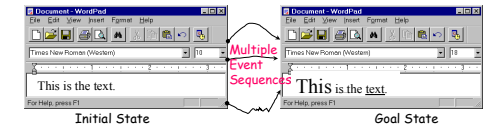
- **legal event sequence**
 - $e_1; e_2; e_3; \dots; e_n$ is a legal event sequence
 - if (e_i, e_{i+1}) is an edge in an event-flow graph
 - or e_i invokes component C_x and e_{i+1} is an event in C_x
- **A GUI test case is a triple**
 - $(S_0, e_1; e_2; e_3; \dots; e_n, S_1; S_2; \dots; S_n)$
 - S_0 is a GUI state, and
 - $e_1; e_2; e_3; \dots; e_n$ is a legal event sequence
 - $S_i = e_i(S_{i-1}), 1 \leq i \leq n$

A Test Case for WordPad

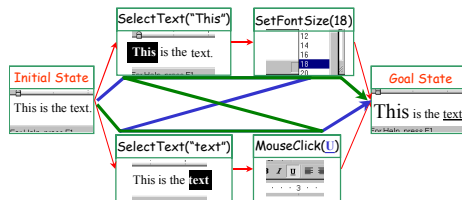


Selecting Event Sequences

- Infinitely many
- Manual
 - Expert chooses sequences
- Automated
 - Randomly choose sequences
 - Structural (event-flow graph & integration tree)
 - Automatically generate events for COMMONLY USED TASKS

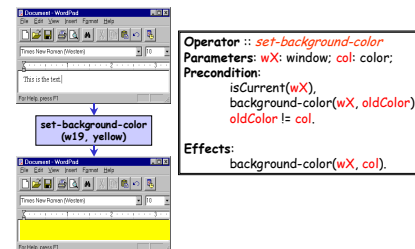


A Plan for a GUI Task

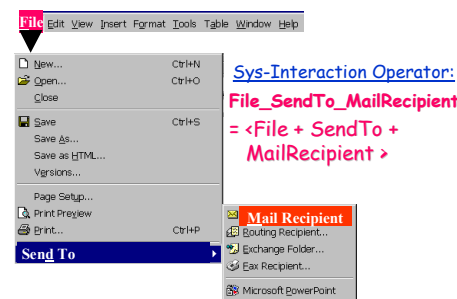


Using Primitive Operators

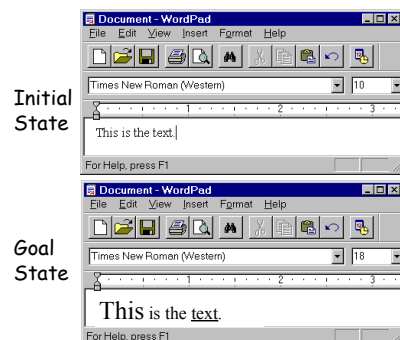
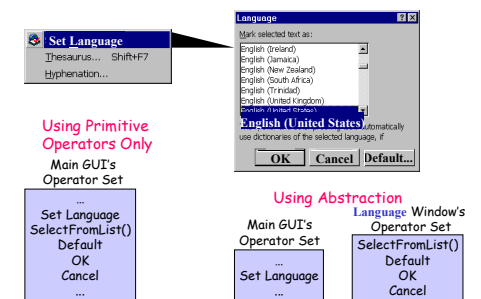
- One operator for each event



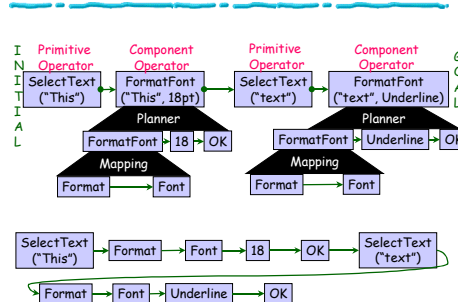
Create System-Interaction Operators



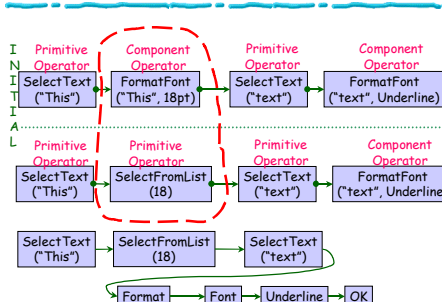
Create Component Operators



Test Case



Alternative Test Case



Further Reading: Publications

- ✓ Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, **Hierarchical GUI Test Case Generation Using Automated Planning**, *IEEE Transactions on Software Engineering*.
- ✓ Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, **A Planning-Based Approach to GUI Testing**, *13th International Software/Internet Quality Week (QW 2000)*, San Francisco, CA, USA, 30 May - 2 June, 2000.
- ✓ Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, **Plan Generation for GUI Testing**, *The Fifth International Conference on Artificial Intelligence Planning and Scheduling (AIPS 2000)*, Breckenridge, CO, USA, pp. 226-235, April 15-17, 2000.
- ✓ Atif M. Memon, Martha E. Pollack and Mary Lou Soffa, **Using a Goal-driven Approach to Generate Test Cases for GUIs**, *The 21st International Conference on Software Engineering (ICSE 1999)*, Los Angeles, USA, pp. 257-266, May 16-22, 1999.
- ✓ Atif M. Memon, **A Comprehensive Framework for Testing Graphical User Interfaces**, PhD Dissertation, University of Pittsburgh, Pittsburgh, PA, July 2001.