



GUI Testing



Lecture Objectives:

- 1) Explain the concept of usability testing. -
- 2) Understand at a preliminary level the concepts of usability testing. -
- 3) List the two major types of GUI testing -
- 4) List the four main types ^{Subtypes} of GUI Functional testing -
- 5) Explain the concept of a capture replay tool -
- 6) Explain the problems of testing with a capture replay tool



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Checking for reserved flight?

Bad usability -> hard to navigate. Hard to understand.

cluttered too much on one screen.



understand

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Usability

- “...the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use.”
- Usability is a measure of how easy it is to use something:
 - How easy will the use of the software be for a typical user to understand, learn, and operate
 - e.g., “user-friendliness”

- Two general approaches

- Usability testing ✓

- Assessing how functional the user interface is to solve the given problem

- Functional Testing ✓

- Does the UI function properly

Testing GUI's

Assesses a good UI design.

Not really scope for this course.

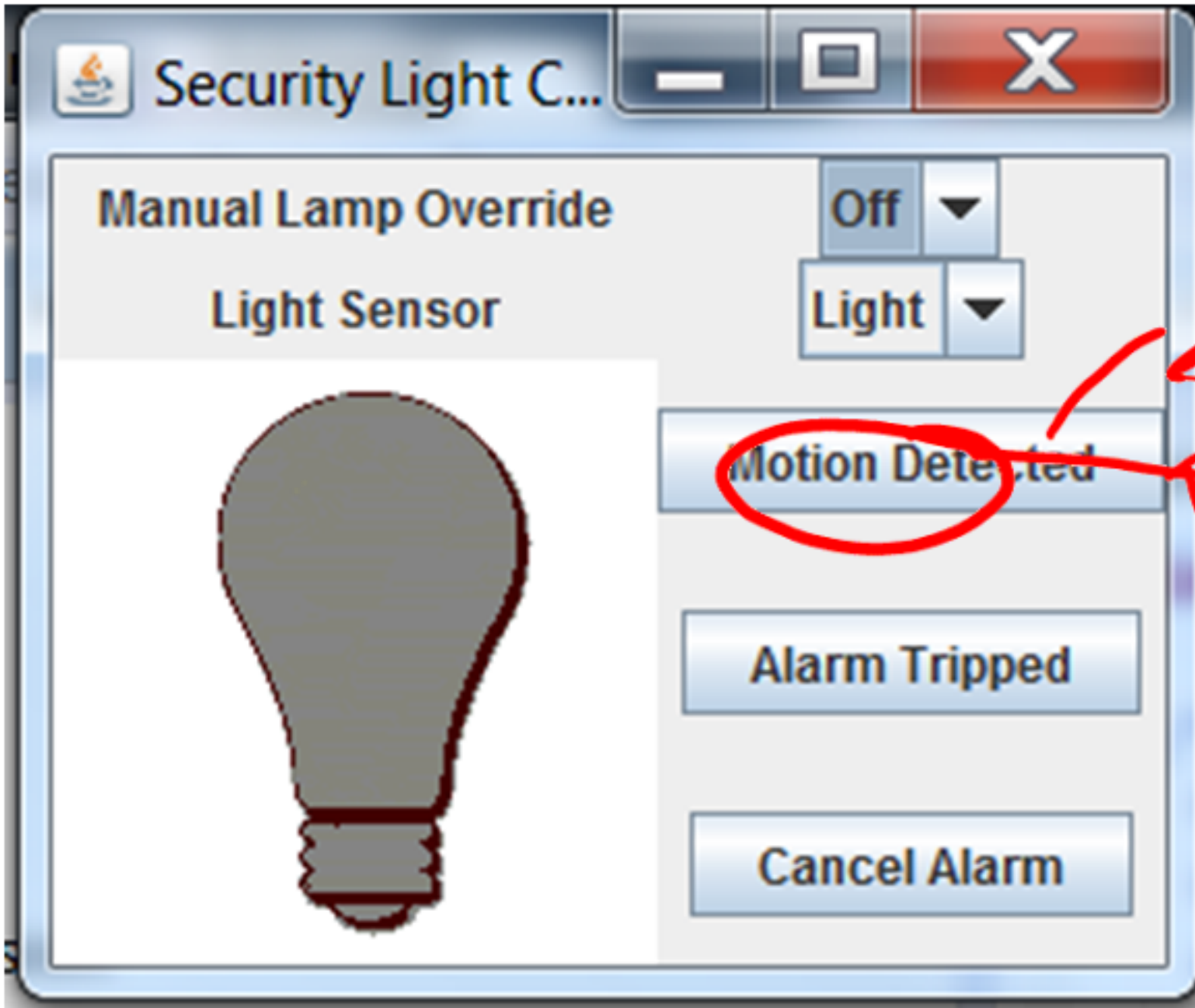
HCI => Human Computer Interaction

Functional Testing of GUIs

- GUI System Testing *4 types*
 - Testing an application through a user interface *⇒ High Level*
- Regression testing *⇒ Automate*
 - Testing the user interface after a new version is released
- Input validation testing *⇒ Different*
 - Determining how well the system handles invalid input *⇒ Fuzz testing*
- GUI Testing
 - How well does the GUI work

How would we test this

GUI?

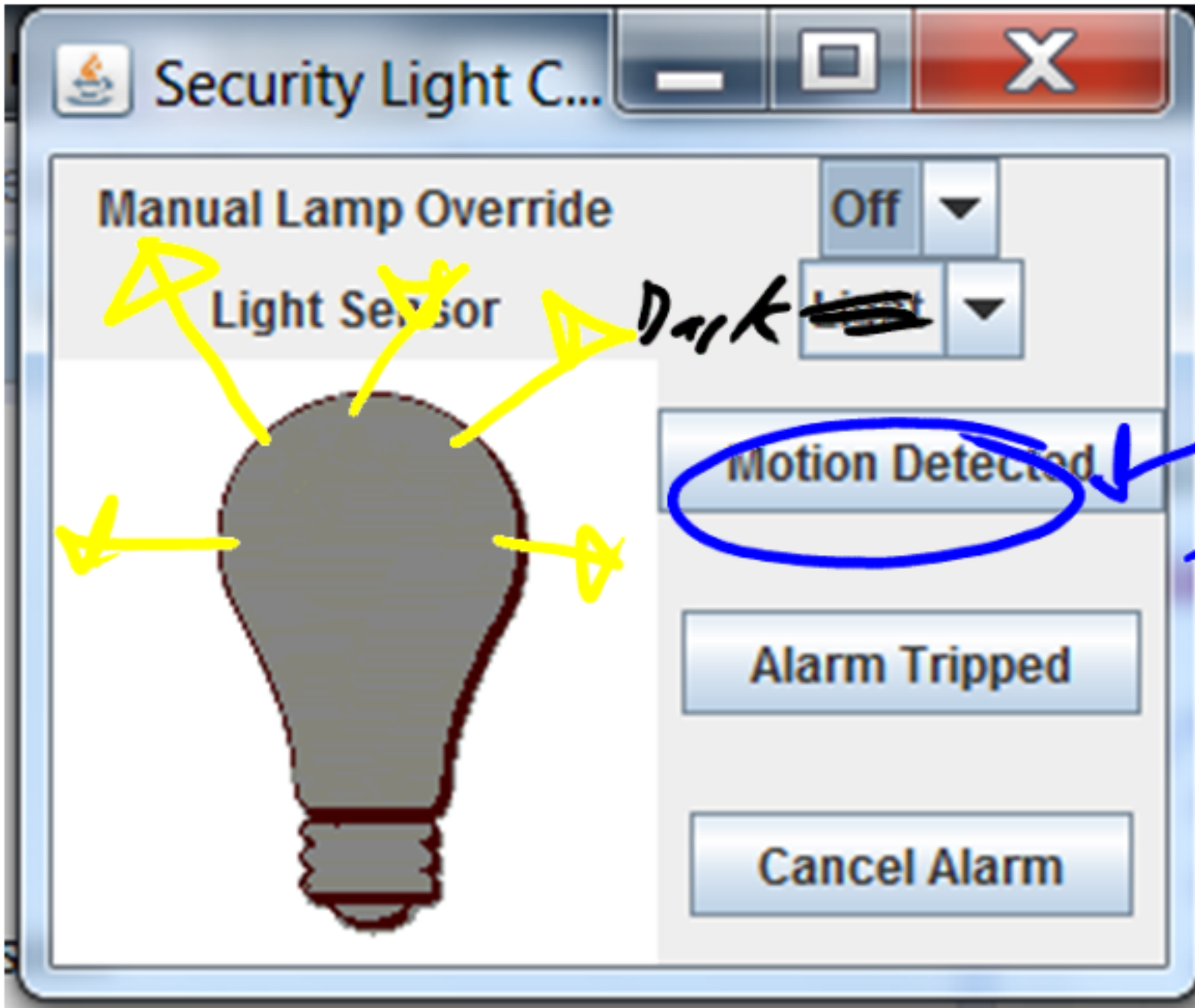


Click
⇒ Motion Detected event.
↓
Mock object



How would we test this

GUI?

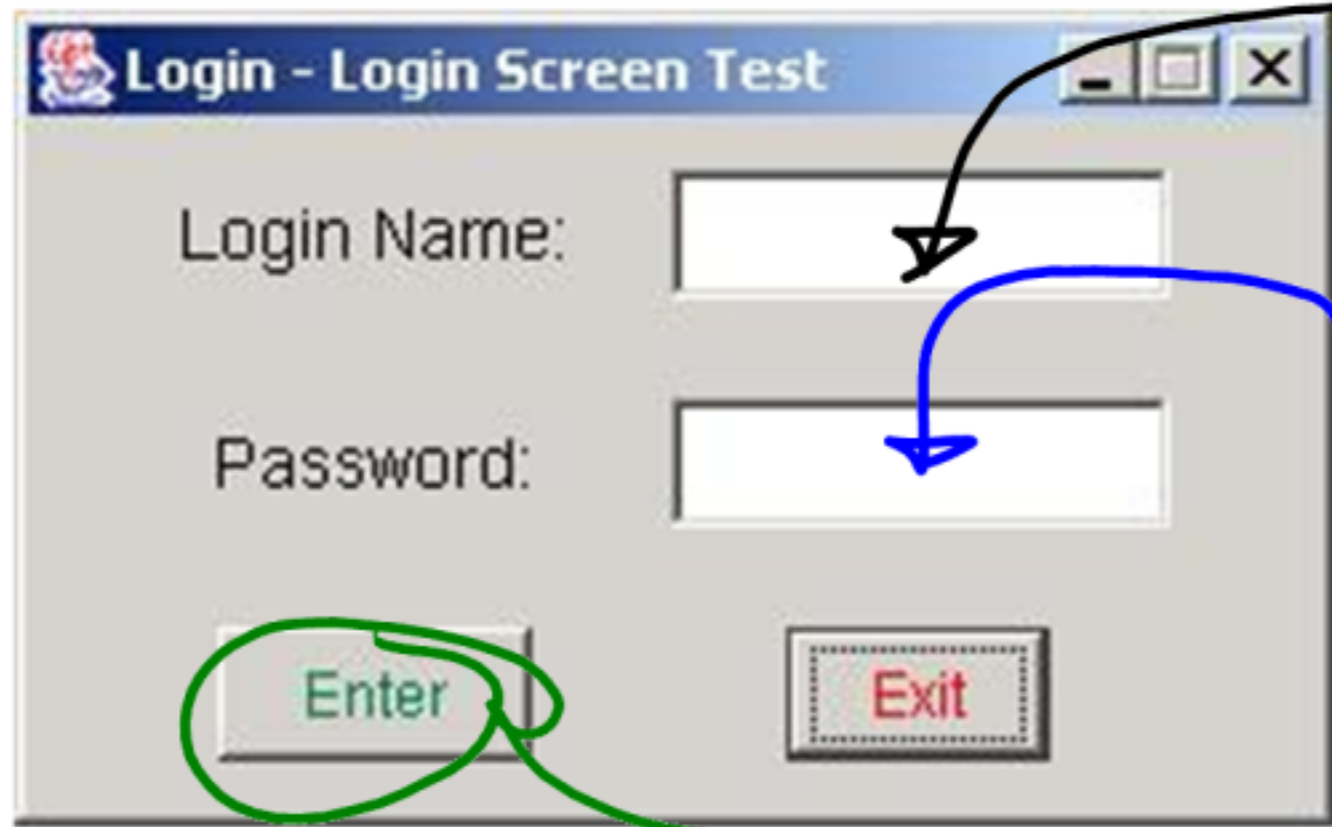


Dark

1. Click
2. Light Changes

How would we test this

GUI?



1. Type "Jim"
2. Type "1234"
3. click Enter

4. Hopefully
be let in.



Approaches for GUI-based testing

- **Manual based**
 - Based on the domain and application knowledge of the tester
- **Scripting**
 - Based on the user writing a set of scripts
- **Capture and Replay**
 - Based on capture and replay of user sessions
- **Model-based testing**
 - Based on the execution of user sessions selected from a model of the GUI
 - Which type of model to use?
 - Event-based model
 - State-based model
 - Domain model
 - How do obtain the model to be used?
 - Specification-based model
 - Model recovered from existing software systems
 - Log-based model

→ Lab 3 ⇒ Pizza System

oh log! ⇒ Program

↳ what user does

⇒ Graphs/
State machines
Discrete events

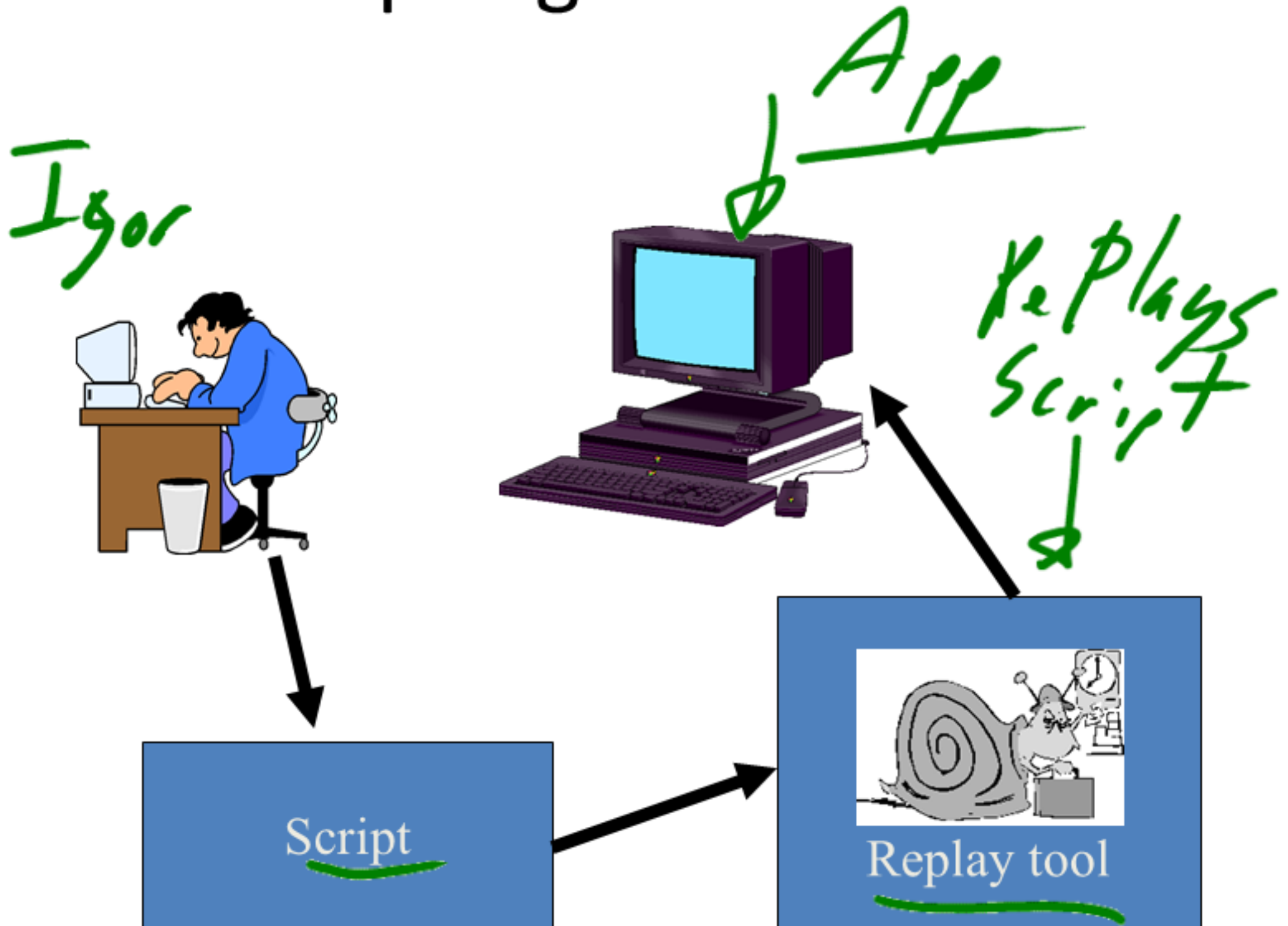


- Another Programming Language.
 - Needs to be subjected to some form of formal verification.
 - Eliminates human error during execution of the test.
 - Can be used (sometimes with modifications) for regression testing.

Scripting

Python

Scripting cont'd



What's wrong w/ scripting?

⇒ Hard to write Scripts.

⇒ Discipline!

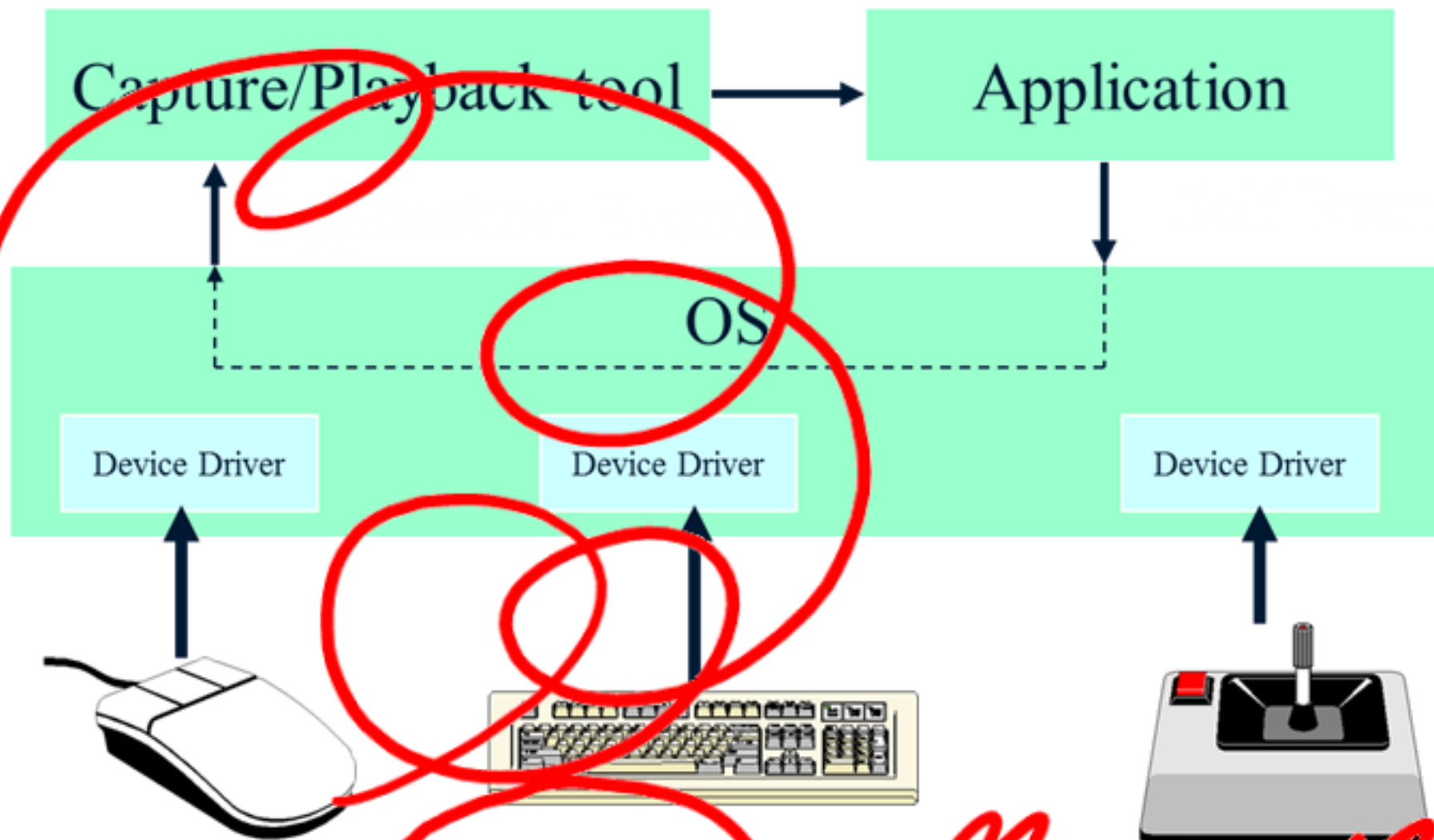
⇒ IDing VI components!

Capture-Replay Tools



*Records,
Script*

Capture replay tool



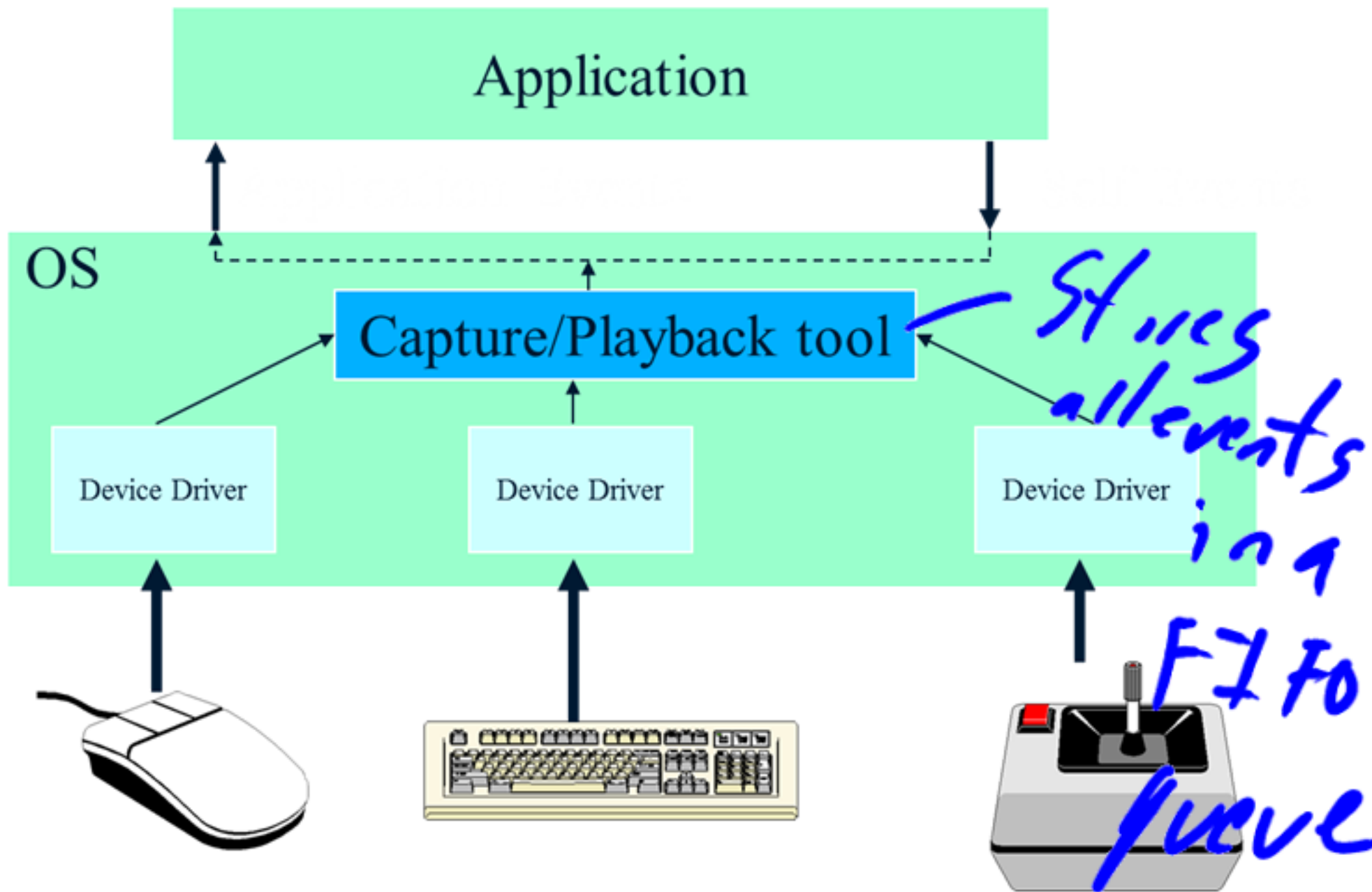
Mouse Moved Events



Btn clicked



Capture Replay Tool



Test \Rightarrow Playback the queue

Problems with Capture

replay tools

1. Might be slow to test.

2. Less control over behavior.

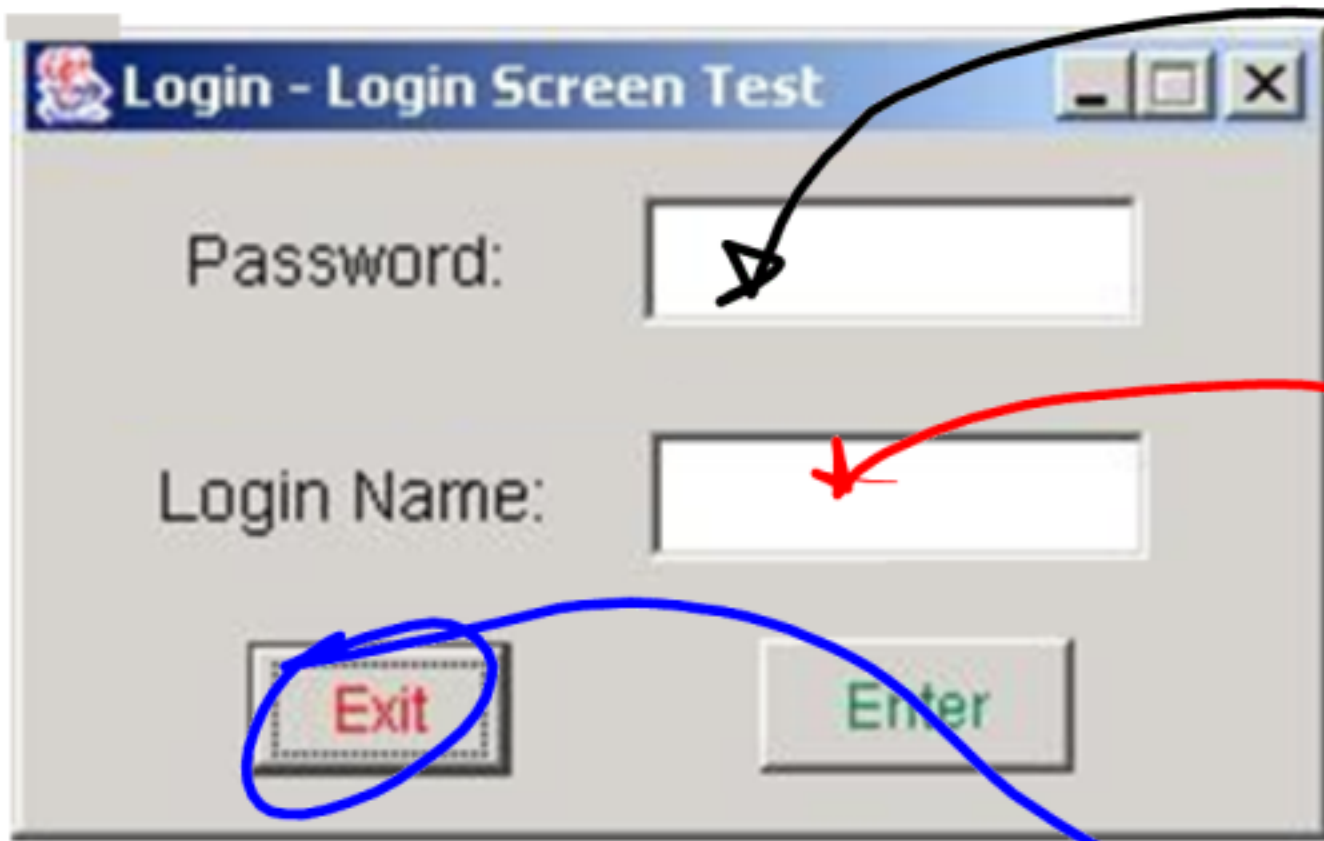
~~3.~~ Change in GUI ~~↓~~

~~*~~

Can really break
playback ~~*~~

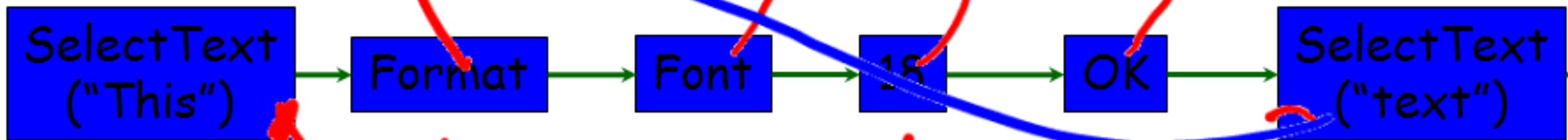
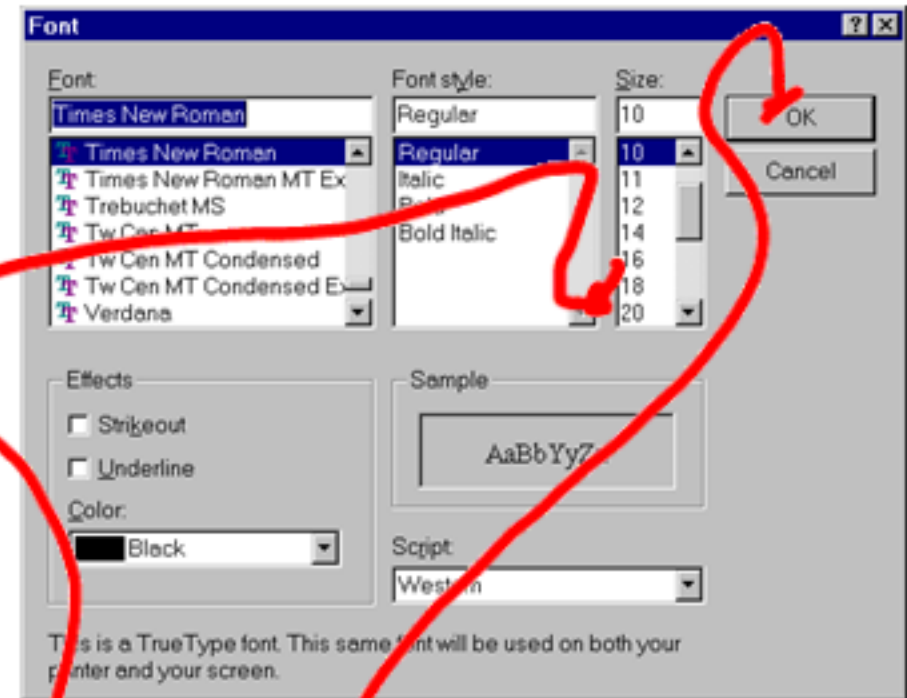
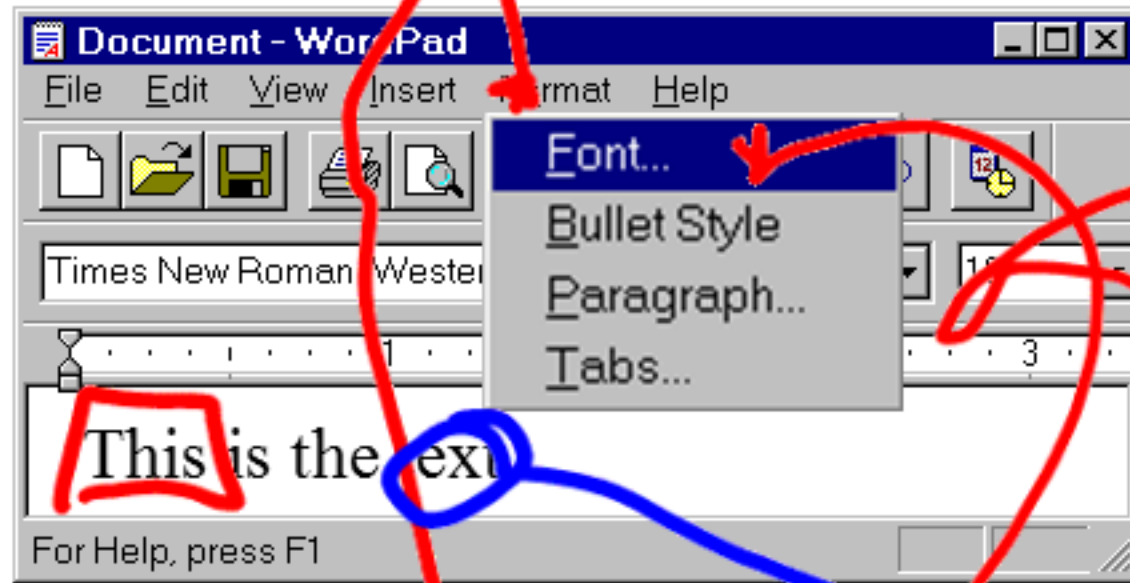


Capture Replay Problems



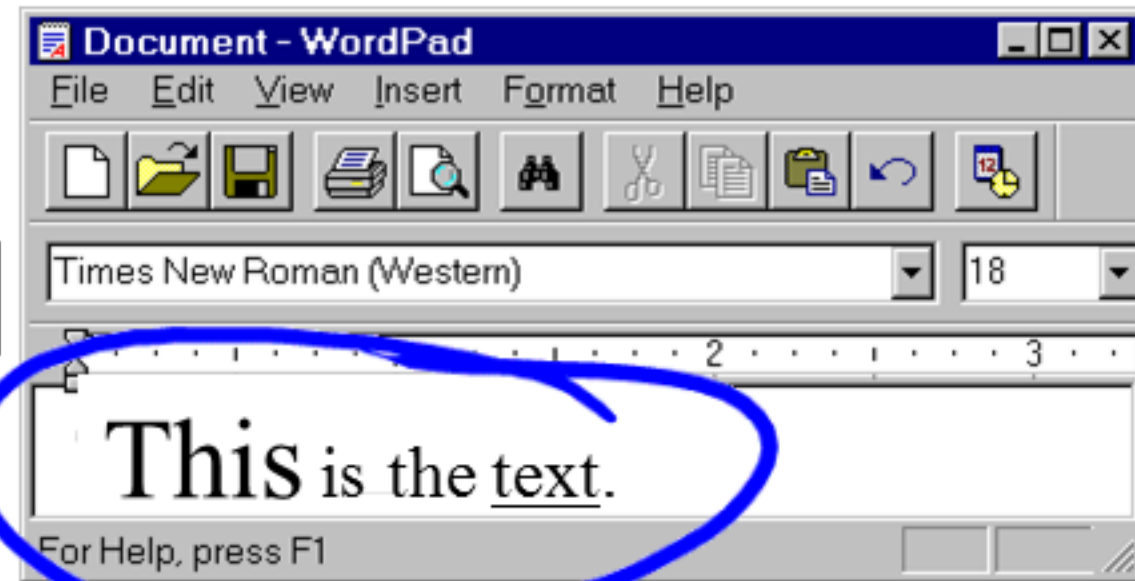
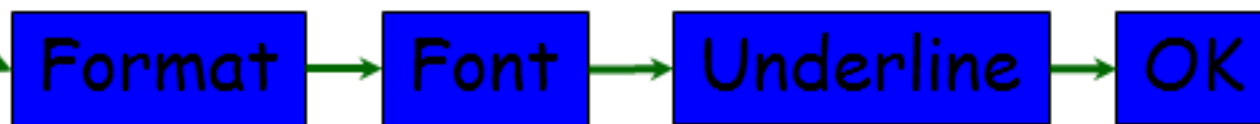
A Test Case for WordPad

S₀



Higher-Level!

base on
names



Tools for GUI-based testing

- **Marathon**
 - **Abbot**
 - **Guitar**
 - **HtmlUnit, HttpUnit, JWebUnit**
 - **HtmlFixture**
 - **Selenium**
 -
- Java
- Web
- 