CSE 403
Lecture 15

UI Automation / Functional Testing

Reading:

How to Break Software, Ch. 2, Whittaker

slides created by Marty Stepp
http://www.cs.washington.edu/403/

Recall: Kinds of testing

- **unit testing**: looks for errors in objects or subsystems
- **integration testing**: find errors when connecting subsystems
- **system testing**: test entire system behavior as a whole, with respect to scenarios and requirements
  - functional testing: test whether system meets requirements
  - performance testing: nonfunctional requirements, design goals
  - acceptance / installation testing: done by client

Functional testing

- **ad-hoc**: Just run the product and click things.

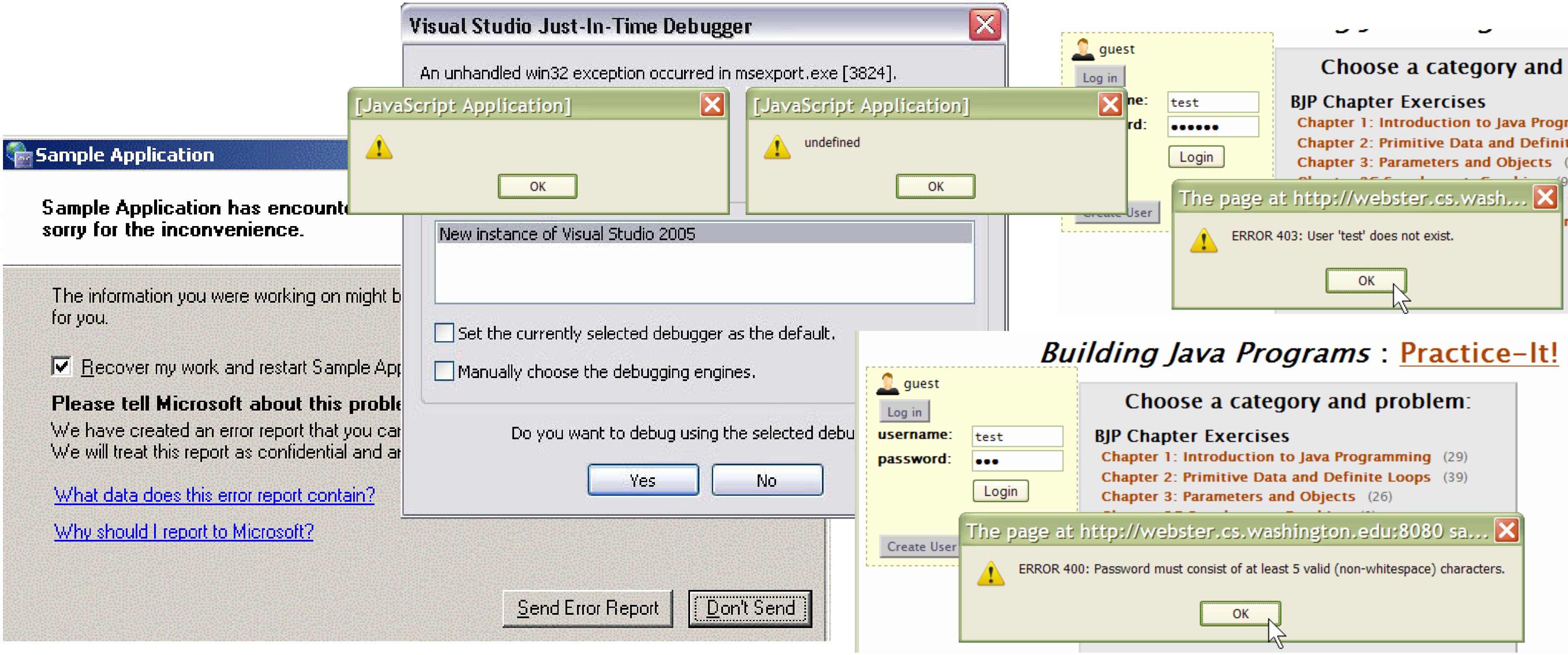
- **UI automation**: Simulate usage of a product's UI in code.
  - "record" usage and play back later
  - or write code to simulate mouse clicks

- Many developers rely too much on ad-hoc testing.
  - pro: Simple; fast; does not require specialized knowledge
  - con: Inaccurate; must be repeated many times; poor at catching regressions; costs more and more time later in the project

  - The ideal is a mix of both kinds of UI testing.

Flush out error messages

- – empty strings (or strings made entirely of spaces, etc.)
- – invalid strings (too short, too long; special characters)
- – 0 or negative numbers
- – settings that do not make sense in combination



Visual Studio Just-In-Time Debugger

An unhandled win32 exception occurred in msexport.exe [3824].

New instance of Visual Studio 2005

□ Set the currently selected debugger as the default.

□ Manually choose the debugging engines.

Do you want to debug using the selected debu

[JavaScript Application]

[JavaScript Application]

undefined

Sample Application

Sample Application has encount
sorry for the inconvenience.

The information you were working on might b
for you.

☑ Recover my work and restart Sample App

Please tell Microsoft about this proble

We have created an error report that you ca
We will treat this report as confidential and a

What data does this error report contain?

Why should I report to Microsoft?

guest

ne: test

rd: ••••••

Choose a category and

BJP Chapter Exercises

Chapter 1: Introduction to Java Progr

Chapter 2: Primitive Data and Definit

Chapter 3: Parameters and Objects

The page at http://webster.cs.wash...

ERROR 403: User 'test' does not exist.

Building Java Programs : Practice-It!

guest

username: test

password: •••

Choose a category and problem:

BJP Chapter Exercises

Chapter 1: Introduction to Java Programming (29)

Chapter 2: Primitive Data and Definite Loops (39)

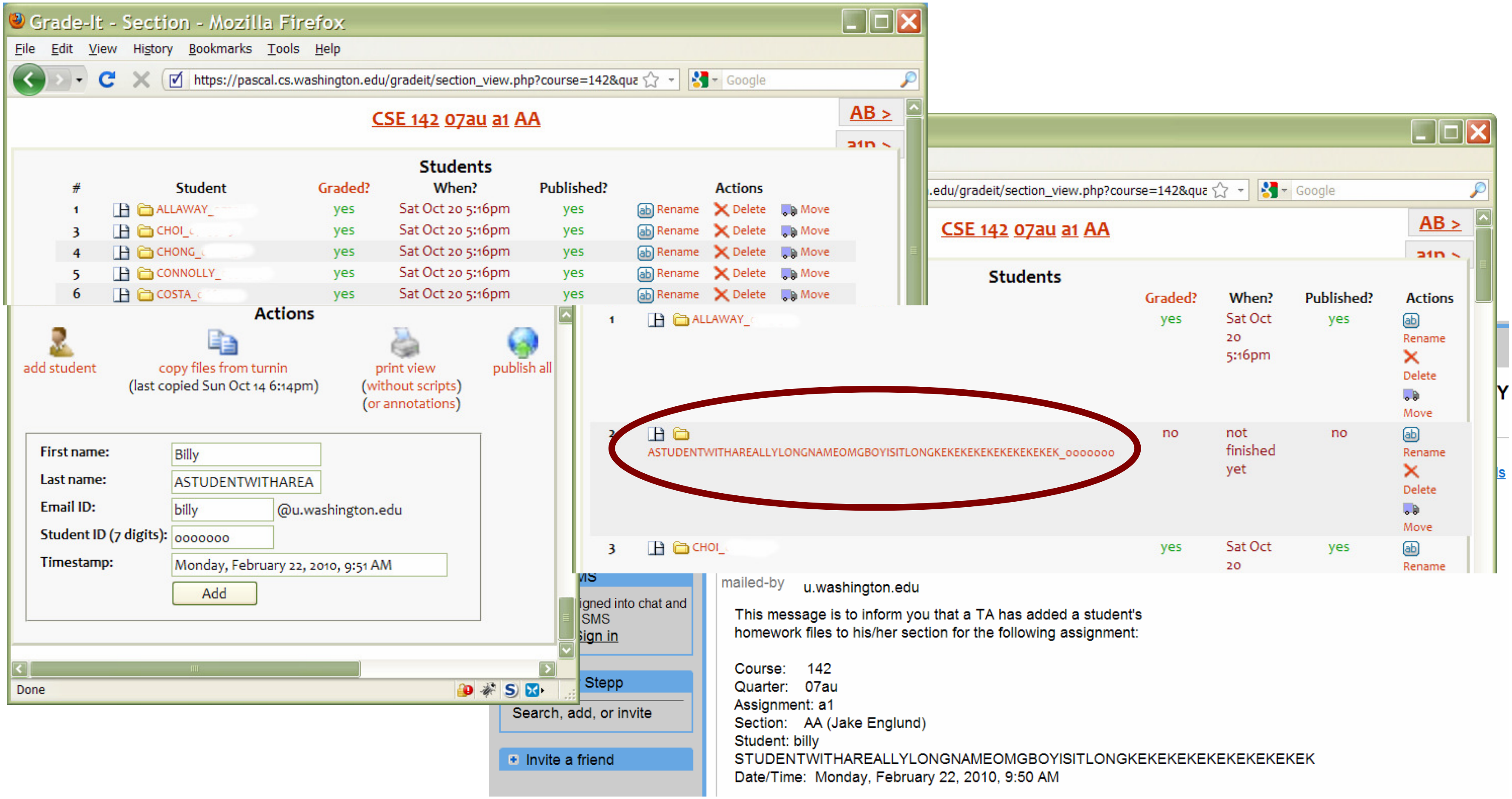
Chapter 3: Parameters and Objects (26)

The page at http://webster.cs.washington.edu:8080 sa...

ERROR 400: Password must consist of at least 5 valid (non-whitespace) characters.

Input buffer overflows

- When prompted for input, try to put in a very long string
  - Will it be accepted, leading to a strange appearance on the UI?



Grade-It - Section - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://pascal.cs.washington.edu/gradeit/section_view.php?course=142&que
Google
AB >
21D >

CSE 142 07au a1 AA

Students

#		Student	Graded?	When?	Published?	Actions		
1		ALLAWAY_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename	Delete	Move
3		CHOI_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename	Delete	Move
4		CHONG_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename	Delete	Move
5		CONNOLLY_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename	Delete	Move
6		COSTA_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename	Delete	Move

Actions

First name:	Billy
Last name:	ASTUDENTWITHAREA
Email ID:	billy @u.washington.edu
Student ID (7 digits):	0000000
Timestamp:	Monday, February 22, 2010, 9:51 AM
	Add

CSE 142 07au a1 AA

Students

#		Student	Graded?	When?	Published?	Actions
1		ALLAWAY_[redacted]	yes	Sat Oct 20 5:16pm	yes	Rename Delete Move
2		ASTUDENTWITHAREALLYLONGNAMEOMGBOYISITLONGKEKEKEKEKEKEKEKEKEK_0000000	no	not finished yet	no	Rename Delete Move
3		CHOI_[redacted]	yes	Sat Oct 20	yes	Rename

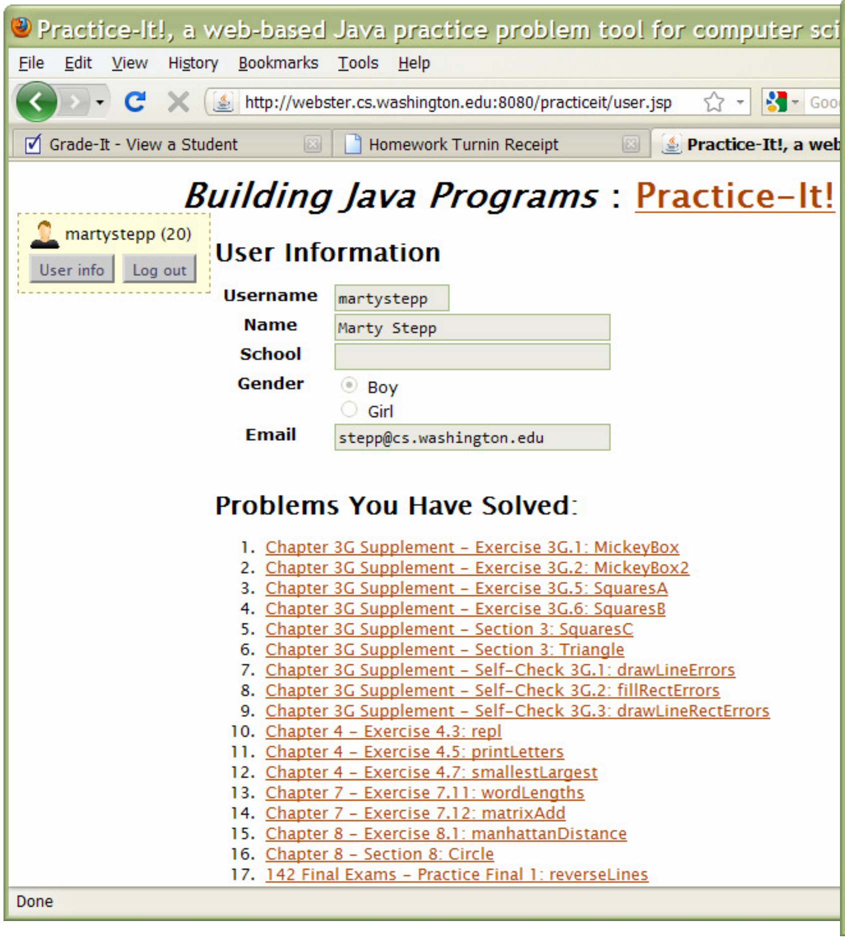
mailed-by u.washington.edu

This message is to inform you that a TA has added a student's homework files to his/her section for the following assignment:

Course: 142
Quarter: 07au
Assignment: a1
Section: AA (Jake Englund)
Student: billy
STUDENTWITHAREALLYLONGNAMEOMGBOYISITLONGKEKEKEKEKEKEKEKEKEK
Date/Time: Monday, February 22, 2010, 9:50 AM

Overflow data structures

- Whenever a UI shows a page or list, try to add to that list until it overflows, causing crashes, errors, or awkward appearance


Practice-It!, a web-based Java practice problem tool for computer sci
File Edit View History Bookmarks Tools Help
http://webster.cs.washington.edu:8080/practiceit/user.jsp
Grade-It - View a Student
Homework Turnin Receipt
Practice-It!, a web

Building Java Programs : Practice-It!

martystepp (20)

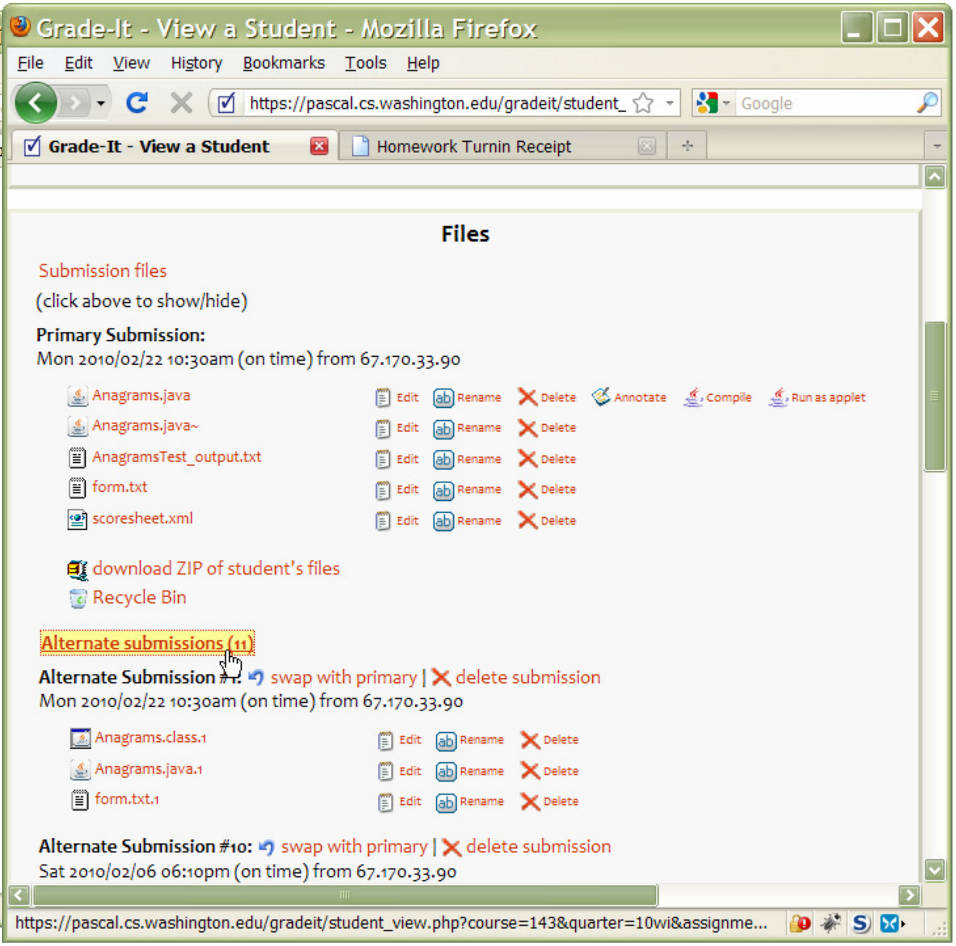
User info | Log out

User Information

Username	martystepp
Name	Marty Stepp
School	
Gender	● Boy ○ Girl
Email	stepp@cs.washington.edu

Problems You Have Solved:

1. Chapter 3G Supplement – Exercise 3G.1: MickeyBox
2. Chapter 3G Supplement – Exercise 3G.2: MickeyBox2
3. Chapter 3G Supplement – Exercise 3G.5: SquaresA
4. Chapter 3G Supplement – Exercise 3G.6: SquaresB
5. Chapter 3G Supplement – Section 3: SquaresC
6. Chapter 3G Supplement – Section 3: Triangle
7. Chapter 3G Supplement – Self-Check 3G.1: drawLineErrors
8. Chapter 3G Supplement – Self-Check 3G.2: fillRectErrors
9. Chapter 3G Supplement – Self-Check 3G.3: drawLineRectErrors
10. Chapter 4 – Exercise 4.3: repl
11. Chapter 4 – Exercise 4.5: printLetters
12. Chapter 4 – Exercise 4.7: smallestLargest
13. Chapter 7 – Exercise 7.11: wordLengths
14. Chapter 7 – Exercise 7.12: matrixAdd
15. Chapter 8 – Exercise 8.1: manhattanDistance
16. Chapter 8 – Section 8: Circle
17. 142 Final Exams – Practice Final 1: reverseLines


Grade-It - View a Student - Mozilla Firefox
File Edit View History Bookmarks Tools Help
https://pascal.cs.washington.edu/gradeit/student_
Google
Grade-It - View a Student
Homework Turnin Receipt

Files

Submission files

(click above to show/hide)

Primary Submission:
Mon 2010/02/22 10:30am (on time) from 67.170.33.90

Anagrams.java	Edit	Rename	Delete	Annotate	Compile	Run as applet
Anagrams.java~	Edit	Rename	Delete			
AnagramsTest_output.txt	Edit	Rename	Delete			
form.txt	Edit	Rename	Delete			
scoresheet.xml	Edit	Rename	Delete			

download ZIP of student's files

Recycle Bin

Alternate submissions (11)

Alternate Submission #1: swap with primary | delete submission
Mon 2010/02/22 10:30am (on time) from 67.170.33.90

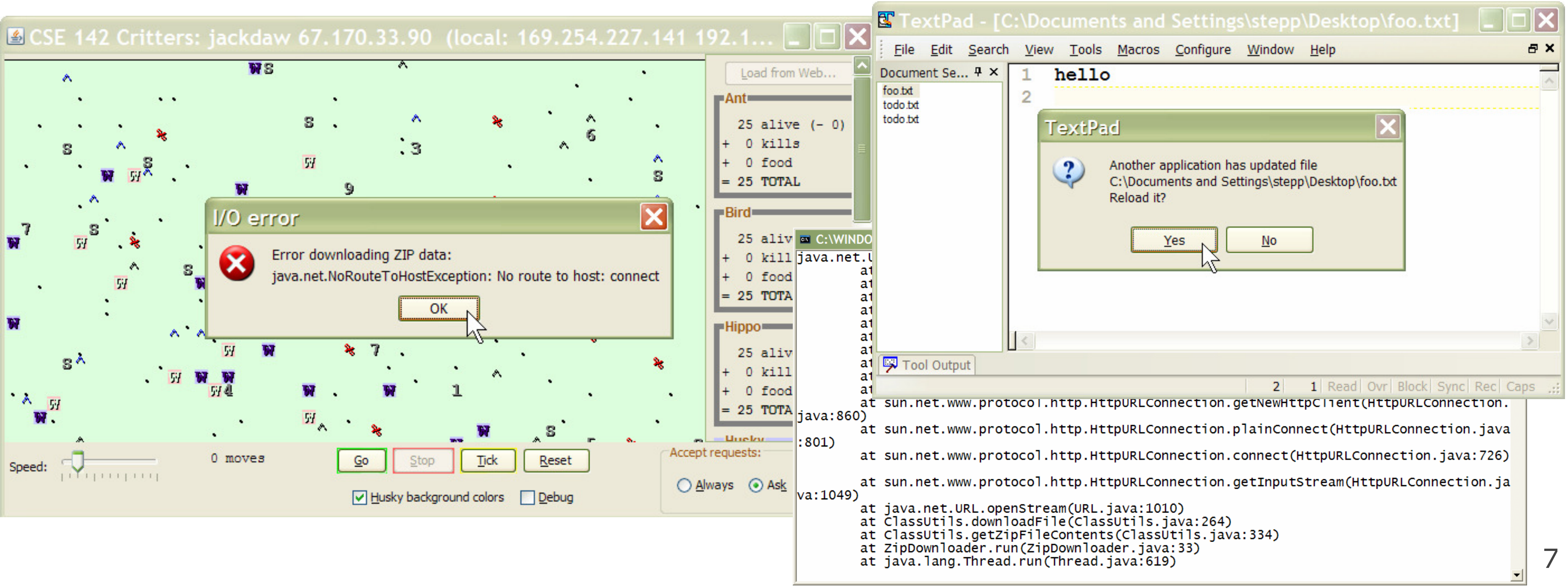
Anagrams.class.1	Edit	Rename	Delete
Anagrams.java.1	Edit	Rename	Delete
form.txt.1	Edit	Rename	Delete

Alternate Submission #10: swap with primary | delete submission
Sat 2010/02/06 06:10pm (on time) from 67.170.33.90

https://pascal.cs.washington.edu/gradeit/student_view.php?course=143&quarter=10wi&assignme...

Violate app's assumptions

- What does the app's GUI do if:
  - The file it is using gets externally modified or deleted?
  - The network goes down (or just slows down) unexpectedly?
  - The OS amount of memory available drops?
  - The processor becomes busy and the app slows down?



CSE 142 Critters: jackdaw 67.170.33.90 (local: 169.254.227.141 192.1...

I/O error

Error downloading ZIP data:
java.net.NoRouteToHostException: No route to host: connect

OK

TextPad - [C:\Documents and Settings\stepp\Desktop\foo.txt]

```
hello
```

TextPad

Another application has updated file
C:\Documents and Settings\stepp\Desktop\foo.txt
Reload it?

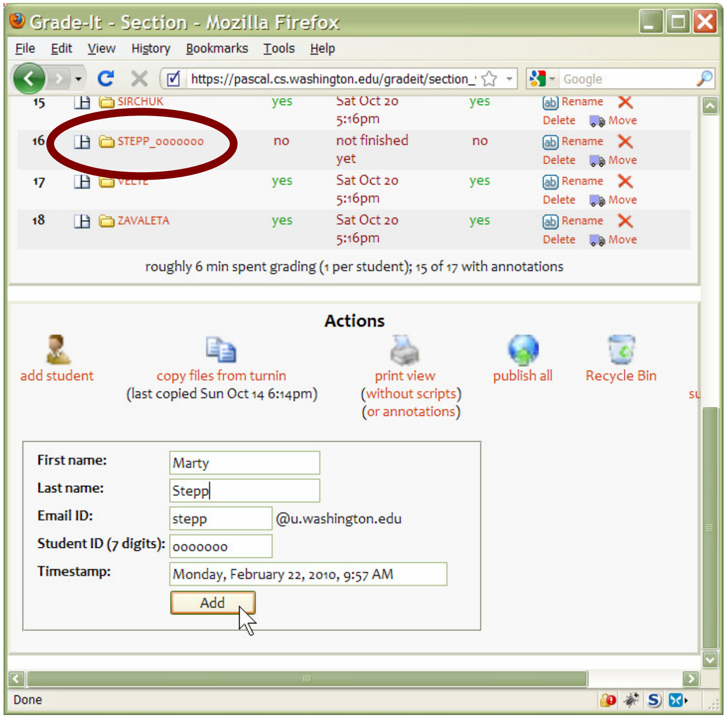
Yes No

C:\WINDO

```
java.net.U
        at
        at
        at
        at
        at
        at
        at
        at
        at
        at
        at sun.net.www.protocol.http.HttpURLConnection.getNewHttpClient(HttpURLConnection.
java:860)
        at sun.net.www.protocol.http.HttpURLConnection.plainConnect(HttpURLConnection.java
:801)
        at sun.net.www.protocol.http.HttpURLConnection.connect(HttpURLConnection.java:726)

        at sun.net.www.protocol.http.HttpURLConnection.getInputStream(HttpURLConnection.ja
va:1049)
        at java.net.URL.openStream(URL.java:1010)
        at ClassUtils.downloadFile(ClassUtils.java:264)
        at ClassUtils.getZipFileContents(ClassUtils.java:334)
        at ZipDownloader.run(ZipDownloader.java:33)
        at java.lang.Thread.run(Thread.java:619)
```

Repeat/duplicate inputs

- Try the same input multiple times to expose bugs:
  - re-add an existing user
  - create a file that already exists
  - delete a file that is already deleted or that does not exist
  - click the button to perform an action multiple times
    - "Buy", "Order", "Check Out"
    - Will the customer be charged twice?
  - web apps: click "Back" and then try an action again
    - Was the developer expecting this?



Grade-It - Section - Mozilla Firefox
File
Edit
View
History
Bookmarks
Tools
Help
https://pascal.cs.washington.edu/gradeit/section_
Google

15	SIRCHUK	yes	Sat Oct 20 5:16pm	yes	Rename Delete Move
16	STEPP_0000000	no	not finished yet	no	Rename Delete Move
17	VELTE	yes	Sat Oct 20 5:16pm	yes	Rename Delete Move
18	ZAVALETA	yes	Sat Oct 20 5:16pm	yes	Rename Delete Move

roughly 6 min spent grading (1 per student); 15 of 17 with annotations

Actions

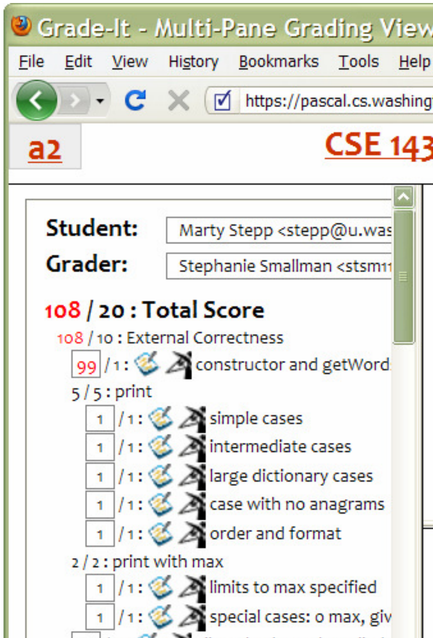
First name:	Marty
Last name:	Stepp
Email ID:	stepp @u.washington.edu
Student ID (7 digits):	0000000
Timestamp:	Monday, February 22, 2010, 9:57 AM

Cause invalid outputs

- Most GUIs stop you from supplying bad input.
  - But maybe you can still cause bad output.

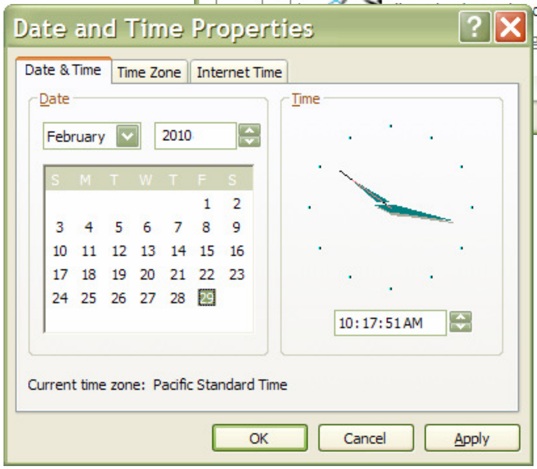
- Example: Set calendar to an invalid date:
  - The UI properly restricts you to Feb 1-28.
  - Choose a leap year, then select Feb 29.
  - Change year back to a non-leap year.
  - Feb 29 will still be shown as a valid choice.

- Example: TextPad "Block Select" feature
  - toggle on, copy text, toggle off, paste


Grade-It - Multi-Pane Grading View
File Edit View History Bookmarks Tools Help
https://pascal.cs.washing
a2
CSE 143

Student: Marty Stepp <stepp@u.was
Grader: Stephanie Smallman <stsm1

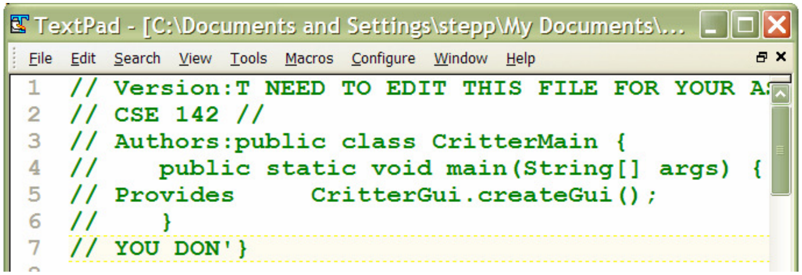
108 / 20 : Total Score
108 / 10 : External Correctness
99 / 1 : constructor and getWord
5 / 5 : print
1 / 1 : simple cases
1 / 1 : intermediate cases
1 / 1 : large dictionary cases
1 / 1 : case with no anagrams
1 / 1 : order and format
2 / 2 : print with max
1 / 1 : limits to max specified
1 / 1 : special cases: 0 max, giv
called
getWo



Date: February 2010

Time: 10:17:51 AM

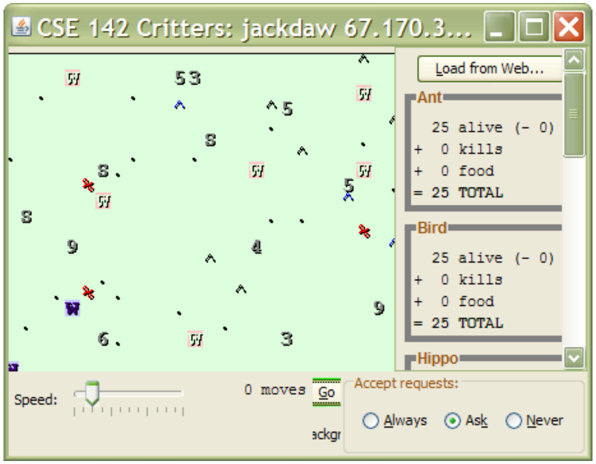
Current time zone: Pacific Standard Time


TextPad - [C:\Documents and Settings\stepp\My Documents\...
File Edit Search View Tools Macros Configure Window Help

```
// Version:T NEED TO EDIT THIS FILE FOR YOUR A
// CSE 142 //
// Authors:public class CritterMain {
//    public static void main(String[] args) {
// Provides      CritterGui.createGui();
//    }
// YOU DON'}
```

Test moving / sizing

- Many UI designers don't consider what their screen or page will look like when resized to extremes
  - try resizing the window or adding input to grow a window's size
    - does the window add scrollbars?
    - do some controls disappear or overlap?
    - does text begin to wrap in odd ways?



Ant
```
  25 alive (- 0)
+  0 kills
+  0 food
= 25 TOTAL
```

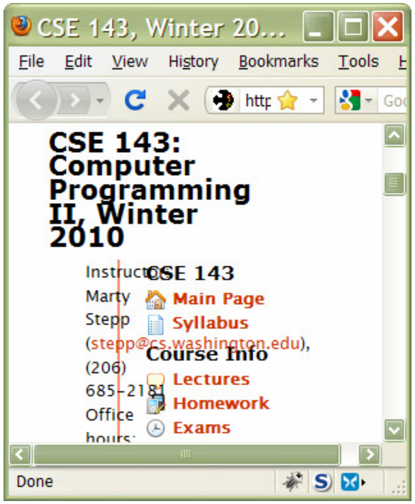
Bird
```
  25 alive (- 0)
+  0 kills
+  0 food
= 25 TOTAL
```

Hippo

Speed:

0 moves

Accept requests: ○ Always ● Ask ○ Never



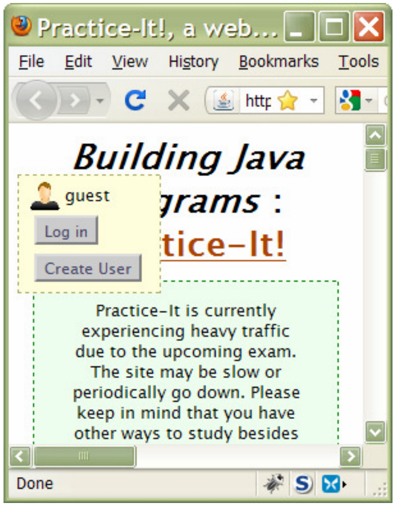
CSE 143: Computer Programming II, Winter 2010

Instruct**CSE 143**
Marty Stepp (stepp@cs.washington.edu), (206) 685-2181 Office hours:

Main Page
Syllabus

Course Info

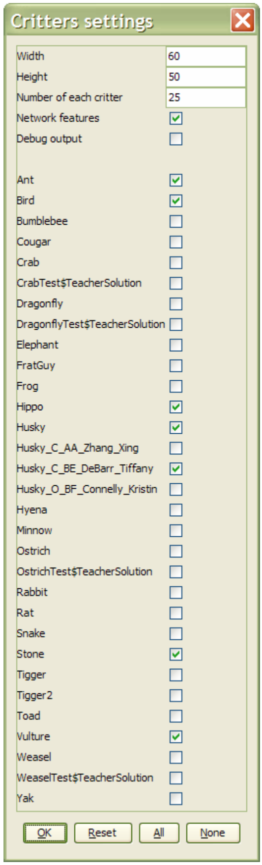
Lectures
Homework
Exams



Building Java *grams :* tice-It!

guest
Log in
Create User

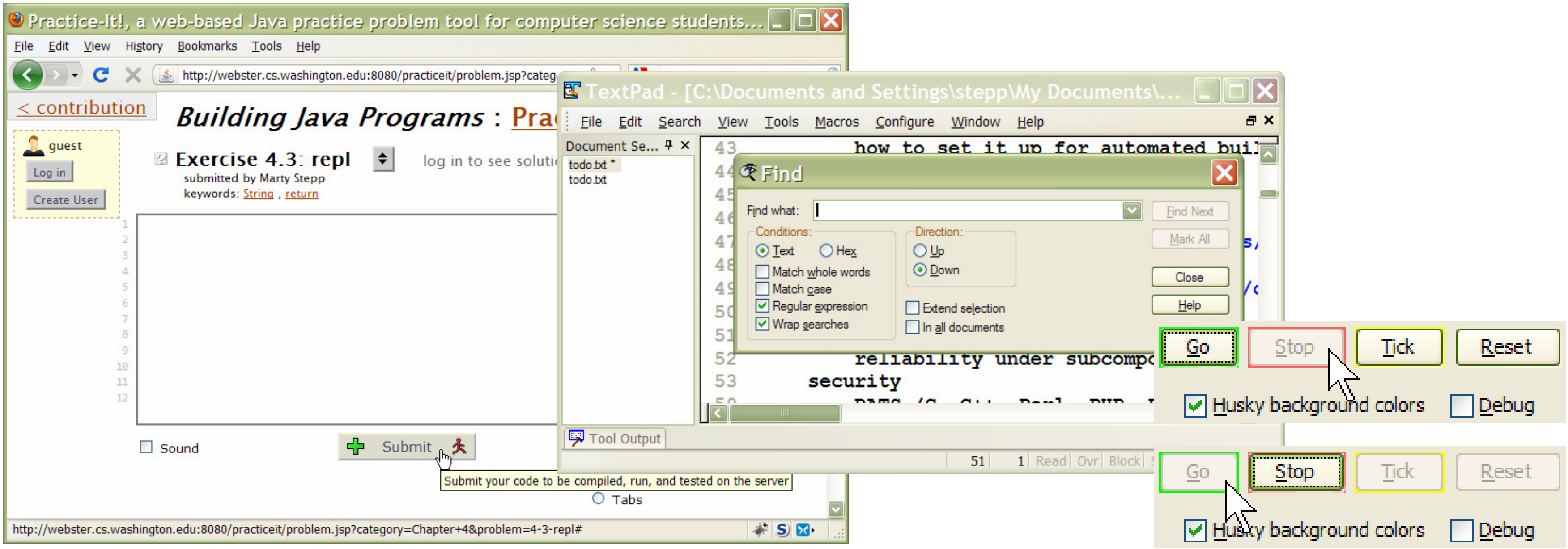
Practice-It is currently experiencing heavy traffic due to the upcoming exam. The site may be slow or periodically go down. Please keep in mind that you have other ways to study besides



Width	60
Height	50
Number of each critter	25
Network features	☑
Debug output	□
Ant	☑
Bird	☑
Bumblebee	□
Cougar	□
Crab	□
CrabTest$TeacherSolution	□
Dragonfly	□
DragonflyTest$TeacherSolution	□
Elephant	□
FratGuy	□
Frog	□
Hippo	☑
Husky	☑
Husky_C_AA_Zhang_Xing	□
Husky_C_BE_DeBarr_Tiffany	☑
Husky_O_BF_Connelly_Kristin	□
Hyena	□
Minnow	□
Ostrich	□
OstrichTest$TeacherSolution	□
Rabbit	□
Rat	□
Snake	□
Stone	☑
Tigger	□
Tigger2	□
Toad	□
Vulture	☑
Weasel	□
WeaselTest$TeacherSolution	□
Yak	□

Test enabling / disabling

- Enable/disable elements to indicate whether they can be used.
- Test the enabling/disabling of all UI elements.
  - Do elements disable/re-enable when they are supposed to?
  - Is it ever possible to click an element that shouldn't be clickable, or impossible to click an element that should be clickable?



Practice-It!, a web-based Java practice problem tool for computer science students...

http://webster.cs.washington.edu:8080/practiceit/problem.jsp?categ

Building Java Programs : Prac

Exercise 4.3: repl

submitted by Marty Stepp

keywords: String , return

log in to see soluti

Submit your code to be compiled, run, and tested on the server

http://webster.cs.washington.edu:8080/practiceit/problem.jsp?category=Chapter+4&problem=4-3-repl#

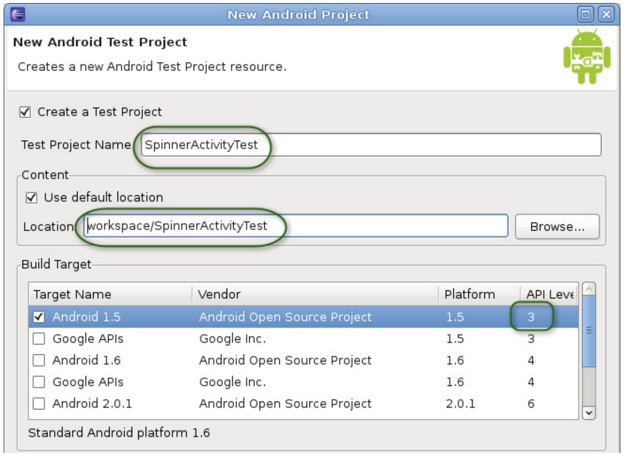
TextPad - [C:\Documents and Settings\stepp\My Documents\...

```
43        how to set it up for automated bui
52        reliability under subcompo
53     security
```

Android testing

- Google recommends creating an entire separate test Eclipse project to store your unit tests for an Android app
  - http://developer.android.com/tools/testing/

- put in tests/ subdir of main app
  - MyProject/
    - AndroidManifest.xml
    - res/ ... (resources for main app)
    - src/ ... (source code for main app) ...
    - **tests/**
      - **AndroidManifest.xml**
      - **res/** ... (resources for tests)
      - **src/** ... (source code for tests)



New Android Project

New Android Test Project

Creates a new Android Test Project resource.

☑ Create a Test Project

Test Project Name: SpinnerActivityTest

Content

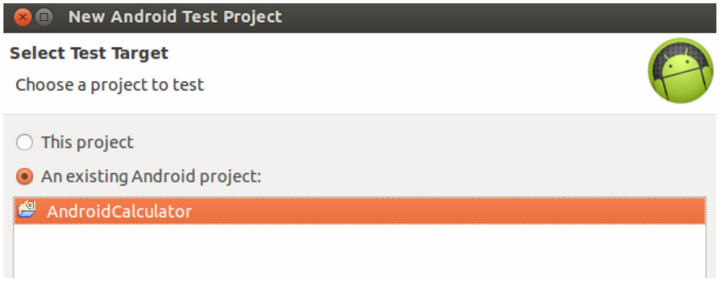
☑ Use default location

Location: workspace/SpinnerActivityTest

Build Target

Target Name	Vendor	Platform	API Leve
☑ Android 1.5	Android Open Source Project	1.5	3
□ Google APIs	Google Inc.	1.5	3
□ Android 1.6	Android Open Source Project	1.6	4
□ Google APIs	Google Inc.	1.6	4
□ Android 2.0.1	Android Open Source Project	2.0.1	6

Standard Android platform 1.6



New Android Test Project

Select Test Target

Choose a project to test

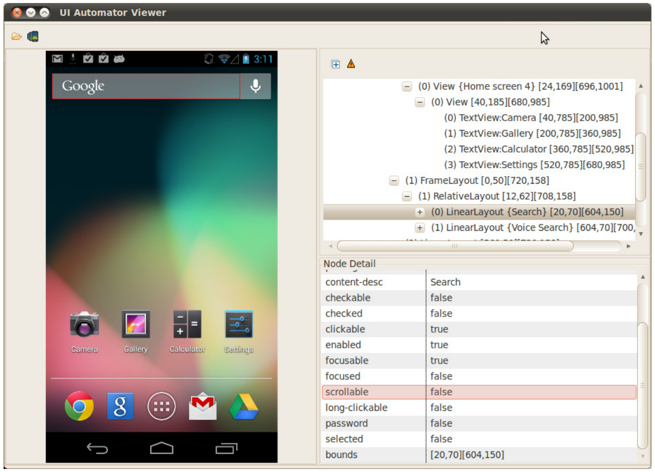
○ This project

● An existing Android project:

AndroidCalculator

Android UI testing

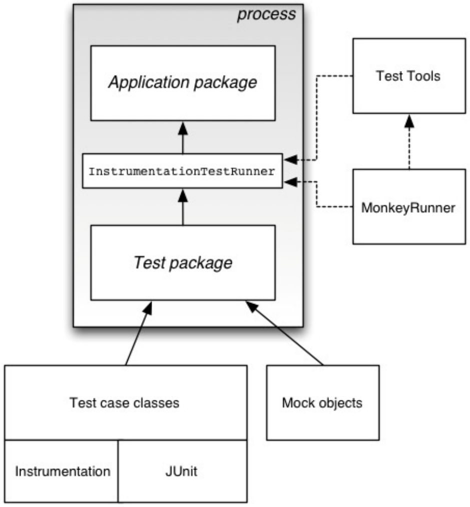
- uiautomatorviewer
  - allows you to inspect current state of an on-screen UI
- UiAutomatorTestCase
  - a specialized JUnit test that can construct and interact with UI controls
- UI Automater Monkey
  - simulates pseudo-random UI interaction to test UI robustness and stress testing



```
(0) View {Home screen 4} [24,169][696,1001]
  (0) View [40,185][680,985]
    (0) TextView:Camera [40,785][200,985]
    (1) TextView:Gallery [200,785][360,985]
    (2) TextView:Calculator [360,785][520,985]
    (3) TextView:Settings [520,785][680,985]
(1) FrameLayout [0,50][720,158]
  (1) RelativeLayout [12,62][708,158]
    (0) LinearLayout {Search} [20,70][604,150]
    (1) LinearLayout {Voice Search} [604,70][700,
```

Node Detail

content-desc	Search
checkable	false
checked	false
clickable	true
enabled	true
focusable	true
focused	false
scrollable	false
long-clickable	false
password	false
selected	false
bounds	[20,70][604,150]



Android UI test example

```
import com.android.uiautomator.core.*;
import com.android.uiautomator.testrunner.*;

public class LaunchSettings extends UiAutomatorTestCase {
  public void testDemo() throws UiObjectNotFoundException {
    getUiDevice().pressHome();

    // simulate a user bringing up the All Apps screen
    UiObject allAppsButton = new UiObject(new UiSelector().description("Apps"));
    allAppsButton.clickAndWaitForNewWindow();

    // simulate the user bringing up the Apps tab
    UiObject appsTab = new UiObject(new UiSelector().text("Apps"));
    appsTab.click();

    // simulate a user swiping until they come to the Settings app icon
    UiScrollable appViews = new UiScrollable(new UiSelector().scrollable(true));
    appViews.setAsHorizontalList();

    // simulate a user click to launch the app
    UiObject settingsApp = appViews.getChildByText(new UiSelector()
      .className(android.widget.TextView.class.getName()), "Settings");
    settingsApp.clickAndWaitForNewWindow();

    // validate that the package name is the expected one
    UiObject settingsValidation = new UiObject(new UiSelector()
      .packageName("com.android.settings"));
    assertTrue("Unable to detect Settings", settingsValidation.exists());
  }
}
```

Android UI test code 2

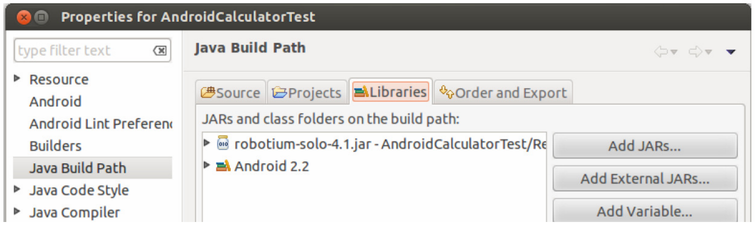
```
// Start main activity of the application under test
mActivity = getActivity();

// Get a handle to Activity object's main UI widget, a Spinner
mSpinner = (Spinner) mActivity.findViewById(
                 com.android.example.spinner.R.id.Spinner01);

// Set Spinner to a known position
mActivity.setSpinnerPosition(TEST_STATE_DESTROY_POSITION);

// Stop activity - onDestroy() should save state of Spinner
mActivity.finish();

// Re-start Activity - onResume() should restore Spinner state
mActivity = getActivity();

// Get Spinner's current position
int currentPosition = mActivity.getSpinnerPosition();

// Assert that current position is same as the starting position
assertEquals(TEST_STATE_DESTROY_POSITION, currentPosition);
```

Robotium

robotium

It's like Selenium, but for Android™

- Robotium
  - UI test automation tool for Android apps
  - based on very popular Selenium web app UI test tool
  - http://code.google.com/p/robotium/
  - tutorials:
    - http://www.youtube.com/watch?v=VYk1_kpSzQg
    - https://code.google.com/p/robotium/wiki/RobotiumTutorials



Properties for AndroidCalculatorTest

type filter text

Resource
Android
Android Lint Preferen
Builders
Java Build Path
Java Code Style
Java Compiler

Java Build Path

Source | Projects | Libraries | Order and Export

JARs and class folders on the build path:

robotium-solo-4.1.jar - AndroidCalculatorTest/Re
Android 2.2

Robotium test code

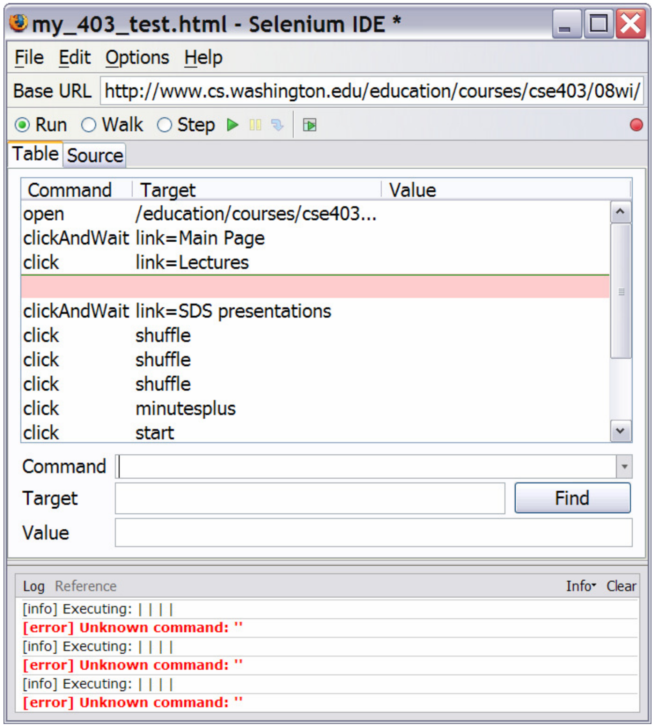
```
import com.jayway.android.robotium.solo.*;
public class EditorTest extends
                ActivityInstrumentationTestCase2<EditorActivity> {
  private Solo solo;

  public EditorTest() {
    super(EditorActivity.class);
  }

  public void setUp() throws Exception {
    solo = new Solo(getInstrumentation(), getActivity());
  }

  public void testPreferenceIsSaved() throws Exception {
    solo.sendKey(Solo.MENU);
    solo.clickOnText("More");
    solo.clickOnText("Preferences");
    solo.clickOnText("Edit File Extensions");
    assertTrue(solo.searchText("rtf"));

    solo.clickOnText("txt");
    solo.clearEditText(2);
    solo.enterText(2, "robotium");
    solo.clickOnButton("Save");
    solo.goBack();
    solo.clickOnText("Edit File Extensions");
    assertTrue(solo.searchText("application/robotium"));
  }

   public void tearDown() throws Exception {
     solo.finishOpenedActivities();
  }
}
```

Selenium

- Records and plays back automated "test cases" of walking through a web app's UI

- can **assert** various aspects of the web page state to make sure the page looks right

- tests can be saved as HTML
  - or can be written in:
    - Java
    - Ruby
    - Python
    - ...



Base URL http://www.cs.washington.edu/education/courses/cse403/08wi/

Command	Target	Value
open	/education/courses/cse403...	
clickAndWait	link=Main Page	
click	link=Lectures	
clickAndWait	link=SDS presentations	
click	shuffle	
click	shuffle	
click	shuffle	
click	minutesplus	
click	start	

Command

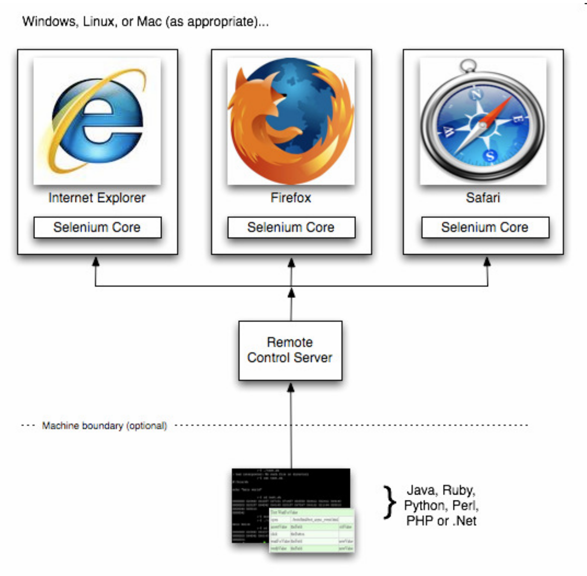
Target

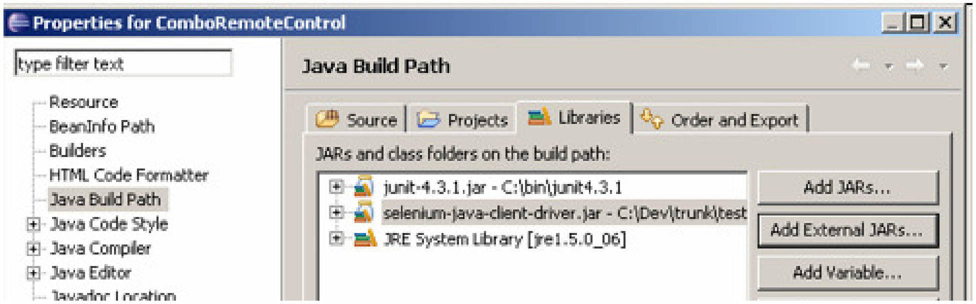
Value

```
[info] Executing: | | | |
[error] Unknown command: ''
[info] Executing: | | | |
[error] Unknown command: ''
[info] Executing: | | | |
[error] Unknown command: ''
```

Components of Selenium

- Selenium IDE - record/playback tool as Firefox add-on
  - produces Selenium Core test cases
- Selenium Core - HTML/JS framework that runs in any browser
  - for testing browser compatibility
- Selenium Remote Control (RC) - automation framework
  - for running tests on a schedule
  - used with Eclipse or a dedicated server


Windows, Linux, or Mac (as appropriate)...
Internet Explorer
Selenium Core
Firefox
Selenium Core
Safari
Selenium Core
Remote Control Server
Machine boundary (optional)
Java, Ruby, Python, Perl, PHP or .Net


Properties for ComboRemoteControl

type filter text

- Resource
- BeanInfo Path
- Builders
- HTML Code Formatter
- Java Build Path
- Java Code Style
- Java Compiler
- Java Editor
- Javadoc Location

Java Build Path

Source | Projects | Libraries | Order and Export

JARs and class folders on the build path:

- junit-4.3.1.jar - C:\bin\junit4.3.1
- selenium-java-client-driver.jar - C:\Dev\trunk\test
- JRE System Library [jre1.5.0_06]

Add JARs... | Add External JARs... | Add Variable...

Example Selenium test

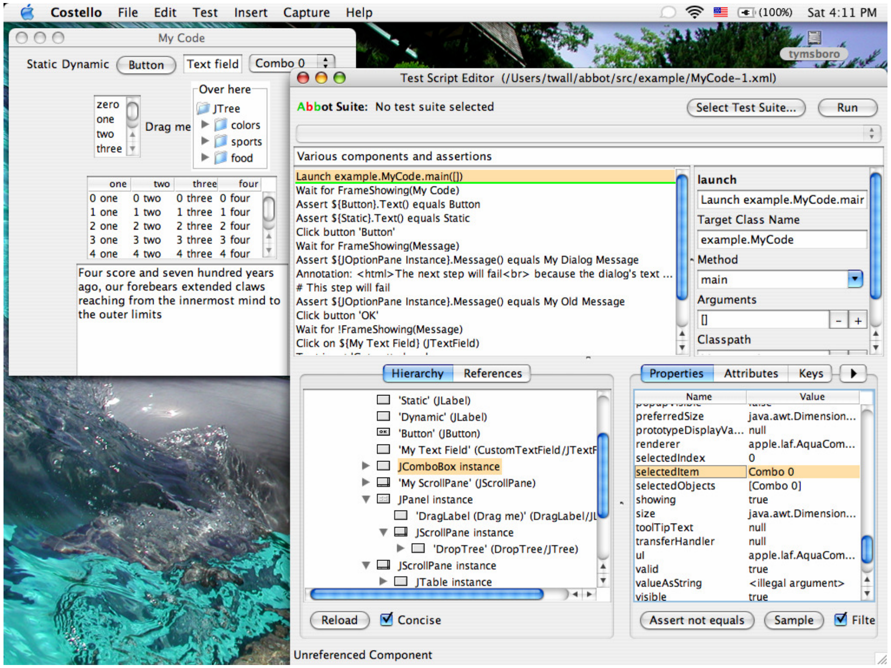
```
import com.thoughtworks.selenium.*;

public class NewTest extends SeleneseTestCase {
    public void setUp() throws Exception {
        setUp("http://www.google.com/", "*firefox");
    }

    public void testNew() throws Exception {
        selenium.open("/");
        selenium.type("q", "marty stepp");
        selenium.click("btnG");
        selenium.waitForPageToLoad("30000");
        assertTrue(selenium.isTextPresent(
            "University of Washington"));
    }
}
```

Selenium example 2

```
import java.util.*;
import org.openqa.selenium.*;
import org.openqa.selenium.firefox.*;

public class GoogleSuggest {
    public static void main(String[] args) throws Exception {
        WebDriver driver = new FirefoxDriver();
        driver.get("http://www.google.com/webhp?complete=1&hl=en");

        // Enter the query string "Cheese"
        WebElement query = driver.findElement(By.name("q"));
        query.sendKeys("Cheese");

        long end = System.currentTimeMillis() + 5000;  // Sleep 5 sec
        while (System.currentTimeMillis() < end) {
            WebElement resultsDiv = driver.findElement(
                                        By.className("gac_m"));
            if (resultsDiv.isDisplayed()) break;
        }

        // And now list the suggestions
        List<WebElement> allSuggestions = driver.findElements(
                                By.xpath("//td[@class='gac_c']"));
        for (WebElement suggestion : allSuggestions) {
            System.out.println(suggestion.getText());
}   }   }
```

Java Swing UI testing

- Abbot - Functional UI testing for Java desktop app GUIs
  - (not for Android apps)
  - works with Costello companion app
  - http://abbot.sourceforge.net/



one	two	three	four
0 one	0 two	0 three	0 four
1 one	1 two	1 three	1 four
2 one	2 two	2 three	2 four
3 one	3 two	3 three	3 four
4 one	4 two	4 three	4 four

Four score and seven hundred years ago, our forebears extended claws reaching from the innermost mind to the outer limits

Test Script Editor (/Users/twall/abbot/src/example/MyCode-1.xml)

Abbot Suite: No test suite selected

Various components and assertions

```
Launch example.MyCode.main([])
Wait for FrameShowing(My Code)
Assert ${Button}.Text() equals Button
Assert ${Static}.Text() equals Static
Click button 'Button'
Wait for FrameShowing(Message)
Assert ${JOptionPane Instance}.Message() equals My Dialog Message
Annotation: <html>The next step will fail<br> because the dialog's text ...
# This step will fail
Assert ${JOptionPane Instance}.Message() equals My Old Message
Click button 'OK'
Wait for !FrameShowing(Message)
Click on ${My Text Field} (JTextField)
```

launch

Launch example.MyCode.mair

Target Class Name: example.MyCode

Method: main

Arguments: []

Classpath

```
'Static' (JLabel)
'Dynamic' (JLabel)
'Button' (JButton)
'My Text Field' (CustomTextField/JTextF
▶ JComboBox instance
▶ 'My ScrollPane' (JScrollPane)
▼ JPanel instance
    'DragLabel (Drag me)' (DragLabel/JL
  ▼ JScrollPane instance
    ▶ 'DropTree' (DropTree/JTree)
▼ JScrollPane instance
  ▶ JTable instance
```

Name	Value
preferredSize	java.awt.Dimension...
prototypeDisplayVa...	null
renderer	apple.laf.AquaCom...
selectedIndex	0
selectedItem	Combo 0
selectedObjects	[Combo 0]
showing	true
size	java.awt.Dimension...
toolTipText	null
transferHandler	null
ui	apple.laf.AquaCom...
valid	true
valueAsString	<illegal argument>
visible	true

Unreferenced Component