Acceptance and Integration Testing

Prof. Dr. Dirk Riehle

Friedrich-Alexander University Erlangen-Nürnberg

ADAP B03

Types of Tests [1] (Recap)

- **Components tests** (a.k.a. unit tests)
  - Focus on testing one component out of context
- **Acceptance tests** (a.k.a. functional tests)
  - Focus on testing one cross-cutting functionality
- **Integration tests** (a.k.a. system tests)
  - Focus on testing end-to-end system integrity

Acceptance Tests

- Object under test is the system or a non-trivial subsystem
  - This is in contrast to unit testing, which isolates one component
- The tests focus on the system's observable functionality
  - The PRD (product backlog) serves as the specification
- Test set-up has to cordon off rest of the system

Tell-a-Friend Acceptance Test

```
public void testTellFriendMakeWebPart() {
    Map<String, String> args = new HashMap<String, String>();
    ...
    args.put(TellFriendFormHandler.EMAIL_SUBJECT, "Oh well...");
    handler.handlePost(session, args);

    part = handler.makeWebPart(session);
    assertEquals(part.getValue(TFFH.EMAIL_SUBJECT), "Oh well...");
}

public void testTellFriendPost() {
    EmailAddress from = EmailAddress.getFromString("i@w.org");
    EmailAddress to = EmailAddress.getFromString("fan@yahoo.com");
    String subject = "Coolest website ever!";
    ...
    Map<String, String> args = new HashMap<String, String>();
    args.put(TellFriendFormHandler.EMAIL_FROM, from.asString());
    args.put(TellFriendFormHandler.EMAIL_TO, to.asString());
    args.put(TellFriendFormHandler.EMAIL_SUBJECT, subject);
    args.put(TellFriendFormHandler.EMAIL_BODY, body);

    handler.handlePost(session, args);
}
```

Test Set-up Example (JUnit 3.8)

```
public class HandlerTestSetup extends TestSetup {
    public UserSession session;

    protected void setUp() throws Exception {
        super.setUp();
        session = createUserSession();
        ContextManager.setThreadLocalContext(session);

        Test test = getTest();
        if (test instanceof HandlerTest) {
            HandlerTest handlerTest = (HandlerTest) test;
            handlerTest.setUserSession(session);
        }
    }

    protected UserSession createUserSession() {
        Wahlzeit.configurePartHandlers();
        UserSession result = new UserSession("testContext");
        ...
        result.setConfiguration(LanguageConfigs.get(Language.ENGLISH));
        return result;
    }
}
```

How to Write Acceptance Tests

- Think from specification (through user interface)
- Sequentially test all relevant parameters
- Cover all functional edge cases

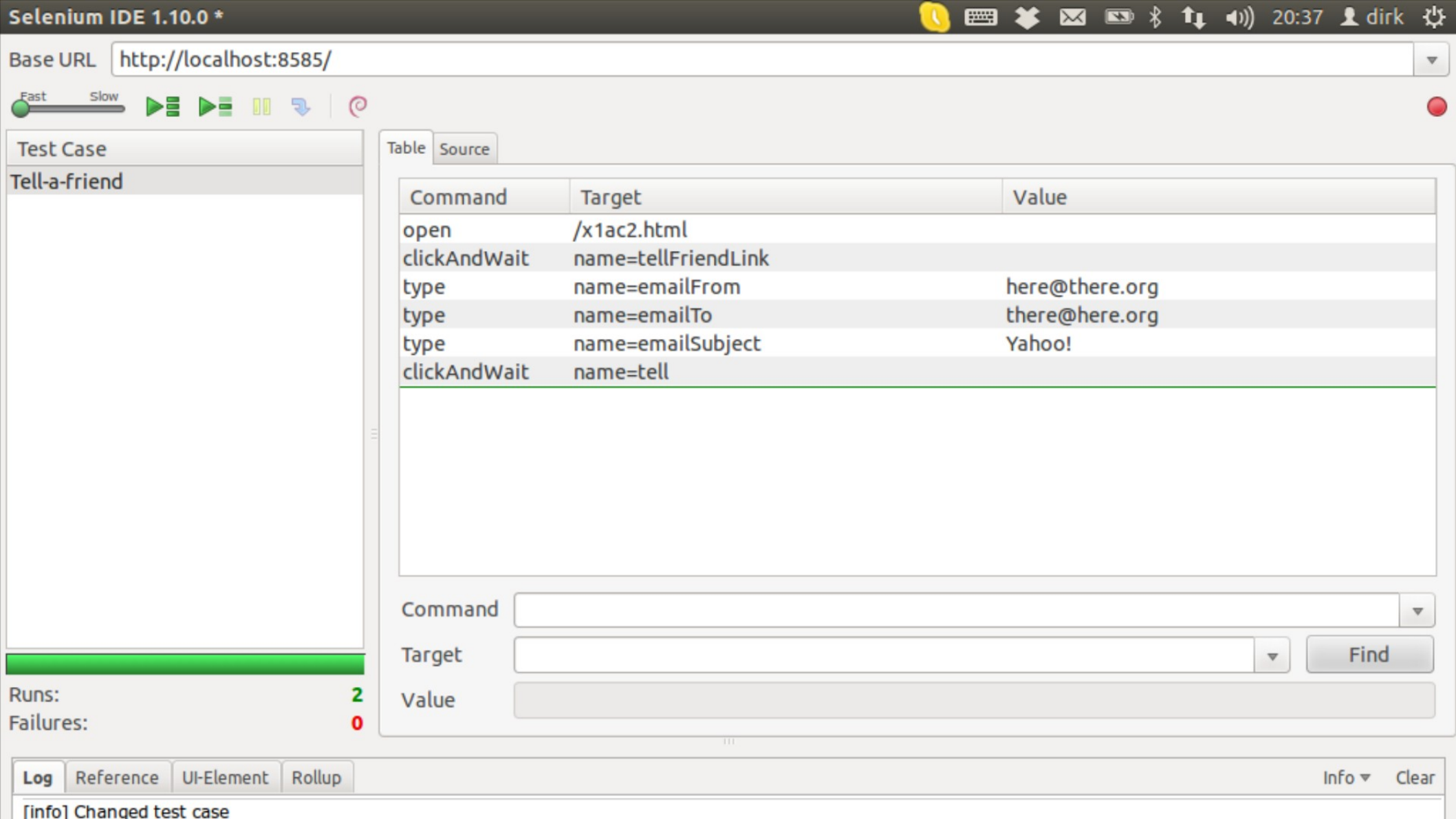
Tell-a-Friend Acceptance Test Example

```
public void testTellFriendMakeWebPart() {
    Map<String, String> args = new HashMap<String, String>();
    ...
    args.put(TellFriendFormHandler.EMAIL_SUBJECT, "Oh well...");
    handler.handlePost(session, args);

    part = handler.makeWebPart(session);
    assertEquals(part.getValue(TFFH.EMAIL_SUBJECT), "Oh well...");
}

public void testTellFriendPost() {
    EmailAddress from = EmailAddress.getFromString("j@w.org");
    EmailAddress to = EmailAddress.getFromString("fan@yahoo.com");
    String subject = "Cool test website ever!";
    ...
    Map<String, String> args = new HashMap<String, String>();
    args.put(TellFriendFormHandler.EMAIL_FROM, from.asString());
    args.put(TellFriendFormHandler.EMAIL_TO, to.asString());
    args.put(TellFriendFormHandler.EMAIL_SUBJECT, subject);
    args.put(TellFriendFormHandler.EMAIL_BODY, body);

    handler.handlePost(session, args);
}
```

RATHER PAINFUL

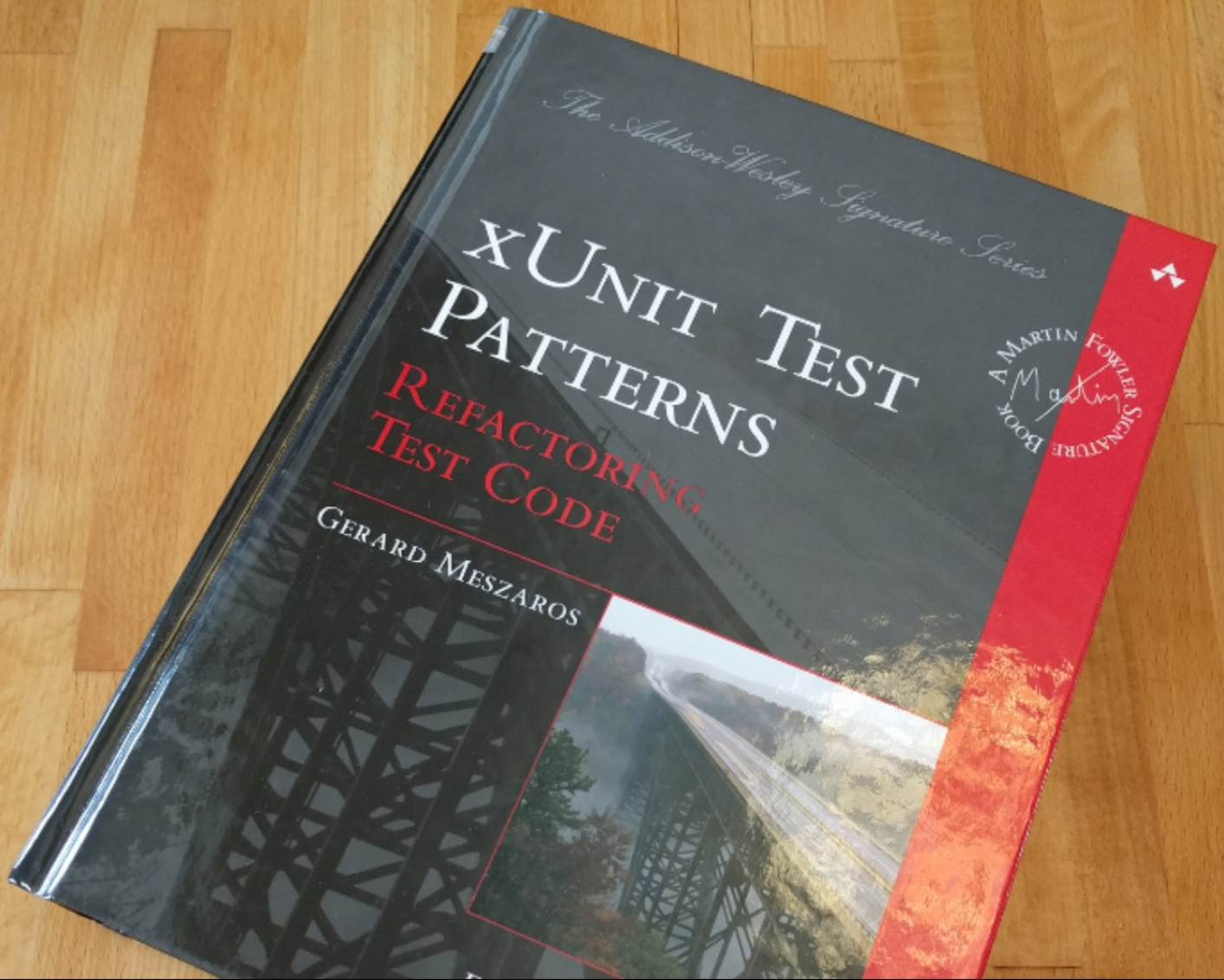
Model-View-Separation and Testing

- Model-view-separation
  - Cleanly separates the domain model from it user interface(s)
  - Is a common simplification of the MVC pattern
  - Significantly simplifies functional testing of domain model
- Programmatic testing needs a clean model interface (API)
  - API = application programming interface
  - Wahlzeit provides a clean in-Java interface
  - Better would be a language independent API


Selenium IDE 1.10.0 *
20:37
dirk
Base URL
http://localhost:8585/
Fast
Slow
Test Case
Tell-a-friend
Table
Source
Command
Target
Value
open
/x1ac2.html
clickAndWait
name=tellFriendLink
type
name=emailFrom
here@there.org
type
name=emailTo
there@here.org
type
name=emailSubject
Yahoo!
clickAndWait
name=tell
Command
Target
Find
Value
Runs:
2
Failures:
0
Log
Reference
UI-Element
Rollup
Info
Clear
[info] Changed test case

Advanced Testing Concepts (Recap)

- Handling complex system set-ups
  - Mocking, stubbing, nulling
  - Dependency injection
- Testing specific system aspects
  - Concurrency
  - Legacy code
- Test structure and practicality
  - Extent of tests run, run-time


The Addison Wesley Signature Series
xUnit Test Patterns
Refactoring Test Code
Gerard Meszaros
A Martin Fowler Signature Book

Review / Summary of Session

- Acceptance and integration tests
- Ways of implementing these tests
- Challenges of complex testing

Thank you! Questions?

dirk.riehle@fau.de – http://osr.cs.fau.de

dirk@riehle.org – http://dirkriehle.com – @dirkriehle

Credits and License

- Original version
  - © 2012-2019 Dirk Riehle, some rights reserved
  - Licensed under Creative Commons Attribution 4.0 International License
- Contributions
  - ...