Testing A Web Site

• Want to simulate actual use cases / scenarios
• Play a sequence of actions from start to finish
  • Login through logout
  • Look at what results
• Need to generate user actions
• Need to check the results
• Need to have multiple such scenarios (lots)
Generating User Actions

- Can be done without a browser
  - Actions = URL request with proper context
    - Context = cookies, put fields, ...
  - **curl** is a command-line tool that can do this
  - Lots of work however
  - But you can put together scripts of curl calls to emulate tests
- Want to do it with a browser
  - Or something that acts as a browser
Web Site Testing Tools

- **httpunit**
  - Create test cases for calls to the server
    - Providing input, checking expected output
  - These are using a Java framework
- **Generating test cases automatically**
  - By analyzing on the JavaScript code
- **Sikuli**
  - Test cases with visual input and output
    - Why is this difficult?
  - Examples https://www.youtube.com/watch?v=pWLa1kxakOs
  - Tutorial: https://www.youtube.com/watch?v=rrVHoYBknGo
  - Overview: https://www.youtube.com/watch?v=01jFl8KrEMY
Browser Automation: Selenium

• Example: https://www.youtube.com/watch?v=gsHyDIyA3dg
• Installation: http://www.seleniumhq.org/download
• Firefox:
• Chrome:
  • https://github.com/SeleniumHQ/selenium/wiki/ChromeDriver

• Example of creating a script
• Example of a written script
Performance Testing

• **Importance of performance**
  • 100ms makes the difference between success & failure

• **What do you want to test**
  • How fast the web site performs
  • Speed to undertake common actions
  • How responsive the web site is
  • What happens if ...

• **What are the testing circumstances**
  • How many users should you have for testing?
Performance Testing

• Most developer tool sets include this for a single page:
  • Can look at browser debugger network page
• gtmetrix: https://gtmetrix.com
Load Testing

• How does the application behave under load
• What types of load should be considered
  • Network performance
    • How does the user’s connection affect your application
    • How does overall network activity affect your application
  • Large numbers of simultaneous users
    • What happens to your server under load
    • What happens to your database under load
  • Large individual requests
    • Complex database queries
  • Heavy load on specific pages
Stress Testing

- What are the limits of your application
- What types of things to consider
  - Maximum load that can be tolerated
  - Maximum input size that can be processed
- Determine what happens when things go wrong
  - Database crash or disconnect
  - Server crash or disconnect
  - Web server crash or disconnect
  - Browser crash or disconnect
  - Network crash (server/browser stay up)
  - Gradual degradation
How To Do Performance Testing

• What do you need to do
  • Recruit hundreds of users
  • Simulate lots of users
    • Doing normal things with the system
    • Doing particular things with the system
  • Simulate failures
• Suppose I wanted to try my app with 1000 users
  • How might you do this?
Jmeter: Performance Testing

- Jmeter is an open-source web performance tester
  - http://www.youtube.com/watch?v=8NLeq-QxkSw
- Works with a set of test cases
  - Series of interactions with the back end
  - These can be specified
    - Manually by a set of HTTP requests (URLs with data)
    - By example (gathering information from sample runs)
- Will run many of these simultaneously
  - You get to specify which ones and how many
  - With random delays
  - For as long as you want
Security Testing

- **URL security**
  - Ability to bypass login/security by creating a URL
  - Ability to get private pages by editing URLs
  - Passing in inputs that will make the system misbehave
    - Overly long inputs that can cause buffer overflows

- **Input checking**
  - Are all invalid inputs detected
  - Openness to SQL injection and Cross-browser attacks

- Are internal files, etc. in the web pages inaccessible
- Is SSL used for all appropriate pages
  - Can it be bypassed?
- Are all errors, security breach attempts, etc. logged
Security Testing

• **Tools exist**
  - Netsparker: [https://www.youtube.com/watch?v=bVpv4r1T5Ac](https://www.youtube.com/watch?v=bVpv4r1T5Ac)
    - Download: [http://www.netsparker.com](http://www.netsparker.com)
  - Wapiti, Websurgery, ...
Design For Testing

- Want to have a web site that is testable
  - Might not be possible to test live site
    - Don’t want it to crash
    - Want to test before installing updates
    - Actions might have real-world effects

- Set up a test site
  - Separate database
  - Add test users
  - Internal code to handle external actions
    - Based on which server is being run
  - Do it on a local machine / separate VM
  - Possibly special URLs to reset the server to a known state
Lab Preparation

- Have an accessible test site for your project
  - Can be production site if that is safe
- Meet to determine who will test what
  - Html/CSS, Usability, Web Site, Performance, Load Testing, Security
  - Develop a testing plan for your project
    - When and what, reusable tests, testing before update, ...
- Download and install the tools you need if any
- Come prepared to set up tests and test your project
Next Time

- Next Times: Testing Lab