Agile Software Requirements

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Iowa State University
COMS 409 – Software Requirements
Purpose

• Introduce you to Agile software development
• Discuss Agile software requirements
Overview

- What is Agile?
- Waterfall vs. Agile
- User Stories
- Embedded Documentation
- Non-functional Requirements
- Q & A
About Me

• Independent software consultant
• 14 years of professional Agile software development experience
• Data-driven desktop, server, and web apps
  • Web-based GIS data warehouse
  • Energy data ETL application
  • Global data management system
  • Intelligent lighting control systems
  • Open source data explorer
Education

• BS in Computer Science
• BA in Philosophy
  • Minor in Economics
  • Focus on Artificial Intelligence and Machine Learning
• AS in MIS
• AS in Business Administration
Public Speaking

• Events:
  • Iowa Code Camp
  • Nebraska Code Camp
  • Iowa .NET Users Group
  • Agile Iowa

• Topics:
  • Lean / Agile
  • Data Analysis
  • Patterns, Practices, and Principles
What is Agile?
What is Agile?

- Started with the Agile Manifesto
  - 4 value propositions
  - 12 principles
- Common set of practices across several methodologies

Agile Values

• Individuals and interactions
  • over processes and tools
• Working software
  • over comprehensive documentation
• Customer collaboration
  • over contract negotiation
• Responding to change
  • over following a plan

Source: http://agilemanifesto.org/
12 Principles of Agile

1. Continuous delivery of value
2. Embrace changing requirements
3. Frequent deployment
4. Customer collaboration
5. Motivated individuals
6. Face-to-face conversation
12 Principles of Agile

7. Working software as measure of progress
8. Sustainable development
9. Technical excellence
10. Simplicity
11. Self-organization
12. Continuous improvement
Agile Methodologies

- Scrum
- XP
- Kanban
- Lean
- And many more...

Source: http://parkertoddloesch.files.wordpress.com/2011/09/umbrella.jpg
Waterfall vs. Agile
Waterfall

Start

Requirements

Design

Implementation

Verification

Maintenance

Finish

Time
Agile

## Waterfall vs. Agile Processes

<table>
<thead>
<tr>
<th></th>
<th>Waterfall</th>
<th>Agile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure of Success</strong></td>
<td>Execution of the plan</td>
<td>Working software</td>
</tr>
<tr>
<td><strong>Management Culture</strong></td>
<td>Command and control</td>
<td>Self-organization</td>
</tr>
<tr>
<td><strong>Requirements / Design</strong></td>
<td>Big and upfront</td>
<td>Just-in-time / minimal</td>
</tr>
<tr>
<td><strong>Code / Implementation</strong></td>
<td>Code first and test later</td>
<td>Test and code together</td>
</tr>
<tr>
<td><strong>Testing and QA</strong></td>
<td>Big test plan / test last</td>
<td>Test early / continuously</td>
</tr>
<tr>
<td><strong>Planning and Scheduling</strong></td>
<td>Large detailed plan</td>
<td>Short, iterative increments</td>
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</tbody>
</table>
User Stories
User Story

• Short description of functionality that will provide value to a user

• Contains:
  • Title
  • Description
  • Acceptance Criteria

• Placeholder for a conversation to occur

Enter PIN Number

As an ATM user
I want to enter my PIN
So that I can withdraw cash
User Story Example

**Title:** Enter Personal Identification Number (PIN)

**Description:**
- As an ATM user
- I want to enter my PIN
- So that I can withdraw cash

**Acceptance Criteria:**
- PIN must be four digits long
- PIN must not allow alpha or special characters
- PIN must be entered within 30 seconds or the transaction will be canceled
Agile Requirements

• Feature requests captured in user stories
• User stories are prioritized in product backlog
• Work on user stories in priority order

<table>
<thead>
<tr>
<th>Priority</th>
<th>Product Backlog</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Feature 1</td>
</tr>
<tr>
<td></td>
<td>Feature 2</td>
</tr>
<tr>
<td></td>
<td>Feature 3</td>
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<td>...</td>
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<tr>
<td></td>
<td>...</td>
</tr>
<tr>
<td>Low</td>
<td>Feature n</td>
</tr>
</tbody>
</table>
Agile Requirements

• For each user story:
  • Gather requirements through collaboration
  • Implement functionality using Agile practices
  • Requirements become embedded in code
Agile Requirements Gathering

• Minimal documentation
• Communication and collaboration are critical
• Uses whole-team approach
• On-site user representation
• Rapid feedback loop is critical to success

Embedded Documentation
Waterfall Requirements Documentation

- In Waterfall:
  - Documentation is the blueprint
  - Code is the product being produced

- Documentation is:
  - Often out of date
  - Not read frequently
  - Not executable

Agile Requirements Documentation

- In Agile:
  - Code is the blueprint
  - Working software is the product being produced

- Code is:
  - Always up to date
  - Continuously read
  - Executable

- Requirements are embedded in the code

<table>
<thead>
<tr>
<th>Practice</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test-Driven Development (TDD)</td>
<td>Low-level Behaviors</td>
</tr>
<tr>
<td>Behavior-Driven Development (BDD)</td>
<td>High-level Behaviors</td>
</tr>
<tr>
<td>Domain-Driven Design (DDD)</td>
<td>High-level Policy / Domain Logic</td>
</tr>
<tr>
<td>Domain-Specific Languages (DSL)</td>
<td>Human-readable code for business</td>
</tr>
<tr>
<td>Clean Code</td>
<td>Reader-centered code for devs.</td>
</tr>
</tbody>
</table>
Non-Functional Requirements
Non-Functional Requirements

• Maintainability
• Performance
• Reliability
• Security
• Testability
• Usability
Agile NFRs

Driven by Users:
• Performance
• Security
• Usability

Driven by Developers:
• Maintainability
• Readability
• Testability
Conclusion
Conclusion

• What is Agile?
• Waterfall vs. Agile
• User Stories
• Embedded Documentation
• Non-functional Requirements
Recommended Reading

Agile Software Requirements
Lean Requirements Practices for Teams, Programs, and the Enterprise
Dean Leffingwell
Foreword by Don Reinertsen

SOFTWARE REQUIREMENTS
Practical techniques for gathering and managing requirements throughout the product development cycle
Karl E. Wiegers
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Renze Consulting
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Data Explorer
http://www.data-explorer.com
Q & A