Agile.EDU
An Agile Undergraduate Software Engineering Course

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tiny.cc/SWE
Program Overview

- Liberal arts college in Salt Lake City
- ~60 Computer Science majors
- ~10 Computer Information Systems majors
- Typical SWE class size is ~15 students
Pre-Reqs

• 1 Year of Java programming (CS 1 & CS 2)
• 1 semester of database course (MySQL)
• Required for both CS & CIS majors
• Common elective for CS minors
Primary Learning Goals

• Significant project experience in group setting

• Exposure to process model for software development
Secondary Learning Goals

- Experience with SCM system
- Presentation experience
- Writing
Secondary Learning Goals

- Ok, write a cool piece of working software!
Team-Based

- Teams of 3 or 4
- Organized as teams from very beginning of class
- Instructor assigns teams
- Team coordinator
- Problem teammates can be fired
Overview of Agile

- Individuals and actions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan
Agile Adoption

“Is Agile the New Norm?”

State of Agile
Experience with Agile Development

COMPANY EXPERIENCE
How Many?
88% of respondents said their organizations were practicing agile development, up from 81% in 2010 and 80% in 2011.

How Long?
On average, respondents worked at companies that have been practicing agile for over 5 years, with a rapidly growing number of companies in the 2-5 year range (53% compared to 36% in 2012). Approximately 19% have practiced agile for over 5 years, up from 9% in 2011.

88% YES 12% No

8% < 1 Year 21% 1-2 Years 53% 2-5 Years 19% 5+ Years
## Schedule

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 4</td>
<td>Project concept and initial requirements gathering</td>
</tr>
<tr>
<td>5 - 7</td>
<td>Release 1*</td>
</tr>
<tr>
<td>8 - 10</td>
<td>Release 2</td>
</tr>
<tr>
<td>11 - 13</td>
<td>Release 3</td>
</tr>
<tr>
<td>14</td>
<td>Final exam and reflection</td>
</tr>
</tbody>
</table>

*Release = Iteration*
Documentation and Code Base

- All documents are stored as Google Docs
- Code base uses git and github
# Deliverables Schedule

## Project Activities and Deliverables Schedule

This document outlines a set of deliverables corresponding to your team project. Each deliverable has a due date as well as a point value towards the project.

<table>
<thead>
<tr>
<th>Deliverable</th>
<th>Points</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team name and team coordinator</td>
<td>5</td>
<td>11:55 PM January 14, 2015</td>
</tr>
<tr>
<td>Project Concept Document</td>
<td>10</td>
<td>11:55 PM January 26, 2015</td>
</tr>
<tr>
<td>Project Status Document</td>
<td>5</td>
<td>11:55 PM February 4, 2015</td>
</tr>
<tr>
<td>Acceptance Test Plan</td>
<td>5</td>
<td>11:55 PM February 11, 2015</td>
</tr>
<tr>
<td>Release 1</td>
<td>50</td>
<td>3:30 PM February 23, 2015</td>
</tr>
<tr>
<td>Bug Tracking</td>
<td>5</td>
<td>3:30 PM March 25, 2015</td>
</tr>
<tr>
<td>Release 2</td>
<td>70</td>
<td>3:30 PM March 25, 2015</td>
</tr>
<tr>
<td>Release 3</td>
<td>95</td>
<td>3:30 PM April 22, 2015</td>
</tr>
<tr>
<td>Individual Report</td>
<td>5</td>
<td>3:30 PM April 27, 2015</td>
</tr>
<tr>
<td>User Documentation</td>
<td>15</td>
<td>3:30 PM April 29, 2015</td>
</tr>
</tbody>
</table>
Statement of Needs

Develop software that teaches 1st and 2nd graders basic math skills. The platform may be desktop (OS X or Windows), web-based, or mobile (iOS or Android).
Project Concept Docs
(Login Page)

Start

Map View

(on click)

Level view

(if they get to the desired answer it progresses back to the map to get to the next level)

© Insomnia Games
The Amazing Race!

Project concept:
“Be the first to travel the world!”

We are planning to make a web application using the Django framework and javascript (possibly use flash). Our project is going to be mostly program driven because we have little to no experience in using these languages and software.

Overall our idea is to let the students race around the World! The student will follow a designated path through the continents. At each continent, the student will play a math mini game. If they beat the mini game, then they travel to the next continent. The difficulty of the problems in the game will increase with each continent.
Requirements Gathering

- **Users** are identified

- Functional requirements are gathered as **user stories**
User Stories

As a
<type of user>
I want
<a capability>
so that
<a business value>
Examples

• As a teacher I want to be able to look at student scores so that I can help the students who are struggling.

• As a student I want to be able to look up my scores so that I know how I am progressing.

• As a student I want to be able to change my password so that my account is private.

• As a teacher I want a game that teaches students addition to improve their math skills.
Requirements Gathering

- User stories are then assigned **story points** (a numeric value on a scale.)

- Possible Scales
  
  - 1, 2, 3, 4, 5, 6 😞
  
  - 1, 2, 4, 8, 16 🌟
  
  - 1, 2, 3, 5, 8, 13 🌟

- Story points are assigned using “**planning poker**” activity.
Release Planning

- **Velocity** = Story Points Completed During Release

- **Required Velocity** = \( \text{Sum(story points)} / 3 \)

- User stories are prioritized into High, Medium, Low

- High (R1)  Medium (R2)  Low(R3) (attempting to balance number of story points for each release)

- Serves as initial schedule for R1.
Acceptance Tests

• Acceptance tests specify conditions a user story meets requirements.

• Acceptance tests are written for R1 user stories. (Using TDD.)
## Acceptance Testing

<table>
<thead>
<tr>
<th>Test #</th>
<th>Feature (User Story Covered) covered</th>
<th>Preconditions</th>
<th>Test Actions</th>
<th>Expected Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Login</td>
<td>The user attempts to login in using username and password</td>
<td>1. Use admins credentials 2. Use a students credentials 3. Use incorrect credentials</td>
<td>The admin credentials will produce a prompt to ask admin if they want to be redirected to game or admin main page. The student credentials will open the students main page. The incorrect credentials will inform the user their username or password is incorrect.</td>
</tr>
</tbody>
</table>
Walking Skeleton

“A Walking Skeleton is a tiny implementation of the system that performs a small end-to-end function. It need not use the final architecture, but it should link together that main architectural components. The architecture and the functionality can then evolve in parallel.”

- Alistair Cockburn
Conclusion of Release 1

• Teams present projects at the end of each release

• The customer (i.e. instructor) proposes 1 or more changes to the project

• Teams re-evaluate user stories, story points, and schedule.

• Repeated at conclusion of R2.
Other Docs

• Technical docs (ER models, notes, etc.)
• Project status
• Burndown chart
• Bug list
# Project Status

<table>
<thead>
<tr>
<th>User Story #</th>
<th>Task</th>
<th>Developer</th>
<th>Estimate</th>
<th>Status</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Add and remove problems</td>
<td>Dana</td>
<td>5-6 hours</td>
<td>Completed</td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>Nav-bar highlighting</td>
<td>Will</td>
<td>30 mins</td>
<td>Nearly Done</td>
<td>the nav bar needs updating as pages are added</td>
</tr>
<tr>
<td>?</td>
<td>Overall HTML styling</td>
<td>Will</td>
<td>2 hrs</td>
<td>in progress</td>
<td>the styling is very basic but hopefully easily modifiable</td>
</tr>
<tr>
<td>6</td>
<td>Teacher is able to change student's info (specifically, password and email)</td>
<td>Dana</td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Teacher can change his/her password and email</td>
<td>Dana</td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Connect the dots game</td>
<td>Megan</td>
<td>8 hours</td>
<td>Nearly Done</td>
<td>the coloring part of the game is functional, it just needs to be stylized to our liking. Then we need to make it a game</td>
</tr>
<tr>
<td>4</td>
<td>Color game - (placement)</td>
<td>Will</td>
<td>8 hours</td>
<td>in progress</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Observe student scores</td>
<td>Dana</td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Level Visibility - student</td>
<td>Megan</td>
<td>1 hour</td>
<td>Completed</td>
<td>Was a part of the 8 hours on next task</td>
</tr>
<tr>
<td>10</td>
<td>Return to previous levels - student</td>
<td>Megan</td>
<td>1 hour</td>
<td>Completed</td>
<td>Took closer to 8 hours...</td>
</tr>
<tr>
<td>11</td>
<td>Change password - student</td>
<td>Megan/Will</td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Observe scores - student</td>
<td>Megan</td>
<td>30 min</td>
<td>Completed</td>
<td>Just need to stylize</td>
</tr>
</tbody>
</table>
Burndown Chart

![Burndown Chart 2](image-url)
## Bug List

<table>
<thead>
<tr>
<th>ID</th>
<th>Date/Time</th>
<th>Creator (Discoverer)</th>
<th>Title</th>
<th>Status</th>
<th>Assigned To</th>
<th>Priority</th>
<th>Severity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3/16/2015</td>
<td>Dana? Will?</td>
<td>Master Issues</td>
<td>Closed</td>
<td>All of Us</td>
<td>Immediate</td>
<td>Medium</td>
<td>The master branch is missing design stuffs</td>
</tr>
<tr>
<td>2</td>
<td>3/23/2015</td>
<td>Dana</td>
<td>Update Database Issues</td>
<td>Closed</td>
<td>Dana</td>
<td>Medium</td>
<td>Medium</td>
<td>Updating database kicks user off the website, then interprets him/her as a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>previous user who logged in</td>
</tr>
<tr>
<td>3</td>
<td>3/24/2015</td>
<td>Megan</td>
<td>undefined! End</td>
<td>Closed</td>
<td>Megan</td>
<td>Medium</td>
<td>Low</td>
<td>at the end of the game it writes 'undefined' to the screen instead of 'great'</td>
</tr>
<tr>
<td>4</td>
<td>3/24/2015</td>
<td>Will</td>
<td>Stud. Navbar</td>
<td>Closed</td>
<td>Will</td>
<td>Medium</td>
<td>Low</td>
<td>work'</td>
</tr>
<tr>
<td>5</td>
<td>3/30/2015</td>
<td>Will</td>
<td>marker scaling location</td>
<td>Closed</td>
<td>Will</td>
<td>Medium</td>
<td>Medium</td>
<td>The location of the pointer does not match the location of where the color is</td>
</tr>
</tbody>
</table>
bdennin / MathQuest

Westminster College - Software Engineering Project - Spring 2015

188 commits 1 branch 0 releases 4 contributors

Branch: master MathQuest /

omg

bdennin authored 3 days ago

File: .settings
Author: bdennin
Date: 7 months ago

File: src
Author: bdennin
Date: 3 days ago

File: .classpath
Author: bdennin
Date: 6 months ago

File: .gitignore
Author: bdennin
Date: 7 months ago

File: .project
Author: bdennin
Date: 8 months ago

latest commit bb7b76d891

HTTPS clone URL
https://github.com

You can clone with HTTPS or Subversion.

Clone in Desktop
Download ZIP
Release 3

- Production release!
- Fully deployed!
- And more!
- User documentation!
Good job! That is correct!
1 is in the Tens place!

Your number is 658
What place is 6 in?

Ones  Tens  Hundreds
Question Prompt
What is 7 - 3

Answer Options
2
3
6
4

Message Pane
Correct! Monster takes damage!

Monster attacks you!
Defend yourself!
You have entered combat!
It is your turn to act.
You have entered the inn!
The price for potion today is 3 gold.
Project Types

- Lots of Java desktop games
- Some C# desktop games
- Lots of web-based games using framework (Django popular)
- Still no mobile apps.
Assessment

• Running since 2006

• Numerous students have indicated it has helped them find internships and career employment

• Feedback very positive from local employers

• Many students adopt the Agile approach for developing their senior project

• Attendance nearly 100%

• Only 1 firing
What Could We Do Better?

- Work with a real customer
- Use it as an opportunity to introduce common framework (i.e. Node.JS)
- Apply continuous integration
- Use more Scrum-like terms
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