

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-Reqqs

- 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?”



Schedule

Weeks	Topic
1 - 4	Project concept and initial requirements gathering
5 - 7	Release 1*
8 - 10	Release 2
11 - 13	Release 3
14	Final exam and reflection

*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

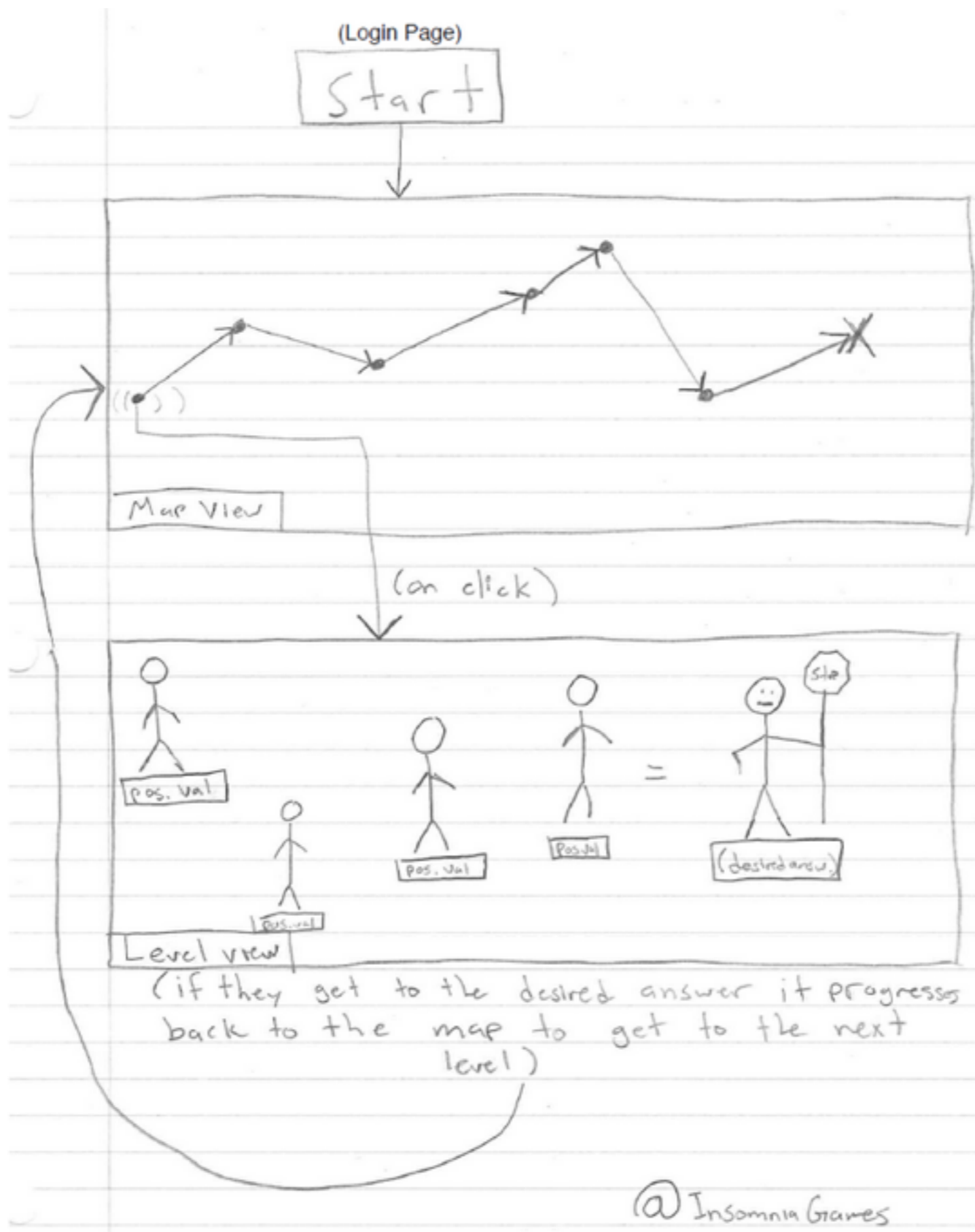
This document outlines a set of deliverables corresponding to your team project. Each deliverable has a due date as well as a point value towards the project.

Deliverable	Points	Due Date
Team name and team coordinator.	5	11:55 PM January 14, 2015
Project Concept Document	10	11:55 PM January 26, 2015
Project Requirements Document	15	11:55 PM February 2, 2015
Project Status Document	5	11:55 PM February 4, 2015
Acceptance Test Plan	5	11:55 PM February 11, 2015
Release 1	50	3:30 PM February 23, 2015
Bug Tracking	5	3:30 PM March 25, 2015
Release 2	70	3:30 PM March 25, 2015
Release 3	95	3:30 PM April 22, 2015
Individual Report	5	3:30 PM April 27, 2015
User Documentation	15	3:30 PM April 29, 2015

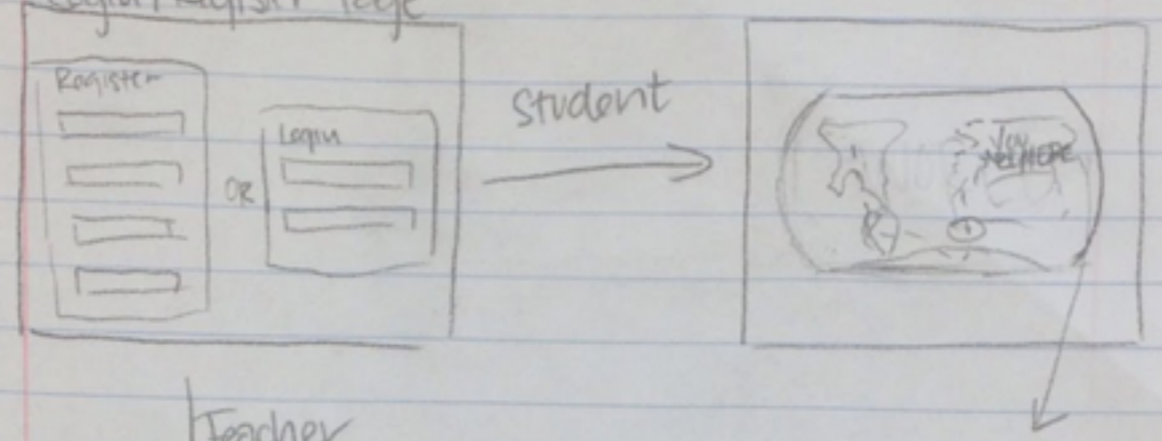
Statement of Needs

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)

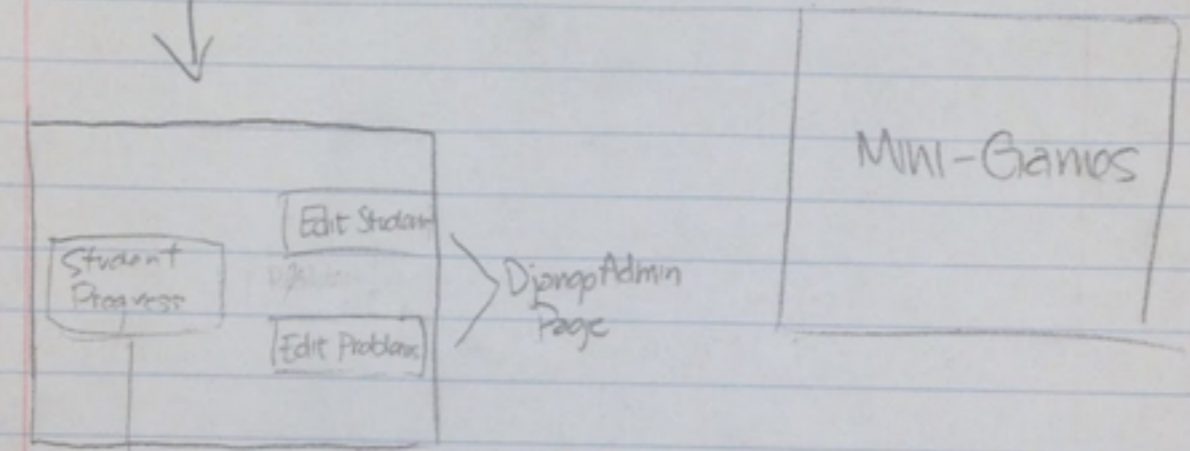
Project Concept Docs



Home Page
Login/ Register Page



Teacher



Student Name	Level	Score

Detail on individual student

Show Certific.

Connect the Dots Game



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



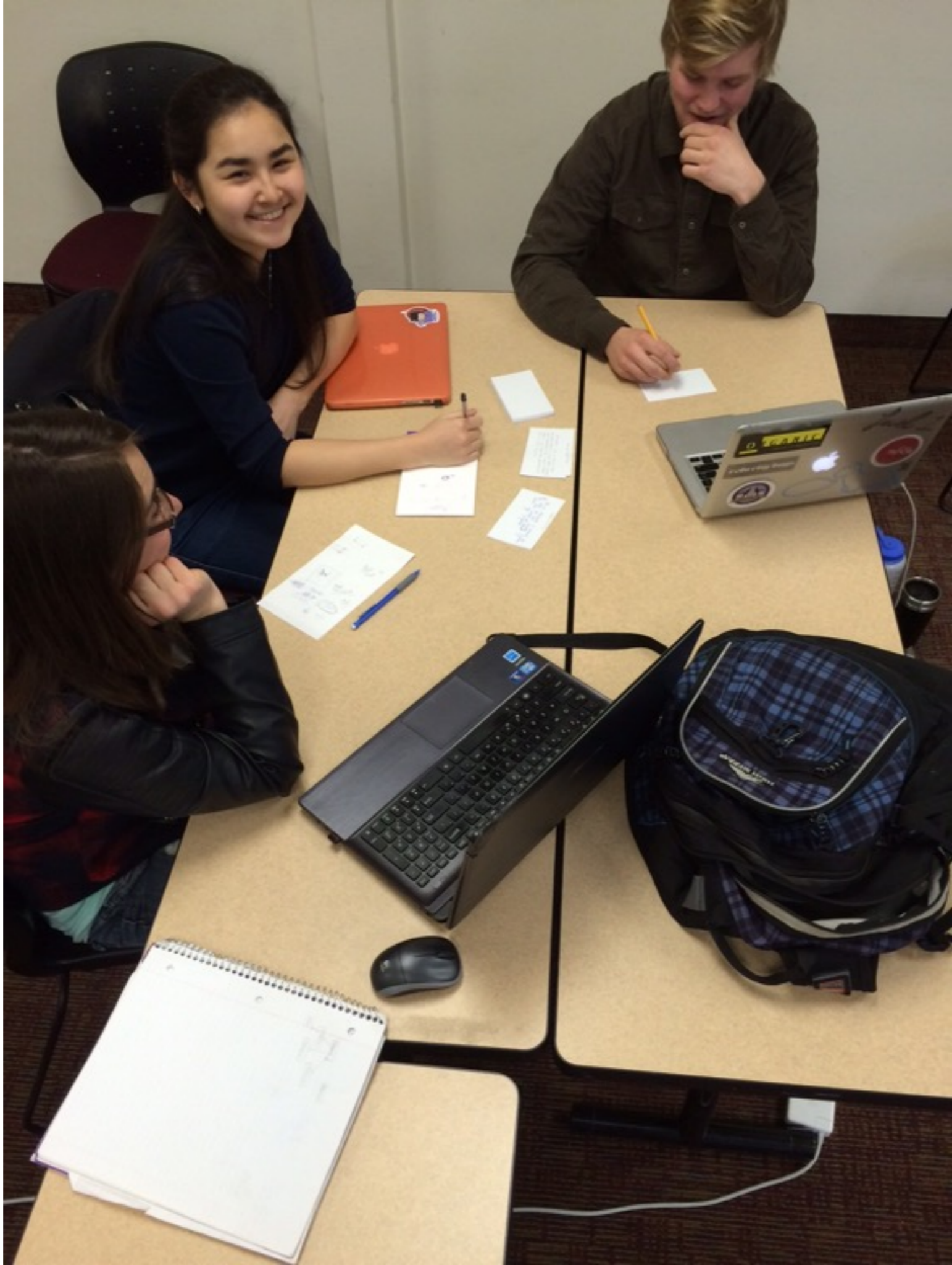
1, 2, 3, 5, 8, 13



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

Release Planning

- **Velocity** = Story Points Completed During Release
- **Required Velocity** = $\text{Sum}(\text{story points}) / 3$
- 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.)

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Acceptance Testing

Test #	Feature (User Story Covered) covered	Preconditions	Test Actions	Expected Outcome
1	Login	The user attempts to login in using username and password	1. Use admins credentials 2. Use a students credentials 3. Use incorrect credentials	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.

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.

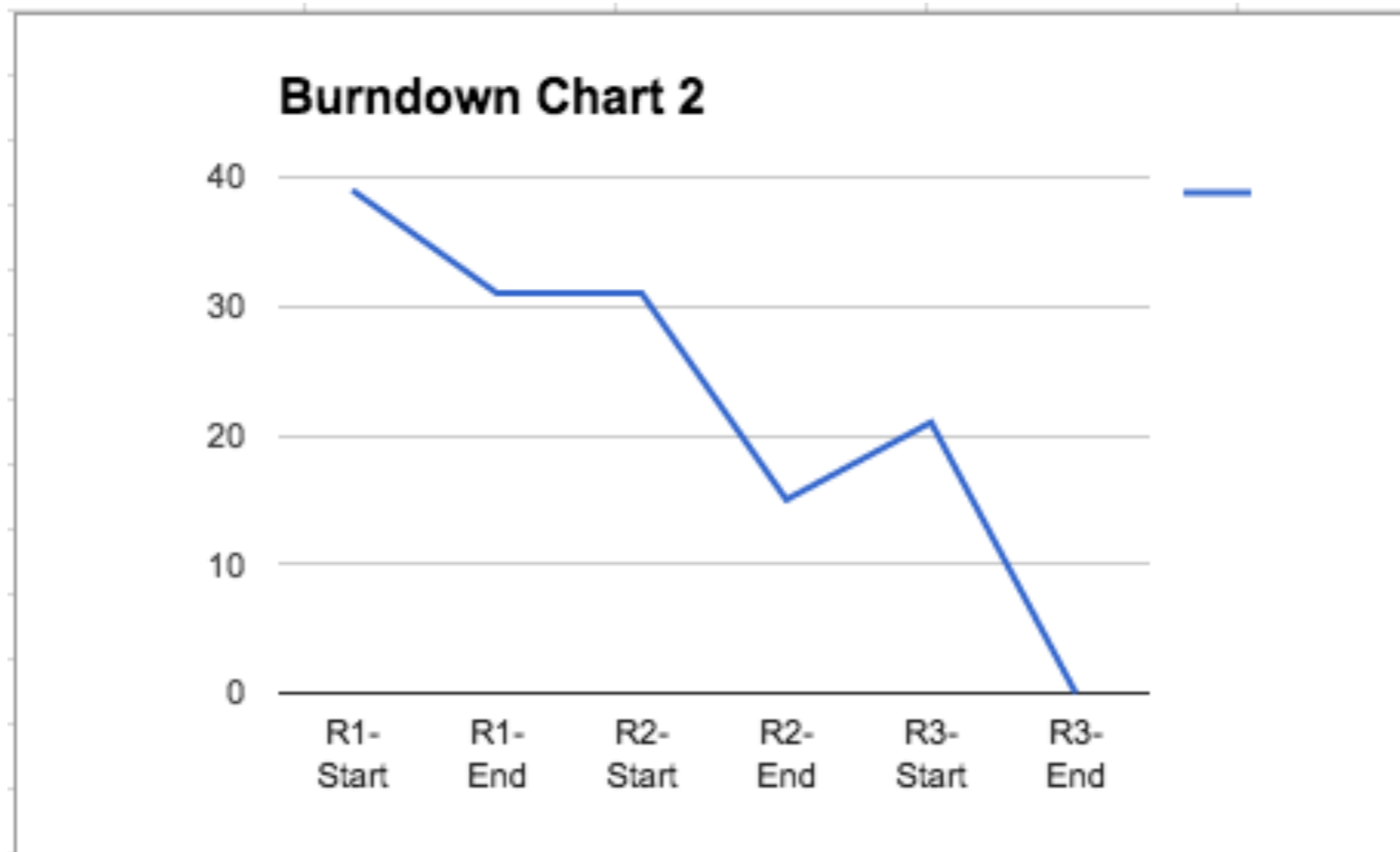
Other Docs

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

Project Status

Release 2					
User Story #	Task	Developer	Estimate	Status	Notes
3	Add and remove problems	Dana	5-6 hours	Completed	
?	Nav-bar highlighting	Will	30 mins	Nearly Done	the navbar needs updateing as pages are added
?	Overall HTML styling	Will	2 hrs	in progress	the styling is very basic but hopefully easily modifiable
6	Teacher is able to change student's info (specifically, password and email)	Dana		Completed	
7	Teacher can change his/her password and email	Dana		Completed	
4	Connect the dots game	Megan	8 hours	Nearly Done	Have it fully functional except one game, and still need to send student to the next level and update score
4	Color game - (placement)	Will	8 hours	in progress	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
5	Observe student scores	Dana		Completed	
9	Level Visibility - student	Megan	1 hour	Completed	Was a part of the 8 hours on next task
10	Return to previous levels -student	Megan	1 hour	Completed	Took closer to 8 hours...
11	Change password - student	Megan/Will			
12	Observe scores -student	Megan	30 min	Completed	Just need to stylize

Burndown Chart



Bug List


ID#	Date/Time	Creator (Discoverer)	Title	Status	Assigned To	Priority	Severity	Description
1	3/16/2015	Dana? Will?	Master Issues	Closed	All of Us	Immediate	Medium	The master branch is missing design stuffs
2	3/23/2015	Dana	Update Database Issues	Closed	Dana	Medium	Medium	Updating database kicks user off the website, then interprets him/her as a previous user who logged in
3	3/24/2015	Megan	undefined! End	Closed	Megan	Medium	Low	at the end of the game it writes 'undefined' to the screen instead of 'great work'
4	3/24/2015	Will	Stud. Navbar	Closed	Will	Medium	Low	
6	3/30/2015	Will	marker scaling location	Closed	Will	Medium	Medium	The location of the pointer does not match the location of where the color is

GitHub

 **bdennin / MathQuest**

 Watch 4

 Star 0

 Fork 3

Westminster College - Software Engineering Project - Spring 2015

 188 commits

 1 branch

 0 releases

 4 contributors





Branch: master ▾

MathQuest / +



omg

 **bdennin** authored 3 days ago


latest commit `bb7b76d891` 

 `.settings` more loot 7 months ago

 `src` omg 3 days ago

 `.classpath` fixed probs wtih jar 6 months ago

 `.gitignore` trash 7 months ago

 `.project` Oh 8 months ago

 Code


 Issues 0


 Pull requests 0

 Pulse


 Graphs

HTTPS clone URL



You can clone with [HTTPS](#) or [Subversion](#). 

 Clone in Desktop

 Download ZIP

Release 3

- Production release!
- Fully deployed!
- And more!
- User documentation!



TEACHER LOGIN

Math Quest

FIRST NAME:

LAST NAME:

-SUBMIT-



Good job! That is correct!
1 is in the Tens place!

Your number is 658
What place is 6 in?

Ones

Tens

Hundreds



Player Health

LEVEL: 1
Level Display

Boss Health

Question Prompt
What is $7 - 3$

Answer Options

2

3

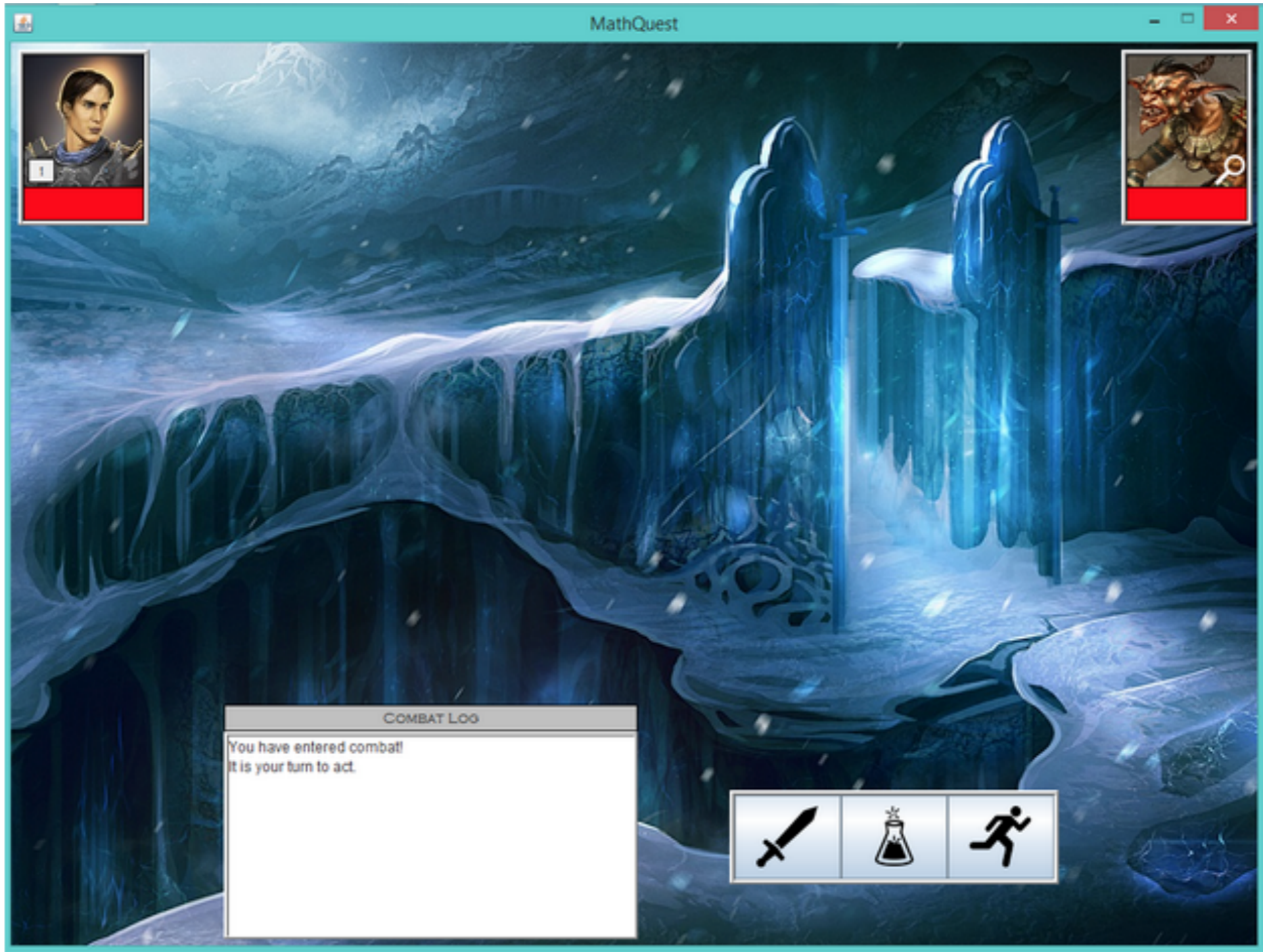
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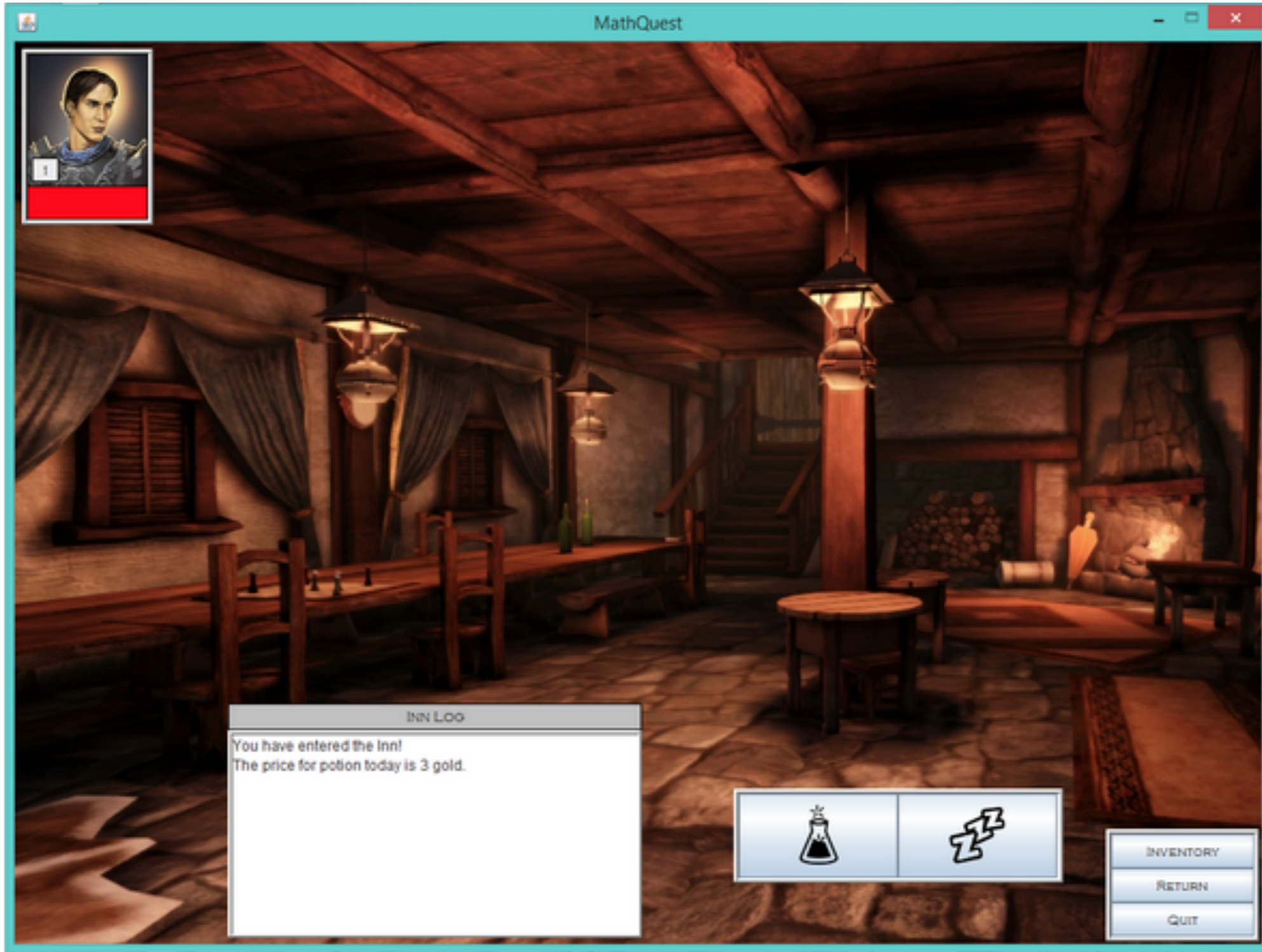
4

Message Pane

Correct! Monster takes damage!

Monster attacks you!
Defend yourself!

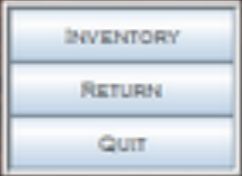


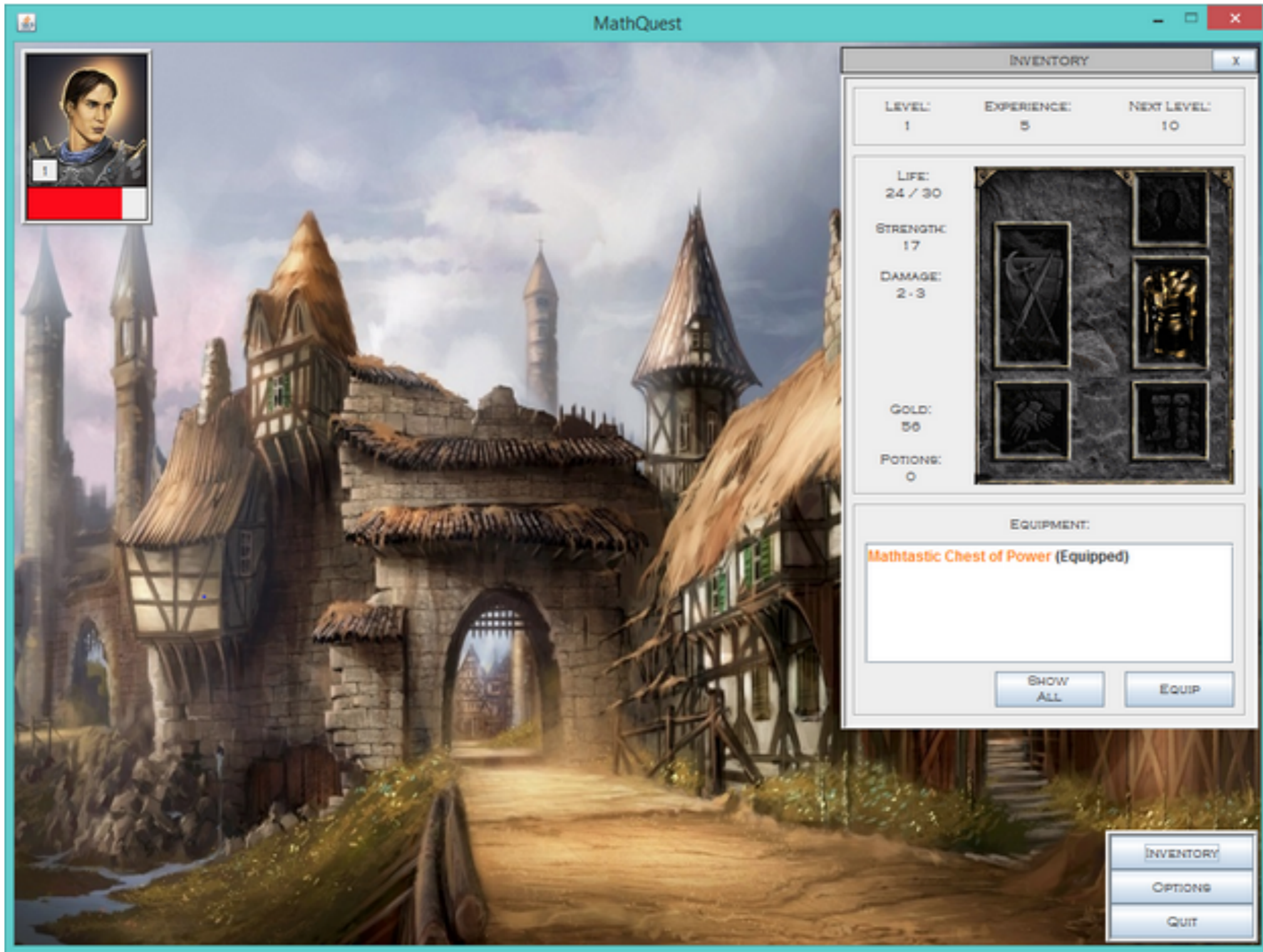


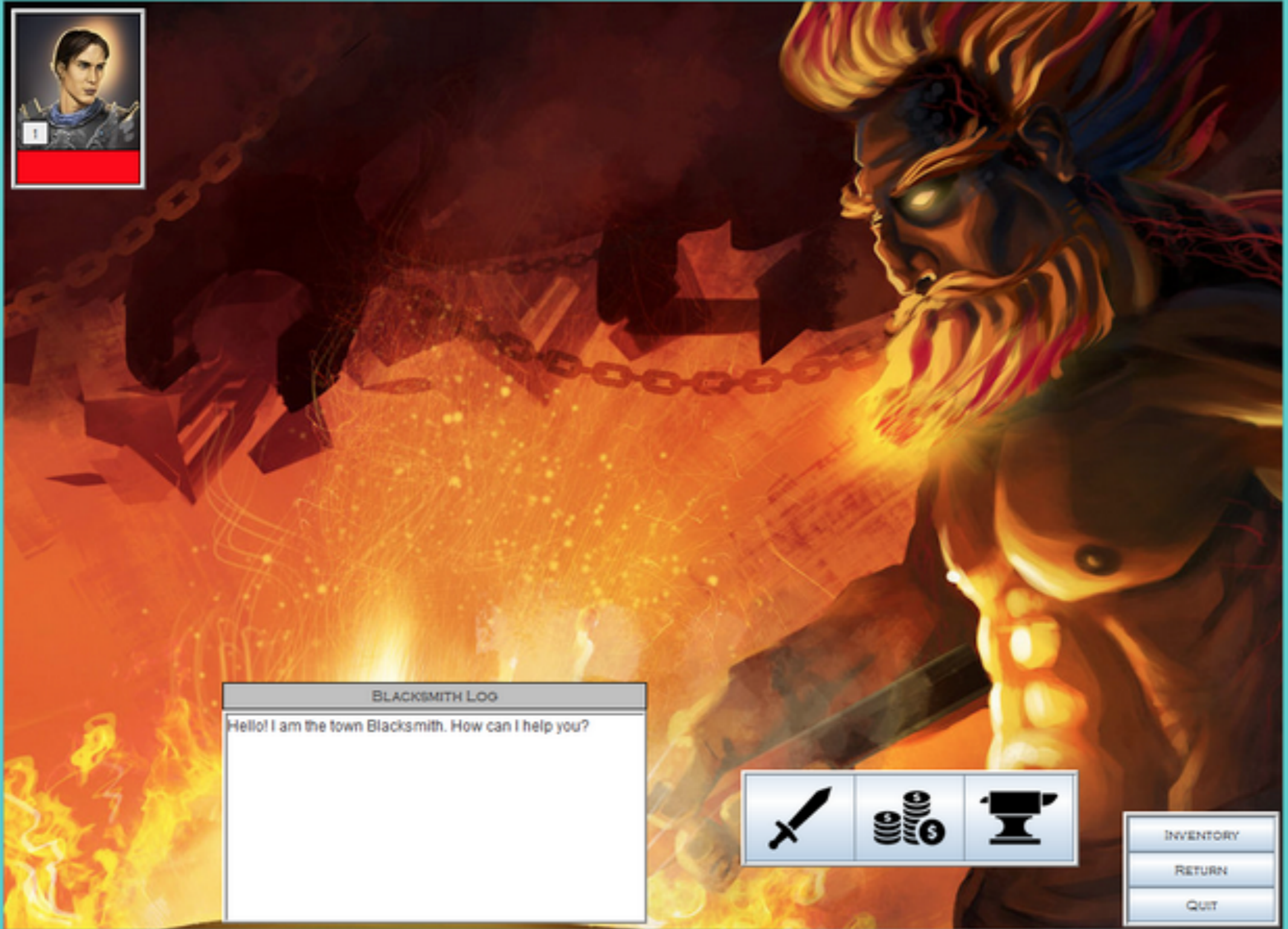
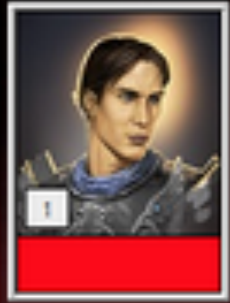
MathQuest



INN LOO
You have entered the Inn!
The price for potion today is 3 gold.







BLACKSMITH LOO

Hello! I am the town Blacksmith. How can I help you?



- INVENTORY
- RETURN
- QUIT

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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