Ω Tech

Lightweight E-book Access Platform (LEAP) Software Plan

Revision 1.8
Date: 9/19/14

Table of Contents

Contents

Introduction

1.1 Problem Definition:

It is difficult for students at Capital Region BOCES and Questar III to log into different e-book websites to look for an e-book they are in need of or are interested in. Having to remember usernames and passwords for multiple websites tends to get frustrating and many students give up looking for the e-books they are interested in.

1.2 System Justification

The purpose of LEAP is to provide a central portal for students and faculty to login, and access e-books from multiple publishers and vendors. LEAP will have different interfaces depending on the role of the user. LEAP will monitor e-book availability from all third party vendors to determine if the user can borrow the e-book.

1.3 Goals for the System and on the Project

The goal of LEAP is to make e-book management simpler for students and faculty. This will be done by providing an easy to use, central portal to read and manage e-book availability. LEAP will be mostly used by children, so the interface must be simple and straightforward. Compatibility with most mobile devices is necessary.

1.4 Constraints for the System and on the Project

- Compatible with most browsers and operating systems
- Compatible with most resolution sizes and mobile devices
- Must be able to pull information in real time from all vendors and publishers

1.5 Functions to be Provided

- Fetch and display e-books from all available vendors and publishers
- Check e-book status from all available vendors and publishers
- Administrator functions to create and delete user accounts
- Administrator functions to create and delete vendors and publishers
- Filter function to search for e-books by fields like author and genre
- Provide various statistics such as the most popular e-book and who rents the most e-books

1.6 User Characteristics

- Administrator – High-level access; can add and delete vendors, publishers and accounts as well as change information including passwords
- Teachers – Medium-level access; can edit their students' accounts and access teacher-only e-books

- Students: Low-level access; a student will either be in the K-5 or 6-12 category. The system will filter e-books depending on their education level

1.7 Development/Operating/Maintenance Environment

Server:
Operating System: Cent OS 5.2 Final
Kernel: 2.6.8-92.e15
Physical Memory: 8 GB
CPU: Intel Xeon 2.66 GHz
GCC Version 4.1.2 20071124 (Red Hat 4.1.2-42)

Software Engineering Lab PC:
Operating System: Windows 7 Enterprise (x64) Service Pack 1
Physical Memory: 6 GB
CPU: Intel Core i5-3470 3.20 GHz
Hard Drive: 430 GB free space.

Mac:
Operating System: Mac OSX 10.7.5
Physical Memory: 4GB 1333MHz DDR3
Processor: 2.5 GHz Intel Core i5

1.8 Solution Strategy

Omega Tech will take the following steps to ensure that each step of the project is implemented according to client specifications.

- Software Plan:
    - The software plan will encompass our preliminary design for the project. We will look at all known constraints and limitations on the project, and clearly define the problem at hand. We will work to ensure that the design meets our client’s expectations as closely as possible.

- Requirement Specifications
    - During requirement specification we will peruse our list of initial design plans, and produce a list of specific details that are related to LEAP.

- Preliminary Design
    - The preliminary design will serve as a rough draft design of the final implementation of the LEAP software. The preliminary design will be based off of the requirements specification.

- Detailed Design
    - Following the review of the preliminary design, the detailed design will be built off of the preliminary design. During the detailed design phase we will create a more detailed version of LEAP.

- Acceptance Test
    - The acceptance test will be the project phase during which we will test all defined problems that we sought to solve during the design phase. During the acceptance test we will display the final produced product.

1.9 Priorities of the System Features

The main priority of LEAP is to provide students with a single login to access all available e-books. Other priorities include user management, usage reports, and the ability to add and delete publishers and vendors.

1.10 System Acceptance Criteria

LEAP will have the following functionality:

- The main interface will be able to:
    - Properly display e-books according to user-selected filters and availability
    - Provide help information for all user input fields

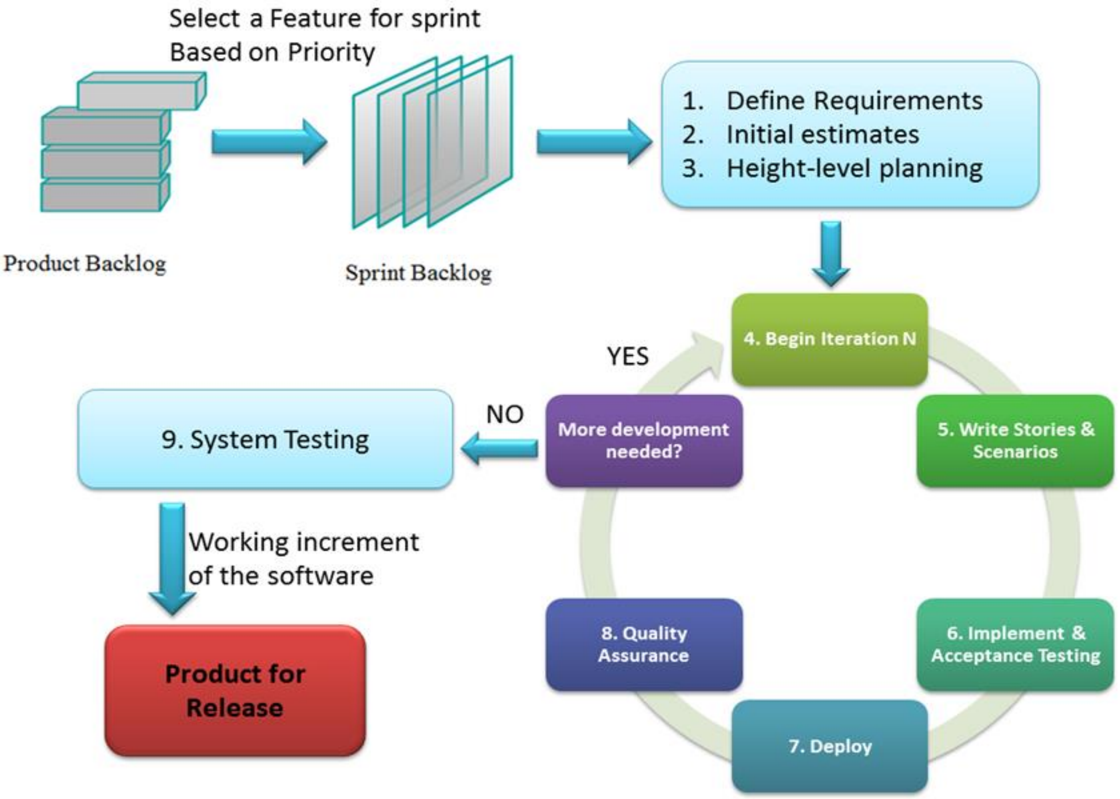
- Administrators will be able to:
    - Add and delete users
    - Add and delete vendors and publishers
    - Be able to view statistics
    - Access all e-books

- Teachers will be able to:
    - Edit student accounts
    - Access teacher specific and student e-books

- Students will be able to:
    - View e-books filtered by their education level
    - Rent e-books from available vendors and publishers

System Definition and Project Plan

2.1 Project Management and Development Model (Image)



- **Product Backlog**
  - Omega Tech will gather all necessary information regarding the project from the client. This information may be "fuzzy" or unclear at first and this is acceptable. The product backlog contains a large list of all of the product features and requirements as they come from the client. The product backlog is a place to put all requirements as they come in. The product backlog is ordered in descending priority.
- **Sprint Backlog**
  - The sprint backlog is a backlog of tasks that are "sprint-ready". Being sprint-ready means that tasks have all necessary information in order to develop and deliver the feature. This includes clear functional requirements and a "definition of done" or "acceptance criteria". The functional requirements are typically listed in short bullet format and the definition of done is a clear statement about when the product is accepted as complete. The

definition of done is easily translated into a set of tests that make it clear when the task is done. The sprint backlog is ordered in descending priority.

- **Sprint Planning (1, 2, 3)**
    - During a sprint planning meeting the team pulls items from the top of the sprint backlog. The amount of items needed to be pulled is selected as a team; the amount of items we initially choose will more likely than not be an inaccurate estimation of the amount of work the team can complete during the sprint. This will be the case for the first one or two sprints, but over time will be a good way to understand how much the team can complete during a sprint. Knowing this will help Omega Tech plan accordingly.
        i. When pulling an item from the sprint backlog, you must clearly define requirements in bullet format.
        ii. Initial estimates describe the complexity of the item and the team resources needed.
- **Begin the Iteration / Sprint (4)**
- **Write Stories & Scenarios (5)**
    - This is where we break the backlog item bullets into individual tasks by writing "user stories". User stories are short and simple definitions of the product features told from the perspective of the person who desires the capability; with them being either a user of the product or the client. (Example template: "As a <type of user>, I want <some goal> so that <some reason>.)
    - User stories incorporate the "definition of done" through the way they are written so that it is clear when a task is completed.
- **Implement & Acceptance Testing (6)**
    - This is where the team lead delegates to the developers sprint items and the associated user stories.
    - Developers will implement the user stories and once all stories for the sprint item are complete and unit tested, the item as a whole can be accepted as complete.
- **Deploy (7)**
    - The feature is "deployed", in our case the feature will be added to the overall software structure. Integration testing and component interface testing take place here if necessary.
- **Quality Assurance (8)**
    - This is where we thoroughly test the completed sprint item. Regression testing may or may not be conducted here depending on if the item calls for it.
- **More Development Needed?**
    - After the quality assurance process, it may be found that more development is needed.
        i. If so, then the item may or may not be added back to the top of the sprint backlog. If the development is small enough that it can be completed by the end of the sprint without effecting the completion of other sprint items, then it may be done in the current sprint. If the item is still in the form of a "deliverable product" by the end of the sprint then it is added to top of the sprint backlog.
        ii. If not, we do overall system testing with each completed item at the end of the sprint.
- **Product for Release**
    - At the end of each sprint, the goal is to have a "deliverable product" ready for the client. For example, this may be a version update of the product including several new features.

2.2 Organization Structure

Name	Role	E-mail
Garrett Allen	Lead Programmer	gm17alle@siena.edu
Damian Crisafulli	Webmaster	dm21cris@siena.edu
Josh McDonald	Database Administrator	jj21mcdo@siena.edu
Amar Mian	Team Leader	a10mian@siena.edu
Justin Rousseau	Web Developer	jd24rous@siena.edu

2.2.1 Description of Responsibilities

Lead Programmer - Responsible for the underlying design and implementation of all software. Will ensure the quality of each individual piece of software as well as the successful integration of the parts.

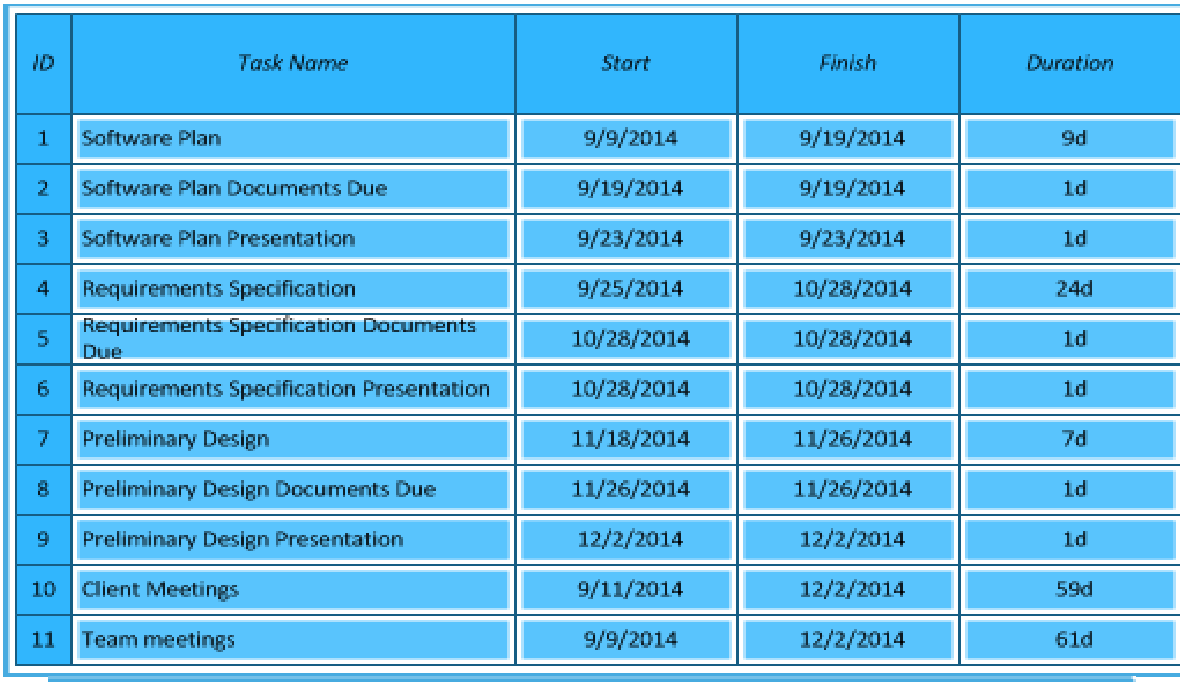
Webmaster - Responsible for Omega Tech website as well as the design and implementation of the Omega Tech's LEAP software.

Database Manager - Responsible for leading the design and development of the database. This will mainly consist of building relevant schema and writing queries.

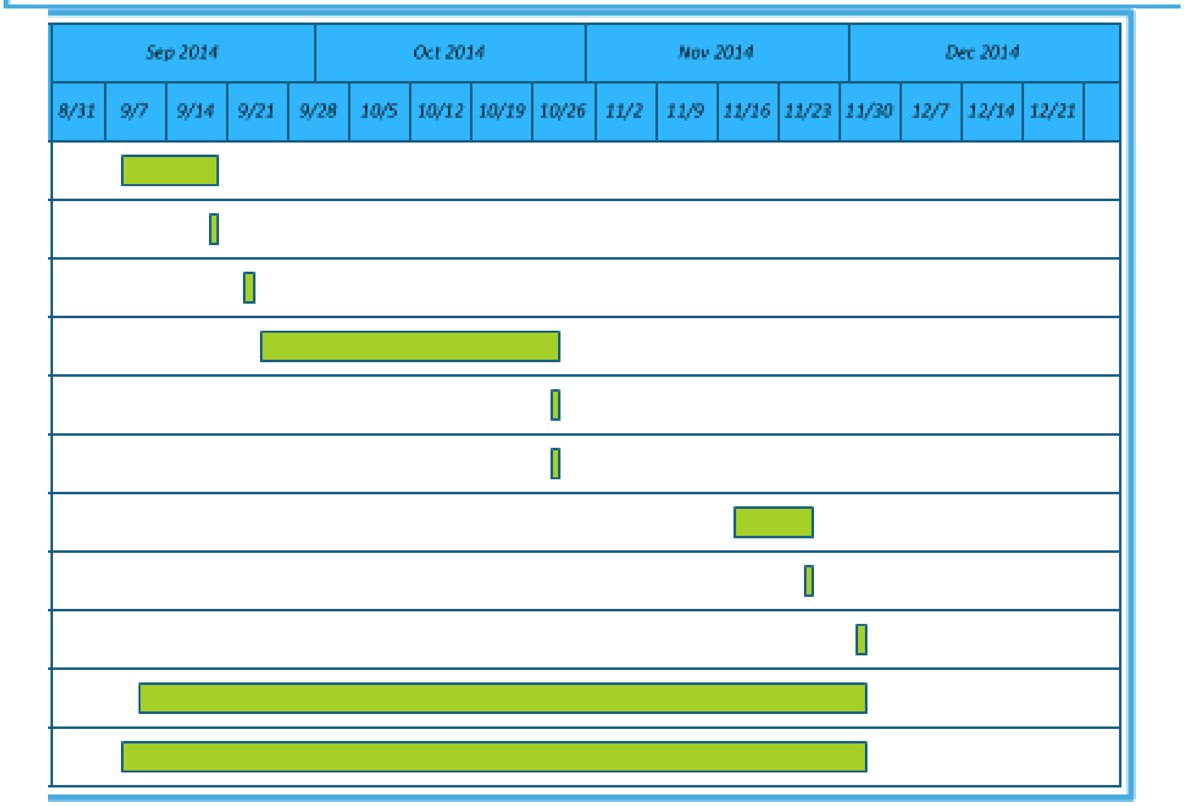
Team Leader - Responsible for maintaining all documents throughout the course of the project. Manages Omega Tech's resources, as well as a majority of communication between Omega Tech, Dr. Fryling, and the clients.

Web Developer - Will assist in creating and maintaining all web-related content. This includes the company website and our web solution. Responsibilities include writing and editing content, helping to design the webpage layout, determining technical requirements, updating the website, creating any necessary backup files, managing the repository, and helping to solve any web-based problems.

2.3 Development Schedule, Time-Line



ID	*Task Name*	*Start*	*Finish*	*Duration*
1	Software Plan	9/9/2014	9/19/2014	9d
2	Software Plan Documents Due	9/19/2014	9/19/2014	1d
3	Software Plan Presentation	9/23/2014	9/23/2014	1d
4	Requirements Specification	9/25/2014	10/28/2014	24d
5	Requirements Specification Documents Due	10/28/2014	10/28/2014	1d
6	Requirements Specification Presentation	10/28/2014	10/28/2014	1d
7	Preliminary Design	11/18/2014	11/26/2014	7d
8	Preliminary Design Documents Due	11/26/2014	11/26/2014	1d
9	Preliminary Design Presentation	12/2/2014	12/2/2014	1d
10	Client Meetings	9/11/2014	12/2/2014	59d
11	Team meetings	9/9/2014	12/2/2014	61d



2.4 Project Monitoring and Control Mechanisms

Omega Tech will hold regular team meetings, at least two a week to discuss the current state of the project as well as future goals. We will also maintain a close relationship with our clients, having weekly meetings to keep them up to date on our progress and obtain critical feedback from them. In case we cannot meet during regularly scheduled team meetings, we will use communication tools such as Skype to keep in contact with each other. Meetings with clients will predominantly be through conference calls and physical meetings, and email.

2.5 Tools and techniques

Omega Tech will be using development environments such as Eclipse and Coda to develop our software. The development web server will be hosted locally via XAMPP, and MySQL will be used for database design. We will take advantage of publisher APIs to fetch e-book data. If a publisher does not provide an API, we will work to find an acceptable alternative. A code repository like GitHub will be used to handle version control. Programs such as Microsoft Word and Microsoft PowerPoint will be used to maintain official team documents and presentations.

2.6 Programming Languages

The application interface will be built using HTML5 and CSS3. Javascript / JQuery will be used to add web page behavior, as well as to dynamically pull data using JQuery's AJAX function. MySQL will be used to construct the database. Server-side processing will be done using PHP. Omega Tech may find other technologies not yet listed to be of use, and this document will be updated to include any added technologies.

2.7 Testing Requirements

Any new functionality that will be added to software will be tested immediately as according to the Agile scrum methodology. Different types of tests will be conducted to ensure that functionality of both the frontend and backend of the software works as intended. For example, when LEAP reaches a usable state it will be tested by actual students at BOCES and Questar III.

2.8 Supporting Documents Required/ Time of Documentation

Title of Documents	Delivery Date	Presentation Date
Software Plan	September 19, 2014	September 23, 2014
Requirement Specification	October 28, 2014	October 28, 2014
Preliminary Design	November 26, 2014	December 2, 2014
Detailed Design	Spring 2014	Spring 2014
Acceptance Test	Spring 2014	Spring 2014

2.9 Method of Delivery

The documents will be delivered to Dr. Fryling on the dates listed above as well as delivered in hard copy or e-mailed to clients. All of the documents will also be available on Omega Tech's website

2.10 Sources of Information

Omega Tech's primary source of information will come from client meetings with Jen Cannell and J'aimé Pfeiffer. We will be using e-book websites such as Overdrive as a guide. Knowledge obtained from API documentations of the languages will be used throughout the duration of LEAP. Also, we will be using knowledge gained from Dr. Fryling's lectures and Dr. Lim's labs.

Appendix A Glossary of Terms

AJAX: Asynchronous JavaScript and XML, used to create asynchronous web applications.

API: Application Programming Interface

BOCES: Boards of Cooperative Educational Services

Coda: A commercial web development application for Mac OSX.

CSS: Cascading Style Sheets, used to add style to web pages.

Eclipse: A development environment that can be used to program in languages such as Java.

GB: Gigabyte

GHz: Gigahertz

Github: An online platform that is used for source control.

HTML: Hypertext Markup Language, used to provide semantic structure to a website.

Javascript: A programming language that works on the client side for web browsers to provide asynchronous functionality.

JQuery: A cross platform library for JavaScript that is used to simplify scripting.

L.E.A.P: Lightweight E-Book Access Platform, this software project.

MySQL: An open source database management system.
PHP:

SQL: Structured Query Language, used in development of the database.

XAMPP: Stands for: (Cross Platform (**X**) **A**pache **M**ySQL **P**HP **P**erl) An open source web server package.

Appendix B Team Member Resumes

Garrett Allen

EDUCATION

SIENA COLLEGE • Loudonville, NY (Anticipated Graduation: May 2016)

BS in Computer Science • GPA: 4.00/4.00

BS in Mathematics • GPA: 3.91/4.00

Secondary Education Certification • GPA 4.00/4.00

Technical Skills

- Programming Languages : Java • Python • Jython • HTML • SQL
- Operating Systems: Windows • Apple • Linux
- Additional: VIM text editor • Microsoft Office • Excel

RELEVANT COMPUTER SCIENCE EXPERIENCE

GRAPHICAL PROCESSING UNIT RESERCHER, SIENA COLLEGE, NY (June 2014 – Present)

- Utilize GPU technology and Linux Operating system to perform various speed related tests
- Programm in Python using Cuda
- Will present findings at annual GPU Tech Conference in California in March 2015

ROBOTICS RESEARCHER, SIENA COLLEGE, NY (September 2013 – December 2013)

- Used ROS and Linux operating systems and Python programming language to program robot
- Programmed Robot to operate Keurig coffee machine
- Presented Robot at Siena College's 2013 RoboShow

ARTIFICIAL INTELLEGENCE RESEARCHER, SIENA COLLEGE, NY (January 2013 – May 2013)

- Scraped web data from various National Basketball Association statistic data sites
- Designed artificial intellegence program to predict player performances
- Predicted outcomes with 89% success rate

LEADERSHIP AND COMMUNICATION EXPERIENCE

DIFFERENTIAL AND INTEGRAL CALCULUS TUTOR, SIENA COLLEGE, NY (September 2013 – Present)

- Assisted students individually and in groups in single and multivariable calculus
- Tutored over 30 students since being hired

SIENA COLLEGE KARATE CLUB PRESIDENT (September 2012 – Present)

- Planned, hosted, and ran events including self-defense seminars each semester
- Tripled club attendance from 2012-2013 through effective advertising

SCHENECTADY HIGHSCHOOL TEACHING ASSISTANT (May 2014 – July 2014)

- Taught and assisted in a ninth grade algebra classroom for five hours a day
- Helped high needs students pass the Regents exam and avoid failure

DAMIAN CRISAFULLI

EDUCATION

Bachelor of Science, Computer Science Expected May 2015
Siena College, Loudonville NY

- Major: Computer Science
- Related Courses: Web Application Development, Advanced Web Application Development, Data Structures, Object-Oriented Design and Programming, Assembly Language and Computer Architecture, Analysis of Algorithms, Data Base Management, Cryptography and Security, Software Engineering

SKILLS & ABILITIES

Programming Skills:

Java, Python, Ruby, PHP, SQL (MySQL, Oracle), HTML5, CSS3, Javascript/JQuery/AJAX, Various MVC based web frameworks such as RubyOnRails and Code Igniter

Operating Systems:

Windows (XP,Vista,7,8), Mac OSX, Linux (Ubuntu, Solaris, CentOS)

Professional

- Self Motivated
- Detail Oriented
- Excellent Time Management
- Small Business Experience

EXPERIENCE

Assistant Manager - September 2011 to Present
Oliver's Beverage Center – Albany NY

- Place orders and handle deliveries from various distribution companies.
- Keep up to date information and make relevant posts on the companies Facebook and Twitter accounts.
- Update and design new pages for the company website.
- Develop web applications to increase productivity such as a keg inventory management system and an application to easily update the list of available draught beers.
- Answer customer's product questions.

Web Developer – November 2013 to February 2014
Siena Research Institute – Loudonville NY

- Created a web application to display and filter survey data in a user friendly way.
- Utilized the Twitter Bootstrap front-end web framework to make the application mobile friendly.
- Gained experience with the Google Graph API

Joshua J. McDonald

Education:

B.S Computer Science – Siena College, Loudonville NY

Expected Graduation Date: May 2015
Computer Science GPA: 3.36

Relevant Experience:

Student Researcher, Siena College, Loudonville NY May 2013 – August 2013

- Developed an experimental system in Java
- Applied techniques of Genetic Algorithms with Information Extraction

Relevant Coursework:

Data Structures, Object Oriented Programming and Design,
Web Application Development, Analysis of Algorithms,
Intro to Artificial Intelligence, Assembly Language and Computer Architecture

Technical Experience & Knowledge:

Programming Languages: Java, C, HTML, CSS, PHP, JavaScript, SQL
Operating Systems: Windows, UNIX
Software: Eclipse, BlueJ, Netbeans, Microsoft Office Suite, WinSCP,
Microsoft Visual Studio, SmartDraw

Awards and Honors:

Upsilon Pi Epsilon	Inducted May2014
Tech Valley Scholars Program	2013 – Present
William and Delia O'Donnell Harvey Memorial Scholarship	2011 – Present

Amar Mian

EDUCATION

Siena College, Loudonville, NY
Bachelor of Science in Computer Science, May 2015

EXPERIENCE

Team Leader
Software Engineering Team, Siena College, Loudonville, NY, Sept. 2014 – Present

- Lead a 5-person team that works with real clients to develop a web-based Java platform

Fellow
Non-profit Excellence and Transformation, Siena College, Loudonville, NY Jan. 2014 – Present

- Facilitate focus groups of 8 to 12 people to gather
- Communicate with clients, fellows, and faculty mentors
- Create, conduct, and analyze surveys and present the data to Fellows, Faculty, and clients

Shift Supervisor
Front End, Price Chopper, Rensselaer, NY, Aug. 2011- Present

- Helped address customer and employee concerns
- Revised Schedule of 20 cashiers, baggers, and maintenance crew
- Trained new recruits

Group Tutor
Computer Science Tutor, Siena College, Loudonville, NY, Sept. 2013 – May 2014

- Assisted students with questions on homework and labs with languages such as java and Alice

TECHNICAL SKILLS:

Programming Languages: Java, PHP, HTML, CSS
Software: WinSCP, Notepad++, Eclipse

RELEVANT AWARDS:

- Recipient of Presidential Scholarship, 2011- 2015

RELATED COURSEWORK:

- Analysis of Algorithms
- Date Structures
- Software Engineering (fall 2014)
- Assembly Language and Computer Architecture
- Database Management
- Application Development (fall 2014)
- Web Application Development
- Object-Oriented Design and Programming

Justin D. Rousseau

Objective: To contribute skills in data analysis, problem-solving and logical thinking in a Software Development position.

Education:

Siena College, Loudonville, NY
Bachelor of Science, Computer Science and Minor, Philosophy May 2015

Work Experience:

Software Development Intern, Ernst Publishing Company May 2014 – Present

- Worked alongside a small software development team in order to architect and support various applications and web pages.
- Introduced to working with new languages such as C#, Microsoft SQL Server and ASP; developing various desktop applications, Web APIs, Windows Services and data reports.

Research Assistant, Siena College May 2013 – January 2014

- Designed, developed, and maintained the HUMAI Galaxy online platform as a member of a team of faculty and student researchers.
  - To view the platform see: humai.siena.edu

Teaching Assistant, Siena College September 2013 – December 2013

- Facilitated group learning within The Nature of Humans and Machines course.
- Coordinated and set up the technology necessary for distant learning sessions.
- Incorporated research with the HUMAI Galaxy online platform into class in order to motivate students for excellence, getting them involved in the development and analyzation of "Big Questions".

Technical Summary:

Programming Languages: Java, PHP, C#, HTML, CSS, JavaScript, Python, MIPS Assembly
Software: Microsoft Visual Studio, Notepad++, WinSCP, Remote Desktop Connection
Operating Systems: Windows, Mac OS X, Linux

Relevant Courses:

Cryptography and Security, Analysis of Algorithms, Discrete Structures II, Assembly Language and Computer Architecture, Web Application Development, Discrete Structures I, Introduction to Artificial Intelligence, Object-Oriented Design and Programming, Data Structures, Introduction to Programming, Introduction to CS: Python.

Relevant Honors and Awards:

Recipient of the Tech Valley Scholarship 2013

Additional Experience:

Student Worker, Siena College School of Science, *Loudonville, NY* 2013 – April 2014

Office Assistant, Siena College Writing Center, *Loudonville, NY* 2011 – April 2014