Software Plan

Requested by:

Mr. Ken Swarner
System Administrator
Siena College
Computer Science Department

Dr. Tim Lederman
Professor
Siena College
Computer Science Department

RAEMS
Remote Access Environmental Monitoring System

EIN Systems
Environmental Intelligence Network Systems

Prepared by:

Ybelka Brito
Michael Devanandan
Joseph Halvey
Michael Jakubowski
Vernell Mitchell
Anthony Ruotolo

September 20, 2005

RAEMS
Remote Access Environmental Monitoring System

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1.1: Problem definition

In today's society home monitoring devices are becoming more and more of a necessity for a variety of reasons, from basic home security, to optimal room conditions for sensitive electronic equipment. Our client, Mr. Ken Swarner, has requested that we develop a system which will allow people to set up environmental-monitoring devices in their homes and businesses as well as allow them to view the output of these devices from any web browser on the internet.

1.2: System Justification

The purpose of our software is to help system administrators and homeowners feel more secure when away from their office or home. The Remote Access Environmental Monitoring System (RAEMS) will allow a user to remotely check the status of a monitored area via a webpage. This will result in less stress for users, and faster response to critical emergencies.

1.3: Goal for the system and on the project

The Goal for our project is to create an environmental-monitoring system which will allow people to monitor different aspects of their home and/or business from a remote location from the web. This will allow Mr. Swarner to check and regulate the temperature in his office in order to protect his computer equipment. His partner, Dr. Lederman, has also requested a water sensor gauge for the purpose of monitoring and water which may enter his basement at an undesirable time. A webcam was also mentioned.

The goal for our team is to learn about and gain experience in the field of software engineering. We also expect to correct software engineering techniques in a group setting to help solve our client's problem.

1.4: Constraints on the System and on the Project

Our monitoring system needs to be secure, using the HTTPS standard. We must also discover a way for the program to work with IP changes as some clients may not have static IP's. The program itself is required to be built on a Linux server, while the website must run on an Apache web server. We must not use any ActiveX, an the system must work on both Windows and Macintosh Operating systems, with the possibility of also running on the Linux system.

1.5: Functions to be Provided (Hardware and Software/People)

- A central server database to hold information on user accounts, including IP addresses of computers connected to monitoring devices and types of devices connected. This will allow registered users to communicate with and monitor compatible devices from almost anywhere with an internet connection and the required viewing software.

- An Apache Web Server to host a webpage, accessible to users, that allows communication with the central database and the active monitoring devices of the users. Information that would normally be available directly from the device will also be available via the web.

- Webpages on the server will work with the Firefox and Internet Explorer browsers.

- Client software will be made to communicate directly with the monitoring devices, and send information gathered to the central server. The client software will work on major operating systems such as Windows and Linux.

- Devices supported will include a thermometer and a water sensor.

- A security system to prevent unauthorized access to another user's information and devices. Both the server software and the client software will be secure.

1.6: User Characteristics

There will be a number of different types of users. One kind of user will be people in charge of the well being of server rooms and other similar important setups. They will expect detailed information from the system. Another type of user will be a normal homeowner. They will want the system to be user friendly. The system will require users to have an active connection to the internet for their monitoring devices, as well as access to the internet when they wish to check on the status of their monitored areas.

1.7: Development/Operating/Maintenance Environments

The Environmental monitoring system will be created on the Siena College Software Engineering workstations. Users will be able to set up their home or business systems, As well as gain access to the web site and monitor the various devices from any computer with internet capabilities. The usage of this system will be accessible with any computer system with Internet capabilities. The maintenance of this system will be determined later on.

1.8: Solution Strategy

Our team will utilize the Linear Sequential Model (also know as the Classic Waterfall Model) to actualize the system requested by our clients. The Linear Sequential Model is made up of the following levels:

- Problem Definition: In this beginning level the team will identify and define the problem that needs to be addressed.
- Analysis and Requirements: The team will meet with the respected client to gather all information necessary and required to find a solution to the problem projected.
- Preliminary Design: The team will convert the given system requirements into useable software requirements.
- Coding and Testing: The team will translate the known software requirements into machine friendly code. The code will be tested with different cases to make sure it is able to correct errors. This stage will take place in Spring 2006.
- Project Approval: For this final level the team will in fact install the finalized software product. Documents with relevant assistance and maintenance of the system will be provided to the clients in Spring 2006.

1.9: Priorities of System Feature

The most important system feature is maintaining security over the database and the information sent to the database from the user. To ensure this, we will assign passwords to the users who register. We will also use HTTPS using the SSL protocol to protect the users' passwords over the internet. Portability, the ability to use the system from a variety of places, is also of high importance. The purpose of a web-based system is to provide a user-friendly GUI that is completely functional.

1.10: System Acceptance Criteria

The web-based system will allow for a number of on-line activities, including at a minimum:

1) Users to register their compatible monitoring devices.
2) Devices to communicate with the server and send information.
3) The user to access only the parts of the database pertaining to their devices.
4) The user to access the database from anywhere that has the internet and the correct browser.

1.11: Sources of Information

The majority of project information was acquired from meetings with our client, Mr. Ken Swarner. Other sources of information include Software Engineering Lecture by Dr. Tim Lederman, previous Software Engineering teams' projects and our text *Software Engineering: A Practitioner's Approach* by Roger S. Pressman.

2.1: Life-Cycle Model: Linear Sequential (Classic Waterfall) Model
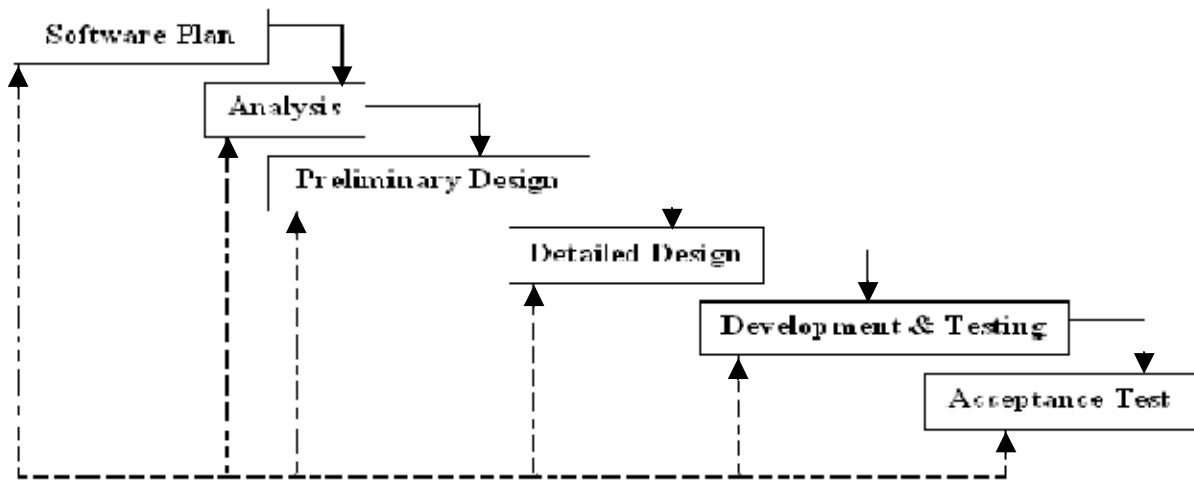
Software Plan
This item defines the problem that needs to be solved. It also allows for our organization to develop and implement a plan to solve the problem.

Analysis
Before a software package can be launched we must fully understand the purpose of the software; the interface (the design of the product that the consumers must be able to interact with as much ease as possible), as well as the desired behavior (how the product is to be used by consumers), performance (the results of the product). These areas need to be documented thoroughly and reviewed by our clients and organization.

Preliminary Design
This is the beginning process of designing the code to build the software product. Various functions and classes are described.

Detailed Design
The entire skeleton of the code is produced and prepared for testing.

Development & Testing
The code design is implemented and compiled to discover any errors and bugs that need to be corrected. The software will not be produced until it meets all of the desired results formulated before testing began. Once the software passed this rigorous testing process the software will be presented to our client(s) for their approval.

Acceptance Test
The software is brought to our clients to ensure that our product has met all of their desired design, behavior, and functions. If our software does not meet their needs it will be brought back for re-evaluation.

2.2: Organizational Structure

Environmental Intelligence Network (EIN Systems) is comprised of the following members:

Name	E-mail Address	Phone Number
Ybelka Brito	syb8052@siena.edu	646.236.8611
Michael Devanandan	smd2621@siena.edu	518.377.2467
Joseph Halvey	sjh7299@siena.edu	914.474.4167
Michael Jakubowski	smj2080@siena.edu	518.522.2212
Vernell Mitchell	svm3084@siena.edu	518.542.7246
Anthony Ruotolo	ap15ruot@siena.edu	518.495.3198

EIN Systems is organized as follows for the Environmental-Monitoring Project:

> Michael Devanandan – Team Leader and System Administrator
> Anthony Ruotolo – Team Coordinator
> Ybelka Brito – Librarian
> Vernell Mitchell – Webmaster
> Michael Jakubowski – Project Engineer
> Joseph Halvey – Software Developer

The team structure of EIN Systems is democratic. Decisions will be decided by the majority vote.

The work assignment for each member is as follows:

Team Leader – Organizes meetings and interviews for the team as well as for the client, guide the team throughout the semester.

System Administrator – Maintains the team's user's accounts and is responsible for software administration.

Team Coordinator – Makes sure every team member is doing their individual projects

Librarian – Maintains all documentation and records of team members and meetings.

Webmaster – Creates and maintains the project web page.

Project Engineer – Responsible for research and development of each aspect of the project.

Software Developer – Responsible for analyzing the problem presented, deciding what type of software is needed to implement the solution of the project.

2.3: Preliminary Staffing and Resource Requirements

The software resources needed for this project are a database management system such as Oracle or MySQL as well as a web design page editor such as Dreamweaver of Fireworks. Our primary sources are those directly involved with this project. Also our client Dr. Ken Swarner is a major source as well as Dr. Tim Lederman, our Software Engineering professor.

2.4: Preliminary Development Schedule

Refer to Gantt chart in the appendix of this document as well as the proposed development schedule in Sec. 3.1

2.5: Project Monitoring and Control Mechanisms

All team members have responsibilities and tasks to prepare according to a weekly schedule maintained by the Team Leader. Weekly meetings are scheduled with client to further acquire necessary information, as well as report progress toward milestones. Strict adherence to the development schedule will help to assure progress is made toward the clients' desired projections. Periodic presentations and team meetings will help provide feedback about our project to ensure that development is proceeding successfully.

2.6 Tools and Techniques to be Used

EIN will make use of a wide variety or hardware and software. On the clients end we will provide for all popular Operating Systems including Windows, MAC OS, and Linux. We will use the Apache Web Server to design a website with a functional GUI which will be accessible through web browsers including Internet Explorer, Netscape Navigator, and Firefox.

2.7 Programming and Scripting Languages

The project will require the integration of several programming languages including PHP, HTML, Java, C++, and Perl.

2.8 Testing Requirements

Testing will be performed during development by group members, with results reported to our client for study and feedback, as well as their participation in the testing process. Each aspect of the project will be rigorously tested by multiple members to ensure that no mistakes are overlooked. Final product testing will be subject to the specifications of our client and it must compatible with all major software and Operating Systems.

2.9:   Supporting Documents Required

The following supporting documents will be given to our clients on the dates provided:

1) The Project Definition/Project Plan – September 20, 2005
2) The Software Requirements Specifications – October 24, 2005
3) The Preliminary Design – November 28, 2005

Additional supporting documentation on the Detailed Design will be contributed to the client in the spring of 2006.
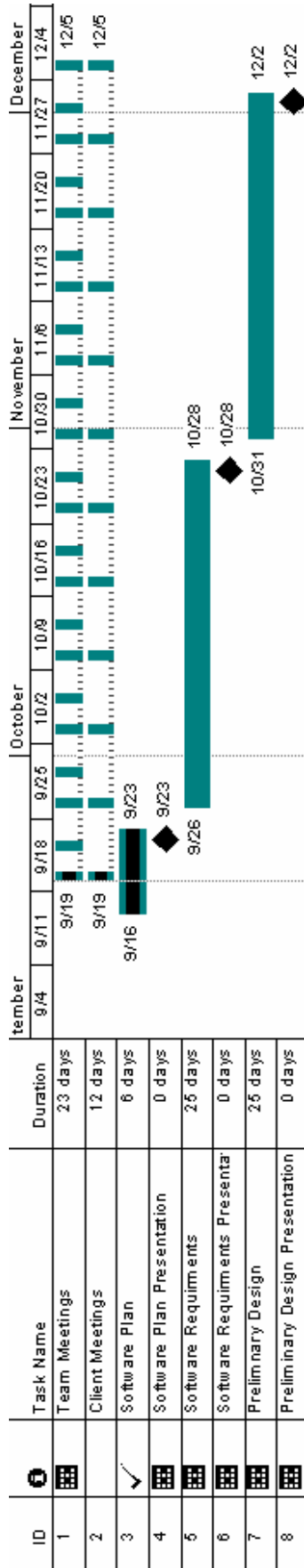
2.10: Manner of Demonstration and Delivery

Through out the development of this project we will give various presentations. These presentations will be made up of, but are not limited to speeches, handouts, demonstrations and PowerPoint slides. Our intention through these presentations is to describe the accomplishments we have made up to that point and to make sure that the client's goals and necessities are being met. Dates of presentations to the client and delivery of documents are as follows:

1) The Project Definition/Project Plan Document – September 20, 2005
2) The Project Definition/Project Plan Presentation – September 23, 2005
3) The Software Requirements Specifications Document – October 24, 2005
4) Software Requirements Specifications Presentation – October 26, 2005
5) The Preliminary Design Document – November 28, 2005
6) The Preliminary Design Presentation – December 02, 2005

2.11: Sources of Information

The majority of project information was acquired from meetings with our client, Mr. Ken Swarner. Other sources of information include Software Engineering Lecture by Dr. Tim Lederman, previous Software Engineering teams' projects and our text *Software Engineering: A Practitioner's Approach* by Roger S. Pressman.

3.1: Gantt Chart

ID		Task Name	Duration
1	▦	Team Meetings	23 days
2		Client Meetings	12 days
3	⟋	Software Plan	6 days
4	▦	Software Plan Presentation	0 days
5	▦	Software Requirments	25 days
6	▦	Software Requirements Presenta	0 days
7	▦	Prelimnary Design	25 days
8	▦	Preliminary Design Presentation	0 days

Task   Milestone   Split

Progress   Summary

Project: Remote Access
Environmental Monitoring System
Date: Mon 9/19/05

Ybelka F. Brito

Present Address
Siena College, SPOB 3289
515 Loudon Road
Loudonville, NY 12211
(646) 236-8611
syb8052@siena.edu

Permanent Address
35 Marcy Place 4H
Bronx, NY 10452
(718) 537-2158
yb0984@yahoo.com

OBJECTIVE

A challenging position in the field of computer science.

EDUCATION

Siena College, Loudonville, NY
B.S. in Computer Science, B.A. in French, Minor in Mathematics and Spanish; May 2006
Study Abroad: Quebec, Canada, Summer 2003; Paris, France, Spring 2005

COMPUTER & LANGUAGE SKILLS

Computers

- Programming in C/C++, Java, HTML, MIPS Assembly Language, Scheme, SQL
- Proficient in Microsoft Word, Excel, Windows & Internet

Languages:

Fluent in Spanish, Proficient in French

RELEVANT COURSE WORK

- Introduction to Computer Science, Procedural Design and Programming, Data Structures, Assembly Language and Computer Architecture, Object-Oriented Design and Programming, Algorithm Analysis, Data Base Management, Java for C++ Programmers, Software Engineering I
- Discrete Structures I & II, Calculus I & II, Foundations of Math I, II & III, Linear Algebra

EXPERIENCE

Intern, **Institutional Planning & Research,** Loudonville, NY, Fall 2005

- Create and maintain a website from which a given database will be used by the Siena Community

Consultant, **Siena College Information and Technology Services**, Loudonville, NY, August 2004 – Present

- Answer calls at I&TS Call Center to provide technical assistance to the Siena Community
- Maintain computers and related machines such as scanners and printers
- Provide one-on-one technical support to students

Resident Assistant, **Siena College,** Loudonville, NY, Fall 2003 – Present

- Respond to the needs of residents on residence hall
- Manage various administrative duties including maintenance requests, incident reports, and room transfers
- Responsible for the safety and security of the building on duty nights
- Enforce and upholds college policies

Resident Counselor, **Center for the Disabled,** Albany, NY, March 2004- Present

- Assist and promote individual consumers' levels of independence with personal, social, recreational, and/or health related needs.
- Instruct and promote residential consumers acquisition of skills, including basic activities of daily living, self care and household management.
- Accompany and/or encourage residential consumers' independence in personal business in the community, including, but not limited to, medical appointments, family visits and community based outings.

ADDITIONAL EXPERIENCE

Siena College Research Institute, Summer 2003
Siena College Admissions Office, Summer 2003
Siena College Dining Services, 2002 – 2003

ACTIVITIES

Mentor, **Siena Mentoring Program,** 2003 – Present
Member, **Computer Science Club and Math Club,** Siena College, 2002 – 2004
Member, **Siena College Tennis Team,** 2002 – 2003

Michael Devanandan

36 Covington Ave.
Schenectady, NY 12304
(518) 377-2467
smd2621@siena.edu

OBJECTIVE

To obtain a position developing new software to solve specific problems or needs of a company

EDUCATION

Siena College, Loudonville, NY
B.S. in Computer Science, May 2006
GPA: 3.6/4.0; Computer Science: 4.0/4.0

COMPUTER EXPERIENCE

- Programming in C, C++, MIPS Assembly, Ruby, Scheme
- Familiarity with UNIX and Windows operating systems
- Knowledge of Microsoft Visual C++, Microsoft Office, MySQL, and OpenGL
- Proficiency in Microsoft Word, PowerPoint

RELEVANT COURSEWORK

Object-Oriented Design and Programming	Analysis of Algorithms
Operating Systems	Bioinformatics
Relational Database Design and Analysis	Intro to Artificial Intelligence
Compiler Design, CFG, Turing Machines	Computer Graphics

RELEVANT EXPERIENCE

Computer Consultant, **Siena College I&TS**, Loudonville, NY, May 2004-present
- Assist students and faculty with software packages and Internet applications
- Answer incoming telephone support calls for I&TS's main office
- Troubleshoot and correct various computer problems

PRESENTATION

Statistical Learning for the Protein Secondary Structure Prediction Problem
Co-Author: Christian Damberg
Location: Hudson River Undergraduate Mathematics Conference, April 30, 2005

ADDITIONAL EXPERIENCE

Cashier, **McDonald's of Delmar**, NY August 2000 – April 2004
- Interacted with customers to take and give orders
- Stocked and cleaned main eating lobby

ACTIVITIES

Treasurer, **Computer Science Club**, Siena College, 2004-present
Recreated Nintendo Entertainment System game Hogan's Alley for the PC

Joseph C. Halvey
3 Poplar Road
Beacon, NY 12508
(845)831-2645
Joseph.Halvey@siena.edu

OBJECTIVE:

A position to learn more in the field of computer science, especially the software engineering aspects, where I can apply my problem solving skills to design programs to complete specific tasks.

EDUCATION:

Siena College, Loudonville, New York.
Undergraduate in Computer Science, minor in Business
Grade Point Average: 3.38/4.0 Computer Science Major; 2.70/4.0 Overall

RELEVANT EXPIERIENCE:

Classes in C/C++, Assembly language, Operating Systems, Databases, Object Oriented Programming, and Algorithm Theory.

ADDITIONAL EXPERIENCE:

St. John the Evangelist, St Joachim Rectory, Beacon, NY September 1998 – August 2002
- Skilled in interfacing with the public
- Responsible for locking church and rectory, and trusted with handling money.

Hudson Valley Stadium, Usher, Beacon, NY, June 2004 – August 2004

HONORS AND ACTIVITIES:

Star Rank Boy Scout, Troop 1, Beacon, NY
Franciscan Scholar, Siena College, 2002-2005

COMPUTER EXPERIENCE:

Outstanding C and C++, SQL and Oracle skills, Intermediate Ruby, RISC assembly language, and Scheme skills. Outstanding Word, Internet, Windows, and Linux skills.

Michael F. Jakubowski

Michael.Jakubowski@siena.edu
1350 Hawthorn Road
Schenectady, NY 12309
(518) 374-1276

OBJECTIVE: Obtain employment utilizing my knowledge of computers and expanding this knowledge to gain a better understanding of Information Technologies.

SUMMARY:

- Enrolled as a full-time Student at Siena College working toward BS in Computer Science.
- Proficient with JAVA, HTML/Internet, UNIX. and many Microsoft applications.

EDUCATION:

Siena College, Loudonville NY.
Fall Semester 2003 - Present
Currently working towards BS in Computer Science

TRANSFERRED CREDITS
Schenectady County Community College, Schenectady, NY.
Spring Semester 2002

San Jose State University, San Jose, CA.
Fall Semester 1997 – Spring Semester 1999

De Anza College, Cupertino, CA.
Fall Semester 1996 – Spring Semester 1997

University of Maryland. College Park, MD.
Fall Semester 1993 – Spring Semester 1995

COMPUTER WORK*:*

Software Engineering I, Computer Architecture and Assembly Language, Data Structures, Object-Oriented Design and Programming, Analysis of Algorithms, Operating Systems, Web Design, Database Management.

COMPUTER EXPERIENCE:

Software Engineer, Siena College, Loudonville, NY Fall Term 2005- present.

Additional Experience:

Northeast Parent and Child Society. Schenectady, NY. 1999-present.
Youth Care Counselor (Full Time)

The Game Gallery. Santa Clara, CA. 1996-1999.
Asst. Manager (Full Time)

Ellis Hospital, Schenectady, NY. 1995-1996.
Unit Clerk/Medical Data Entry (Full Time)

Vernell E. Mitchell

Present Address: (Until 5/17/05)
Siena College, SPOB 2469
515 Loudon Road
Loudonville, NY 12211
(518) 782-6032

Permanent Address:
628 South Pearl St. Apt. K
Albany, NY 12202
(518) 542-7246
vernell_e_mitchell@yahoo.com

EDUCATION

Siena College, Loudonville, NY, May 2006
    B.S. Computer Science, Minor: Psychology
    G.P.A: 3.0

EXPERIENCE

SIENA COLLEGE, Loudonville, NY   2003 – 2005
Residential Assistant
- Created a positive living environment for residents.
- Offered programs for residents to bond, have fun, and build a strong community.
- Mediated with residents to resolve conflicts and concerns.
- Presented residents with a strong example of leadership.

PLUG POWER, Latham, NY   Summer 2004
Intern/Co-op Data Analyst
- Brought a positive attitude and atmosphere to Plug Power.
- Analyzed data outputted from fuel cell stacks.
- Created charts and spreadsheets to discover discrepancies within the data.
- Wrote a Macro program to graph extensive spreadsheets with great efficiency.

GARELICK FARMS, Rensselaer, NY   Summer 2003
Intern
- Organized financial costs of all trucks and tractors using Microsoft Excel.
- Ordered routes and settlements of all trucks and tractors electronically.
- Updated all of the chemical products for inspection by the FDA.

ALBANY YMCA, Albany, NY   2001 – 2002
Membership Services Assistant
- Utilized Oracle system to update member information in database.
- Assisted members and non-members with services.
- Mediated with guests and management related to complaints.

COMPUTER SKILLS

Languages: C++, Scheme, familiar with AutoCAD & MIPS Assembly Language
Operating Systems: UNIX, Windows NT/2000/XP
Software: Microsoft Excel, PowerPoint, Word, Outlook, Visual C++, Visual Basic 6.0, EZWin

ACTIVITIES/AWARDS

Writer, Promethean, 2005-2006
HEOP Student Advisory Board, 2004-2005
Volunteer, Homeless Action Committee, 2004-2005
Volunteer, Regional Food Bank, 2003-2004
Computer Science Club, 2003-2004
Mentor, HEOP, 2003-2004
Campus Involvement Award, 2004
Rookie Resident Assistant of the Year, 2004

Anthony P. Ruotolo Jr.

8960 NY 66
Averill Park, NY 12018
(518) 674-2113
Email: AP15Ruot@Siena.edu

OBJECTIVE

To obtain a challenging position in the field of computer science.

EDUCATION

Siena College, Loudonville, NY.
B.S. in Computer Science, May 2006.
GPA: 3.7/4.0; Computer Science: 3.7/4.0

Hudson Valley Community College, Troy, NY.
Associate in Science, May 2004
GPA: 3.7/4.0; Computer science: 3.7/4.0; Phi Theta Kappa International Honor
Society

COMPUTER EXPERIENCE

- Programming in C, C++, Assembly, and BASIC
- Familiarity with UNIX and all Windows Operating Systems
- Knowledge of Microsoft Excel, Microsoft Office, Microsoft Visual C++, Microsoft
  Visual Basic, OpenGL, and Mathematica.

RELEVANT COURSE WORK

Analysis of Algorithms	Introduction to Computer Science
Assembly Language and Computer Architecture	Numerical Methods
Computer Graphics	Object-Oriented Design and Programming
Data Structures	Procedural Design-Programming

ADDITIONAL EXPERIENCE AND ACTIVITIES

- Okinawan Martial Arts, 2nd degree Blackbelt level, Dillenbeck's American Karate, 1993-
  Present
- Dishwasher and Cook, Weathervane Seafood Restaurant, East Greenbush, NY, 2002-
  2003

3.3: Glossary

Classic **Waterfall Model / Linear Sequential Model** – A systematic, sequential approach to software development that begins at the system level and progresses through analysis, design, coding, testing, and support.

Code – The symbolic arrangement of data or instructions in a computer program or the set of such instructions.

C++ – A compiled object oriented programming language.

Database – A collection of data arranged for ease and speed of search and retrieval.

EIN – *Environmental Intelligence Network* – Our team name for the six software engineers who will design and implement a home environmental regulation system available over the internet.

Gantt Chart – A chart that depicts progress in relation to time, of ten used in planning and tracking a project.

GUI – *Graphical User Interface* – An interface, which uses text box's and buttons to allow easy access of information by a mouse or other input device.

HTML – *Hypertext-markup language* – HTML is a markup language used to structure text and offers hypertext links between documents. It is the standard of the World Wide Web.

HTTPS – *Hypertext Transfer Protocol Secure* – This is a more secure version of HTTP. It is often used for credit card transactions over the web.

Internet – An interconnected system of networks that connects computers around the world via the TCP/IP protocol.

Java – An object oriented programming language.

Perl – A general-purpose interpreted procedural programming language developed for text manipulation and now used for a wide range of tasks including system administration, web development, network programming, GUI development, and more.

PHP – *Hypertext Processor* – PHP is a widely-used server-sided scripting language and can be embedded into HTML.

SSL – *Secure Socket Layer* –A cryptographic protocol which provides secure communications on the internet.