

# Software Plan

Requested by: Mr. Ken Swarner  
Systems Administrator  
Computer Science Department of Siena College

## TCP/IP Packet Identifier

### EdgeTech Development

“Always on the cutting edge”  
edgetechdevelopment@hotmail.com

Prepared by: Matthew DeCrescente – Team Leader  
Eric Fish  
Jill Foster  
John Mooney  
Das Nobel

September 26, 2004

**TCP/IP Packet Identifier  
Software Plan**

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## **1.1 Problem Definition:**

With the growth of Transmission Control Protocol/ Internet Protocol (TCP/IP), many do not understand how various types of information are stored in packets. Our client, Mr. Ken Swarner, has requested the enhancement of existing colorful web-based applications that were previously created by Mirage Inc. and Blue Technologies. Our objective is to enhance this program to make a better graphical interface using the high points of both the existing ones. Our client, Mr. Ken Swarner, likes the readability of Blue Technologies, but prefer the layout of Mirage. We will need to combine them into one. In addition to the changes with the interface, our clients would like us to enhance the program so that a packet can be clicked on and it will automatically load it into the program. The packet is provided in a text file from an external program, such as Ethereal. Also, if the packet is corrupt, we should be able to determine that and give a message.

## **1.2 System Justification:**

The purpose of our software is to allow the students of our client, Mr. Swarner, and also those of Dr. Lederman, to have a better understanding of what is contained in such packets as TCP and IP. Different packets are composed of other packets, and our software will allow users to clearly see this. Users will also learn what is within each packet and what each field does. This will enhance students' exposure to difficult material and will reinforce the current textbook models available to the students.

## **1.3: Goals for the Project**

The goal of the project is to enhance a Graphical User Interface (GUI), which deciphers TCP/IP and several other types of networking information packets. The GUI will take a single packet from the database and convert each part of it from binary to a user-friendly readable version.

As a team, our goal is to become further acquainted with TCP/IP and other network packets. We will gain knowledge of how information is represented within a packet. We will solve our client's problem by deploying the necessary software engineering techniques in a working environment.

We are excited as a team to face challenges of reading text files into the GUI and combining the two present interfaces into one improved interface.

## **1.4: Constraints on the Project**

The software client must be able to function on both a Linux and a Windows platform. Secondly, the software must be web-based and be able to read into a Hypertext Transfer Markup Language (HTML) format. Third, the different packets will be created in Ethereal. Finally, the deadline for this project is April 2005.

### **1.5: Functions to be Provided**

- 1) The GUI will import packets from the text files and will convert them from binary into a user-friendly language. By clicking on specific pieces of the packet, we will get an in-depth view of the IP packet or its related structures;
- 2) When importing text files, we will be able to refresh information to show new packets and their corresponding information;
- 3) There will be radio buttons to allow user to change bases of a number on a specific section within the packet;
- 4) We will keep documentation on all meetings with Mr. Swarner and post them on our website for referral.

### **1.6: User Characteristics**

The main users will be Mr. Swarner and Dr. Lederman. Mr. Swarner will be using this to investigate the structure of TCP/IP packets and Dr. Lederman will be using this as a teaching model to explain how TCP/IP packets are structured and how each field functions. Since this software will be web-based, users will be required to use Internet Explorer and/or Netscape.

### **1.7: Development/Operating/Maintenance Environments**

The system will be developed on the Siena College Software Engineering workstations. The operation of this system will be available on any computer system with Internet connections such as Internet Explorer and Netscape, for the program will be web-based. The maintenance of this system will be determined at a later date.

### **1.8: Solution Strategy**

Our team will use the Linear Sequential Model to develop our client's requested system; specifically the Classic Waterfall Method. This model consists of the following stages:

- 1) Software Plan: In this stage, the team determines the problem that the client is requesting to be solved;
- 2) Analysis: The team meets with the client to gather a comprehensive view of the requirements of the program to be designed;
- 3) Preliminary Design: The team translates the system requirements into software requirements;
- 4) Detailed Design: The team translates those software requirements into machine code and tests the code to correct errors. This stage of the project will take place in the Spring 2005 semester;
- 5) Acceptance Test: The software is installed and documentation is provided to the client to assist the use of the program. This stage will occur in the Spring 2005 semester.

## **1.9 Priorities of System Feature**

A key feature of our system is user-friendliness. Currently, Mr. Swarner is using a graphical interface that needs enhancements to improve its usability. He would like the interface to allow a user to click on a section of the packet to display the information associated with it. This information will be uploaded using text files. Previously, there were options to choose the base to display the values within the packet by either choosing binary, hexadecimal or any other base. We will be enhancing this feature to allow a user to change bases within a section of a packet at their convenience.

### **1.10: System Acceptance Criteria**

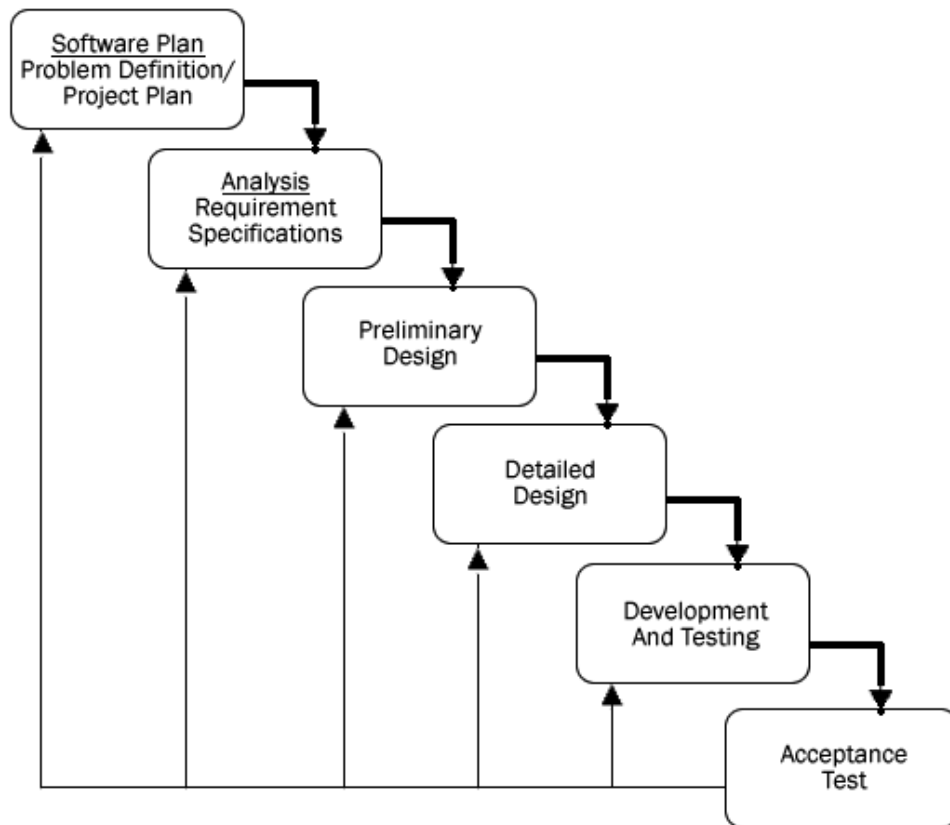
The web-based program will allow for a number of online activities and will, at minimum, allow:

- 1) Users to see the contents of a packet not in binary form;
- 2) Users to see model in a clear, precise manner;
- 3) Users to see the decomposition of a packet;
- 4) Users to pick apart the packet and see what is inside;
- 5) Users to access a menu containing a description of what each field does;
- 6) Access to everyone with a web application;
- 7) Users to see new information when a new packet is loaded and how the information changes;
- 8) Users to see when a file is corrupt and the application cannot decipher meaning.

### **1.11: Sources of Information**

The major source of information for this segment of the project resulted from meetings with our client, Mr. Swarner. Other sources of information include Dr. Lederman's class lectures, the Software Engineering class textbook *Software Engineering: A Practitioner's Approach* by Roger S. Pressman, and previous Software Engineering teams' projects, specifically "Mirage Inc." and "Blue Technologies".

## 2.1: Life-Cycle Model: Linear Sequential Method (Classic Waterfall)



### Software Plan

The purpose of the software plan is to define the problem and steps that will be taken to solve the problem.

### Analysis

Before the software can be developed, the software engineers must understand all information regarding the required function, behavior, performance, and interface of the software as stated by the client.

### Preliminary Design

Software design is a multi-step process that focuses on four distinct attributes of a program: data structure, software architecture, interface representations and procedural or algorithmic detail. The design process translates requirements into a representation of the software that can be evaluated for quality before the beginning of the coding process.

### Detailed Design

During this phase of the model, the design is translated into a machine-readable code.

### Acceptance Test

After code has been generated, testing begins. The testing process focuses on all aspects of the software, ensuring that all statements have been tested. That way, errors may be corrected and it can be established that defined input will produce actual results that agree with the required results.

### Support

Software support and maintenance allows changes and adaptations to be made. For example, a client may require functional or performance enhancements. Support reapplies each of the preceding phases to an existing program rather than a new one.

## **2.2: Organizational Structure**

EdgeTech Development is comprised of the following members:

<u>Name</u>	<u>E-mail Address</u>	<u>Phone Number</u>
Matt DeCrescente	matthew.decrescente@students.siena.edu	(518) 782-6365
Eric Fish	eric.fish@students.siena.edu	(518) 469-0351
Jill Foster	jill.foster@students.siena.edu	(518) 782-5872
John Mooney	john.mooney@students.siena.edu	(518) 782-5584
Das Nobel	dasnobel@yahoo.com	(518) 229-6350

EdgeTech Development is organized as follows for the TCP/IP Project:

Matt DeCrescente – Team Leader  
Eric Fish – Systems Administrator  
Jill Foster – Librarian  
John Mooney – Team Member  
Das Nobel – Webmaster

The team structure of EdgeTech Development is democratic decentralized. Decisions on problems and approaches are made by group consensus. There will be no hierarchy.

The work assignment for each member is as follows:

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

Systems Administrator – Maintains the team users' accounts and is responsible for software administration.

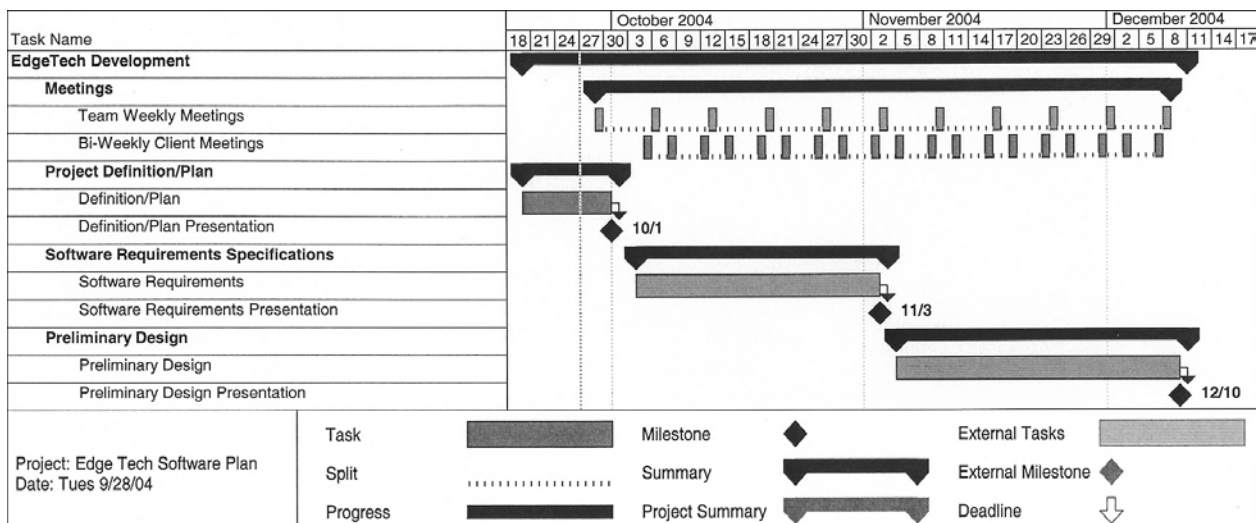
Webmaster – Creates and maintains the project web page.

Librarian – Maintains all team documents and records of all team meetings.

### 2.3: Preliminary Staffing and Resource Requirements

Our required software resources will include a database management system such as Oracle and a web page editor such as Dreamweaver, as the application will be web-based. We may also use a Hypertext Preprocessor (PHP) editor, JavaScript, Visual C++, Visual Basic, and Adobe Photoshop. The hardware resources we require include computer systems, printers, and services. Our primary resources include those directly involved with the project: Mr. Ken Swarner of the Siena College Computer Science Department, Dr. Timoth Lederman, our Software Engineering professor, and the two programs provided by Mirage Inc. and Blue Technologies.

### 2.4: Preliminary Development Schedule



### 2.5: Project Monitoring and Control Mechanisms

In addition to the bi-weekly client interviews, the project team members will meet as necessary to discuss where the project stands and to decide on the appropriate next steps for each member. The project team will assess the client's responses to the evolving Problem Definition/Project Plan, Software Requirements Specifications and Preliminary Design to verify that the ideas of EdgeTech Development correspond with the client's needs. Throughout our development, we will be continually testing our system. If at any time either the project team or the client establishes that the program is not meeting the necessary needs, the project team will take the proper steps in correcting the problem.

### 2.6 Tools and Techniques to be Used:

Computers with Dreamweaver, Microsoft Project, and Microsoft Office will be used. Our team will be using Dreamweaver and PHP to develop our web application, and C++ for the software that the web application will run from. Models provided by Mr. Swarner along with software engineering techniques will be used throughout the process of creating our system.



## **2.7: Programming Languages**

For the development of the TCP/IP project, we will be using Microsoft Visual Basic, C++, Perl, PHP, and for our website we will use JavaScript and HTML.

## **2.8: Testing Requirements**

There will be a thorough testing of this system throughout the development process. Team members as well as other students will also aid in the testing.

## **2.9: Supporting Documents Required**

Supporting documentation will be provided to our client on the following dates:

- 1) Problem Definition/Project Plan – September 28, 2004
- 2) Software Requirements Specifications – November 1, 2004
- 3) Preliminary Design – December 6, 2004

## **2.10: Manner of Demonstration and Delivery**

There will be many presentations given throughout the development process. This process will consist of PowerPoint presentations, speeches, demonstrations, and handouts. The purpose of our presentations will be to make sure our client's goals are being met, and to show what we have completed to date. Dates of presentations are as follows:

- 1) Presentation: Problem Definition/Project Plan – October 1, 2004
- 2) Presentation: Software Requirements Specifications – November 3, 2004
- 3) Presentation: Preliminary Design – December 8, 2004

## **2.11: Sources of Information**

The major source of information for this segment of the project resulted from meetings with our client, Mr. Swarner. Other sources of information include Dr. Lederman's class lectures, the Software Engineering class textbook *Software Engineering: A Practitioner's Approach* by Roger S. Pressman, and previous Software Engineering teams' projects, specifically "Mirage Inc." and "Blue Technologies".

### 3.1: Glossary of Terms

**GUI:**

*Graphical User Interface:* A user interface based on graphics (icons, pictures, and menus) instead of text; uses a mouse as well as a keyboard as an input device.

**Gantt Chart:**

A chart that depicts progress in relation to time, often used in planning and tracking a project

**HMTL:**

*Hypertext Transfer Markup Language:* A markup language used to structure text and multimedia documents and to set up hypertext links between documents, used extensively on the World Wide Web.

**Linear Sequential Model:**

Sometimes called the *classic life cycle* or the *waterfall model*, this model suggests a systematic, sequential approach to software development that begins at the system level and progresses through analysis, design, coding, testing, and support.

**Linux:**

A trademark for an open-source version of the UNIX operating system.

**Network:**

An openwork fabric or structure in which cords, threads, or wires cross at regular intervals.

**PHP:**

Hypertext Preprocessor (server-side scripting language)

**Packet:**

The unit of data sent across a network. "Packet" is a generic term used to describe a unit of data at any layer of the OSI protocol stack, but it is most correctly used to describe application layer data units ("application protocol data unit", APDU).

**Protocol:**

A standard procedure for regulating data transmission between computers.

**Software:**

Written programs, procedures, or rules and associated documentation pertaining to the operation of a computer system and that are stored in read/write memory.

**TCP/IP:**

*Transmission Control Protocol/Internet Protocol:* A protocol for communication between computers, used as a standard for transmitting data over networks and as the basis for standard Internet protocols.

**Matthew DeCrescente**  
matt@decrescente.com

**Present Address**

Siena College, SPOB 3421  
515 Loudon Rd.  
Loudonville, NY 12211  
(518) 878-9473

**Permanent Address**

7 Cheshire Ridge  
Clifton Park, NY  
(518) 878-9473

**OBJECTIVE**

To acquire a position in the field of Computer Science; with particular interest in database management or web design.

**EDUCATION**

**Siena College**, Loudonville, NY  
B.S. in Computer Science, Minor in Business, May 2005  
GPA: 3.23/4.0; Presidents List, Deans List

**COMPUTER EXPERIENCE**

- Programming in C++ and some Assembly.
- Familiarity with UNIX, Linux and Windows Operating Systems.
- Knowledge of Microsoft Excel, PowerPoint, Word, Access and Internet.
- Database background in Oracle/SQL/O2

**RELEVANT COURSES**

Procedural Design-Programming, Data Structures, Object-Oriented Design and Programming, Computer Architecture and Assembly Language, Data Base Management, Analysis of Algorithms, Discrete Structures I & II, Programming Languages, Networks and Communications, Web Design and Maintenance, System Administration.

**RELEVANT WORK EXPERIENCE**

**DeCrescente Distributing Co., *Summer Help***, Mechanicville, NY, Summer 1998-2004

- Used graphics software to create advertisement signs.
- Converted paper filing system to electronic filing system using Excel and Access.
- Set up new computers and printers.

**Siena College I&TS, *Student Consultant***, Loudonville, NY, Fall 2003 –Present

- Head Student Consultant, Fall 2004.
- Answered incoming calls at I&TS Main Help Desk to provide technical assistance to faculty, staff, and students
- Maintained computers and related machines such as scanners and printers
- Provided technical support to the students at Siena College using my computer skills

**ACTIVITIES**

***Member***, Computer Science Club, Siena College, 2003 - Present

## Eric D. Fish

### OBJECTIVE

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To obtain a full-time position in programming, database administration and/or system administration utilizing my computer science and management skills.

### EDUCATION

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<b>B.S., Computer Science</b> GPA: 3.59 (4.0 in Computer Science)	Siena College	Loudonville, NY	2005
<b>B.A., Philosophy</b> GPA: 3.51	Siena College	Loudonville, NY	1995
<b>A.A.S., Business Administration</b> GPA: 3.51	Hudson Valley Community College	Troy, NY	1987

### COMPUTER EXPERIENCE

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Programming Languages: C/C++, Visual Basic, Scheme, Ruby, Perl, html, and Assembly  
Operating systems: Microsoft 3.11, 95, 98, XP, 2000, NT, Unix, and Linux  
Areas studied: Object Orientated design and analysis, Database design and analysis, System Administration, Web Design

### RELATIVE EXPERIENCE

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<b>System Administrator Intern</b>	Siena College, Loudonville, NY	2004 – Present
<ul style="list-style-type: none"><li>• Managed multiple servers, workstations, and x-terminals</li><li>• Designed and programmed specific applications in response to department/client needs</li><li>• Installed and debugged new and/or upgraded software on server and client platforms ensuring compliance with site licenses</li><li>• Installed, configured, and performed troubleshooting on all hardware, peripherals, and equipment necessary to meet system objectives</li><li>• Performed troubleshooting on networks, systems, applications, and other problems</li></ul>		

### OTHER EXPERIENCE

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<b>Encoder</b>	Citizens Bank, Albany, NY	2003 – Present
<ul style="list-style-type: none"><li>• Processed and balanced all branch work</li><li>• Operated NCR encoding machines</li></ul>		
<b>Locomotive Engineer</b>	CSX Transportation, Selkirk, NY	1998 – Present
<ul style="list-style-type: none"><li>• Operated locomotives in the switching, building, and delivering of trains to customer and inter-change locations in compliance with state and federal regulations</li><li>• Maintained train documentation including MSDS and emergency response guides</li></ul>		
<b>General Manger</b>	Bruegger's Bagels, Durham NC	1996 – 1998
<ul style="list-style-type: none"><li>• Managed all aspects of the operation of a food service establishment including but not limited to day-to-day operation, human resources, inventory control, and balance sheet preparation</li><li>• Increased weekly sales form \$16,000 to \$23,000. Increased margin-to-point from 28% to 39%. Reduced employee turnover from 15 weeks to 39 weeks</li></ul>		

- |                             |   |             |
|-----------------------------|---|-------------|
| Various Positions           | KeyCorp, Albany, NY   | 1987 - 1995 |
| <b><i>Coordinator I</i></b> | Encoding Department   |             |
|                             | <ul style="list-style-type: none"> <li>• Managed 171 employees in the daily operation of the Encoding Department</li> <li>• Implemented automated error correction system utilizing DB2 to update customer's accounts with detail error explanation</li> </ul>  |             |
| <b><i>Supervisor</i></b>    | Accounting department   |             |
|                             | <ul style="list-style-type: none"> <li>• Managed 21 employees in the preparation of all daily, monthly, quarterly, and annual financial reports</li> <li>• Lead team to research over 50,000 erroneous general ledger accounts worth over \$600,000 in lost money</li> </ul>                          |             |
| <b><i>Team Leader</i></b>   | Account Reconciliations   |             |
|                             | <ul style="list-style-type: none"> <li>• Managed 12 employees in the reconciliation and customer support of 4,000 large dollar (daily balances in excess of \$25,000,000) accounts</li> </ul>   |             |
| <b><i>Facilitator</i></b>   | Items Processing  |             |
|                             | <ul style="list-style-type: none"> <li>• Acted as liaison between Items Processing staff and management to improve morale and reduce turnover</li> <li>• Identified problems and offered solutions to them</li> <li>• Ensured management's objectives for performance were met or exceeded</li> </ul> |             |

ACTIVITIES

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- Member, Phi Sigma Tau, 1994 – Present
- Member, Computer Science Club, 2003 - Present

## Jill A. Foster

jill.foster@students.siena.edu

Present Address  
Siena College  
SPOB 3495/515 Loudon Road  
Loudonville, NY 12211  
(518) 782-5872

Permanent Address  
4 Mallard Road  
Glenmont, NY 12077  
(518) 465-5918

### OBJECTIVES

To obtain a position in the field of computer science; mainly focused on database management.

### EDUCATION

**Siena College**, Loudonville, NY  
B.S. in Computer Science, Minor in Business, May 2005

### EXPERIENCE

**Student Intern IT Department, GE Advanced Materials**, Waterford, NY, June 2004 – August 2004

- Performed analysis on SAP Business Warehouse application for global systems
- Implemented a documentation package significantly improving new developer initialization time
- Created test plans to validate global order report and global customer cockpit
- Led projects to assist and enhance functionality of end users as well as generating files used globally
- Performed analytical evaluations based upon data extracts from global systems for various business reports
- Served as liaison between business, finance and management
- Initiated and directed meetings between global cross functional teams
- Worked in SAP Business Warehouse, SAP 3.1 and 4.6 Business Objects and WebIntelligence universes

**Consultant, Siena College Information & Technology Services**, Loudonville, NY, August 2003 – Present

- Answered calls at I&TS Main Help Desk to provide technical assistance to Siena community
- Maintained computers and related machines such as scanners and printers
- Provided one-on-one technical support to the students using my computer and communication skills

### ADDITIONAL EXPERIENCE

**Cashier & Food Prep, Pepsi Café, Siena College**, Loudonville, NY, October 2001 – Present

**Vendor, Michelle's Deli**, Albany, NY, May 2001 – August 2003

**Caterer, Siena College Presidential Scholars**, Loudonville, NY, October 2002 – Present

**Caterer, Siena College Dinner & Open Mic Night**, Loudonville, NY, March 2002

**Bartender, Siena College 21 Club**, Loudonville, NY, September 2003 – February 2004

### ACTIVITIES

**Treasurer, Siena College Student Council Class of 2005**, Siena College, December 2003 – Present

**Member, Siena College Student Finance Committee**, Siena College, December 2003 – Present

**Coordinator & Volunteer, Siena College Have a Heart Food Drive**, Siena College, February 2004

**Volunteer, Equinox Thanksgiving Dinner**, Albany, NY, November 1997 – Present

**Cashier, Siena College 21 Club**, Siena College, March 2004

**Volunteer, Class of 2005 Recycling Program**, Siena College, November 2003

### RELEVANT COURSE WORK

- Introduction to Computer Science, Procedural Design and Programming, Data Structures, Assembly Language and Computer Architecture, Object-Oriented Design and Programming, Operating Systems, Database Management, Advanced Database, Communications & Networks, Analysis of Algorithms
- Financial Accounting, Managerial Accounting, Organization & Management, Marketing, Managerial Finance I, Macroeconomics

### COMPUTER SKILLS

- Programming in C/C++, HTML, XML, MIPS Assembly Language, Scheme, SQL, O2
- Proficient in Windows & Internet
- Proficient in Excel, PowerPoint, Word

# John F. Mooney

## **Present address:**

Siena College  
515 Loudon Road  
Loudonville, NY 12211-1462  
Telephone: (518) 265-3151

## **Permanent address:**

6 Old English Road  
Slingerlands, NY 12159  
Telephone: (518) 439-6541  
E-mail: [john.mooney@siena.edu](mailto:john.mooney@siena.edu)

## **OBJECTIVE**

To obtain a position in the field of computer science; special interest in Web Design.

## **EDUCATION**

**Siena College**, Loudonville NY  
B.S. in Computer Science, Minor in Business, May 2005

## **COMPUTER EXPERIENCE**

**Languages:** C, C++, Oracle/SQL, MIPS Assembly, Scheme, HTML, Javascript, VB  
**Operating Systems:** UNIX, Windows 3.x/9x/NT/2000/XP  
**Software Packages:** Microsoft Office, Microsoft Visual C++, EZWin, Macromedia Dreamweaver/Fireworks/Flash, Adobe Photoshop/Acrobat/Distiller  
**Database Management:** Oracle 9i, Microsoft SQL Server/CE

## **RELEVANT COURSEWORK**

Procedural Design and Programming, Data Structures, Computer Architecture and Assembly Language, Object-Oriented Design and Programming, Analysis of Algorithms, Database Management, Communications and Networks, Bioinformatics, Web Design, E-Marketing

## **RELEVANT EXPERIENCE**

**Sales Associate, Computer Renaissance**, Loudonville, NY, January 2001-September 2001

- Sold computer hardware/software to customers.
- Assisted in cleaning/packaging new & used hardware parts.

**Project Supervisor, Bioinformatics Class**, Siena College, Loudonville, NY, Fall 2004

- Organized and supervised group during program planning process
- Developed in depth program used for gene sequencing and string matching
- Displayed results in HTML table showing matches/mismatches in different gene strings

**IT Specialist Intern, Federal Highway Administration**, Albany, NY, July 2004-Present

- Perform end-user workstation hardware and software updates as required.
- Assisted in programming/debugging several Web-based ASP.NET applications.
- Designed/Implemented Web pages for Intranet site as well as Internet site.

## **ADDITIONAL EXPERIENCE**

**Customer Service Representative, Crossgates Mall**, Albany, NY, December 1999-July 2001

**Sales Associate, Timex Store**, Albany, NY, March 2001-October 2003

**Shipping Supervisor, Symmetry**, Slingerlands, NY, Summers: 2000-Present

