

Cardinal Banc Web Site

By

Kelton Wheatley & Jeremy Monroe

Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

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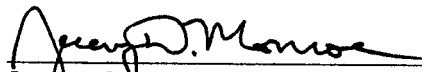
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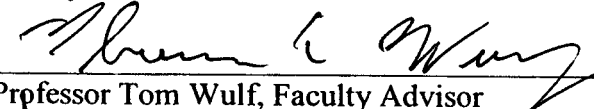
Kelton Wheatley

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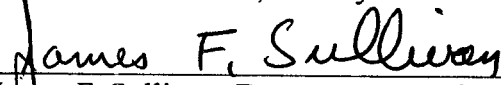
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James F. Sullivan, Department Head

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Date

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Table of Contents

Section	Page
Acknowledgements	i
Table of Contents	ii
List of Figures	v
Abstract	vi
1. Statement of the Problem	1
2. Description of the Solution	1
2.1 Web site	1
2.2 Database	2
2.3 User Profiles	3
2.3.1 Potential Clients	3
2.3.2 Cardinal Banc Employees	3
2.3.3 Managers	3
2.3.4 Associates	4
2.3.5 Office Staff	4
2.4 Design Protocols	4
2.4.1 Organizational Scheme	5
2.4.2 Interface Design	5
2.4.3 Color Scheme	5
3. Statement of Deliverables	6
4. Design and Development	7
4.1 Timeline	7
4.1.1 Senior Design I Spring 2003	7
4.1.2 Senior Design II Summer 2004	7
4.1.3 Senior Design III Winter 2005	8
4.2 Software and Hardware Requirements	8
4.2.1 Software Requirements	9
4.2.2 Hardware Requirements	9
4.3 Budget	9
5. Proof of Design	10
5.1 Unsecured Section	10
5.1.1 Home Page	10
5.1.2 Mortgage Loans Section	11
5.1.2.1 Conforming Loans Page	11
5.1.2.2 Non-Conforming Loans Page	11
5.1.2.3 Residential Mortgage Indexes	11
5.1.2.4 Commercial Loans Page	12
5.1.2.5 Reverse Mortgage Page	12
5.1.3 Resource Center Section	12
5.1.3.1 What's New Page	12
5.1.3.2 Loan Process Page	13
5.1.3.3 Free Credit Report Page	13

5.1.3.4 Mortgage Glossary Page	13
5.1.3.5 Calculator Pages	14
5.1.3.6 Frequently Asked Questions Page	18
5.1.4 About Us Section	18
5.1.4.1 About Our Company Page	18
5.1.4.2 Mission Statement Page	18
5.1.4.3 Client Testimonials Page	18
5.1.4.4 Meet Our Associates Page	19
5.1.5 Apply For Loan Section	19
5.1.5.1 Apply Page	19
5.1.5.2 Pre-Qualify Page	19
5.2 Secured Section	20
5.2.1 Associate Login Page	20
5.2.1.1 Secure Page	21
5.2.2 Manager Section	22
5.2.2.1 Register New User Page	22
5.2.2.2 Edit Users Pages	23
5.2.2.3 Edit Mission Statement Page	23
5.2.2.4 Edit Frequently Asked Questions Page	24
5.2.2.5 Add/Edit Client Testimonials Page	25
5.2.2.6 Go To Associates Page	26
5.2.3 Associates Section	26
5.2.3.1 Add/Edit Client Testimonial Page	26
5.2.4 Office Staff Section	27
5.2.4.1 Generate Client Report Page	27
5.3 Site Navigation	28
5.3.1 JavaScript Top Navigation Menu Bar	28
5.3.2 Side Navigation Bar	29
5.3.3 Bread Crumb Navigation	29
6. Testing Procedures	30
6.1 End User Testing	30
6.1.1 Potential Clients	30
6.1.2 Cardinal Banc Employees	31
6.1.2.1 Managers	31
6.1.2.2 Associates	31
6.1.2.3 Office Staff	32
7. Conclusions and Recommendations	32
7.1 Conclusions	32
7.2 Recommendations	33
Appendix A - Site Hierarchy	
A 1. Cardinal Banc Web Site - Public Section	35
A 2. Cardinal Banc Web Site - Secured Section	36
Appendix B - Database Structure	37
Appendix C - Stored Procedures	
C 1. ClientInfo	38

C 2. DeleteTestimonial	38
C 3. DeleteUser	38
C 4. GetFAQ	38
C 5. GetMission	38
C 6. GetRole	39
C 7. GetTestimonial	39
C 8. GetUser	39
C 9. GetUserBio	39
C 10. GetUserTestimonial	39
C 11. InsertTestimonial	39
C 12. LookupUser	40
C 13. RegisterUser	40
C 14. SelectFullUser	40
C 15. SelectUserProfile	40
C 16. UpdateFAQ	40
C 17. UpdateMission	41
C 18. UpdateProfile	41
C 19. UpdateTestimonial	41
C 20. UpdateUser	41
C 21. GetClientData	42

References	43
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List of Figures

Figure 1. Budget	9
Figure 2. Home page	10
Figure 3. Link to glossary	11
Figure 4. What's new page	13
Figure 5. Mortgage glossary	14
Figure 6. Loan payment calculator	15
Figure 7. Simple loan calculator	15
Figure 8. Debt consolidation calculator	16
Figure 9. Interest only loan payment calculator	16
Figure 10. Renter mortgage affordability calculator	17
Figure 11. Loan comparison calculator	17
Figure 12. Associate biography	19
Figure 13. Pre-qualify for a loan page	20
Figure 14. Associate login page	21
Figure 15. Register new user	22
Figure 16. Edit user biography	23
Figure 17. Edit mission statement	24
Figure 18. Add frequently asked questions	25
Figure 19. Add/edit client testimonials	26
Figure 20. Client reporting page	27
Figure 21. Top Navigation Bar	28
Figure 22. Logged in user display	29
Figure 23. Left navigation bar	29
Figure 24. Bread-crumbs navigation	29

Abstract

The Cardinal Banc Web site is an informative, user friendly Web site designed to increase a local businesses customer base. Cardinal Banc Mortgage Company did not have a true Web presence; their original site was a one-page text site with basic information. The Cardinal Banc Web site will be used as an advertising medium that will help customers with mortgage decisions by way of marketing tools and valuable information. The Web site contains a database backend that will be utilized for data collection, reporting capabilities and updating the Web site. M6.net Web hosting will host the site www.cardinalbanc.com. Some of the latest software tools were utilized to build the site: ASP.NET, C#, HTML, JavaScript and Microsoft SQL Server 2000. The Web site is broken down into a secure and non-secure site. The secure site allows Cardinal Banc employees to run reports and update and publish information to the Web site. The non-secure site allows potential clients to obtain company information, mortgage information, submit an online application & use marketing tools. The Web site was built with the customer as the focus, so it was created with a very organized, user friendly, simple navigation scheme.

Cardinal Banc Web Site

1. Statement of the Problem

Cardinal Banc is a mortgage broker that specializes in the sale of home and commercial mortgages and refinancing solutions. It currently has a one page Web page that is extremely amateur resulting in a very minimal presence on the Internet. Having presence on the Web is a key factor for any company to increase sales and build a larger client base. The majority of business Cardinal Banc obtains is currently through telemarketing and advertisement mailers (11).

Cardinal Banc currently does not have a method to gather and collect valuable client information, which could further enhance the advertisement of the company.

2. Description of the Solution

Web presence will greatly increase marketing capabilities of Cardinal Banc (2). Combined with the other marketing tools, the Web site will enhance its marketing strategy to increase the number of clients and ultimately increase the number of loans it sells. (8) With the addition of a Web site to its set of marketing tools, Cardinal Banc is now able to direct potential clients to its Web site for additional information about the company and for help with obtaining and expediting a loan. We utilized our combined skill levels to create an informative and dynamic Web site, with a database back-end, for Cardinal Banc.

2.1 Web site

The Web site is built within the Microsoft .NET framework using ASP.NET. C# was used for the server-side code and XHTML, JavaScript, and XML was used for the client-side code. The Web site is very easy to navigate and user friendly. After

considering multiple hosting companies, the associates of Cardinal Banc chose M6.net Web hosting for its value and reliability. M6.net was chosen because they offer support for site created in ASP.NET, SQL Server 2000, and have very competitive pricing. The Web site also adheres to the following Americans with Disabilities Act design guideline: a text equivalent for every non-text element (1).

The Web site contains two separate sections, an unsecured section and a secured section. The unsecured section is for public information and is accessed by potential client. It contains information about Cardinal Banc, such as contact information, associate biographies, company history, types of mortgages offered, and a mission statement. This section also has informative mortgage tools the user can use to help make a decision about the loan they are trying to obtain. These tools include a multiple mortgage calculators, frequently asked questions, a downloadable application, the ability to obtain a free credit report, and a mortgage glossary.

Cardinal Banc associates use the secure section of the site. They are prompted for a user id and password when they attempt to access the secured section. Within this section, the associates can dynamically update the site or update their personal biography profile.

2.2 Database

The relational database back-end was created using Microsoft's SQL Server 2000. See Appendix B. The database uses stored procedures to select, insert, update, and delete information throughout the site. See Appendix C. Throughout the Web site, the database will populate different pages with the stored information. The database will also hold the associate information needed to login to the secured section of the site.

2.3 User Profiles

There are two categories of application users. They are potential clients and Cardinal Banc employees.

2.3.1 Potential Clients

The potential clients are the primary users of the Cardinal Banc Web site. The potential clients are in the market to purchase a home, refinance a mortgage, or obtain information about mortgages. They will need to have the following level of knowledge to use the Web site:

- The potential clients will need to have access to the Internet, and working knowledge of the Internet and Web browsers.
- They should also know how to navigate simple Web pages, such as use of a hyperlink and how to use the address bar.
- They should know what the 'FORWARD' and 'BACK' buttons, on their Web browser, do.

2.3.2 Cardinal Banc Employees

Cardinal Banc employees include three levels of users: managers, associates and office staff.

2.3.3 Managers

Managers have all access rights to the site. They are able to login to the secure section of the site and update content on the Web pages, such as the 'Frequently Asked Questions' and 'Associate Biography' pages. Managers have access to add a new user to the site, remove a currently registered user, and are able to run reports on the data

collected in the database. Managers consist of top-level employees of Cardinal Banc. All of the managers can be considered average computer users. The managers were trained on operating the functionality of the Web site. They will also need to have access to the Internet and a working knowledge of a Web browser.

2.3.4 Associates

Associates have limited access to the secure section of the site. They are able to login to the secure section of the site and update their personal biography and the 'Client Testimonials' page. Associates consist of loan officers within the company. They are considered average computer users. The associates were trained on operating the functionality of the Web site. They will also need to have access to the Internet and a working knowledge of a Web browser.

2.3.5 Office Staff

The Office Staff has limited access rights on the secure section of the site. They are able to login and run reports on the data collected, such as whether or not the client needs to be contacted. Office Staff consist of clerical employees of Cardinal Banc. All of the office administrators can be considered average computer users. The office administrators were trained on the reporting functionality of the Web site. They will also need to have access to the Internet and a working knowledge of a Web browser.

2.4 Design Protocols

We coded the majority of the Web site using the Visual Studio .NET Interface Design Environment (IDE). This IDE allowed us to utilize IntelliSense to easily select from an array of object options and it made it easier to distinguish between the server-side code behind and the actual HTML Web forms. This ultimately, in our opinion, made

the site easier to code. Within the .NET Framework, we chose ASP.NET and the C# language for the server-side code and XHTML, JavaScript, and XML for the client-side code. We accessed the SQL Server 2000 database by using ADO.NET.

2.4.1 Organizational Scheme (See Appendix A - Site Hierarchy)

2.4.2 Interface Design

The users of the site must be connected to the Internet and will access the site through a Web browser. They will move about the site using the top and side navigation bars. When the user passes the mouse pointer over the navigation bar, a drop down will display a list of links to click.

Certain pages within the site will also have a left navigation section. These links will display on the left hand side of the Web page. When a user clicks one of these links, they will be taken to the appropriate page.

A final navigation bar will let the user know where they are within the site. This is known as 'Bread Crumb' navigation. When a user clicks on a link in the site and is redirected to that page, the 'Bread Crumb' navigation bar displays their location.

2.4.3 Color Scheme

The color scheme we have chosen for the site is maroon, black, and white. We originally had the site in red but later decided that the maroon was not as bright as red and could still be related to the cardinal bird feather, which is in the logo. The foreground color is a gray against a white background. This will allow a clear readability throughout the site.

The top navigation bar changes from black to gray when a user scrolls the mouse pointer over the link. The dropdown section of the top navigation changes from gray to

maroon to indicate the link is selected.

3. Statement of Deliverables

This section contains a statement of deliverables that will be implemented into the Web site by the time it is completely finished.

1. A Web site designed to deliver information about Cardinal Banc, a Cincinnati based Mortgage Company
2. The user interface is written in ASP .NET. The front-end, client-side, will use HTML, JavaScript, and XML which will allow for simple navigation.
3. The back-end, server-side, coding will be done in C# to communicate between the client and server.
4. The employees of Cardinal Banc will have a secure login, which will be authenticated against a SQL Server 2000 database using a hash password and salt, to keep the passwords secure.
5. The users of the site will be able to complete the following tasks:
 - Web Site Users:
 - Obtain important information about the company and what products and services it offers
 - Fill out a form to determine if they pre-qualify for a loan
 - Access calculators to determine how much they can afford to borrow
 - View information and photos of all the associates at Cardinal Banc
 - Cardinal Banc Associates:
 - Login to a secure section of the site to update two pages of the site - Personal biography information and the 'Client Testimonials' page

- Cardinal Banc Managers:

- Login to a secure section of the site and add or remove users
- Update four pages of the site - 'Frequently Asked Questions', 'Client Testimonials', 'Associate Bios', and 'Mission Statement'

- Office Administrators:

- Run informational reports on collected client data

4. Design and Development

The next sections describe the project's timeline, overall budget with hardware, software, and book costs.

4.1 Timeline

This section discusses the timeline, including the submission date for the final Design Freeze and the Final Presentation.

4.1.1 Senior Design I Spring 2003

Weeks 1-5

- Research
- Progress Report
- Problem/Area of Inquiry

Week 6-10

- Write Proposal Draft
- Present Proposal

4.1.2 Senior Design II Summer 2004

Weeks 1-5

- Draft of Project Description and Intended Use and User Profile

- Meet with customer to finalize design
- Progress Report
- Design Web site
- Design Database

Week 6-10

- Progress Report
- Incorporate Database into the Web site
- Implement Security
- Documentation
- Draft Design Freeze
- Submit Design Freeze
- Present Working Prototype (August 23, 2004)

4.1.3 Senior Design III Winter 2005

Weeks 1-10

- Complete Project Functionality (Weeks 1-7)
- Complete Troubleshooting (Weeks 7-10)
- Submit Preliminary Documentation (Week 8)
- Complete Testing of Database (Week 9)
- Complete Testing of Web site (Week 10)
- Submit Final Documentation and Demonstrate Final Project (Week 10)

4.2 Software and Hardware Requirements

This section lists the hardware and software requirements used to build the site.

4.2.1 Software Requirements

- Microsoft Visual Studio .NET Enterprise Edition 2003
- Microsoft SQL 2000 Server
- Jasc Paint Shop Pro 8

4.2.2 Hardware Requirements

- Dell Dimension 4600 Series
- Canon PowerShot S300

4.3 Budget

Item	Cost
Development Budget	
Microsoft SQL Server 2000 Developer Edition (9)	\$37
Microsoft Visual Studio .NET Enterprise Edition 2003 (3)	1780
Jasc Paint Shop Pro 8 (5)	93
Canon PowerShot S300	265
Reference Material	200
Developmental Total	\$2375
Production Budget	
Dell Dimension 4600 Series (4)	\$1,528
M6.net Web hosting (6)	113/year
Microsoft SQL Server 2000 (7)	699
5 Custom Webwinder.com Calculators (10)	138
Internet Explorer 6.0	Free
Production Total	\$2478
(Project Total)	\$4853

(Figure 1. Budget)

5. Proof of Design

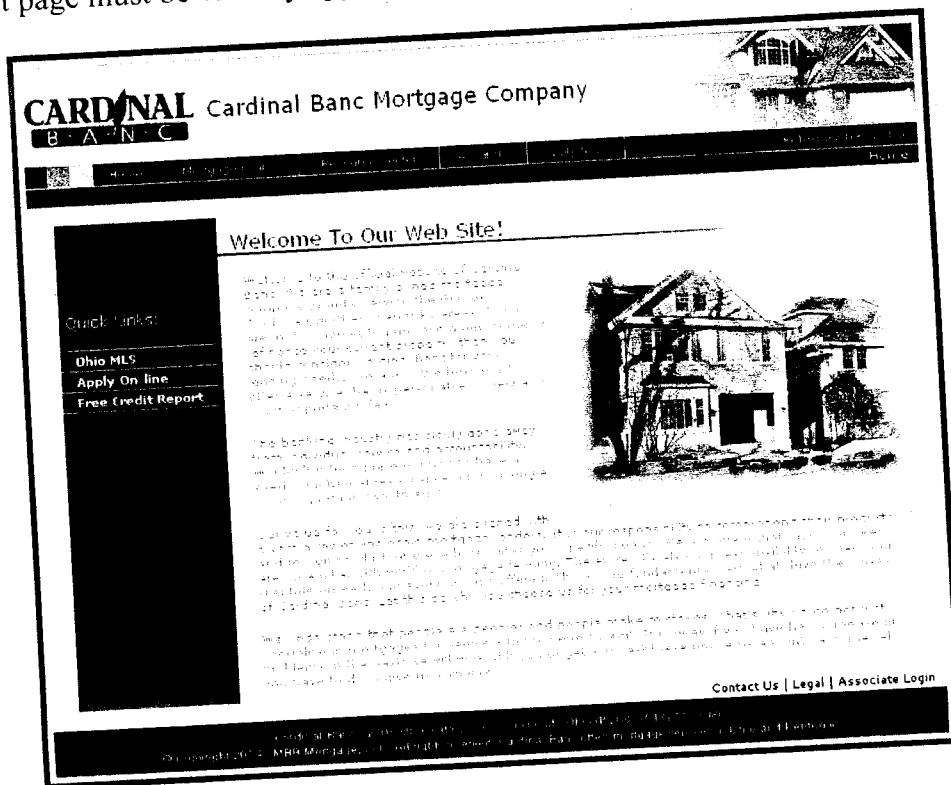
The next section shows in detail how the deliverables of the project were fulfilled and the challenges we encountered.

5.1 Unsecured Section

This section describes the unsecured part of the Web site.

5.1.1 Home Page

The first page of the site is what sets people's first impression. Therefore, this important page must be visually appealing and pleasant to look at. See Figure 2.



(Figure 2. Home page)

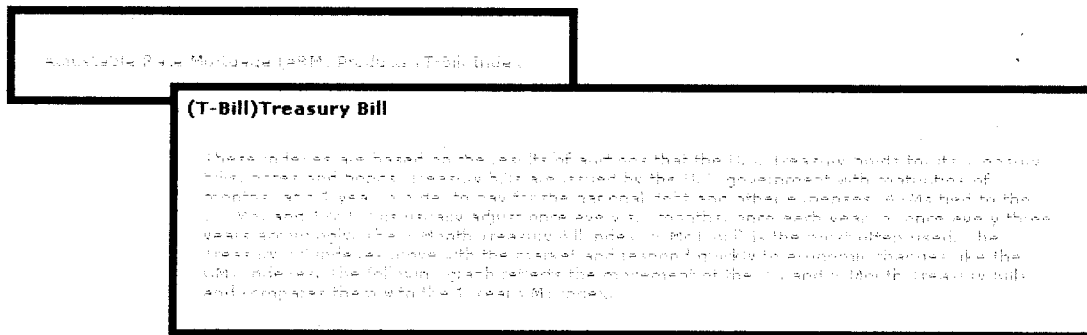
We designed this page to be straightforward and tell the user exactly what Cardinal Banc does and what it represents. It is the starting point for entry into the site, so it was built with easy navigation in mind.

5.1.2 Mortgage Loans Section

This section contains the pages for the Mortgage Loans section of the site. This section explains to the user what types of loans Cardinal Banc offers, and gives them a description of each individual loan.

5.1.2.1 Conforming Loans Page

The Conforming Loans page describes all the residential conforming loans offered through Cardinal Banc. These types of loans are the most popular, and most often requested. The page was written in HTML and includes hyperlinks, to the Mortgage Glossary page, of the terms that are most commonly inquired about. See Figure 3.



(Figure 3. Link to glossary)

5.1.2.2 Non-Conforming Loans Page

The Non-Conforming Loans page was written in HTML and describes all the residential non-conforming loans offered through Cardinal Banc.

5.1.2.3 Residential Mortgage Indexes

The Residential Mortgage Indexes page was written in HTML and informs the users of all the residential mortgage indexes offered through Cardinal Banc.

5.1.2.4 Commercial Loans Page

This page contains a link to the Investors Capitol Corporation. This company is the main company Cardinal Banc uses for commercial loans.

5.1.2.5 Reverse Mortgage Page

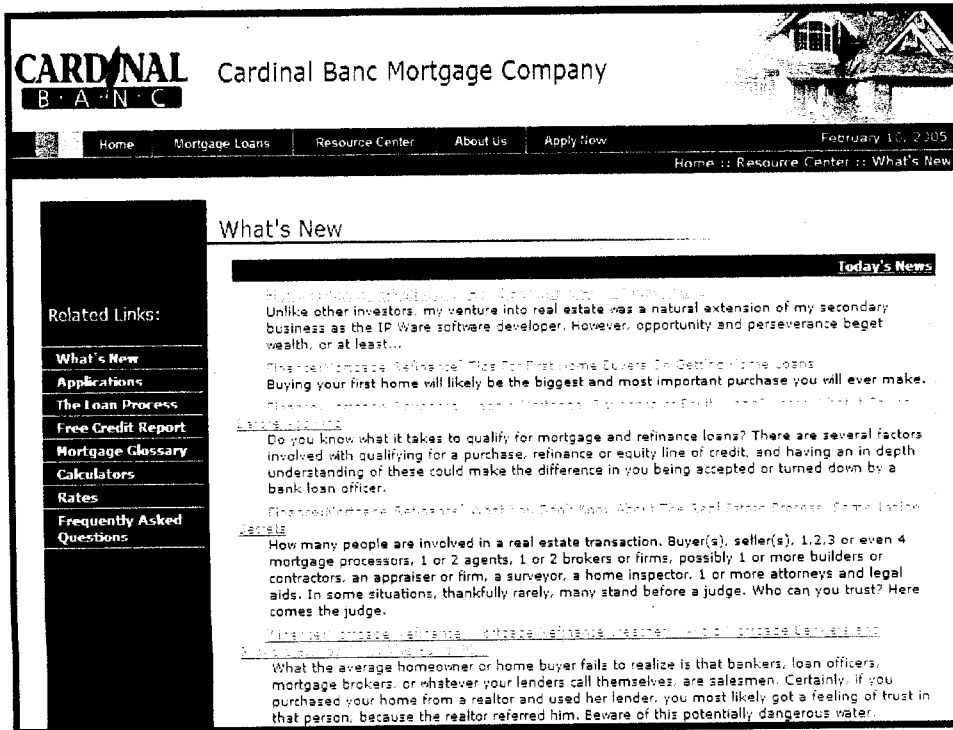
This page was written in HTML and informs the users about the reverse mortgage option offered through Cardinal Banc.

5.1.3 Resource Center Section

This section contains valuable information, which users and potential clients, can use to learn about the mortgage process. It also allows them to utilize important mortgage tools to help throughout the loan process. The pages in this section include a “what’s new” page, a loan process page, and the ability to obtain a free credit report, a mortgage glossary, numerous mortgage calculators, and a frequently asked questions page.

5.1.3.1 What’s New Page

The What’s New page list numerous news articles about the mortgage industry. It utilizes an RSS Feed from <http://ezinearticles.com/rss/Finance-Mortgage-Refinance.xml>. This page will automatically be updated when ezinearticles.com updates the feed, giving the site continuously changing content and keeping users of the site informed on related current mortgage news. See Figure 4.



(Figure 4. What's new page)

5.1.3.2 Loan Process Page

The Loan Process page was written in HTML and informs the user on the steps which are taken to complete a mortgage loan. It walks them through a step-by-step process from getting qualified to closing the loan.

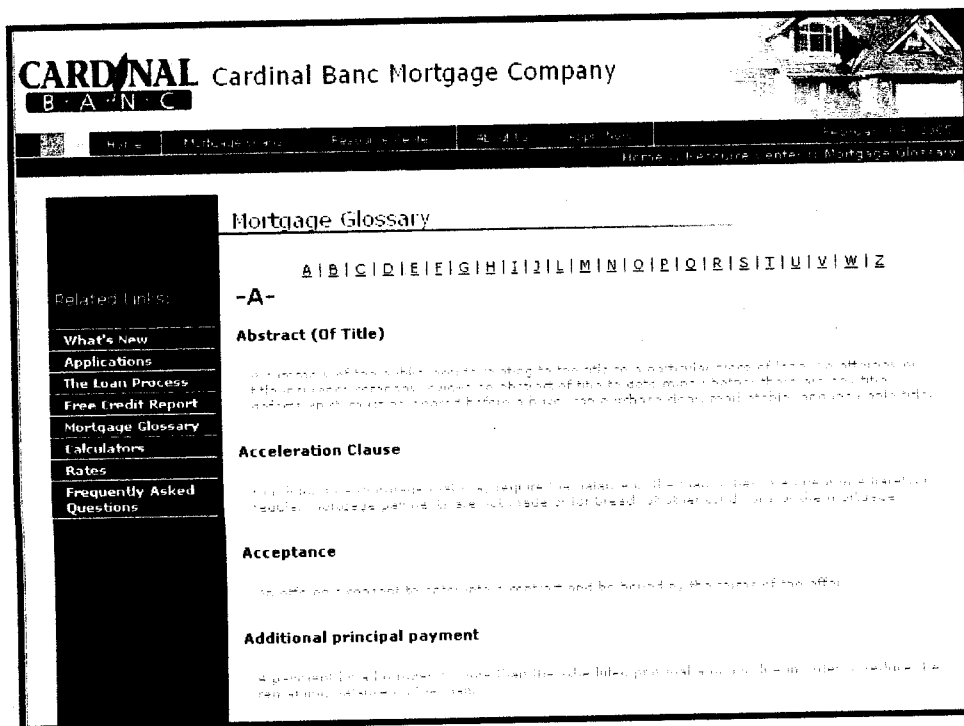
5.1.3.3 Free Credit Report Page

The Free Credit Report page is an HTML page that explains how important a credit score is, why and how the score is used, and what impacts the credit score. The page also links to the Contact Us page, so the user can get in contact with an associate from Cardinal Banc to obtain the free credit report.

5.1.3.4 Mortgage Glossary Page

The Mortgage Glossary page keeps the user informed by displaying a numerous amount of mortgage related definitions. The page, written in HTML, utilizes <a> tag

bookmarks to jump to each letter of the alphabet. See Figure 5.



(Figure 5. Mortgage glossary)

5.1.3.5 Calculator Pages

The Calculator pages allow the user to select from six different calculators to help with their mortgage decision. The list of calculators includes:

- **Loan Payment Calculator** - This calculator will compute a loan's payment amount at various payment intervals -- based on the principal amount borrowed, the length of the loan and the annual interest rate. Then, once you have computed the payment, click on the "Create Amortization Schedule" button to create a report you can print out. See Figure 6.

Loan Payment Calculator

This calculator will compute a loan's payment amount at various payment intervals based on the principal amount borrowed, the length of the loan, and the annual interest rate. If an error has been computed the payment, click on the "Create Amortization Schedule" button to create a report of your payment plan.

How much are you looking to borrow? _____

What is the loan's annual interest rate? _____

What is the term of the loan in years? _____

What is the payment interval? Monthly ▾

Date 1 payment period prior to date of 1st payment: January ▾ 1 ▾ 2005 ▾

This is the amount of your payment: _____

(Figure 6. Loan payment calculator)

- Simple Loan Calculator - This calculator will compute a loan's monthly payment amount. See Figure 7.

Simple Loan Calculator

This calculator will compute a loan's monthly payment amount.

Amount financed: _____

Interest Rate: 6.00% ▾

Number of years: 30 ▾

Monthly payment: _____

(Figure 7. Simple loan calculator)

- Debt Consolidation Calculator - This calculator will show you how consolidating all of your debts into one lower interest loan can reduce your monthly payments. See Figure 8.

Debt Consolidation Calculator

This calculator will show how your monthly payments will change if you consolidate one or more existing loans into a new loan. Enter each one of the debts that you would like to pay off along with how long spreading principal balances, interest (both fixed and variable), or credit payments. Once you have all your debts entered, make any desired changes to the "New Loan" information, default entries and then click on the "Calculate" button.

Credit Type	Balance	Monthly Payment	Interest Rate	Annual Fees
Mortgage ▼				
Mortgage ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				
Credit Card ▼				

Additional Credit: _____ Purpose: _____

New Loan Information

Enter data about your planned new loan with the exception of the proposed monthly balance.

Proposed interest rate (%) 9

Loan term 30 Years ▼

Estimated closing costs (\$) 2300

(Figure 8. Debt consolidation calculator)

- Interest Only Loan Payment Calculator - This calculator will compute a loan's monthly interest-only payment. See Figure 9.

Interest Only Loan Payment Calculator

This calculator will compute a loan's monthly interest-only payment.

Principal: _____

Interest Rate: _____

Monthly interest payment: _____

(Figure 9. Interest only loan payment calculator)

- Renters Mortgage Affordability Calculator - This calculator will estimate the size of a mortgage you could afford based on the size of your monthly rent payment, the down payment you could afford, and on the anticipated property taxes and homeowner's insurance. See Figure 10.

The screenshot shows a web-based calculator titled "Renter Mortgage Affordability Calculator". It includes several input fields for:

- Monthly rent payment
- Down payment amount
- Anticipated property taxes
- Anticipated homeowner's insurance

 Below these fields are two buttons: "Estimate Mortgage Size" and "Clear". At the bottom, there are labels for "Down payment", "Monthly rent", "Property taxes", and "Homeowner's insurance", each followed by a horizontal line representing an input field.

(Figure 10. Renter mortgage affordability calculator)

- Loan Comparison Calculator - This calculator will calculate the monthly payment and interest costs for up to four loans -- all on one screen -- for comparison purposes. See Figure 11.

The screenshot shows a web-based calculator titled "Loan Comparison Calculator". It features a table with four rows for comparing loans. The columns are:

- Principal
- Interest Rate
- # of Payments
- Compute (with a "Compute" button)
- Monthly Payment
- Total Interest
- Reset (with a "Reset" button)

 Each row contains a horizontal line for input in the first three columns, and a "Compute" button in the fourth column. The "Monthly Payment" and "Total Interest" columns are currently empty.

(Figure 11. Loan comparison calculator)

5.1.3.6 Frequently Asked Questions Page

This page saves the users, and associates, time by listing frequently asked questions about the mortgage loan process. This page uses XML and the ASP .NET XMLReader to allow the Cardinal Banc associates to dynamically update the page by adding additional questions as they receive them. The questions are stored in the database and use a stored procedure to update and select the questions to be displayed. See Appendix C 4 and C 16. The XML is then formatted using an XSLT so the page maintains the same look-and-feel as the rest of the pages.

5.1.4 About Us Section

The About Us section explains to the user a brief company history including the company's mission statement. It also lists client testimonials and an associate biography page.

5.1.4.1 About Our Company Page

The About Our Company page was written in HTML and explains the company history and a brief description of the business.

5.1.4.2 Mission Statement Page

The Mission Statement page displays the company mission statement and is updatable by the associates and managers of Cardinal Banc from the secure section of the site. The content is pulled from the database using a stored procedure. See Appendix C 5.

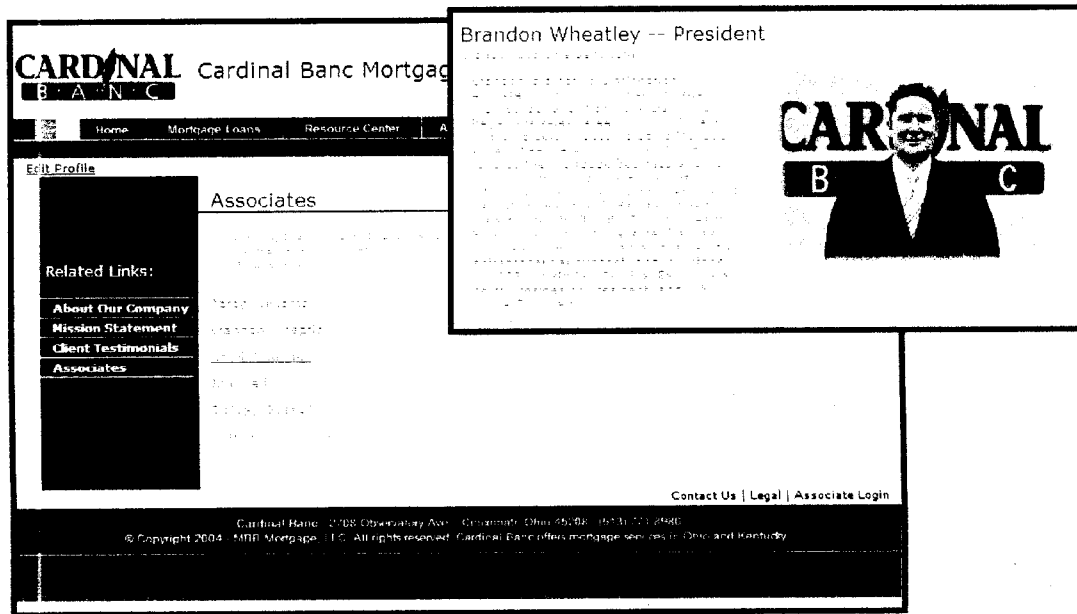
5.1.4.3 Client Testimonials Page

The Client Testimonials page allows the associates and managers to post any positive feedback they receive from clients. This page is updateable by the associates and managers from the secure section of the site. The testimonial list is obtained from the

database as XML, using a stored procedure, and is formatted using an XSLT.

5.1.4.4 Meet Our Associates Page

The Meet Our Associates page displays a list of all the current associates working at Cardinal Banc. The list is pulled from the database as XML, using a stored procedure, and is formatted using an XSLT. When a manager registers a new user, the name of the associate is automatically added to this list. See Figure 12.



(Figure 12. Associate biography)

5.1.5 Apply For Loan Section

5.1.5.1 Apply Page

This page will include a PDF application in which the user can print off, fill out, and mail to Cardinal Banc to expedite the loan process.

5.1.5.2 Pre-Qualify Page

This page uses a JavaScript form to determine if a user would pre-qualify for a

loan. The page also contains a disclaimer stating that the final decision lies with Cardinal Banc and they may or may not qualify. See Figure 13.

See if you pre-qualify for a loan*

This tool will help you determine if you qualify for a loan. It is not a guarantee of a loan. The results are based on the information you provide. The final decision is made by Cardinal Banc. All outputs are estimates and should not be used for anything other than making a rough estimate of what you might expect to receive. The results are based on the information you provide and do not take into account your credit history or other factors. The results are for informational purposes only and do not constitute an offer of a loan.

Purchase Information	Inputs	Outputs
Purchase price:	60000	
Down payment:	% v 10	
Loan amount:		
Annual interest rate:	8	
Length of the mortgage in years:	30	
Payment Information	Inputs	Outputs (Monthly)
Monthly principal & interest payment:		
Annual property taxes:	\$ v 1020	
Annual insurance:	\$ v 300	
Annual PMI:	% v .5	
Monthly association fees:		
Monthly payment (PITI):		
Tax deductible portion of payment:		

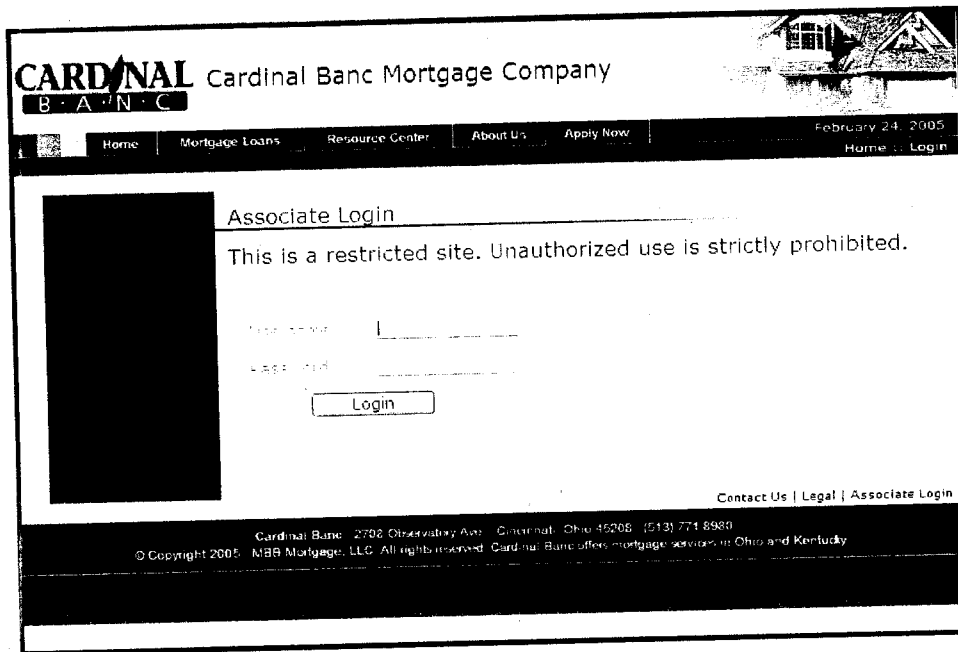
(Figure 13. Pre-qualify for a loan page)

5.2 Secured Section

This section describes the unsecured part of the Web site.

5.2.1 Associate Login Page

The Associate Login page allows the Cardinal Banc associates to login to the secure section of the site. See Figure 14.



(Figure 14. Associate login page)

Once the associate types in the user id and password, the server side code runs through the Forms Authentication process to see whether or not the associate is registered and, if so, creates an authentication ticket with the correct credentials for the site. The ticket holds the version number, user name, creation date, expiration date of sixty-minutes, a persistent cookie flag, and the user role. The page then encrypts the ticket that is passed between the client and the server, and then creates the cookie using the information in the ticket, and finally adds the cookie to the outgoing cookie collection. After this is complete, and the user is authenticated, the page redirects to a secure page to verify the user role.

5.2.1.1 Secure Page

The secure page is a placeholder for server-side code. The page does not include any HTML, only the server code. Once the user is redirected to this page, it uses the 'GetRole' stored procedure to determine what role the user has and redirects them to the appropriate page. See Appendix C 6. The user will either be redirected to the Manager

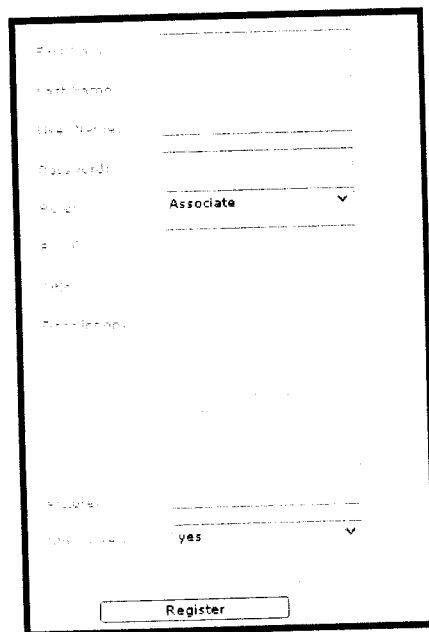
section, Associate section, Office Staff section, or, if they are not authenticated, they are redirected back to the login page.

5.2.2 Manager Section

The Manager section is only accessible by authenticated users with the 'Manager' role. This page welcomes the logged in user to the secured site and lists all the available functions the user is able to perform. This list includes - register a new user, edit user profiles, edit the mission statement, edit the frequently asked questions page, add a client testimonial, and finally, it allows them to go to the associates page.

5.2.2.1 Register New User Page

The Register New User page allows a manager to register a new user to access the secured section. See Figure 15.



The screenshot shows a registration form with the following fields and controls:

- First Name:
- Last Name:
- User Name:
- Password:
- Role: (dropdown menu)
- Phone:
- Address:
- City:
- State:
- Zip:
- Country:
- Confirm Password:
- Gender: (dropdown menu)
- Register button:

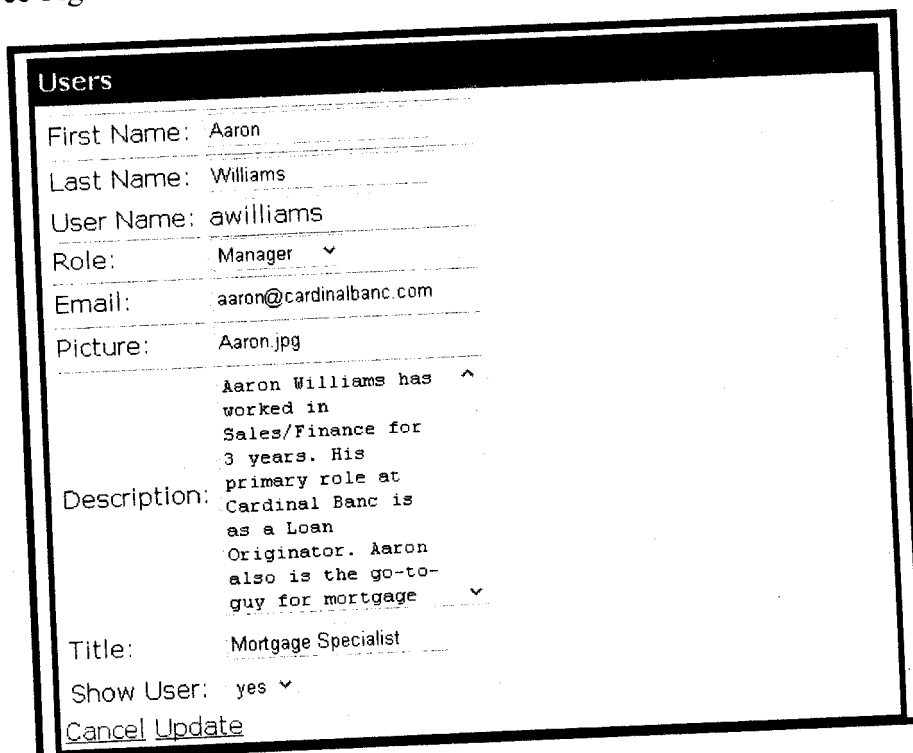
(Figure 15. Register new user)

Once all the fields are filled out, the server-side code first creates a hash and a salt for the password, then uses the 'RegisterUser' stored procedure to add the new user to the database. See Appendix C 13. Once a user is registered, they have immediate access to

the secured site, and they are automatically added to the 'Meet Our Associates' page.

5.2.2.2 Edit Users Page

The Edit Users page allows the manager to edit all of the registered user's profiles. See Figure 16.



The screenshot shows a web form titled "Users" with the following fields and values:

First Name:	Aaron
Last Name:	Williams
User Name:	awilliams
Role:	Manager
Email:	aaron@cardinalbanc.com
Picture:	Aaron.jpg
Description:	Aaron Williams has worked in Sales/Finance for 3 years. His primary role at Cardinal Banc is as a Loan Originator. Aaron also is the go-to-guy for mortgage
Title:	Mortgage Specialist
Show User:	yes
Cancel Update	

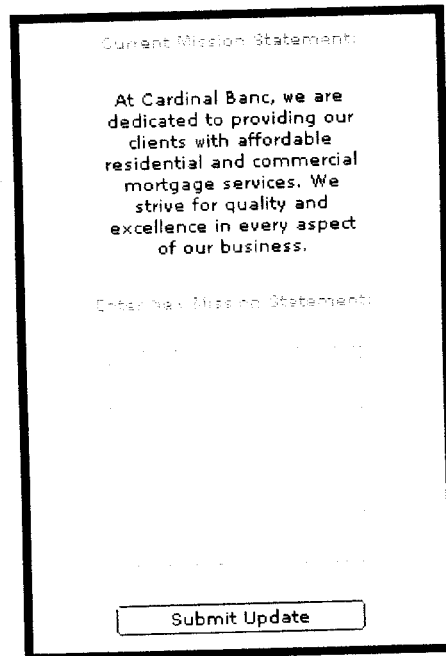
(Figure 16. Edit user biography)

This page uses a Data List to display all the users. The Data List is populated using an OleDb Data Adapter and the 'SelectFullUser' stored procedure. See Appendix C 14. The manager also has access to delete a user from this page. The Data List uses an OleDbDeleteCommand along with the 'DeleteUser' stored procedure to accomplish this task. See Appendix C 3. The Data List uses an OleDbUpdateCommand along with the 'UpdateUser' stored procedure to accomplish the update task. See Appendix C 20.

5.2.2.3 Edit Mission Statement Page

The Edit Mission Statement page allows the manager to update the mission

statement. See Figure 17.



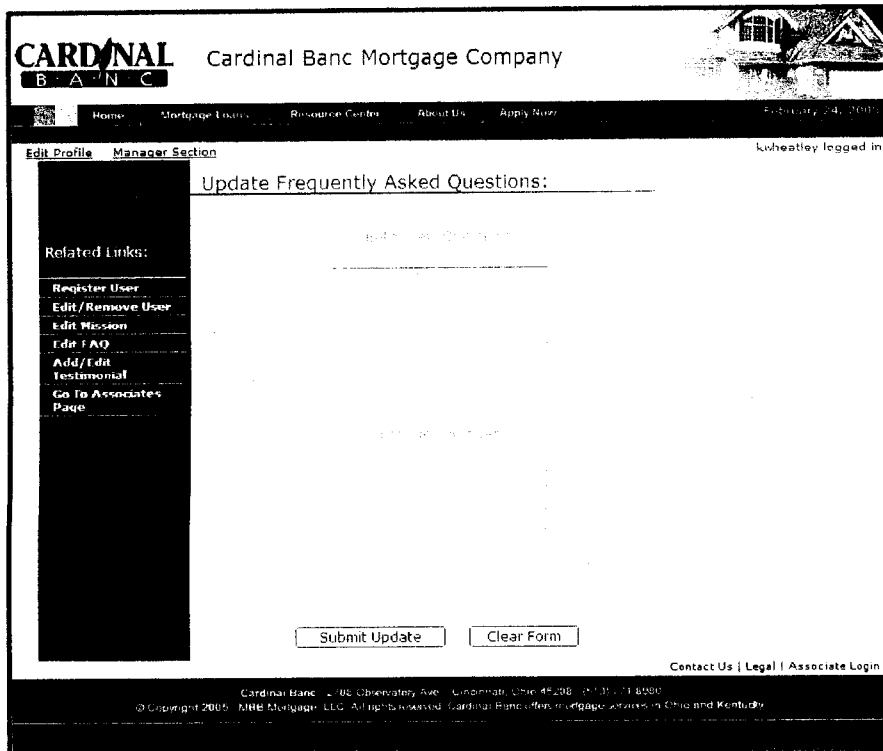
The screenshot shows a web form titled "Edit mission statement". At the top, it displays the "Current Mission Statement" as: "At Cardinal Banc, we are dedicated to providing our clients with affordable residential and commercial mortgage services. We strive for quality and excellence in every aspect of our business." Below this, there is a section for the "Enter New Mission Statement" with a large text area containing several lines of faint, illegible text. At the bottom of the form is a "Submit Update" button.

(Figure 17. Edit mission statement)

This page uses the 'UpdateMission' stored procedure to update the database with the user name of the user making the change, the statement, and a date/time stamp of the time of the update. See Appendix C 17.

5.2.2.4 Add Frequently Asked Questions Page

The Edit Frequently Asked Questions page allows the managers to add a frequently asked question to the Web site. See Figure 18.



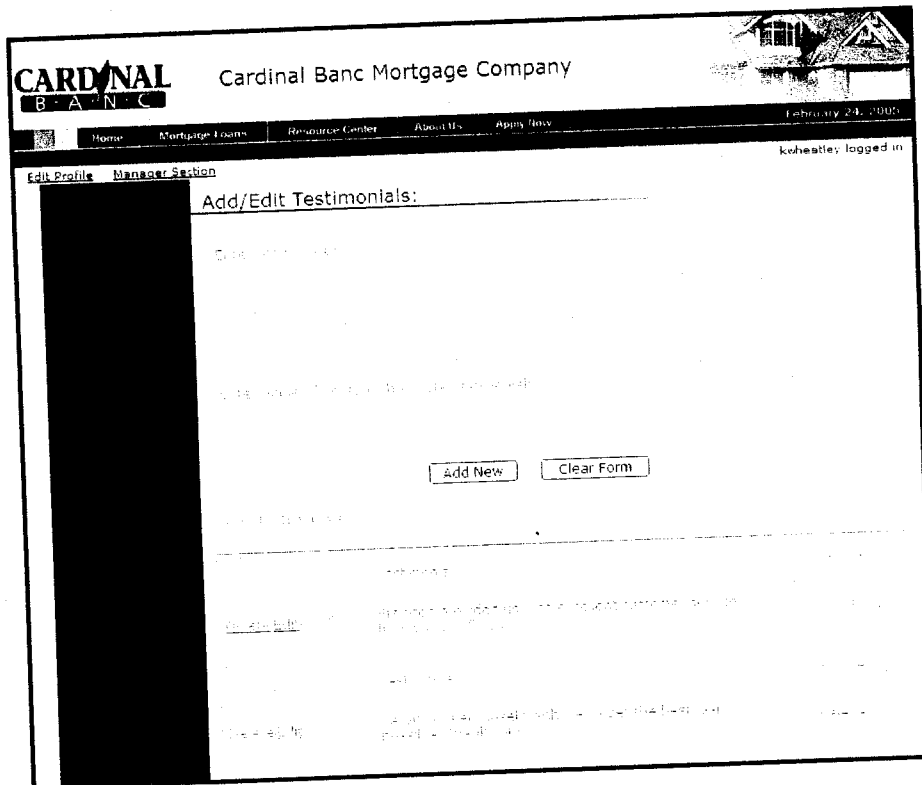
(Figure 18. Add frequently asked question)

The page uses the 'UpdateFAQ' stored procedure to execute the database insert.

See Appendix C 16.

5.2.2.5 Add/Edit Client Testimonial Page

This page allows the managers to add any client testimonials they have received during the course of processing the loan. See Figure 19.



(Figure 19. Add/edit client testimonials)

The page utilizes a SQL Data Adapter along with three stored procedures to update, insert, and delete the client testimonials. See Appendix C 19, C 11, and C 2. It also uses the 'GetTestimonial' stored procedure along with a SQL Command to display any testimonials the manager has put on the Web site. See Appendix C 7.

5.2.2.6 Go To Associate's Page

This page allows the manager to quickly jump to the associate's page.

5.2.3 Associate Section

This section describes the tasks that can be done by the associates of Cardinal Banc.

5.2.3.1 Add/Edit Client Testimonial Page

This page allows the associates to add any client testimonials they have received during the course of processing the loan. It is the same page as the manager uses. (See

Figure 19. Add/Edit Client Testimonials)

5.2.4 Office Staff Section

This section describes the tasks that can be done by the office staff of Cardinal Banc.

5.2.4.1 Generate Client Report Page

This page allows the office staff, and managers, to run a report based on who has contacted Cardinal Banc through the 'Contact Us' page. The page front-end displays two calendars using the .NET Calendar class. See Figure 20.

Please select a start and finish date and click 'Generate Client Report' button.

Start Date:

Jan	February 2005						Mar
Sun	Mon	Tue	Wed	Thu	Fri	Sat	
30	31	1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	
27	28	29	30	1	2	3	
4	5	6	7	8	9	10	

Finish Date:

Jan	February 2005						Mar
Sun	Mon	Tue	Wed	Thu	Fri	Sat	
30	31	1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	
27	28	29	30	1	2	3	
4	5	6	7	8	9	10	

(Figure 20. Client reporting page)

These calendars allow the office staff or manager to select a start and end date as the parameters of the report. The dates are then passed through the query string and used as stored procedure parameters. The back-end uses an SqlDataAdapter and the 'GetClientData' stored procedure to display the information on the screen. See Appendix

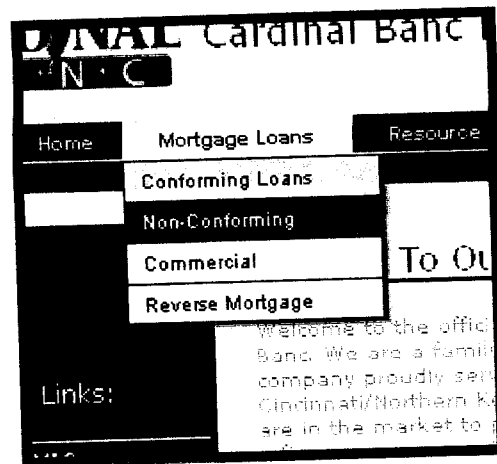
C 21.

5.3 Site Navigation

This section explains the types of navigation used within the Web site.

5.3.1 JavaScript Top Navigation Menu Bar

The top navigation bar was written in JavaScript. It allows the user to select which section of the Web site they would like to browse to. The menu extends down to display the sections when the user scrolls the mouse pointer of a header section. The menu is 90% opacity of the original color, which makes it slightly see-through. The navigation bar is consistent throughout the entire site and uses the color scheme set by Cardinal Banc. See Figure 21.



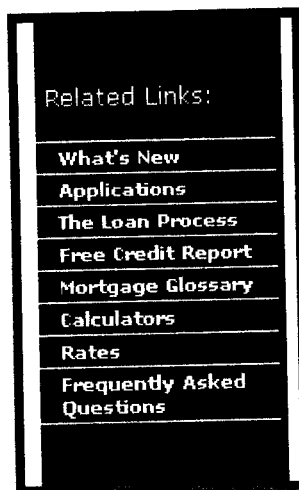
(Figure 21. Top navigation bar)

Also within the top navigation section are link buttons for authenticated users to edit their personal profile and the quickly jump back to the page in which they are authenticated for. It also displays the user id of the logged in user. These displays will only appear on the site when a user is logged in. See Figure 22.

(Figure 22. Logged in user display)

5.3.2 Side Navigation Bar

The side navigation bar gives the user 'Quick Links' and 'Related Links' choices depending on what page they are viewing. See Figure 23.



(Figure 23. Left navigation bar)

The side navigation changes with each page to display links, which is related to the topic of the page. This gives the user easy access to the associated pages for each topic of interest. It uses JavaScript to list the links on each page.

5.3.3 Bread Crumb Navigation

Each page has a Bread Crumb Navigation which displays what page the user is currently viewing and informs them what each parent page is in relation to the child page.

See Figure 24.



(Figure 24. Bread-crumb navigation)

It also allows the user to quickly jump back to the parent pages. Each page, and its related link, is kept in a XML file called Web.sitemap. It utilizes a NavPath control, which is included in the project as a referenced dll, designed by LoudCarrot Software Company.

6. Testing Procedures

The development of the Web site and the back end database included careful planning which helped reduce the number of coding syntax and logic errors. The developers carefully tested all code upon implementation verifying that there were no issues. All code was also carefully tested after each update and modification that was performed.

Testing was performed on the following Microsoft operating systems to ensure functionality: Windows 98, Windows 2000 and Windows XP. To ensure functionality testing was also performed on the following browsers: Netscape 7.0 and Microsoft Internet Explorer versions 5.0 and later.

6.1 End User Testing

Testing was performed on two different groups: Potential Clients and Cardinal Banc Employees.

6.1.1 Potential Clients

Thorough end user testing was performed on potential clients. This testing included requesting end users of various levels of computer experience to surf the Web site and provide feedback on any areas that they had issues with. This feedback was then utilized to revise aspects of the site as needed. As careful planning was performed in the development stages of the Web site there was not much revision required as a result of

the feedback obtained from this group of end users. All users included in the test found the Web site very easy to navigate through.

6.1.2 Cardinal Banc Employees

Thorough end user testing was performed on Cardinal Banc Employees. This testing included the verification and validation of the functionality of the secure pages of the site. The testing included verification of the capability to perform the functions that each of the user groups have rights to. The end user testing included testing on the following user groups: Managers, Associates and Office Staff.

6.1.2.1 Managers

Thorough end user testing was performed on the Manager user group. Several Managers of Cardinal Banc were included in this testing. This testing included verifying that the user could successfully log into the secure site. The managers also tested editing their own profile and resetting their passwords. This testing also included verifying the managers could successfully register a new user, edit user profiles, edit the mission statement, edit the frequently asked questions page, add a client testimonial, and get back to the associates page. The results from the end user testing performed on the managers did not provide any required fixes. This was due to the careful planning and testing that was performed during the development of the Web site and database.

6.1.2.2 Associates

Thorough end user testing was performed on the Associates user group. Several Associates of Cardinal Banc were included in this testing. This testing included verifying that the user could successfully log into secure site. The associates also tested editing their own profile and resetting their passwords. The testing also included verifying that

the associate users could successfully update the client testimonials page.

6.1.2.3 Office Staff

Thorough end user testing was performed on the Office Staff user group. Several office staff members of Cardinal Banc were included in this testing. This testing included verifying that the user could successfully log into the secure site. The office staff members also tested editing their own profile and resetting their passwords. The testing also included verifying that the office staff users could successfully run the reports. The results from the end user testing performed on the office staff did not provide any required fixes. This was due to the careful planning and testing that was performed during the development of the Web site and database.

7. Conclusions and Recommendations

7.1 Conclusions

This project was created in response to Cardinal Banc's need for a Web site to benefit their business. We created a site that was visually appealing to clients and loaded with important mortgage information and tools. The Web site was also created with a secured site that allows Cardinal Banc employees to login and perform various functions. A database back-end allows the employees to perform updates to the Web site. To prepare the project we used Microsoft Visual Studio .NET Enterprise 2003, Microsoft SQL 2000 Server, Web Browser (Internet Explorer 6), and Jasc Paint Shop Pro 8. The project was completed over the three quarter Senior Design sequence. The budget of the project was approximately \$5,113.00, of course the project would have cost much more if labor charges were applied. The project fulfilled all of the deliverables that we set in the Design Freeze. Testing was performed on all user groups to ensure the functionality of

the final product.

7.2 Recommendations

While working on this project we encountered some challenges. Working with ASP.NET was one of these challenges. ASP.NET was rather new to both of us, so we had to address this from the start of the project. It took about three weeks for us to familiarize ourselves with using ASP.NET; this was accomplished by using online information and books. It would be recommended for future projects to use a product that you are already familiar with or take the time for learning the software into account for the timing of the project.

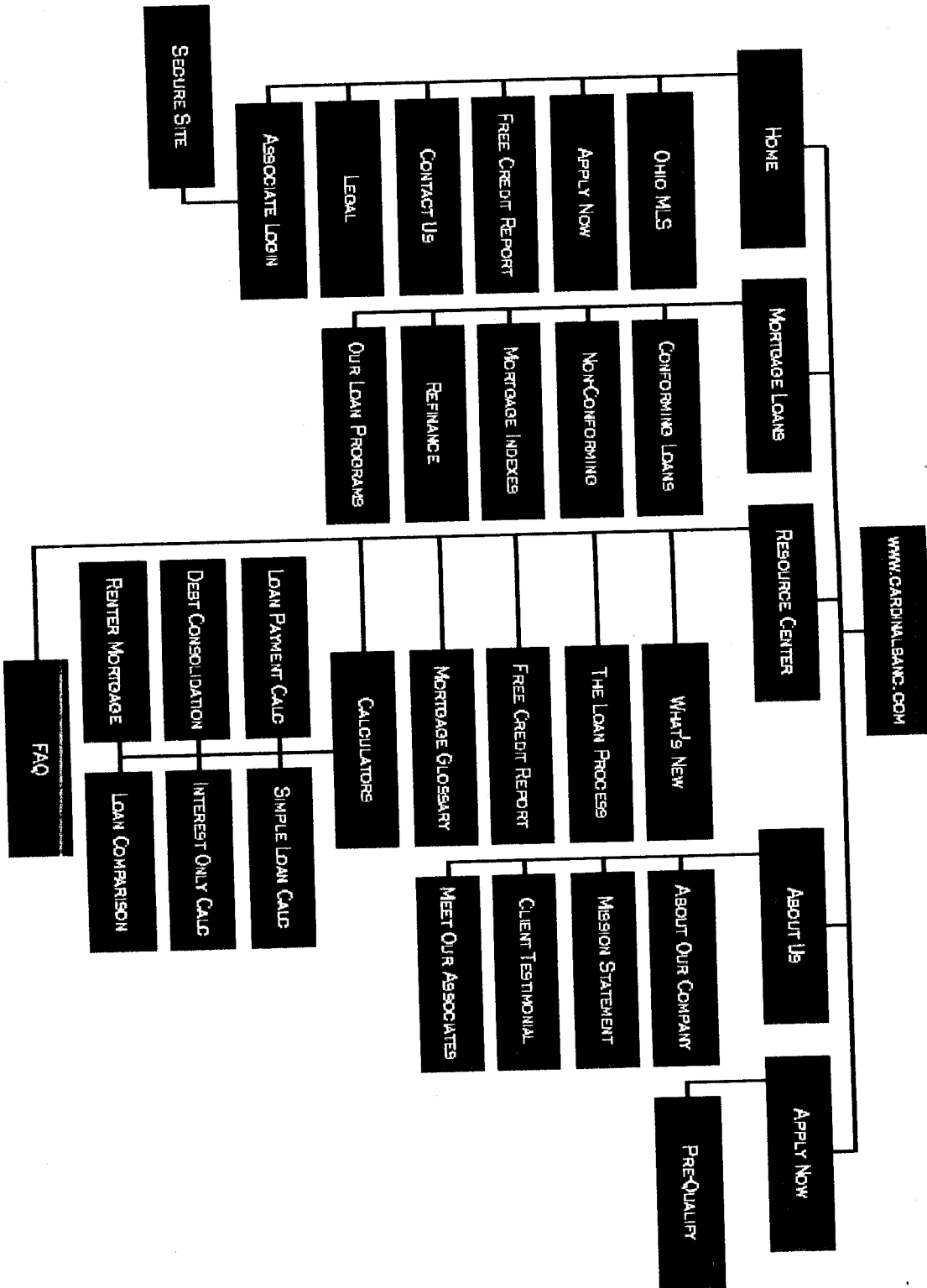
Another issue we faced was integrating an online loan application process from the Web site into Cardinal Banc's software that they use to process the loans. We spent a lot of time and effort researching the possibility of implementing the process. However, the result was that we would need to pay a programmer from the software company to allow the data to be imported from the Web site to the in house application. Cardinal Banc did not wish to further pursue this, as they are currently satisfied with the process as it stands. In case Cardinal Banc decides to implement the consolidated loan process in the future, we have recommended that they contact us to perform this work on the Web site side of the project.

Another issue we faced was obtaining the information from Cardinal Banc to load onto the Web site. The key to the Web site being beneficial to customers was that it is very informative and loaded with important information, so it was critical that Cardinal Banc supply us with this information. We stipulated to the customer that we needed this information from the onset of the project, however some of the information was not

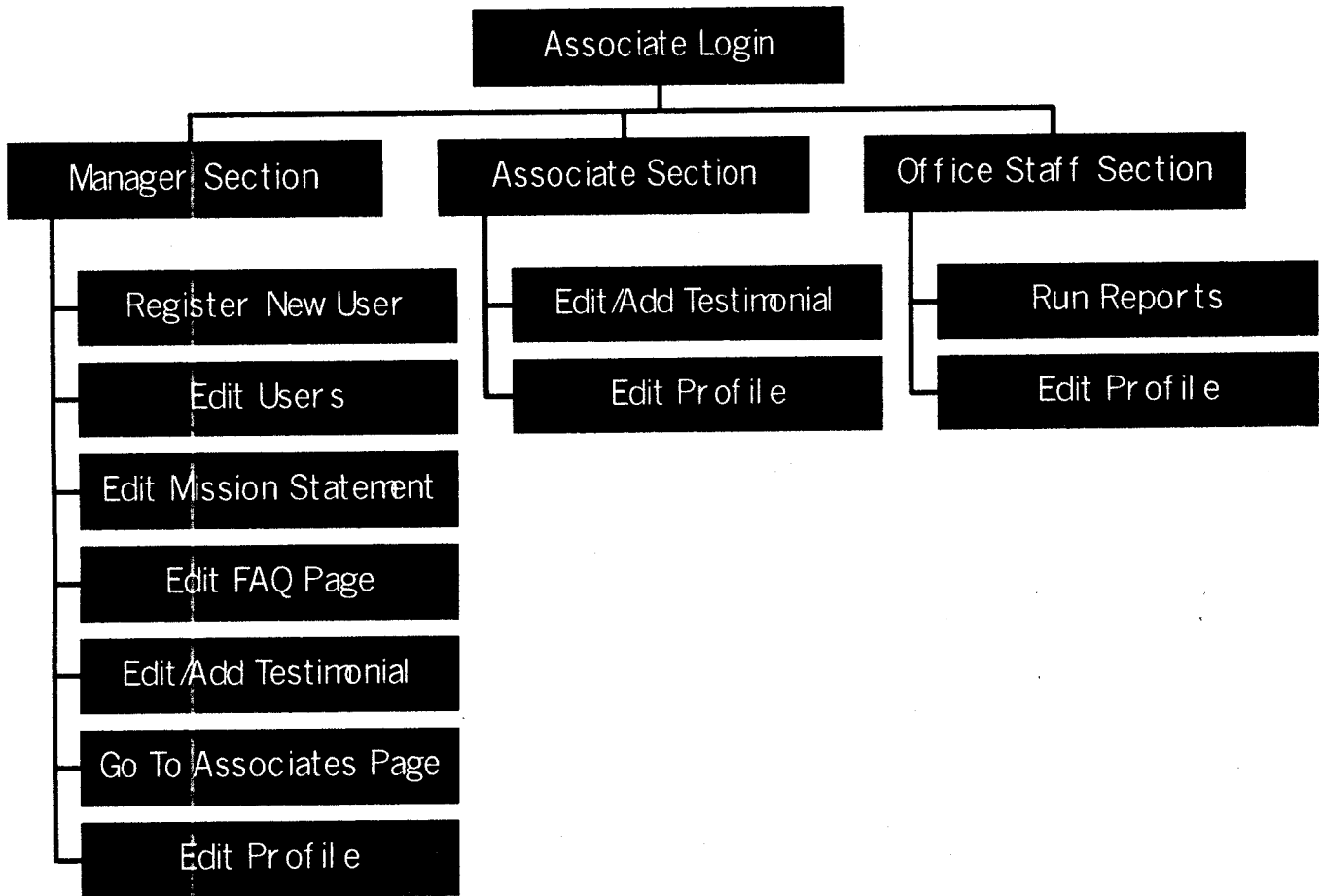
provided to us until the last minute. We recommend for future projects that firm deadline dates be set with the customer, and immediate follow-up action is taken to ensure that the data is provided in a timelier manner.

Appendix A. Site Hierarchy

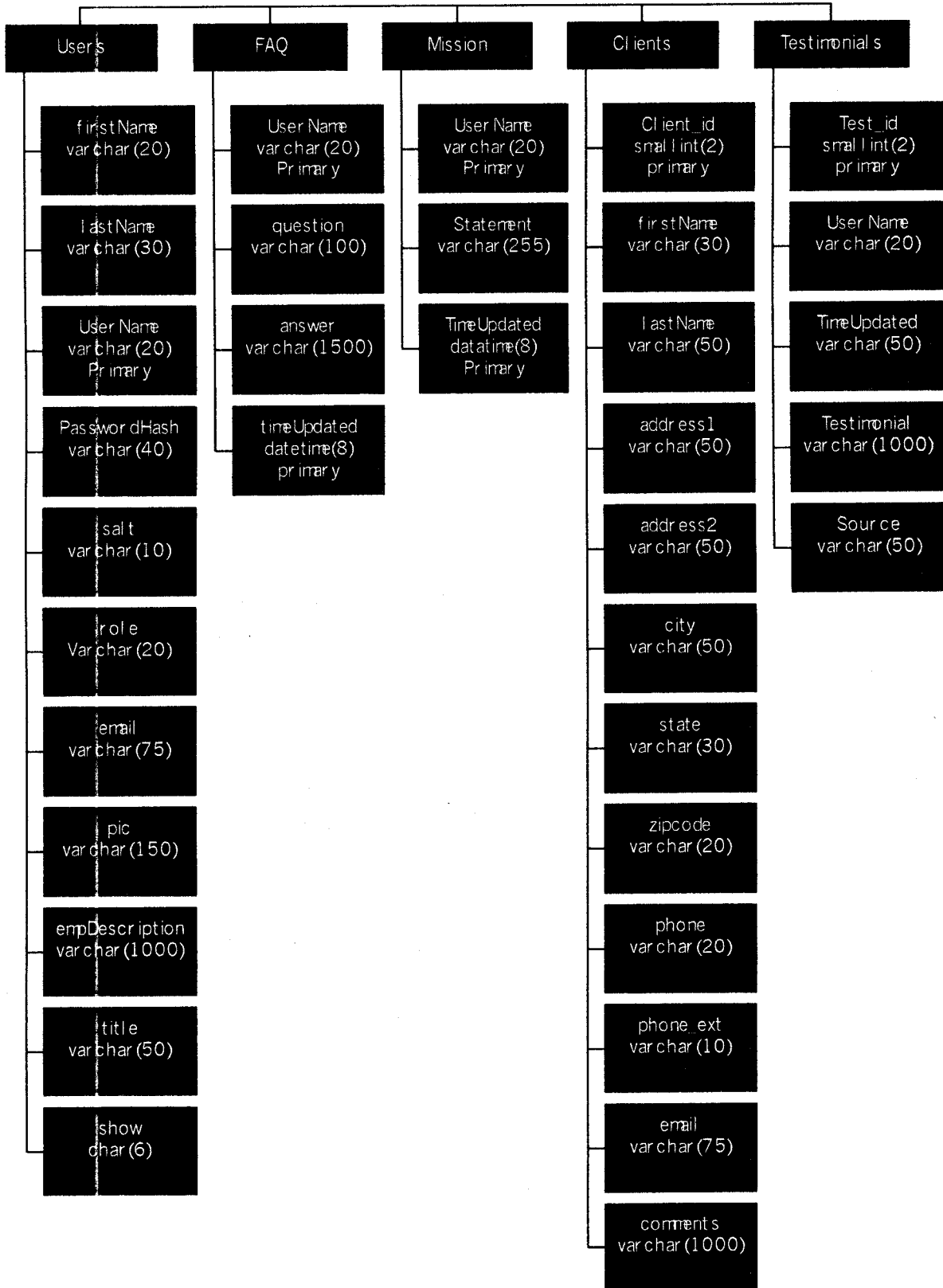
A 1. Cardinal Banc Web Site - Public Section



A 2. Cardinal Banc Web Site - Secured Section



Appendix B. Database Structure



Appendix C. Stored Procedures

C 1. ClientInfo

```
-- create stored procedure to obtain client info
CREATE PROCEDURE ClientInfo
@firstName varchar(20),
@lastName varchar(30),
@address1 varchar(50),
@address2 varchar(50),
@city varchar(50),
@state varchar(30),
@zipcode varchar(10),
@phone varchar(9),
@phone_ext varchar(10),
@email varchar(75),
@comments varchar(1000)

AS
INSERT INTO ClientInfo VALUES(@firstName, @lastName, @address1, @address2, @city,
@state, @zipcode, @phone, @phone_ext, @email, @comments)
GO
```

C 2. DeleteTestimonial

```
-- create stored procedure to delete testimonial
CREATE PROCEDURE DeleteTestimonial
@UserName varchar(20),
@Testimonial varchar(1000),
@Source varchar(50)

AS
DELETE FROM Testimonials
WHERE UserName = @UserName and Testimonial = @Testimonial and Source = @Source
GO
```

C 3. DeleteUser

```
-- create stored procedure to delete users
CREATE PROCEDURE DeleteUser
@UserName varchar(20)
AS
DELETE Users
WHERE UserName = @UserName
GO
```

C 4. GetFAQ

```
-- create stored procedure to select the faq questions and answers
CREATE PROCEDURE GetFAQ
AS
SELECT question, answer FROM FAQ FOR XML AUTO, XMLDATA
GO
```

C 5. GetMission

```
-- create stored procedure to select the mission statement
CREATE PROCEDURE GetMission
@statement varchar(255)
```

```
AS
SELECT statement FROM Mission
GO
```

C 6. GetRole

```
-- create stored procedure to retrieve user role
CREATE PROCEDURE GetRole
@UserName varchar(20)
AS
SELECT role
WHERE UserName = @UserName
GO
```

C 7. GetTestimonial

```
-- create stored procedure to select the testimonials
CREATE PROCEDURE GetTestimonial
AS
SELECT testimonial, source FROM Testimonials FOR XML AUTO, XMLDATA
GO
```

C 8. GetUser

```
-- create stored procedure to get user info
CREATE PROCEDURE GetUser
AS
SELECT firstName, lastName, UserName, show, role
FROM Users
ORDER BY lastName DESC FOR XML AUTO, XMLDATA
GO
```

C 9. GetUserBio

```
-- create stored procedure to get user bio info
CREATE PROCEDURE GetUserBio
@UserName varchar(20)
AS
SELECT firstName, lastName, UserName, email, pic, empDescription, title FROM Users
WHERE UserName = @UserName
GO
```

C 10. GetUserTestimonial

```
-- create stored procedure to select the users testimonials to display
CREATE PROCEDURE GetUserTestimonial
@UserName varchar(20)
AS
SELECT Test_id, UserName, TimeUpdated, Testimonial, Source FROM Testimonials
WHERE UserName = @UserName
GO
```

C 11. InsertTestimonial

```
-- create stored procedure to insert new testimonial
CREATE PROCEDURE InsertTestimonial
@UserName varchar(20),
@datetime varchar(50),
@Testimonial varchar(1000),
@Source varchar(50)
```

```
AS
INSERT INTO Testimonials VALUES(@UserName, @datetime, @Testimonial, @Source)
GO
```

C 12. LookupUser

```
-- create stored procedure to retrieve user details for authentication
CREATE PROCEDURE LookupUser
@UserName varchar(20)
AS
SELECT PasswordHash, salt
FROM Users
WHERE UserName = @UserName
GO
```

C 13. RegisterUser

```
-- create stored procedure to register user details
CREATE PROCEDURE RegisterUser
@firstName varchar(20),
@lastName varchar(30),
@UserName varchar(20),
@passwordHash varchar(40),
@salt varchar(10),
@role varchar(20),
@email varchar(75),
@pic varchar(150),
@empDescription varchar(1000),
@title varchar(50),
@show varchar(6)
```

```
AS
INSERT INTO Users VALUES(@firstName, @lastName, @UserName, @passwordHash, @salt,
@email, @pic, @empDescription, @title, @show)
GO
```

C 14. SelectFullUser

```
-- create stored procedure to retrieve users and list all properties
CREATE PROCEDURE SelectFullUser
AS
SELECT firstName, lastName, UserName, role, email, pic, empDescription, title, show FROM Users
GO
```

C 15. SelectUserProfile

```
-- create stored procedure to retrieve users profile
CREATE PROCEDURE SelectUserProfile
@UserName varchar(20)
AS
SELECT firstName, lastName, UserName, email, pic, empDescription FROM Users
WHERE UserName = @UserName
GO
```

C 16. UpdateFAQ

```
-- create stored procedure to update FAQ page
CREATE PROCEDURE UpdateFAQ
@UserName varchar(20),
```

```

@question varchar(100),
@answer varchar(1500),
@datetime datetime
AS
INSERT INTO FAQ (UserName, question, answer, timeUpdated) VALUES (@UserName,
@question, @answer, @datetime)
GO

```

C 17. UpdateMission

```

-- create stored procedure to update mission statement
CREATE PROCEDURE UpdateMission
@UserName varchar(50),
@statement varchar(255),
@datetime datetime
AS
UPDATE Mission SET UserName=@UserName, Statement=@statement, TimeUpdated=@datetime
GO

```

C 18. UpdateProfile

```

-- create stored procedure to update user profile
CREATE PROCEDURE UpdateProfile
@firstName varchar(20),
@lastName varchar(30),
@email varchar(75),
@pic varchar(150),
@empDescription varchar(1000),
@UserName varchar(20)
AS
UPDATE users SET firstName = @firstName, lastName = @lastName, email = @email, pic = @pic,
empDescription = @empDescription WHERE UserName = @UserName
GO

```

C 19. UpdateTestimonial

```

-- create stored procedure to update testimonials
CREATE PROCEDURE UpdateTestimonial
@Test_id smallint,
@UserName varchar(20),
@datetime varchar(50),
@Testimonial varchar(1000),
@Source varchar(50)

AS
UPDATE Testimonials SET UserName=@UserName, TimeUpdated=@datetime,
Testimonial=@Testimonial, Source=@Source
WHERE Test_id = @Test_id
GO

```

C 20. UpdateUser

```

-- create stored procedure to update user
CREATE PROCEDURE UpdateUser
@firstName varchar(20),
@lastName varchar(30),
@role varchar(30),
@email varchar(75),
@pic varchar(150),

```

```
@empDescription varchar(1000),
@title varchar(50),
@show char(6),
@UserName varchar(20)
AS
UPDATE users SET firstName = @firstName, lastName = @lastName, role = @role, email = @email,
pic = @pic, empDescription = @empDescription, title = @title, show = @show WHERE UserName =
@UserName
GO
```

C 21. GetClientData

```
--create stored procedure to select the client data
CREATE PROCEDURE GetClientData
@contact_date1 datetime,
@contact_date2 datetime
AS
SELECT firstName, lastName, address1, address2, city, state, zip, phone, phone_ext, email,
comments, contact_date FROM Clients
WHERE contact_date > @contact_date1 and contact_date < @contact_date2
ORDER by contact_date
GO
```

References

1. Americans with Disabilities Act. "ADA Home Page – ada.gov – Information and Technical Assistance on the Americans with Disabilities Act". [Http://www.usdoj.gov/crt/ada/adahom1.htm](http://www.usdoj.gov/crt/ada/adahom1.htm). May 8, 2003.
2. Burck, Gail. Manager of Application Technical Support, Union Central Insurance and Investment Company. Personal Interview. April 23, 2003.
3. Cyberian Outpost, Inc. "MS Visual Studio .NET Professional Edition 2002". [Http://www.outpost.com/product/3241051](http://www.outpost.com/product/3241051). May 27, 2003.
4. Dell Inc. "Dell Home Systems Desktops". <http://www.dell.com>. May 16, 2003.
5. Jasc Software. "Jasc Software - Store". <http://www.jasc.com/store/>?. April 15, 2004.
6. M6.net Hosting. "Web hosting, .NET, ASP, PHP, MySql and SQL Server Windows web hosting". <http://www.m6.net/web-hosting-prices.asp>. January 23, 2005.
7. Microsoft Corporation. "Microsoft SQL Server: SQL Server Home". [Http://www.microsoft.com/sql/default.asp](http://www.microsoft.com/sql/default.asp). May 9, 2003.
8. National Association of Mortgage Brokers. "National Association of Mortgage Brokers". [Http://www.namb.org](http://www.namb.org). May 8, 2003.
9. Rhino Software. "Tech Buzz". [Http://www.rhinosoftware.com/techbuzz.htm](http://www.rhinosoftware.com/techbuzz.htm). May 8, 2003.
10. Web Winder Website Calculators. "Home". <http://www.webwinder.com>. January 6, 2005.
11. Wheatley, Brandon. CEO, Cardinal Banc Mortgage Company. Personal Interview. April 19, 2003.