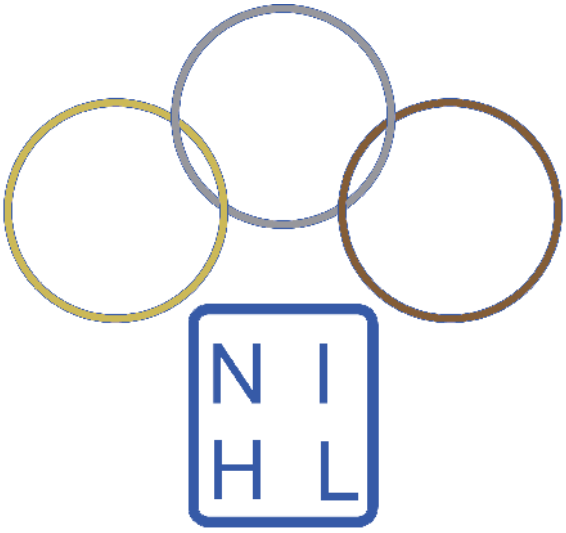
IPRO 308 Final Report
Fall 2009

Developing Web Applications for the Northern Illinois Hockey League



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1.0 Abstract

The aim of this project was to create a website for the Northern Illinois Hockey League (also known as NIHL) for the purpose of organizing hockey season scheduling and statistics reporting. Previously, hockey coaches had to record their schedules and statistics reports by hand, which is a very labor intensive, time consuming and inefficient process. An automated web application would save time, paperwork and produces less frustration for its users. This website would consolidate all relevant information into one centralized website easily accessible to team coaches, club presidents and other people interested in the hockey season. The next semester's IPRO team would continue to test the website and modify this semester's website in order to conform to the hockey season's annual operation.

2.0 Background and Objective

The Northern Illinois Hockey League is the largest hockey league in Illinois and the largest youth all star hockey league in the United States. Operating for over 40 years, this nonprofit organization of volunteers serves over 300 youth teams and over 4,000 players who range from the ages five to 18 years old. Each year, they host a hockey season with various divisions and about 3,500 games are played during that time. All information for the season is recorded by hand. First, all the various division team managers physically meet in one location to work out their scheduling process. Resolved schedule conflicts, a disorganized process itself, frequently occur during the scheduling process. After scheduling, the season begins and game reports are also recorded by hand. This requires over 300 team managers to fax completed game reports to a paid league statistician, who collates them and forwards them to a web site manager out of state. The whole process is conducted by volunteers who dedicate numerous hours to this complex process.

In order to reduce the frustration of handling numerous faxes and losing handwritten papers in the process, NIHL turned to IPRO 308 with the request that they create a website automating the annual season process; everything done by hand would

instead be done electronically. They wanted the website to be efficient and convenient for league administrators and team managers while still emulating their existing system. Other requirements were requested in the creation of this website. The most important aspect of the website was that it had to be easy for its users to understand. The main users would be volunteers and hockey enthusiasts, not tech savvy programmers, so it had to be simple in order to achieve that effect. The website should receive team listings and then automatically generate matches for those teams. The teams would submit their statistics to the program which would instantly update and display those statistics. The website should also be able send emails on when various events were to occur, making it a convenient way to contact all 300 teams at once. Finally, the website had to be free. They didn't want to pay for an outsourced IT administrator to maintain the website, but be directly in control of it instead. It was implied that this kind of website, if successful, would be a useful model to adopt for any type of organized sport.

3.0 Organization and Approach

In order to achieve the primary objective and keep our sponsor's requirements in mind, IPRO 308 members would observe the season process and gather information on how the process works. A client meeting was scheduled for September 12 which would show the IPRO team how the scheduling process actually performed. After information on the system was gathered, the website would be built in three phases: design, development and testing. Two groups formed at this point: the Coding Group and the Documentation & Testing Group.

The Coding Group's main responsibility was to create the physical website. In the design phase, which would end by September 16, the coding group would determine which programming language to use, determine the website's features and create a site map organizing the website's content. The development phase would be dedicated to computer programming and creating all of the website's functions. Specifically, they would design a match-making algorithm for the scheduling process and an organized statistics page. This phase was predicted to be completed by November 11. The testing

phase would be initiated to test the website for bugs and glitches; they would be fixed by November 21.

The Documentation & Testing Group would assist the Coding Group in creating the site map during the design phase. For the development phase, it would create the website's visual display through the use of Adobe Photoshop. Visual design included: color, layout and arrangement of displayed information. Because this group wasn't familiar with computer programming, it would have the advantage of analyzing and understanding the website, as if they were NIHL users, to explain the website's functions in easily understandable terms. One member opted to learn the programming language CSS in order to manipulate and enhance the visual layout of the website as well. Documentation, such as creating website tutorials for first-time users, creating frequently-asked-questions for the help page and developing a test plan, were also included in this group's responsibilities. These tasks were all to be completed by November 11. Test data would be entered into the website for the testing phase by November 21.

3.1 Coding Group Organization

Team Member	*Tasks*	*Projected Due Date*
Dustin Barksdale Major: CS	Site map development	9/9/09
	Data modeling	9/14/09
	Architectural diagrams	9/14/09
	Functional requirements	9/16/09
	Selecting website features	9/16/09
	Matchmaking algorithm for the scheduling process	11/11/09
	Testing	11/21/09
Julian Hays Major: CS	Site map development	9/9/09
	Client meeting	9/12/09
	Data modeling	9/14/09
	Architectural diagrams	9/14/09
	Functional requirements	9/16/09
	Selecting website features	9/16/09
	Create/update/delete options for web pages	11/11/09
	FAQ/help page design	11/11/09
	Rink mapping	11/11/09
	Testing	11/21/09

William Perkins Major: CS	Site map development	9/9/09
	Client meeting	9/12/09
	Data modeling	9/14/09
	Architectural diagrams	9/14/09
	Functional requirements	9/16/09
	Selecting website features	9/16/09
	Table sorting/paging	11/11/09
	Testing	11/21/09
Vladimir Semenov Major: CS	Site map development	9/9/09
	Data modeling	9/14/09
	Architectural diagrams	9/14/09
	Functional requirements	9/16/09
	Selecting website features	9/16/09
	Basic website design	11/11/09
	Season phase transitions	11/11/09
	Stats data entry/modeling	11/11/09
	Scheduling data entry/modeling	11/11/09
	Testing	11/21/09
Mantas Vidutis Major: CS	Site map development	9/9/09
	Data modeling	9/14/09
	Architectural diagrams	9/14/09
	Functional requirements	9/16/09
	Selecting website features	9/16/09
	Stats page filtering options	11/11/09
	Testing	11/21/09

3.2 Documentation & Testing Group Organization

Team Member	*Tasks*	*Projected Due Date*
Krzysztof Bartus Major: ARCH	Test plan development	10/26/09
	Visual design	11/11/09
	FAQ development	11/11/09
	Email notifications	11/11/09
	Test data entry	11/21/09
Kristin Lucchesi Major: CPE	Client meeting	9/12/09
	Documentation	10/5/09
	Test plan development	10/26/09
	Visual design	11/11/09
	CSS application	11/11/09
	Test Data Entry	11/21/09

Christopher Savage Major: ARCH	Site map development	9/9/09
	Documentation	10/5/09
	Test plan development	10/26/09
	Test data entry	11/21/09
	Visual design	11/11/09
Colin Scheer Major: HUM	Client meeting	9/12/09
	Test plan development	10/26/09
	Visual design	11/11/09
	Tutorial development	11/11/09
	FAQ development	11/11/09
	Documentation	12/04/09

4.0 Analysis and Findings

Communication between the Coding Group and the Documentation & Testing Group was excellent as both teams kept each other up to date on their progress. The design phase was completed on schedule with a sitemap organizing what tasks would be performed in various parts of the website.[1] The Coding Group decided early on to use Python as its programming language and Django as the framework for coding. The website was also hosted on a free development server by Vladimir Semenov. All of the website's primary functions were created and the website was up and running by October 13.

The website contained all of the basic pages needed to function, including the specified web applications required the hockey season to operate: user accounts, season management page, scheduling page, list of teams, clubs and divisions, stats page for organizing statistics reporting, rink information and a help page. The website was created in a way that a user account would be required to gain access to certain areas of the website. The main accounts are the League Administrator, Team Manager and Club Manager. Other users will be able to view statistics of the website, but the three mentioned accounts have greater access to specific applications within the site itself.[2]

The Coding Group had to get its members acquainted with the coding language Python before coding could begin, but this minor obstacle was overcome by late September. Due to the complexity of the programs and algorithms, the development

[1] See Appendix A for a detailed picture of the sitemap.
[2] See Appendix B for a general overview on how the website works.

phase of the web application took up the majority of the semester to complete, extending past the targeted deadline, November 21. Michael Glynn frequently met with the Coding Group to answer specific questions concerning the hockey seasonal process which helped the Coding Group conform to the actual process. Consequently, more time would be needed to rewrite the programs, putting the group behind schedule. The Coding Group did not begin the testing phase of the website at the projected deadline.

In the meantime, the Documentation & Testing Group developed the test plan for the next semester to follow. The test plan summarizes the order of testing the website pages with the intention of mimicking a test hockey season. Test data was also entered into the website, but it was a time-consuming process, taking about 20 hours to enter information on 300 teams and 80 rink locations. About 40 hours worth of test data remains to be entered into the website before the testing phase can properly begin. There was also a difficulty in acquiring correct test data. Team information provided by our sponsor didn't exactly match the team information displayed on NIHL official website. The Documentation & Testing Group had to analyze which information was correct, and this delayed time to enter in test data, which began in late October.

The visual design of the website currently follows a pre-designed template, which is aesthetically simple. Kristin Lucchesi, in the Documentation & Testing Group, attempted to learn the programming language CSS, but learning on the go while simultaneously attempting application was difficult in producing acceptable visual designs. The lack of graphic designers greatly limited the capabilities of both the Coding and Documentation & Testing Groups. Photoshop mockups of buttons, banners, tables and website layouts were created, but the Documentation & Testing Group focused more on data entry and developing the public imagery of the website instead. The Coding Group was also primarily concerned with building the website first as well.

Tutorials for first-time users and video demonstrations were created.[3] They would demonstrate and explain the step-by-step process involved in navigating the website. Frequently asked questions (FAQ) were also written up for the website's help page. The tutorials, however, reflect the basic prototype of the website as it currently

[3] See Acknowledgements and References for the web address of the video demo.

stands; if the website were to be altered or modified, the tutorials would also have to be modified accordingly.

5.0 Conclusion and Recommendations

On the whole, the website is functional. It contains all the necessary programs needed to operate as a hockey league website. It is a visually basic website, but it needs to be polished up into a final product for real world application. Because the website hasn't finished being officially tested, it is hard to determine the simplicity of the website for NIHL users. Tutorials and FAQ have been created, but they reflect the current form of the website. When the test plan is followed by the next semester's IPRO team, the website will likely have to be modified, improved and the tutorials will also have to be edited accordingly. The tutorials should also be tested to make sure that they make sense to the NIHL users, who will be using the website in the future. A lot of time will have to be set aside for test data entry because it is a time consuming process.

Visual design will also have to be heavily introduced to the website to make it more aesthetically pleasing to the eye. It was very difficult for a non-computer science major to try learning CSS and simultaneously apply it to the website during the semester. It would be a better idea for a computer science major to handle all the programming languages rather than have non-computer science majors struggle with understanding the programming language. It would also be ideal for the next computer science majors to have knowledge of Python and Django for the sake of consistency with the programming language of the website. The Photoshop mockups haven't been implemented into the site, but they can still be incorporated into the website's design. Combined with applying the programming language CSS to the website, there is much room for improvement on the visual look of the website.

If this website is successful in achieving its primary goal for the NIHL organization, efficient simplicity, it can act as an inspirational model program for other sports organizations to adopt. This website could serve as an example of how to effectively manage schedules and score keeping, which can be applied to any type of

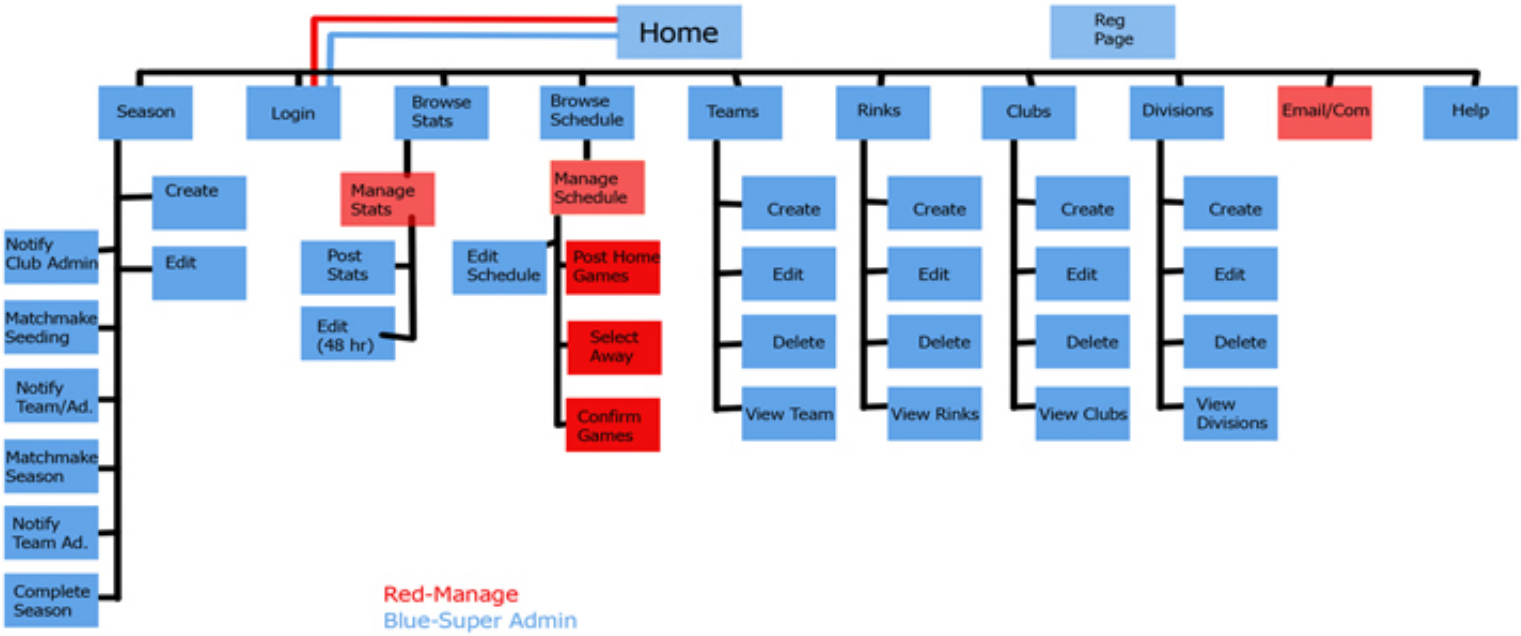
sports organization. This IPRO could turn itself into an ENPRO to explore the possibility of turning this website design into a business.

6.0 Acknowledgements and References

We would like to thank Michael Glynn for his knowledge of the NIHL organization. His insight and patience assisted with the creation of this website.

Official NIHL website: http://www.nihl.info/
IPRO 308 website: http://nihlapp.vsemenov.webfactional.com/
IPRO 308 website demo: http://vsemenov.webfactional.com/demos/nihlapp/

7.1 Appendix A: Sitemap



This diagram summarizes the roles of the League Administrator and Team Managers. The first ten boxes at the top represent website pages. The boxes below represent the functions each of the ten pages can perform. The coloring represents which users have access to various functions within the page; the League Administrator has the most tasks to perform, and therefore, the most functions are available to that role.

7.2 Appendix B: Website Overview (included in the website's tutorial section)

The purpose of this website is to make managing a hockey season easier than writing everything by hand and relying on faxes to submit information. This website organizes the schedules, game statistics and team information into one centralized area, allowing anyone interested in the season to view particular information of interest. Specifically, this site manages the scheduling process and statistics record keeping, making it convenient for the Team Managers and League Administrators to enter such data as the season progresses. The website has been designed to be simple as well as efficient with the common hockey coach in mind. Tutorials help get new users acquainted with the website and a Help page answers various questions about the website.

The most important user for the website is the League Administrator. The League Admin is responsible for entering division, club and team data before each new season. Such information is located in its own site allowing the League Admin to quickly locate specific information and change it without hassle. These pages also serve as team and club profiles, containing contact information and other information vital for the hockey season. League Administrators are also responsible for creating the new season, setting season deadlines and assisting the team managers in editing statistics and schedule conflicts. They maintain the website making sure deadlines are met and statistics are accurately presented.

When the new season is created, the Team Admins will log in to create their schedules for both the Seeding games and Season games. The display of such information eliminates the need for every team manager to have to meet in one physical location, since all they need is access to the internet. Every game report can be entered into the website, which in turn updates the team's statistics. Any club and team can view such statistics at their own leisure.

Information on rinks and their locations are also available for display. The League Admin, Club Admin and Team Manager Admin have specific access to areas of the website based on their roles in the season. League Admins have the most access to editing information; Team Admins only have access to creating season schedules and

game reporting while Club Admins have access to edit their club profiles. The rest of the users can only view displayed information, with no access to editing such information.