IPRO 342: Development of a Real-Time Information System

Sponsor: Midwest Steal & Services Inc.

Advisor: William Maurer

Team Members

+ Derrick Davis + Cordell Jackson + Matthew Kasa + Peter Mathes +

+ Atinder pal Sohal + Jonathan Roraff + Kevin Tan +

Abstract

Midwest Steel & Services Incorporated—a growing company in addition to being the sponsor of IPRO 342—requested assistance in expanding its business software and creating the means to provide a better real-time information system. Specifics issues faced by the company include developing, manipulating, and maintaining a system to access cost controls, manage job tracking, and improve purchasing capabilities.

The focus of the Summer 2009 IPRO 342 was on implementing a relational database (structured by the Spring 2009 IPRO 342). The goal set by Midwest Steel within this implementation was the ability to access, track, and update all transactions in conjunction of the ability to access and update the inventory database. Further request was the capacity to organize and print both inventory reports as well as transaction reports.

Background

Sponsor –

Midwest Steel & Services purchases and converts plate steel into mold and die bases for the plastic and steel industries. Their competitive advantage is in the ability to deliver finished product in 6-7 days where most competitors at a minimum require several weeks. Key to the company's success lies in the ability to make smart purchases and track performance within tight cost controls.

Problems –

The initial focus was on implementing a relational database. The previous semester developed a semi-functioning relational database; however, the company requires a fully functional system. The issue faced with this problem was connecting the system interface with the information database supplied by the sponsor. The original interface passed along to the Summer 2009 IPRO 342 group was written in PHP; furthermore, this interface was only capable of connecting to the information database under extremely limited and difficult circumstances. Therefore, it was left

to the Summer 2009 IPRO 342 group to reevaluate the interface program such that it is operationally sound in communication with the information database.

The secondary focus, as set by Midwest Steel, were the ability to access, track, and update all transactions in conjunction of the ability to access and update the inventory database as well as the capacity to organize and print both inventory reports and transaction reports. Once connectivity to the information database was achieved, this problem was approached by developing software functions, using ASP.net, to access the information database and manipulate data therein.

Existing Technology –

The existing technology and resources that are available are Microsoft Access, Microsoft Excel, and Exact JobBOSS. Currently, Midwest Steel & Services Inc. is using Exact JobBOSS for a majority of their inventory processing and is using Microsoft Excel for inventory reports and order quotes. Even though these programs manage the information that is needed by the company, too great of a quantity of time is invested in translating data from one of the resources into the other resource which denies the company a smooth, real-time data-access system.

Spring 2009 IPRO 342 –

The previous semester analyzed the database layout and produced a data dictionary for accessing fields of information within the database. Furthermore, they developed the framework of an interfacing program; however, it had no internal functionality nor was it capable of communicating with the database for informational access.

Ethical Dilemma –

The ethical dilemma sourced from investigating the problem and creating a solution is that the Development Team must avoid breaking any software copyrights in developing the interface software and programming the functionality within the interface software.

Objectives

1. Obtain Communication Between Interface Software and Information Database
    + This objective sources from a problem that arose in the previous semester while originally developing the web-enabled interface software in PHP.
    + Rewrote the web-enabled interface software in ASP.net which is more appropriately compatible with the MS-SQL database software that Midwest Steel & Services has invested in.
    + Once the translation from PHP to ASP.net was completed, since ASP.net is designed in parallel to MS-SQL by Microsoft, the communication difficulties evaporated.
2. Develop Querying Functionality Within the Interface Software
    + Maintain programming separation to avoid violating software copyrights.
    + Use the data dictionary developed to maintain logical data access.
3. Use Querying Functionality to Produce Inventory Reports
    + Operates through the querying function to access the inventory data from the database.
    + Functionality to extract data and organize the data based on material type, mill thickness, house thickness, width estimate, length estimate, calculated weight, cost per hundred weight and calculated value.
4. Use Querying Functionality to Produce Product Reports
    + Operates through the querying function to access the product data from the database.
    + Functionality to extract data based on order / production date, material type, product weight, or product cost.

Methodology

Task	Start Date	End Date
Retrieve Previous Semester's Data	06/01	06/10
Analyze Data	06/10	06/15
Project Plan	06/15	06/16
Development of Software Application	06/15	06/29
Midterm Presentation	06/22	06/30
Reassessing & Development of Software Application	07/06	07/15
Visit Sponsor		07/16
Abstract, Brochure, & Poster	07/15	07/21
Practice Presentation	07/20	07/22
IPRO Day		07/23
Final Report	07/17	07/24
CD & Documentation	07/23	07/24

Due to availability of Midwest Steel & Services Inc., only a single meeting was arranged; furthermore, the date of this meeting was changed from the original schedule plan since Midwest Steel was undergoing a merger during the 2009 summer.

Structure & Assignments

Advisor: William Maurer

Team Leader: Derrick Davis.....2nd Year Information Technology Management

- Coordinate and Organize Meeting with Sponsor
- Coordinate Meeting with Advisory Graduate Student
- Consult with Sponsor and Understand Existing System Process
- Midterm Presenter
- IPRO Deliverable, Work CD
- Final Presenter

Development Team

- Connect and Run MS-SQL Database
- Develop Web-Enabled Software Interface
- Develop and Program Querying Functionality
- Program Compiling Functionality for Product Reports
- Program Compiling Functionality for Inventory Reports

Matthew Kasa..... 4th Year Electrical Engineer
- Software Developer

Atinder pal Sohal..... 4th Year Electrical Engineer
- Software Developer
- Final Presenter

Kevin Tan..... 4th Year Electrical Engineer
- Software Developer
- Consult with Sponsor and Understand Existing System Process
- Final Presenter

Business Team
- IPRO Deliverable, Project Plan
- IPRO Deliverable, Midterm Presentation
- IPRO Deliverable, Final Presentation

Cordell Jackson .....4th Year Engineering Management
- Midterm Presenter
- IPRO Deliverable, Poster
- IPRO Deliverable, Abstract/Brochure
- Final Presenter

Peter Mathes.....4th Year Psychology
- IPRO Deliverable, Poster
- IPRO Deliverable, Abstract/Brochure
- Final Presenter

Jonathan Roraff.....3rd Year Applied Mathematics
- Midterm Presenter
- Consult with Sponsor and Understand Existing System Process
- IPRO Deliverable, Final Report
- Final Presenter

Due to the small size of the Summer 2009 IPRO 342 group, the team deemed it was necessary to break up only into two groups, a Development Team and a Business Team. The Business Team managed the majority of IPRO deliverables, most of the communications with the sponsor, as well as understanding the needs and demands of the sponsor. On the other hand, the Development Team tackled the thick of programming needed to develop the real-time database system.

Budget

Paper and Printing	
Abstract/Brochure	x 100 Sheets
Color Printing	x $0.25 per Sheet
Total	= $25.00
Poster	Provided by IPRO Department
Total	= $0.00
Transportation	
From 3300 S Federal St, Chicago, Illinois 60616	
To 581 S Wheeling Rd, Wheeling, Illinois 60090	31.1 Miles
Roundtrip	x2
Cars	x2
Federal Mileage Rate	x$0.55 per Mile
Total	= $68.42
Final Total	$93.42

Code of Ethics

Overarching Standard

The Summer 2009 IPRO 342 group shall act within the guidelines of an honorable and professional manner in order to develop a web-enable, real-time database management system for Midwest Steel & Services, Inc.

The Height of Honesty

Cannon: As a team, honesty shall be held in the highest regard at all times. It is one's duty to report and manage all information and resources accurately and without bias. Thus including—but not limited to—time keeping, financial expenditures and reimbursement and trusted, sensitive information.

Pressure: One's need to appropriate time and dedication to the focus of IPRO 342.

Pressure: To record time and monetary resources in an accurate and precise fashion to prevent a misuse of funds or misrepresentation of resources.

Risk: A lack of dedication, individual or collective, may result in a poor grade or inadequate performance to satisfy the needs of the sponsor.

Measure: Each individual shall be responsible for holding one's self, in addition to the collective, to a strict standard of honesty and accountability.

Reputation and Personal Relations

Canon: It is the responsibility of each member to treat all others with a regard of honor and respect in order to function as a team without conflict.

Pressure: Each member has external concerns, internal needs, and personal time commitments.

Risk: Work needed for the project to be completed will not get done before set deadlines.

Risk: Without working as a cohesive team, work shall become unfairly disproportionate between members.

Measure: Treat each member with respect and understanding—everyone has work to be done. Furthermore, the total sum of work has deadlines which cannot be met simply by grudgingly dividing work.

Call for Communication

Cannon: All matters shall be taken seriously and handled in a logical, rational, and professional manner.

Pressure: The need to handle the complexity of a real world situation in a very limited amount of time.

Pressure: Working with a group of unfamiliar peers.

Risk: Any minor miscommunication may develop into a dispute or unprofessional behavior.

Risk: Any minor miscommunication may lead to a lack of completed work.

Measure: Members shall openly discuss all concerns as a group and pose any uncertainties. All team members are responsible for the group to have acceptable lines of communication to the individual. Furthermore, any disputes are to be brought immediately before the group leader or advisor.

Proprietary Information

Cannon: Academic honesty, adherence to trademark, copyright, patent, rights reserved and all other laws, measures or policies in place to protect proprietary information is to be understood and respected at all times. Credit shall be given to any and all sources of information used in research and deliverables.

Pressure: Midwest Steel & Services, Inc. databases contain personal, sensitive information concerning the company, the company's inventory, and product consumers of the company.

Pressure: Using information from unreliable sources for personal ease.

Risk: The use of falsified or copyrighted information in the system developed for the sponsor.

Measure: Individuals shall hold one another accountable for unlawful use of proprietary information. This shall be accomplished by citation of knowledge gathered and a healthy respect or the law. Success has been accomplished if no legal or disciplinary reprimand is necessitated.

Results

The first objective was accomplished simply by translating the PHP-base interface software over to that of ASP.net

The second objective was achieved with assistance from a graduate student, assigned by Professor Val Scarlata, who was well versed in database systems.

The third and fourth objectives were completed near the finish of the semester once the querying functionality was achieved and the totality of the data dictionary was understood.

The four primary objectives which were set before the Summer 2009 IPRO 342 group were all accomplished by the end of the summer semester. Nevertheless, there were other objectives set by Midwest Steel; however, those were not presented to the Summer 2009 IPRO 342 group because of time considerations with it only being a summer semester.

Since developing the Web-Enabled Database Management System required access to information databases, there were multiple ethical issues that were encountered. As noted previously, there is the dilemma to violate no software copyrights while developing the interface software requested by Midwest Steel. Additionally, there is the database presented to the Summer 2009 IPRO 342 group which contained product information, customer purchase information, and inventory information. Due to this information being accessed by the group, there is the ethical concern to not divulge any of the information held within the database to any outside parties; furthermore, to not procure or use any of the information within for any form of personal gain.

Obstacles

+ Lack of Information

  The Spring 2009 IPRO 342 group did not leave a Work CD or Final Report with the IPRO Office, thus leaving the Summer 2009 IPRO 342 group without a foundation.

  This was resolved by gaining a Work CD from the sponsors that was a majority of the final product of the Spring 2009 IPRO 342 group.

  This obstacle could have been prevented had the Spring 2009 IPRO 342 group submitted a Work CD and Final Report as each IPRO is technically required to.

+ Database Access

  The Work CD procured from the Midwest Steel sponsor was written entirely in .BAK backup files instead of the appropriate file types in order to be easily uploaded to a software development program.

  This obstacle was cleared by determining the file extension for each individual document then saving each to the given file extension.

  This obstacle could have been prevented one of two ways. First, the Spring 2009 IPRO 342 group could have left a Work CD with the IPRO office. Second, they could have left a Work CD with the sponsor that was not saved in backup format.

+ Communication

  The web-enabled database management system was not communicating with the MS-SQL database in order to access the information held within the database.

  Translating the system from PHP to ASP.net, a language designed in parallel to MS-SQL, allowed the database management system to fully communicate and interact with the database.

  The portion of this obstacle that was unable to be overcome was the time necessary to convert the software from PHP to ASP.net.

+ Software Language

  In order to gain communication with the database and the interface software, an understanding of the software languages involved was needed to be learned.

  Learning PHP was accomplished for this obstacle through web-sources. In consideration of ASP.net, this obstacle was resolved through assistance from a graduate student assigned to help the Development Team by Professor Val Scarlata.

  Time was a major consideration to this obstacle. Time could have been conserved if the Development Team had known that PHP should have been ignored and ASP.net should have been pursued from the start.

+ Sponsors

  The sponsors were very selective in what time was available in order to discuss details and to meet.

  This was managed by working with their schedule to set up a meeting much later than expected within the summer semester. Additionally, the interface was designed in an acceptably generic format instead of getting specific details from the sponsor.

  In address to future IPRO 342 groups, it is recommended to initiate communication with the sponsor as soon as possible.

Recommendations

PHP and MySequel are free software programs designed for Database Management and Database Software respectively. Since Midwest Steel & Services Inc. has already invested in MS-SQL databases for information storage, it is recommended to future IPRO 342 groups to use ASP.net since ASP.net is designed in parallel to MS-SQL by Microsoft and has higher stability and simpler communication standards then trying to match PHP with MS-SQL.

References

MacDonald, Matthew. *Beginning ASP.net 3.5 in C#*. 2nd Edition. Apress, 2008. Print.

Midwest Steel & Services Inc. Web. <http://www.mdwsteel.com>.

MS-SQL Server Developer Center. Microsoft Corporation. Web. <http://msdn.microsoft.com>.

Visual C# Developer Center. Microsoft Corporation. Web. <http://msdn.microsoft.com>.

W3Schools Online Web Tutorials. Refsnes Data. Web. <http://www.w3schools.com>.

Resources

Derrick Davis

Class ..... 32 Hours
Trip to Sponsor ..... 7 Hours
Web Application Development ..... 40 Hours
IPRO Deliverables ..... 15 Hours
Graduate Meetings ..... 20 Hours

Cordell Jackson

Class ..... 32 Hours
IPRO Deliverables ..... 20 Hours

Matthew Kasa

Class ..... 32 Hours
Learning PHP ..... 8 Hours
Setting Up and Running the Database ..... 12 Hours
Writing Query Source Code ..... 27 Hours
Graduate Meetings ..... 20 Hours

Peter Mathes

Class ..... 32 Hours
IPRO Deliverables ..... 12 Hours

Atinder pal Sohal

Class ..... 32 Hours
Learning HTML ..... 3 Hours
Learning PHP ..... 10 Hours
Acquiring Visual Studio ..... 5 Hours
Setting Up and Running the Database ..... 20 Hours
Writing Report Page Source Code ..... 20 Hours
IPRO Deliverables ..... 2 Hours
Graduate Meetings ..... 20 Hours

Jonathan Roraff

Class ..... 32 Hours
Analyzing Inventory / Product Reports ..... 2 Hours
Develop Web Page Format ..... 2 Hours
Trip to Sponsor ..... 7 Hours
IPRO Deliverables ..... 43 Hours

Kevin Tan

Class ..... 32 Hours
Learning PHP ..... 5 Hours
Setting Up and Running the Database ..... 3 Hours
Convert PHP to ASP.net ..... 2 Hours
Writing Inventory Page Source Code ..... 15 Hours
Writing Queries ..... 3 Hours
Formatting Web Page ..... 2 Hours
Trip to Sponsor ..... 7 Hours

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Midwest Steel & Services, Inc. – The corporation which allowed IPRO 342 to exist and allow the group to learn and grow for its needs.