Worldwide Logistics Data Access Project

By

Michael Craig Akers

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

June 2005

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Michael Craig Akers	June 2, 2005
Tamisra Sanyal	June 2, 2005
Patrick C. Kumpf, Ed.D. Interim Department Head	June 2, 2005

Acknowledgements

I would like to thank Worldwide Logistics for giving me the opportunity to do the *Worldwide Logistics Data Access Project*. Jeff Bergmann, Chief Operations Officer at Worldwide Logistics, was a main contributor in the success of this project. Jeff encouraged the company to design a new database system. Mr. Bergmann also helped by offering industry information.

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Abstract

The *Worldwide Logistics Data Access Project* is a database system. Currently Worldwide Logistics Inc. Associates uses an Approach database from the IBM Company. The system is slow causing insufficient workflow. Relationships are a big part of the shipping industry. Worldwide's relationships with customers and carriers have to be maintained. The old database system will not be able to provide the communication between Worldwide and its growing members. Business growth is good, but that growth will actually negatively impact Worldwide if technology improvements are not made. The new system will benefit by integrating dormant pre-existing purchased technologies. The company wants to provide its customers with vital information quickly and efficiently. I created a system using SQL Server, Microsoft Access and Macromedia Flash to provide the employees with demanded information requested by customers. The *Worldwide Logistics Data Access Project* is scalable meeting today's requirements along with the demands of tomorrow.

Worldwide Logistics Data Access Project

1. Problem Statement

1.1 Definition of Problem

Logistics is an essential part of world markets. Without logistics, our markets would not exist. Companies are always in need of transportation for their goods. All manufacturing factories do not reside in one centralized location. They are found throughout the world. Following the manufacturing process of an item, the item needs to be transported to a store. To facilitate this we have "global supply chain management" which means a system that manages materials from a point of origin to a manufacturer, a shipper and finally a consumer (2, p. 1). Air, water and land are different ways to transport goods.

Worldwide Logistics Inc. is a company that manages the distribution for multiple associations of manufactures. The associations are TOYSA (Toy Shippers Association Incorporated), NCBFAASA (National Customs Brokers Forwarders Associates of America Shippers Association) and IHSA (International House Wares Shippers Association). TOYSA will be the focus for this project. TOYSA provides a water service although land services can be contracted. The association provides rates to members that are only available to big corporations. Having access to these rates brings savings to a smaller toy companies.

TOYSA's services are provided through a series of steps. The steps are:

- Membership Process
  o Joining the association
- Member Commitments

- o Amount the member will be shipping

- Contract Negotiations

  - o Get the rates we will be providing

- Provide Rates

  - o Requested rates to members

- Billing Process

  - o Billing data must be stored

  - o Billing must be sent out in the middle of the month and monthly

- Payment

  - o Members must pay their fees

A fee is charged for each container used by a member although the fee can be reduced by using more containers. TOYSA is not responsible for the charge of shipping, but only the use of its contracts. The member will receive a bill from both the carrier for rates and the association for fees. A bill of lading is used to provide detailed information for each shipment made by a member. The bill of lading is provided by the association carrier. TOYSA provides, by request, copies of each bill of lading that pertains to a member.

1.2 Current Issue

The company is currently using Lotus Approach to meet its data needs. The database was set up about ten years ago by an individual with no experience in database systems. The system is rapidly degrading because of the layout chosen for the database. The system uses a "Master ID System" created by the past database designer. The system resembles a combination key, but every table uses this combination. During

an interview with the data entry specialist, she stated, "The system is very slow from one entry page to the next. Multiple people accessing the database, makes working in the database impossible." (3)

The company would like to move out of IBM (Approach) and into Microsoft (Access). They use Microsoft technologies for most of their business needs, but the database system is currently IBM based. Years ago they used Lotus SmartSuite much like they use Office today for this is why the database is an IBM technology. The database was created years ago by an inexperienced user. To make matters worse, the past "DBA" cannot recall how he got the system to work; this inhibited him from modifying or redoing the database system.

2. Solution

The company was in need of a data storage solution that would help facilitate their services. I have been in contact with Jeff Bergmann, Manager of Operations for Worldwide Logistics Incorporated. Together we continuously reviewed the progress of this project.   Jeff and I, using suggestions from other employees, decided on some of the functions this project needed to provide. The functions we decided on are as follows:

- It must be scalable. TOYSA will continue to grow. Its technology will need updating to help serve the growth.

- It must print multiple reports. Multiple reports are needed to satisfy the billing, rate request and queried information.

- It should be secure. Data will need to be kept confidential at all times.

- It should be easy to use. The front end application should have good appearance and a user friendly orientation to it.

The system's ability to be scalable was vital to allow future projects. The company would like to eventually would like to offer online services. The online services would allow members to check rates and pay bills.

The solution is scalable, user friendly, secure, and allow dynamic reporting. The database system allows multiple technologies to access and use information stored within it. Allowing technologies access gives the advantage of creating spreadsheets, mail/letter-merges[A], charts and many more tasks.

- Provides a scalable solution. Since the company is currently using Microsoft technologies I have chosen according to the current environment. The solution will provide for all the current demands as well as future demands.

- Provides user friendly functionality. This will be accomplished by:

    o Creating standard interfaces

    o Testing of the interfaces

    o Revising and retesting

- Provides a secure solution. The solution will use user authentication for in-house data access needs.

- Provides Dynamic Reporting. Reports will produce multiple printouts. As a request from the company I have chosen to use Microsoft technologies to provide the reports.

3. User Profiles

There will be three levels of TOYSA Data Access users. The user categories will consist of Typical, Data Entry, Internet and Administrator. Each group will be setup with different permissions.

3.1 Regular User

The typical user will have access to data on the database. This means the user has searching capabilities and reporting permissions. The user will not have full updating rights. The user will be permitted to update non-vital data. An example would be updating a contact name. The Information Technology experience level will be equal to typical desktop application users.

3.2 Data Entry

This user plays a very important role. Data entry needs to exist. Reason being there would be no data for retrieval. The user will have total access to data input. The front-end application will catch most mistakes made by the user, but ultimately the Data Entry User should be conscientious when inputting data. This will give the Typical User correctly formatted data to search and report. Information Technology experience will be the same as the Typical User.

3.5 Administrator

A user with access to all data and technologies comprised to make the product. The user will be responsible for product updates and bug reports. The Administrator will audit activity, maintain security, provide future functions for the product. Administrators will understand how the solution works.

4. Design Protocols

4.1 Organizational Scheme

A Relational Database and client-side local area network front end (See Figure 1)
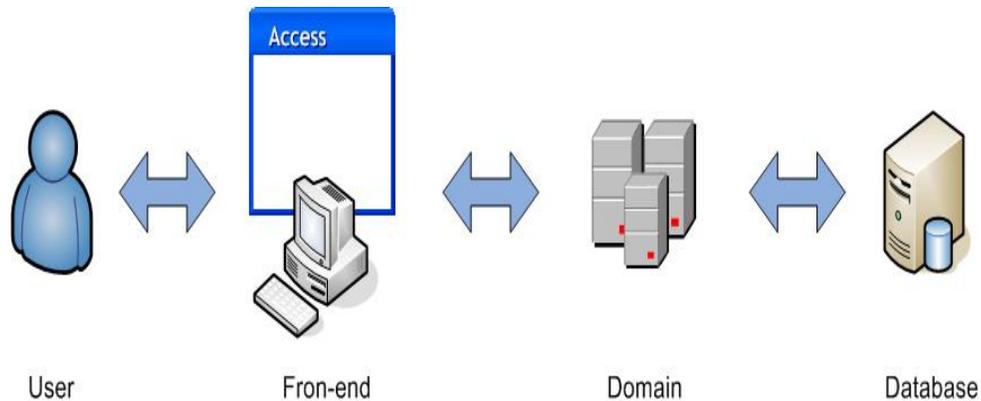
make up the solution.

Figure 1. **Organizational Scheme**

4.1.1 Front-end Clients

The client will be wanting to access or input information. To do so the client will

use the application interface. The Local Client must first log onto TOYSA'S Domain

Server (Active Directory). The user is then granted access to the application.

4.1.2 Application

The application is important it allows the client connection to the database. The

Local Application will communicate directly with the database with no server between

the Application and the Database Server.

4.1.3 Server

The server will grant permission depending on the end client. The database

resides on a separate machine. This will help to allow better data access. The Database

management software will reside on this server (machine). The basic Database diagram

is shown below (Figure 2. Database Diagram). The diagram only shows the foreign and
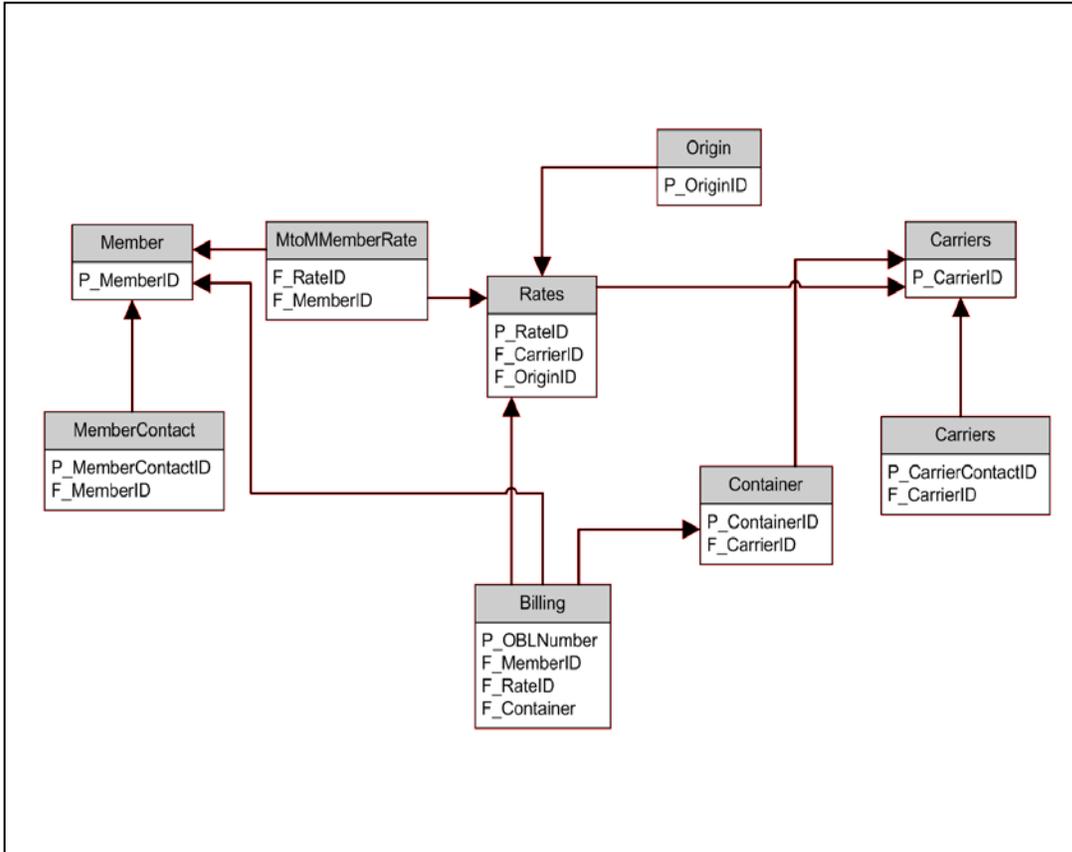
primary keys.

Figure 2. Database Diagram

4.2 Interface Design

4.2.1 Back-end

The interface is for the Administrator. The Administrator will be familiar with

SQL Server and Enterprise Manager. See the Back-end Interface on the next page
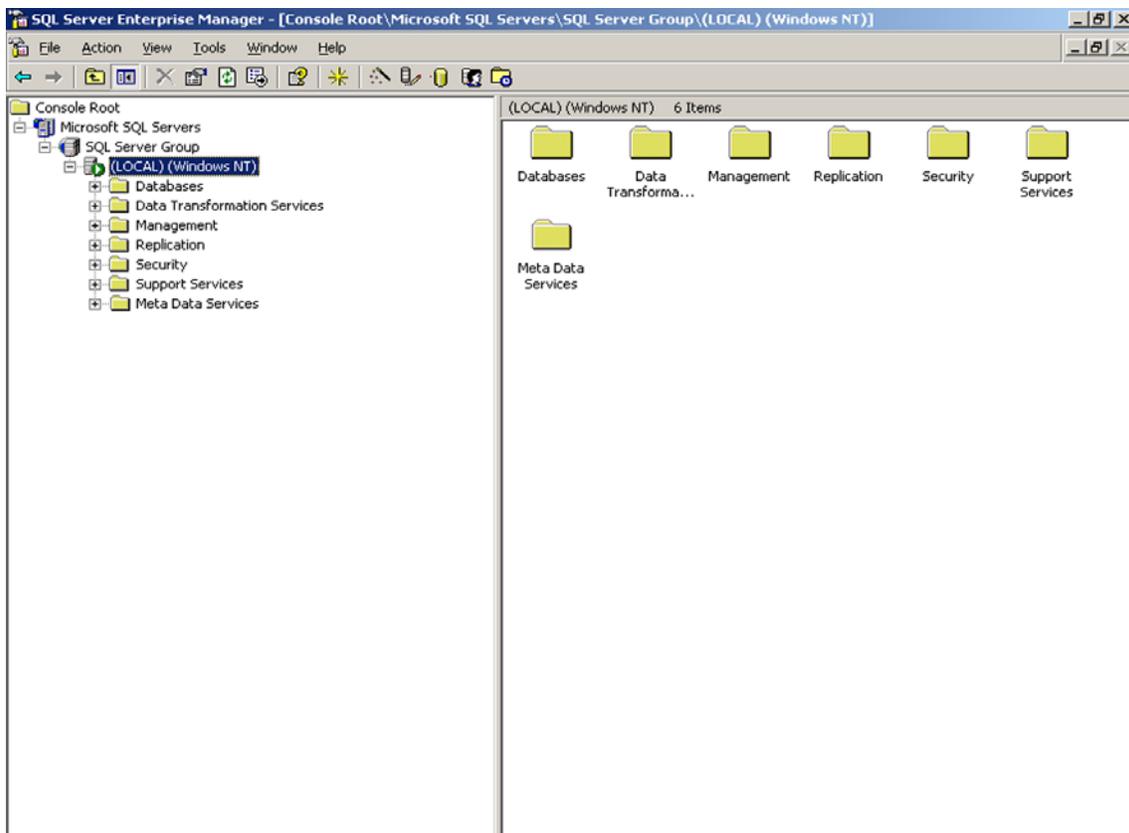
(Figure 3. Enterprise Manager Interface).

Figure 3. Enterprise Manager Interface

4.2.2 Front-end

The interface is catered to the Typical and Data Entry users. This interface is 10" by 9". The navigational buttons will be used to go to different areas of the application (Carriers, Members, Rates, Reports and Billing). The user has headings (Members Information, Members Contacts and Members Rates) for each section of the form. See the Local Client Interface (Figure 3. Local Client Interface). Ashly Bissantz [3], Data Entry Specialist at Worldwide Logistics Inc., helped to come up with the design of the form.

Figure 4. Local Client Interface

4.3. Icons and Graphical Symbols

The figure (Figure 4. Navigational Icons) below shows the icons\buttons that are located throughout the application. These icons were made so that symbolically they would be easily understood. The navigational buttons will have arrows typically seen in a database application (|<, <, >, >|). The command button will have text to inform the user of what function the button performs.
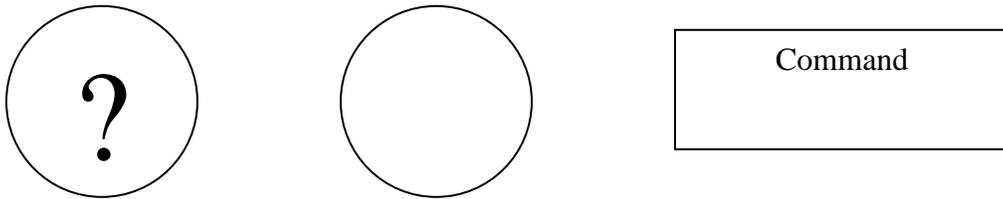
Figure 5. Navigational Icons

4.4. Shade Scheme

Three shades are primarily used in the application. The shades were chosen based on the desire of the company. The shades are black, white, and grey. The black is used to show detail and contrast.

Shades are:
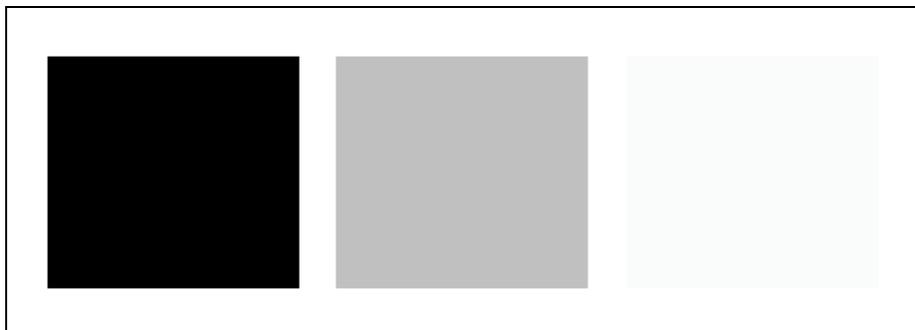
Figure 6. Shades

4.5. Help

The user can access help by using the help icon (see Figure 4. Navigational Icons). The help will be made from macromedia flash. Flash was chosen because of its ability to offer rich multimedia content. The help section is very futuristic offering video and audio. The user is able to find out exactly how to do a particular job.

5. Deliverables

1. Environment created

2. Virtual PC

3. Windows Server 2003 Standard Installed

4. DNS and Active Directory Installed

5. Back-end

6. SQL Server installed

7. Tables Created

8. Normalized and de-normalized

9. Relationships Created

10. Front-end

11. Design

     i. Graphics (Buttons and Forms)

    ii. Shade Scheme

12. Member Contact Forms (Add, Edit, Search (Basic), Delete)

13. Member Forms (Add, Edit, Search (Basic), Delete)

14. User Login

15. Finish Error Handling (Check Data)

16. Application Setup

17. Reports (Monthly invoicing, rate sheets)

18. Forms (Rates, carrier, carrier contact, dynamic search and billing)

19. Test Evaluation Form

20. Help Application

21. Stored Procedures (Carriers, rates, reports and advanced searches)

6. Design and Development

6.1. Timeline

See Appendix B.

6.2. Senior Design I

- Researched Databases, Logistics, and Worldwide Logistics

- Set Project Goals

- Decided on a solution

- Started Development

- Completed Proposal and Presentation

6.3. Senior Design II

- Continued Research

- Virtual Environment Setup

- Start Design

- Install Instance of Database

- Setup Tables

- Normalize and De-normalize

- Setup Relationships

- Front-end Started (Forms)

- Testing

6.4. Senior Design III

- Continued Form Design

- Reports

- User Login

- Application Setup

- Help Application

- Test Evaluation Form (For Testing)

- Testing and Revising

- Finished Product

- Training

7. Budget

7.1. Software

The project will call for several software and hardware solutions. The software will consist of the following:

Photoshop – for making graphics

Access – to create the Local Client front-end

SQL Server 2000 – database (back-end)

Flash – to create the Help Application (Client front-end)

Funding for the software needed was provided by the company.

Manufacturer	Product	Price	Project Cost
Adobe[1]	Photoshop CS	$649.00	$649.00
Microsoft[4]	Access	$229.00	$0.00
Microsoft[5]	SQL Server 2000	$2249.00	$2249.00
Macromedia[6]	Flash MX 2004 Professional	$499.00	$499.00
	TOTALS	$3626.00	$3397.00

Figure 7. Budget Table

7.2. Hardware

The project will use a preexisting sever located at the company's office and services already being used.

8. Project Testing

The testing was done in the offices of Worldwide Logistics on virtual machines. The company currently has rights to use development software through the "Action Pack Subscription" (Developer and Seller resource of Microsoft Technologies). Each tester used an evaluation form while conducting the test. The testing followed a process. There were three main testing phases and many tests I completed throughout the development process. The testing process is shown on the next page (Figure 8. Testing). A sample form is shown in the Appendix (Appendix A. Testing Evaluation Form).
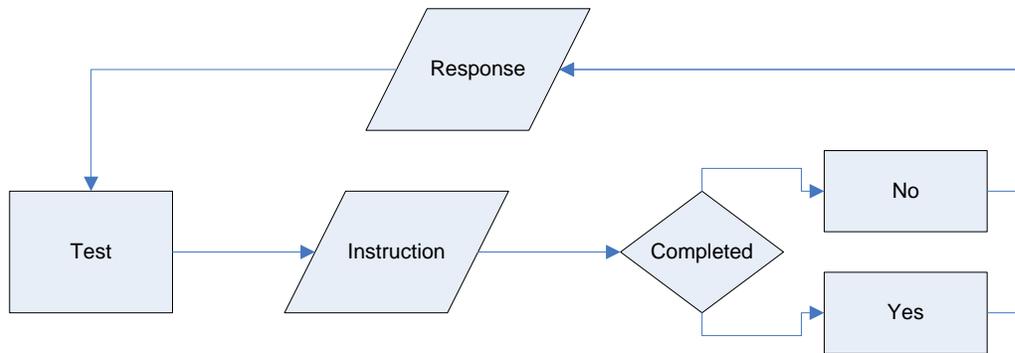
Figure 8. Testing

8.1. Phase I

This phase involved getting a better idea of what the end user needed. Suggested features were made to improve the quality of the application. Some of those features were centralized areas for the retrievable of information. For example the members have their own section with member specific contact, rate and company information.

8.2. Phase II

The user tested the application, giving feedback on new features. This was also the preliminary testing phase. The project was completed at this phase.

8.3. Phase III

The project is tested for any remaining bugs. The user's responses were all yes and the application was finalized.

9. Conclusion

9.1 Conclusion

The Worldwide Logistics Data Access Project was needed to replace the old, inefficient database. The new database meets the demands of the company, Worldwide Logistics. The application and structure are appealing. Several technologies were used to make this solution. Those technologies include Microsoft Access, Microsoft SQL

Server 2000, Adobe Photoshop, and Macromedia Flash. The Design Freeze Deliverables

were satisfied and testing was done to guarantee quality.

Appendices A.
Testing Evaluation Form

Employee Information		
Name of Employee:		**Position:**
Date:		

Review Guidelines		
Review Scale	**0** = **DNW (Did Not Work)** **1** = **Hard To Do** **2** = **OK (Medium) To Do** **3** = **Easy To Do**	

Evaluation		
(Use Reverse Side For More Comments)		

	DNW	Hard	OK	Easy	Comments
Logon To Application	☐	☐	☐	☐	
Browse Members/Carriers/Rates	☐	☐	☐	☐	
Edit Members/Carriers/Rates	☐	☐	☐	☐	
Print An Invoice And Mid-Month	☐	☐	☐	☐	
Help (Was it easy to find?)	☐	☐	☐	☐	
Add A Bill To Database	☐	☐	☐	☐	
Edit A Bill	☐	☐	☐	☐	
Find A Bill	☐	☐	☐	☐	
Overall Of Application	☐	☐	☐	☐	

Response Total   =

(Back)

Additional Comments
Comment:
Comment:
Comment:
Comment:
Comment:

NOTE:

Thank you for completing this evaluation of the Toysa Database. The users' involvement is necessary to provide a successful application. You may have to perform more than one evaluation.

Appendix B.
Project Timeline

ID	Task Name	Start	Finish	Duration	2004 Oct	Nov	Dec	2005 Jan	Feb	Mar	Apr	May
1	Initial Research	10/1/2004	10/19/2004	2.6w	■							
2	Write Proposal	10/21/2004	11/15/2004	3.6w		■						
3	Present Proposal	11/18/2004	11/18/2004	0w		◆						
4	Research Logistics	11/18/2004	12/16/2004	4.2w			■					
5	Research Access	11/25/2004	12/1/2004	1w			■					
6	Research SQL Server 2000	12/3/2004	12/9/2004	1w			■					
7	Research Flash	12/13/2004	12/17/2004	1w			■					
8	Develop and Test Database	12/28/2004	1/20/2005	3.6w				■				
9	Develop and Test Front End	1/24/2005	2/16/2005	3.6w					■			
10	Develop and Test Internet Form	2/18/2005	3/15/2005	3.6w						■		
11	Present Prototype	3/17/2005	3/17/2005	0w						◆		
12	Improvements and Complete	3/25/2005	5/3/2005	5.6w							■	
13	Help Application	5/5/2005	5/12/2005	1.2w								■
14	Present Final Project	5/20/2005	5/20/2005	.2w									

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