Accident Fault Finding System

By

Elmryano K.D Somboton

Dissertation submitted in partial fulfillment of
the requirements for the
Bachelor of Technology (Hons)
(Business Information Systems)

OCTOBER 2006

Universiti Teknologi PETRONAS
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CERTIFICATION OF APPROVAL

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Approved by,

_____

(Ms. Shakirah Mohd Taib)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
OCTOBER 2006

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources person

ELMRYANO K.D SOMBOTON

ABSTRACT

The aim of this project is to develop a system to allow relationships to be drawn between hypothesis and evidence. The fault could be identified when a relationship between hypothesis and evidence is exists. This project delivers a system that will be used to analyze the fault of an accident happened by comparing the hypothesis and evidence which would be done by the proposed system. Developing this system is to extend the existing system which is Incident Reporting System; where the existing system does not handle fault finding of the accident occurred in University Technology PETRONAS (UTP). Currently Health, Safety and Environment department in UTP is applying equations and formula in order to investigate the accident using hypothesis method. Thus this system will be used by the Health, Safety and Environment department in UTP to study and analyze the fault of any incident would be occurred. The system will be modeled using Visual Basic.NET. As for the database, the author is using Microsoft Access. This project needs to consider a lot of issues for this development, such as validity, reliability and the equipment available. The project is expected to come out with a reliable accident fault finding system which could be an application solution and accident solver to the HSE department of UTP and also as an information system that allows incidents, causes, evidence and interpretations to be collected, retrieved and managed. However, there are some limitations of the system being developed due to unsolved coding. As overall, the system has achieved its objective in terms of data integration and eases the investigation tasks.

ACKNOWLEDGEMENT

I would like to express my gratitude and thanks to my supervisor, Miss Shakirah for her advices, helps, coordination and supervision in making this Final Year Project a success. She assisted and guided throughout the research and implementation of the Final Year Project (FYP).

Many thanks also to UTP Information & Communication Technology and Business Information Systems FYP Committees for putting effort in succeeding the completion of the project.

Finally, I would like to thank to HSE department of UTP especially to Mr. Wan Tarmizi for his support and information given in completing this project. I would appreciate the cooperation and assistance given.

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ABBREVIATION

FYP	Final Year Project
UTP	Universiti Teknologi PETRONAS
HSE	Health Safety and Environment
GUI	Graphical User Interface
GIS	Geographic Information System
GPS	Global Positioning System
PETRONAS	Petroliam Nasional, Malaysia

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND OF STUDY

In the early days of knowledge management, there was a strong focus on information technology (IT). As knowledge management became the latest buzzword, technology vendors were quick to spot an opportunity to sell 'knowledge management solutions' and many of the companies that led the way in knowledge management were quick to buy – to their cost. Having made significant investments in the latest systems, they then found that people simply did not utilize them and so the systems ended up being limited to dead-end. These companies learned the hard way that knowledge management is about people, processes and technology – in that order of priority.

According to Fumiko Kondo in his findings, technology is an important enabler of many knowledge management initiatives. Technology can support and enable knowledge management in two main ways [1]:

i. It can provide the means for people to organize, store and access explicit knowledge and information, such as in electronic libraries or best practices databases.

ii. It can help to connect people with people so that they can share tacit knowledge, such as through white pages, groupware or video conferencing.

This project development is for the extension of the existing system, Incident Reporting System, which this existing system is to facilitate submission of report and consolidate and trending the incident reports. As the author studied the current system, the system does not handle any fault finding activities which this activity would be useful for the Health, Safety and Environmental department to investigate any accident or occurred in UTP.

1.2 PROBLEM STATEMENT

1.2.1 Problem Identification

Currently, when an accident has occurred, HSE department will do the post-mortem and evaluating procedure will be done. After evaluating process has been done, HSE department will proceed to investigate the cause of the problem. Investing the problem involves two methods; go to the accident site; and using hypothesis. Using hypothesis is applying the equations and formula to get the result of what has cause the accident occurred. This is very time consuming and inefficient way to apply in investigating fault and the data would be not validate. Without fault finding system knowledge base, it is difficult to know whether the hypothesis is valid or invalid.

1.2.2 Significance of the project

Accident Fault Finding System is designed to assist HSE officers to perform their fault finding using hypothesis. HSE officers would no longer perform it manually using the formulas and mathematical concepts to find the fault that caused the accident occurred. Users that are granted with access only can access the system to perform the investigation and find the relation between hypothesis and evidence of an accident occurred. With this system as well may help the user to reduce time and energy to do the investigation on an accident using hypothesis method.

1.3 OBJECTIVES AND SCOPE OF STUDY

The objectives of the project are:

- To come out with an accident fault finding system in aiding UTP HSE department in finding fault of a(n) problem/ accident.
- To design knowledge management model using Visual Basic.NET.
- To find the advantages of the implementation of the accident fault finding system.

For the first phase of the project, author is required to come out with a system that would aid in fault finding for any accident occurred in UTP. The knowledge management technology and the tools itself are hoped to help and support the system development as it has a lot of advantages compared to existing technologies. In order to do that, the author has decided to choose Visual Basic.NET in which it will be implemented with knowledge management technology in accident fault finding system.

As an addition, the implementation will be done using the flexible manufacturing system that has the flexible routing and machining systems. The author will design the fault finding system equipped with the knowledge management technology using Visual Basic.NET and will compare it to other knowledge management system also using Visual Basic.NET capabilities to see the advantages and disadvantages. The completion of this project hopefully will inspire many industries to implement this knowledge management based system technology.

1.3.1 Project Limitation

This project however, is only applicable for hypothesis accident investigation which, this method (using hypothesis) is not fully applied by UTP HSE unit. Also for the conclusion, it is only could be drawn when the evidence and hypothesis that stored in database are matched as well as the evidence that support and contradict the hypothesis.

1.4 FEASIBILITY OF PROJECT WITHIN THE SCOPE AND TIME FRAME

A time given is about eight months in order to complete this project. For the first four months, it is allocated for carrying out research and writing paperwork while the remaining four months will be used in developing the system. This project is divided into three phases. The first phase will focus on the development of accident fault finding system.

The second phase will stress on the application of the system as part of the project to users and the final phase will cover the whole application including the neatness and user friendly interface is concerned. Task allocation for each step is arranged accordingly so that enough time is distributed to complete the project.

CHAPTER 2
LITERATURE REVIEW AND THEORY

2.1 SUPPORTING INFORMATION

2.1.1 Knowledge Management

Knowledge Management caters to the critical issues of organizational adaptation, survival and competence in face of increasingly discontinuous environmental change. Essentially, it symbolizes organizational processes that seek interactive combination of data and information processing capacity of information technologies, and the creative and innovative capacity of human beings [2]. Figure 1 below shows the knowledge management system architecture.

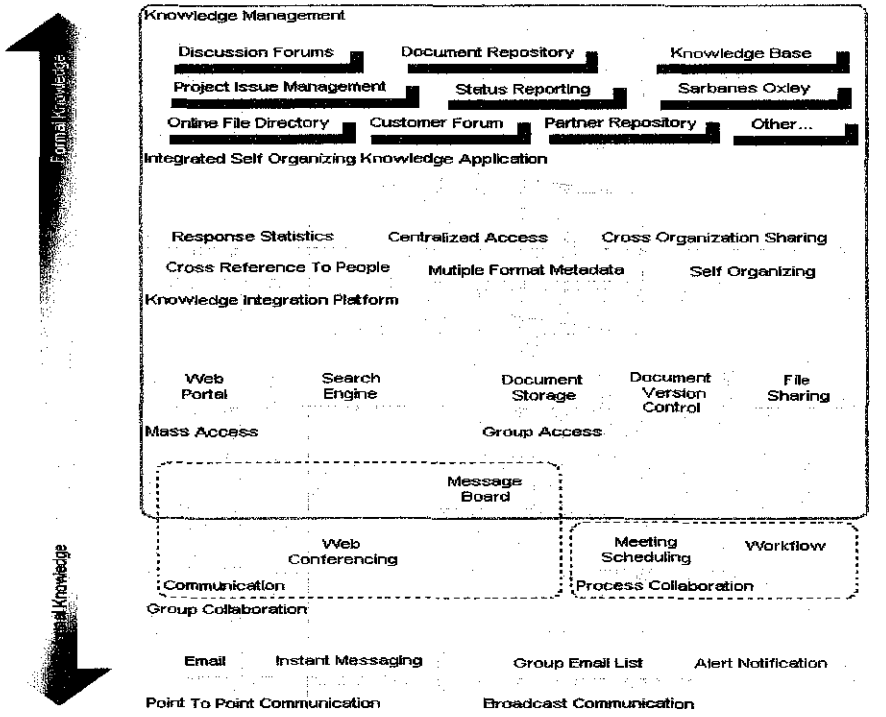

Figure 1: Knowledge Management System Architecture

Many organizations that are applying knowledge management are observing increasing excitement about the wonders delivered by newest information technologies in an era characterized by knowledge as the critical resource for business activity. With the advent of new technologies, such as data mining, intranets, videoconferencing, and web casting, several technologists are offering such solutions as a solution for meeting the business challenges of the knowledge era. Trade press coverage of the 'productivity contradiction' has further added to the speed of the information technology (IT) treadmill by suggesting that increasing investments in new information technologies should somehow result in improved business performance.[2] For instance, some recent stories published in the trade press have asserted that certain technologies, such as intranets, have some inherent capability for facilitating organizational transformation initiatives, such as knowledge management.

Interestingly, some technology experts and academic scholars have observed that there is no direct connection between IT investments and business performance or knowledge management. For instance, Erik Brynjolfsson, a professor at MIT Sloan School, notes that: "The same dollar spent on the same system may give a competitive advantage to one company but only expensive paperweights to another."[3] Hence a key factor for the higher return on the IT dollar is the effective utilization of technology.

2.1.2 Knowledge management in the 'Old' Information Era

In the information era, technology leader, as well as hardware and software providers, has been offering out-of-box solutions that are expected to enable knowledge management. Such off-the-shelf solutions are expected to offer means for storing best practices devised by human experts in information databases which may be later used for crunching out the pre-determined solutions based on pre-defined parameters. For example, identifying and documenting rules for managing data; and assuring that data are accurate and maintain integrity. A *Computerworld* article defined knowledge management in terms of mapping knowledge and information resources both on-line and off-line. [4] The merging and consensus building emphasis of such systems is

suited for stable and predictable organizational environments. However such interpretations of knowledge management, based primarily on rules and procedures embedded in technology, seem uneven with the dynamically changing business environment.

2.1.3 Knowledge management in the New World of business

The traditional paradigm of information systems is based on seeking a consensual interpretation of information based on socially spoken rules or the mandate of the company bosses. This has resulted in the confusion between 'knowledge' and 'information'. However, knowledge and information are distinct entities. While information generated by the computer systems is not a very rich carrier of human interpretation for potential action, 'knowledge' lives in the user's subjective context of action based on that information. Hence, it may not be incorrect to state that knowledge resides in the user and not in the collection of information.

Karl Erik Sveiby, the author of *The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets*, contends that the confusion between `knowledge' and `information' has caused managers to sink billions of dollars in technology ventures that have yielded marginal results. He stated that the business managers need to realize that unlike information, knowledge is embedded in people and knowledge creation occurs in the process of social interaction [2]. Another well-known knowledge professor, Ikujiro Nonaka, has emphasized that only human beings can take the central role in knowledge creation. He argues that computers are merely tools, however great their information-processing capabilities may be.

The 'wicked environment' of the new world of business forces the need for variety and complexity of interpretations of information outputs generated by computer systems. Such variety is necessary for translating the multiple world views of the uncertain and unpredictable future.

2.2 ACCIDENT FAULT FINDING SYSTEM

Fault Finding System is a system that allows diverse searches based on the hypothesis and evidence that are contained in the databases. The users are needed to select evidence and hypothesis of the accident occurred from the list boxes provided.

To access the databases, they must be activated first. The information that is used by the interface comes directly from the databases. If information in the databases in changed then the user needs to update the information by restart/ reopen the interface.

HSE officer must first enter a validate password and username in order to access the system. These may be used to identify the level of access that the engineer has if the system contains some restricted areas.

Fault finding often start of with a specific problem occurring, this is then clarified through a series of questions to try to determine exactly what caused the accident (evidence). A search of the system would be carried out using the evidence to generate a list of possible solution. For example, a fuse is broken and caused a burning building. The evidence is the burning building and the hypothesis made by HSE offices might be the fuse is faulty, someone has burnt it, etc. the system would handle information shuffle which it would rank the results that are most frequently match with the evidence and hypothesis. Figure 2 shows the process flow of Accident Fault Finding System.

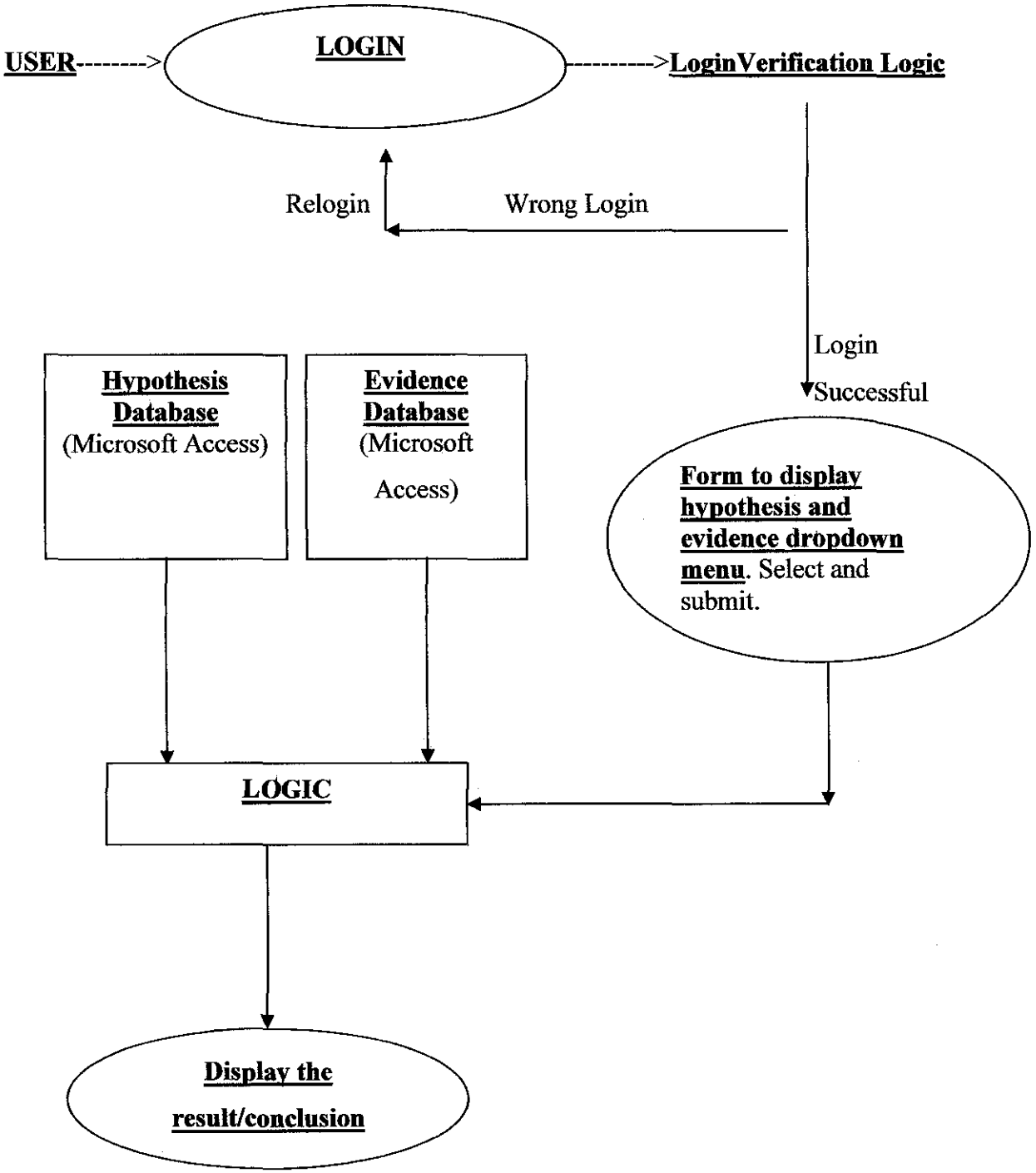

Figure 2: Process flow of Fault Finding System

2.2.1 Accident Fault Finding Procedure

Accessing, sharing, and using knowledge during critical accidents: many of us share this same dilemma. Accident Fault Finding System is a field in which there is a huge potential for collaborative work. Many of the organizations and people involved are ready and willing to work together. We must do so in order to avoid repeating each other's errors, building incompatible systems, and isolating ourselves from other organizations and industries. [1]

In the HSE department, fault finding procedure is performed by doing the post-mortem on the accident occurred. The first step is to evaluate the procedure and do the reporting on what has occurred based on the evidence of the accident. After the procedure has done, comes to the investigation part which HSE has to investigate the cause of the accident based on the evidence and proof. For example, the faulty fuse has caused the socket to be burnt off.

Other method also is applied when comes on investigating the fault and cause of the problem or accident occurred. One of the methods is using hypothesis. Using hypothesis will require HSE staff to apply the formula or equation to get the result that will lead to the cause of the problem/ accident. At this point, it is very obvious that the method is time consuming as HSE department does not use any computerized system to deals with the hypothesis to get the absolute result. Applying knowledge base fault finding system will help HSE department to find the problem caused when comes using hypothesis to do the investigation activity.

The existing system is the Incident Reporting System is only matters on the reporting part of the accident occurred while Accident Fault Finding System will assist in finding faults.

2.3 KNOWLEDGE MANAGEMENT AND FAULT FINDING SYSTEM

The interest in knowledge management has surged during the last few years, with a growing number of publications, conferences and investment in knowledge management initiatives. [3]

Sometimes, seeing the value of an idea is not enough and you need to rely on fault finding to strengthen your concept. There are some faults which are immediately obvious. There are some faults which any mind that is risk-averse will be able to find. But then there are other faults which are not at all easy to find. We may need to use our creative imagination to foresee different possibilities and different circumstances. When reaching of using our creative imagination, knowledge base is useful to be applied in the fault finding system. When knowledge base is applied, it can assist the user to do the 'thinking' for the fault of an accident as well as the solution for it.

2.4 CONCLUSION

Based on the review, fault finding can be implemented by using knowledge base where fault finding also is part of knowledge base. Accident fault finding system knowledge base will allow the management compare the hypothesis and evidence and make a relationship between hypothesis and evidence to get the conclusion of an accident. With precise data about causes of accident, a line manager can accurately apply recommendations to reduce injury levels significantly.

This kind of efficient reporting raise the awareness of the management group concerning the value of the safety data system, the safety professional can consistently show a contribution to savings and to profits.

CHAPTER 3
METHODOLOGY/PROJECT WORK

3.1 PROJECT WORK

3.1.1 Requirement Planning Analysis

In order for the project to be completed successfully and according to the planning, certain approaches and methodologies are taken. The diagram below shows the steps that author has planned and organized in order to complete this project. This diagram shows the overall planning of the project combining the first and second phase of project.

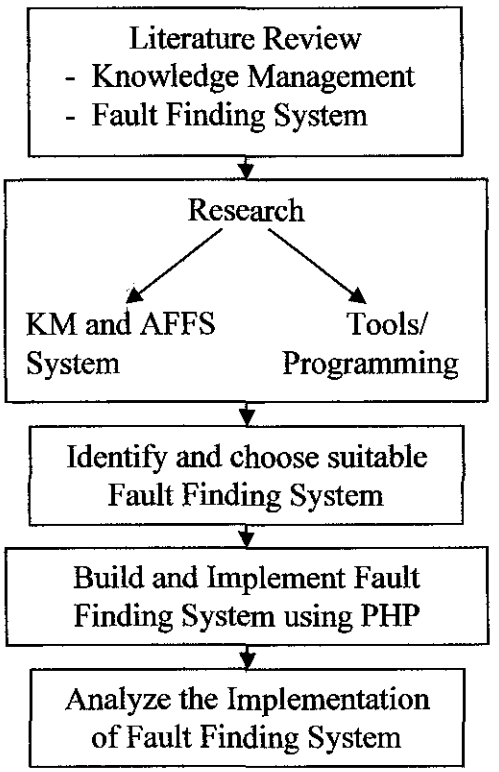

Figure 3: Project Flow Diagram

The first activity in the requirements planning analysis is to identify objectives and scope of the application or system. The scope is refined due to changes that have been made with the author's supervisor.

During this particular phase, the author have conducted some feasibility study by considering the time and scope that underlie the starting concept of each and every project. Researches from many sources have been made as a guideline for my project. These findings seem benefit me in term of other companies new technologies and better procedure of fault finding. The ideas and theories help me to conclude the best method to build the system. In strengthening the research and findings, the author had reviewed some existing systems of other companies as guidance to develop the HSE Accident Fault Finding System.

Other than that, the author had interviewed one of the HSE staffs regarding on the current fault finding procedure that they implement. They had briefly explained about the flow and procedures involved during the fault finding process.

3.1.2 User Design Interface

For the user interface, basically it is design according to the user where HSE Accident Fault Finding System will be used by Head Program or Head Department and also HSE Unit. Therefore, a very simple interface is required to be developed as the user may easily learn to use the system and a very simple training will be required to train the user. A use case and entity diagram will be developed after the research part has been completed.

3.1.3 Developing Prototype

To develop the system, the author will be using Microsoft Access for the hypothesis database and evidence database, Visual Basic.NET for the interface of the system. To process the logic of the matches evidence and hypothesis, the author will be using

procedural rules or case-based reasoning and coded in Visual Basic.NET. In designing the prototype, the author must ensure that the system meets the objectives stated in the planning phase. First, is to construct a database by creating particular tables and to link the data source. Second, to write a program for each field in particular forms. Third is to generate the report from the data entered. Finally, to compile the program and ensure it works.

3.1.4 Testing

Testing involves during the entire process of developing the prototype. Each field table is tested whether it is stored in database or not. Also, to test whether the right functions is used for particular field. Before developing a real product, the author had designed a temporary template to test and differentiate each coding that is used. Later, the author applied the codes to the actual prototype. The methodology or project work the author had mentioned above is actually what had the author did for her project.

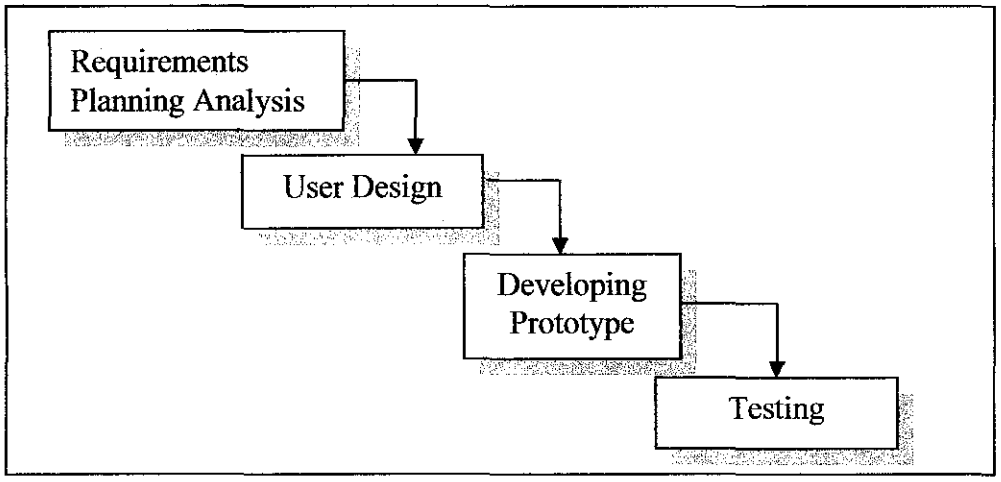

Figure 4: Phases in Project Work

3.2 TOOLS REQUIRED

In order to develop the project, the author chose suitable hardware and software to complete the project. Here is the list of hardware and software used to develop the project:

Hardware:

- Intel Celeron 2.40GHz
- 256 MB of 64-bit SDRAM memory
- 20 GB hard disk drive
- Two stereo speakers and 16 bit stereo audio supporting Sound Blaster Pro
- Universal serial bus (USB) port
- V.90 56Kbs modem
- 10-100 BT Ethernet card

Software:

- Microsoft Windows XP Professional, Version 2002, Service Pack 2
- Microsoft Office XP, Premium Edition (Word, Access)
- Microsoft Visual Studio.NET 2003

CHAPTER 4
RESULTS AND DISCUSSION

4.1 REQUIREMENT PLANNING ANALYSIS

4.1.1 Findings Analysis

As of researches done, author can simply say that, UTP might enhance the fault finding procedure not only within the campus but the area outside campus. It is an opportunity for the UTP residents to easily deal with matter such as accident and injury cases.

The form of accident reports is another issue in developing the system. From the author's point of view and supporting points, the author suggest that the usage of accident fault finding system that is practiced by UTP is better as it also can be used for either employee or student. This is because most of staff and student are lack of knowledge in terms of HSE terminologies especially on the fault finding terms.

Referring to injuries and accidents in manufacturing companies, the possibility of usage of Accident Fault Finding System is higher and more practical due to amount of hazards that usually lead to accidents. In UTP itself, the implementation of Accident Fault Finding System can be used in chemical lab and labs that using machinery technology or anywhere within the campus.

The usage of GIS based system, pen computers and laptops in UTP's HSE also can be implemented in future. They are all capable in identifying accidents by segment or area-based location on its facilities was an efficient method for capturing the information.

From these findings, the author had chosen to develop a system with criteria as below:

- To develop a computer-based accident fault finding for UTP
- To remain the procedure in finding fault process using hypothesis used by HSE UTP
- To build a system that is applied within university campus only
- To build a system that generate trends of accident

4.1.2 Interview Session

In the requirement planning phase, the author had conducted an interview session with the officer of Health Safety and Environment Unit of UTP. These are the findings of subject matter:

- Accident refers to an event or chain of events which can cause and / or has caused injuries, illness and/ or damages to assets, people, the environment and third parties. Such accident would include lost times, fatalities, fires, explosion, oil or chemical spills and etc.
- There are additional events that require investigation such as occupational illness, fire or explosion, property damage and major near miss accidents.

In investigating, the particular people need to consider the following:

- To use question such as "what, when, why, how, where and who".
- To consider environment, equipment, procedures, people and organization
- To prepare accident investigation tree to identify leads and the causes
- To interview and record facts

The process of investigation of accident comprises of notification, appointment of investigation team, preparation, fact findings, analysis and recommendation, prepare a report and distribution of findings.

4.2 USER DESIGN INTERFACE

4.2.1 Use Case Diagram

Use case diagram shown in figure 5 is designed based on analysis that has been made in requirement planning analysis. It shows the interaction between users such as staff, student, head department and HSE unit, and the Accident Fault Finding System. The system is used primarily to capture the high level user functional requirements of a system. Besides, it gives the unit of estimation and the unit of work.

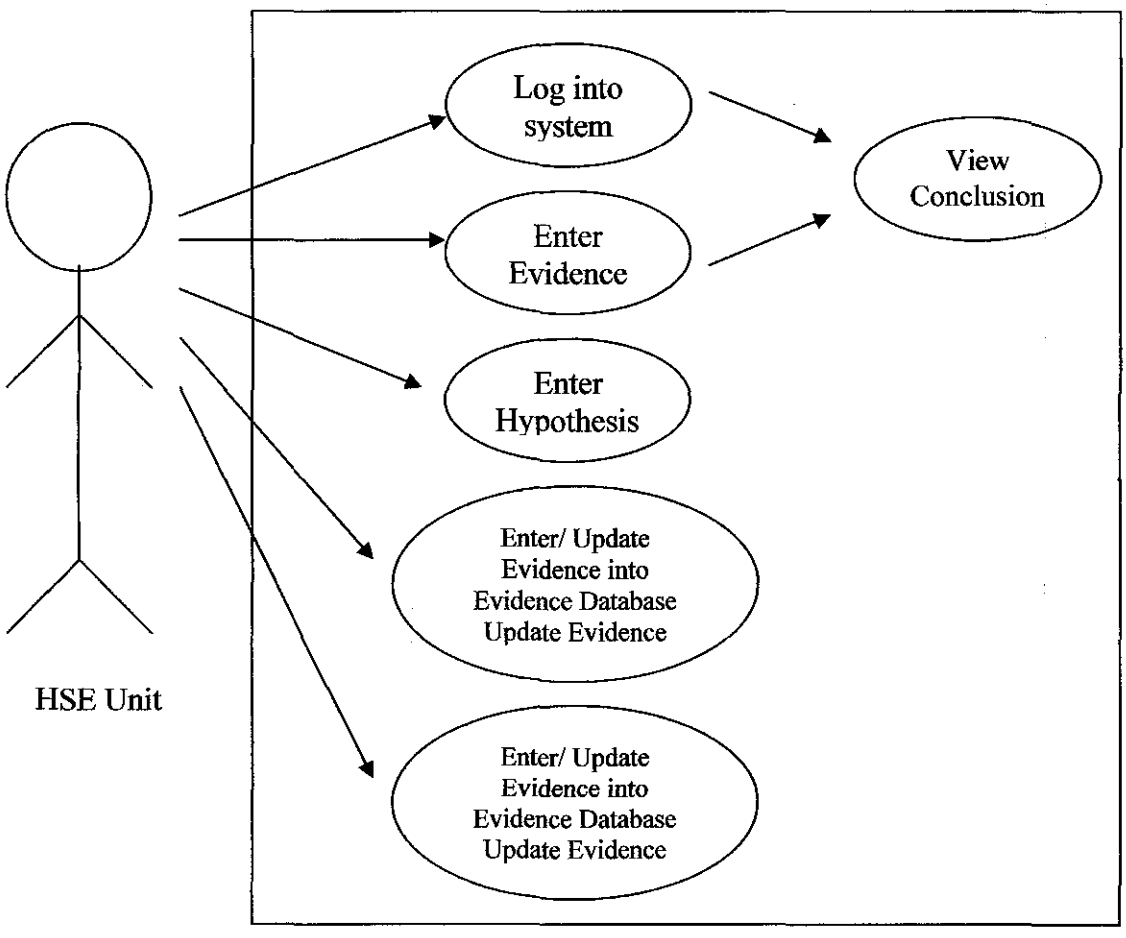

Figure 5: HSE Unit Log in

Actors: Health Safety and Environment officers (HSE)

Description: HSE unit officers of UTP log into Accident Fault Finding System. He or she enters the hypothesis as well as the evidence of the accident occurred. When the system generates the logic between the hypothesis and evidence entered by the officer, it will produce a conclusion of the accident occurred. The officers are also responsible to update or delete the hypothesis and evidence in the database.

4.2.2 Entity Relationship Diagram

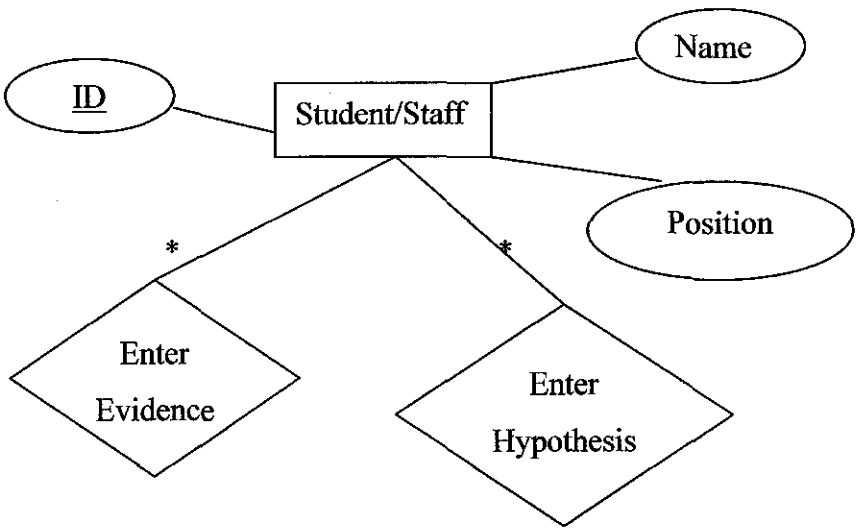

Figure 6: ER Diagram

Figure 6 shows that entity relationship of HSE Unit and the Accident Details. Two or more Head Department/ Program and one HSE unit can enter the evidence and hypothesis in the database as well to find the accident fault.

4.2.3 Data Flow Diagram

The diagram shown in figure 7 illustrates the flow of data through a system and the process performed by the Accident Fault Finding System.

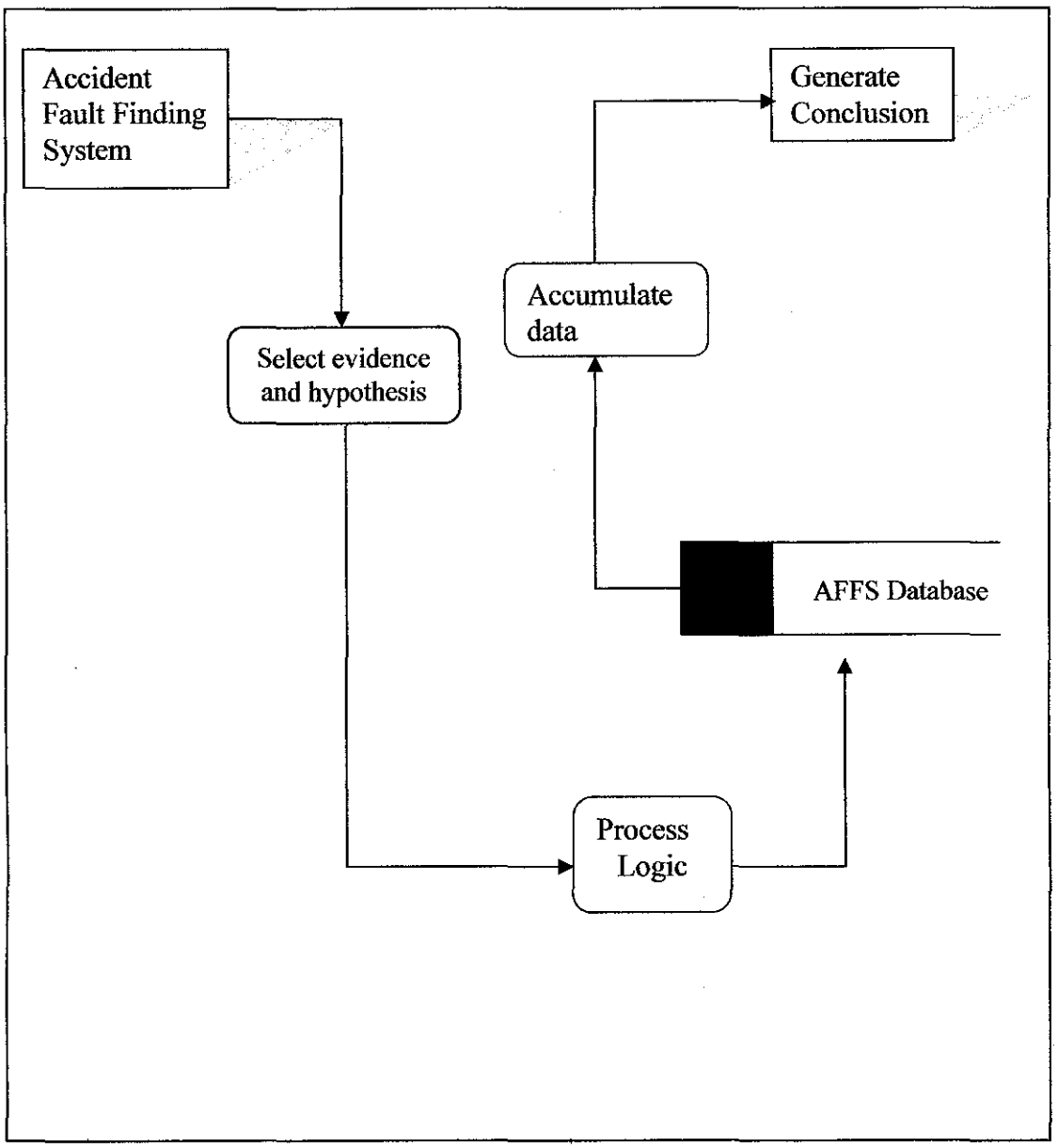

Figure 7: Accident Fault Finding System Data Flow Diagram

4. 3 DEVELOPING PROTOTYPE

A prototype is an application that is developed for the user (HSE staff) to investigate an accident using hypothesis method. Below are the print screens of the accident fault finding system prototype.

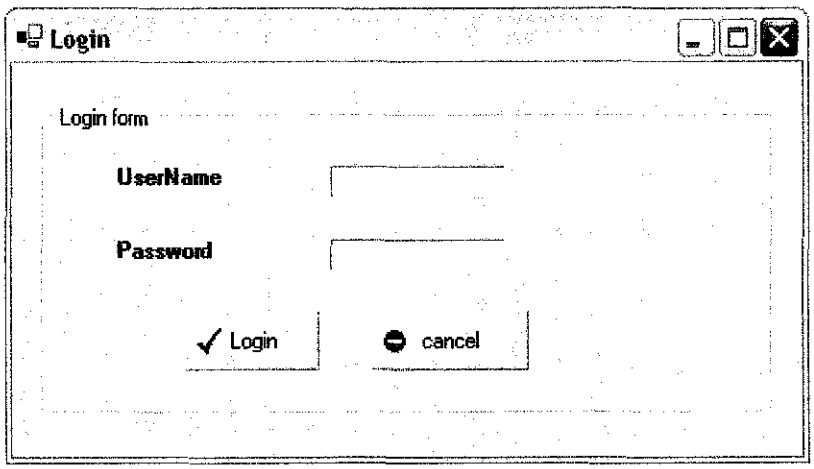

Figure 8: User Login

Figure 8 shows that the user must first enter his/ her name as well as the password to access to the system.

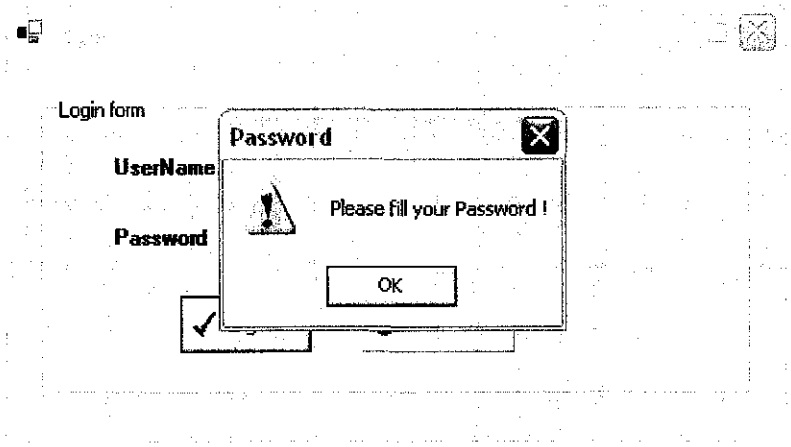

Figure 9: Message box for no password entered

Figure 9 shows that the user has not enter password to access to the system.

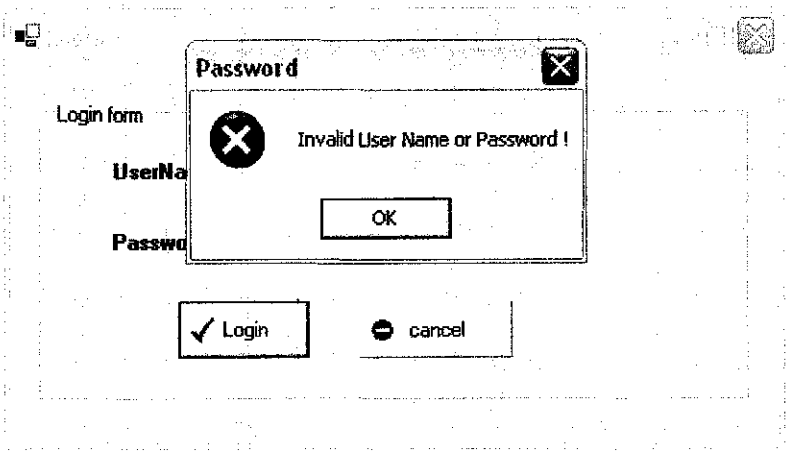

Figure 10: Message Box for intruder

Figure 10 shows that users with no identification is not allow to enter the Accident Fault Finding System

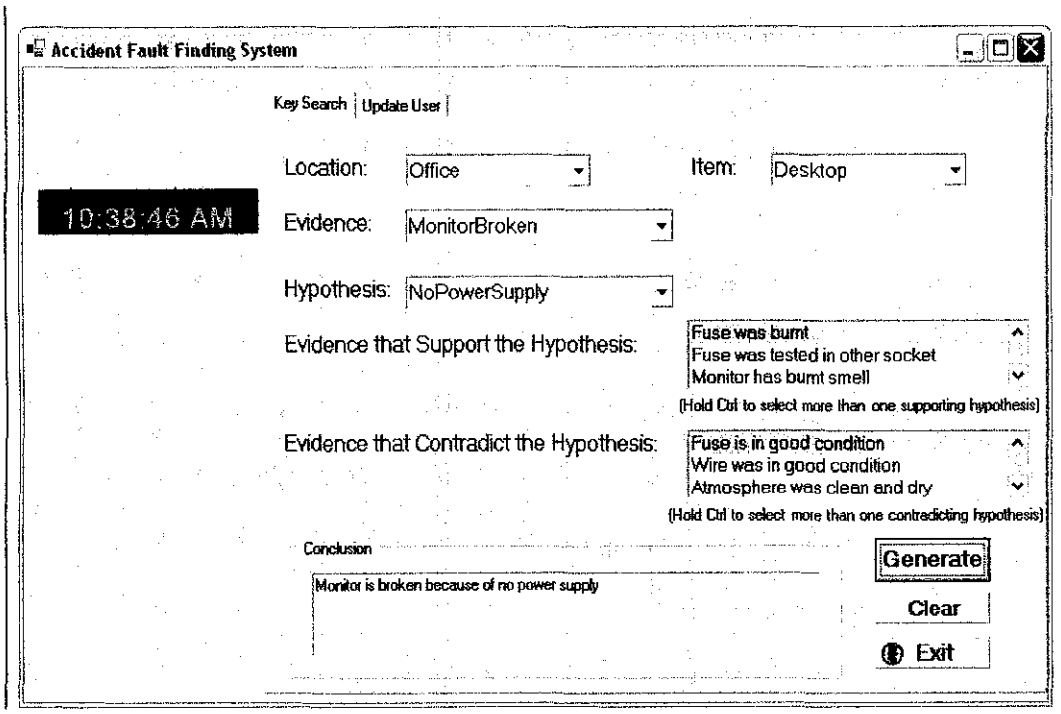

Figure 11: Authorized users page

Figure 11 shows that the user has been granted the access to Accident Fault Finding System and the officer will fill in the line details of initial accident that had occurred by selecting the appropriate data from the drop down boxes. When the last box is filled with input, the system will then generate the conclusion based on the entered data (evidence and hypothesis). To start a new investigation, the user can click the Clear button to start a new prediction.

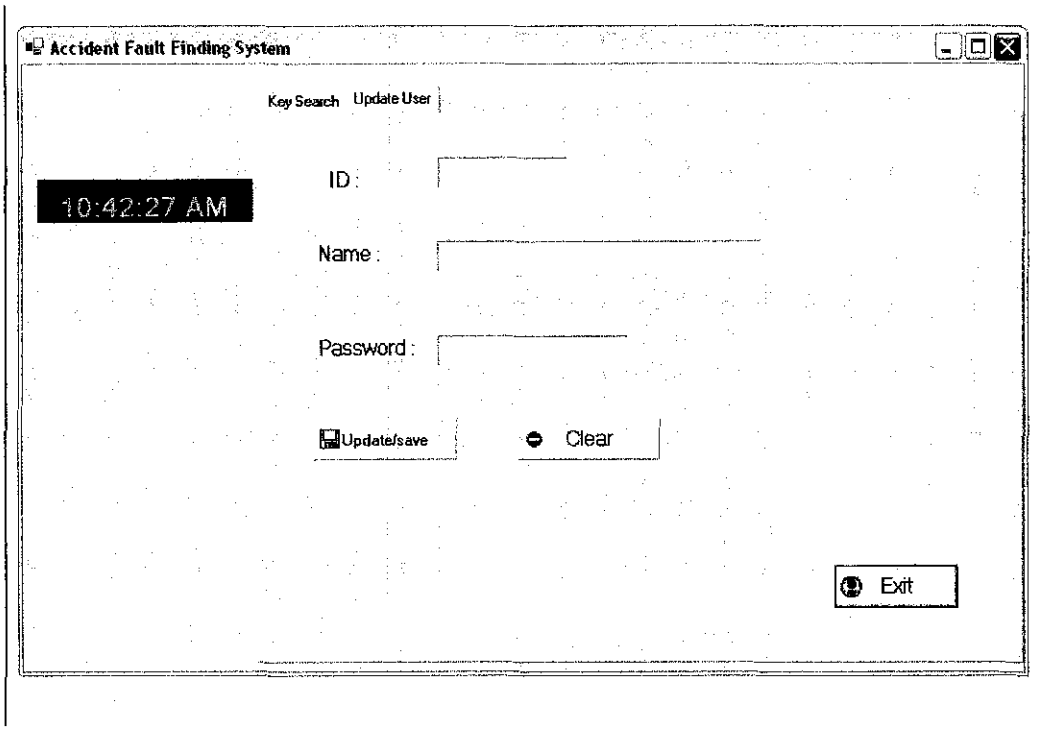

Figure 12: Update users' page

Figure 12 shows a page to update the existing users which users may change over the time and also the users may want to change their login details.

CHAPTER 5
CONCLUSION AND RECOMMENDATION

5.1 CONCLUSION

Implementation of knowledge management based system in accident fault finding system is a great approach and it is very beneficial for the various industries and application. The application of it would result in better fault finding procedure using hypothesis. This also contributes in many aspects especially in term of time-saving and reliability which are very constrain in this hi-tech era. Time-saving and flexibility can be achieved if this technology is implemented wisely. Fault can be searched using hypothesis and use the system/ application to draw a conclusion between the evidence and hypothesis. It is more practical if this Accident Fault Finding System could be integrated with the existing system called Incident Reporting System. According to the UTP HSE unit procedure when an accident occurred, a report must be produced before any investigation held. Thus, this way not only could enhance the efficiency of reporting but also the investigation using hypothesis method.

Though this system is not totally fully reliable and suitable for investigating accident but it could be implemented and introduce to UTP HSE unit as the system could assist the unit in using hypothesis to investigate accident occur within UTP. Through this system also, it could assist the unit in reducing the time to investigate the accident's fault by eliminating the use of paper (form).

5.2 RECOMMENDATION

After conducting a few researches, the author found that the existing system which is the Incident Reporting System and the developed system, Accident Fault Finding System could be merging and integrate as one system. By combining these two systems, it could produce an efficient work flow to perform reporting as well the investigation. Another opportunity is that this system could apply GPS and GIS for future enhancement. These technologies are capable to map accident area at particular workplace.

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APPENDIX 1 TEST CASES FOR LOGIN FORM

Valid Test Case

Test Case	Input	Expected Output	Actual Output	Comment/ Status
Login	User Name: Password:	Login form is closed	Login form is closed	Pass
Logout	Click	Confirmation message box is appear	Confirmation message box is appear	Pass
Confirmation Message box	Yes	• Authorized users page is appear	• Authorized users page is appear	Pass
	No	• Confirmation message box is closed • Login form is open	• Confirmation message box is closed • Login form is open	Pass Pass

Invalid Test Case

Test Case	Input	Expected Output	Actual Output	Comments/ Status
Insert incomplete input: • User Name • Password	User Name = " " Password = " "	Display error message	Display error message	Pass
Insert incorrect input: • Incorrect user name • User Name		Display error message	Display error message	Pass
Insert the same input: • Same user name		Display error message	Display error message	Pass

APPENDIX 2 TEST CASES FOR ACCIDENT FAULT FINDING SYSTEM

Valid Test Case

Test Case	**Input**	**Expected Output**	**Actual Output**	**Comments/ Status**
Select Location	Click	Display Item Lists	Display Item Lists	Pass
Select Item	Click	Display Evidence Lists	Display Evidence Lists	Pass
Select Evidence	Click	Display Hypothesis Lists	Display Evidence Lists	Pass
Select Hypothesis	Click	Display Evidence that Support(s) the Hypothesis Lists	Display Evidence that Support(s) the Hypothesis Lists	Pass
Select Evidence that Support(s) the Hypothesis	Click	Display Evidence that Contradict(s) the Hypothesis Lists	Display Evidence that Contradict(s) the Hypothesis Lists	Pass
Generate Conclusion	Click	Display the conclusion	Display the conclusion	Pass
Clear	Click	Clear the selections	Clear the selections	Pass
Exit	Click	Accident Fault Finding form is closed	Accident Fault Finding form is closed	Pass

Invalid Test Case

Test Case	Input	Expected Output	Actual Output	Comments / Status
Insert no Input	Click	Item, Evidence, Hypothesis, Evidence that Support(s) the Hypothesis, and Evidence that Contradict(s) the Hypothesis dropdown boxes are disabled	Item, Evidence, Hypothesis, Evidence that Support(s) the Hypothesis, and Evidence that Contradict(s) the Hypothesis dropdown boxes are disabled	Pass
Generate Conclusion without Input	Click	Display error message	Display error message	Pass

APPENDIX 3 TEST CASES FOR UPDATE USER

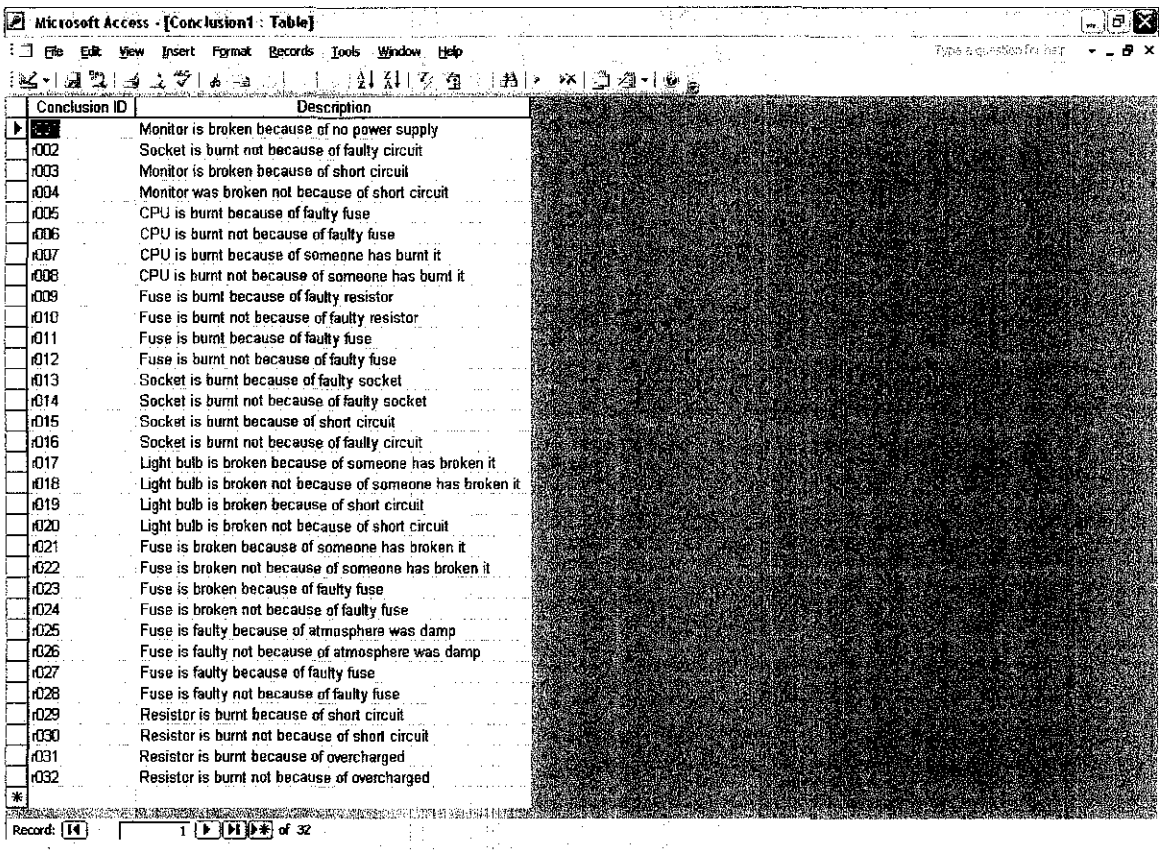
Valid Test Case

Test Case	Input	Expected Output	Actual Output	Comments/ Status
Update Information	• ID • User Name • Password	Update confirmation message box is appear	Update confirmation message box is appear	Pass
Clear	Click	Clear the textboxes	Clear the textboxes	Pass
Exit	Click	Accident Fault Finding form is closed	Accident Fault Finding form is closed	Pass

Invalid Test Case

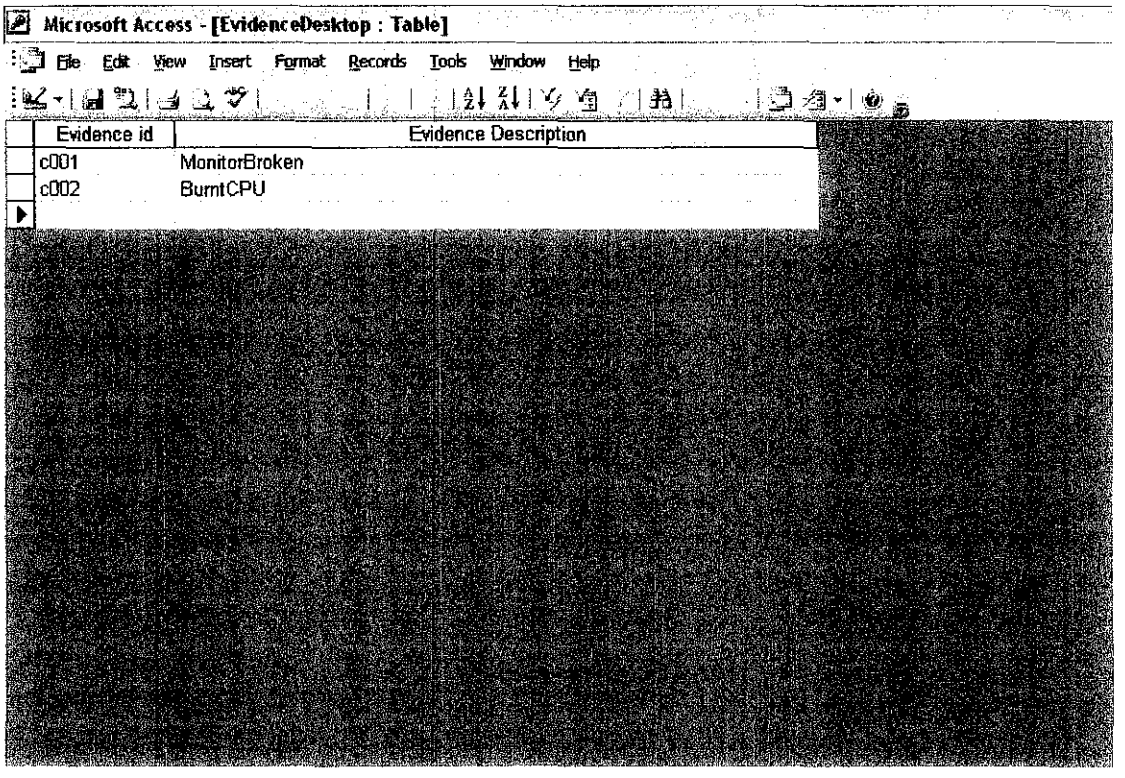
Test Case	Input	Expected Output	Actual Output	Comments/ Status
Insert incomplete input: • User Name • Password • ID	User Name = " " Password = " " ID = " "	Display error message	Display error message	Pass

APPENDIX 4 CONCLUSION DATABASE

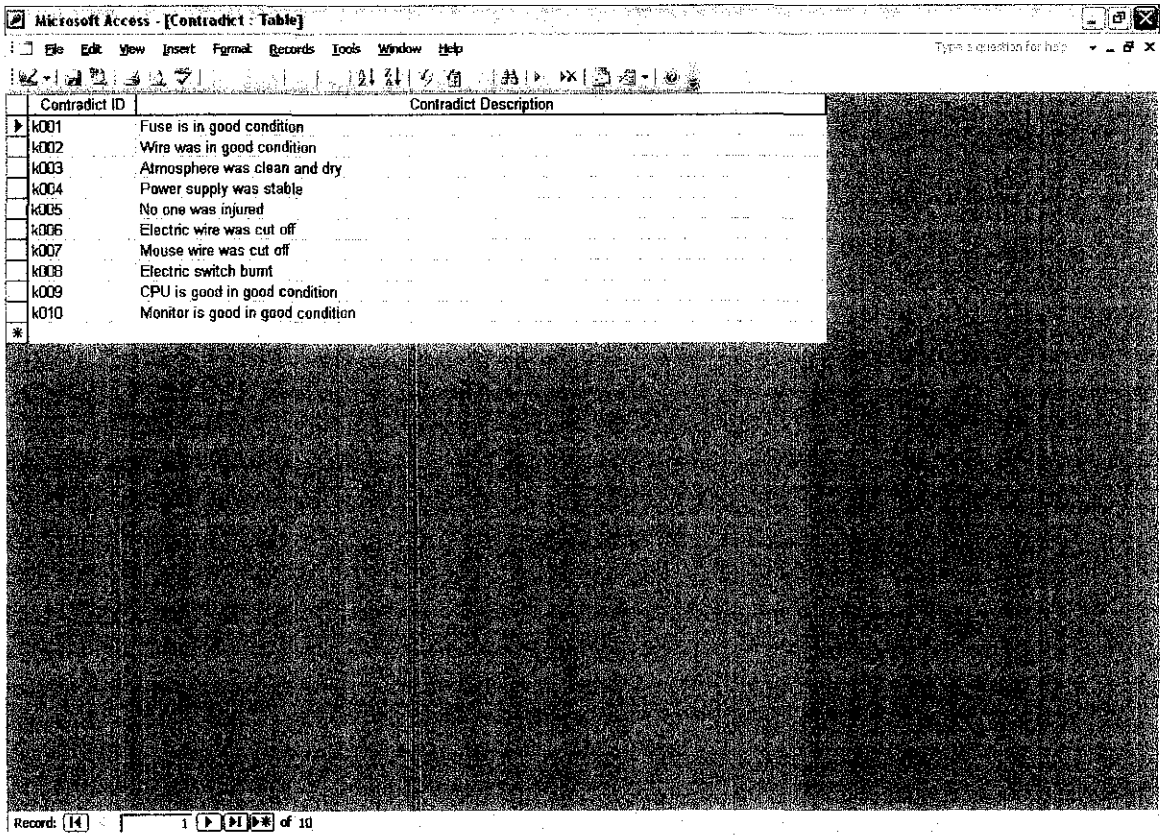


Conclusion ID	Description
r001	Monitor is broken because of no power supply
r002	Socket is burnt not because of faulty circuit
r003	Monitor is broken because of short circuit
r004	Monitor was broken not because of short circuit
r005	CPU is burnt because of faulty fuse
r006	CPU is burnt not because of faulty fuse
r007	CPU is burnt because of someone has burnt it
r008	CPU is burnt not because of someone has burnt it
r009	Fuse is burnt because of faulty resistor
r010	Fuse is burnt not because of faulty resistor
r011	Fuse is burnt because of faulty fuse
r012	Fuse is burnt not because of faulty fuse
r013	Socket is burnt because of faulty socket
r014	Socket is burnt not because of faulty socket
r015	Socket is burnt because of short circuit
r016	Socket is burnt not because of faulty circuit
r017	Light bulb is broken because of someone has broken it
r018	Light bulb is broken not because of someone has broken it
r019	Light bulb is broken because of short circuit
r020	Light bulb is broken not because of short circuit
r021	Fuse is broken because of someone has broken it
r022	Fuse is broken not because of someone has broken it
r023	Fuse is broken because of faulty fuse
r024	Fuse is broken not because of faulty fuse
r025	Fuse is faulty because of atmosphere was damp
r026	Fuse is faulty not because of atmosphere was damp
r027	Fuse is faulty because of faulty fuse
r028	Fuse is faulty not because of faulty fuse
r029	Resistor is burnt because of short circuit
r030	Resistor is burnt not because of short circuit
r031	Resistor is burnt because of overcharged
r032	Resistor is burnt not because of overcharged

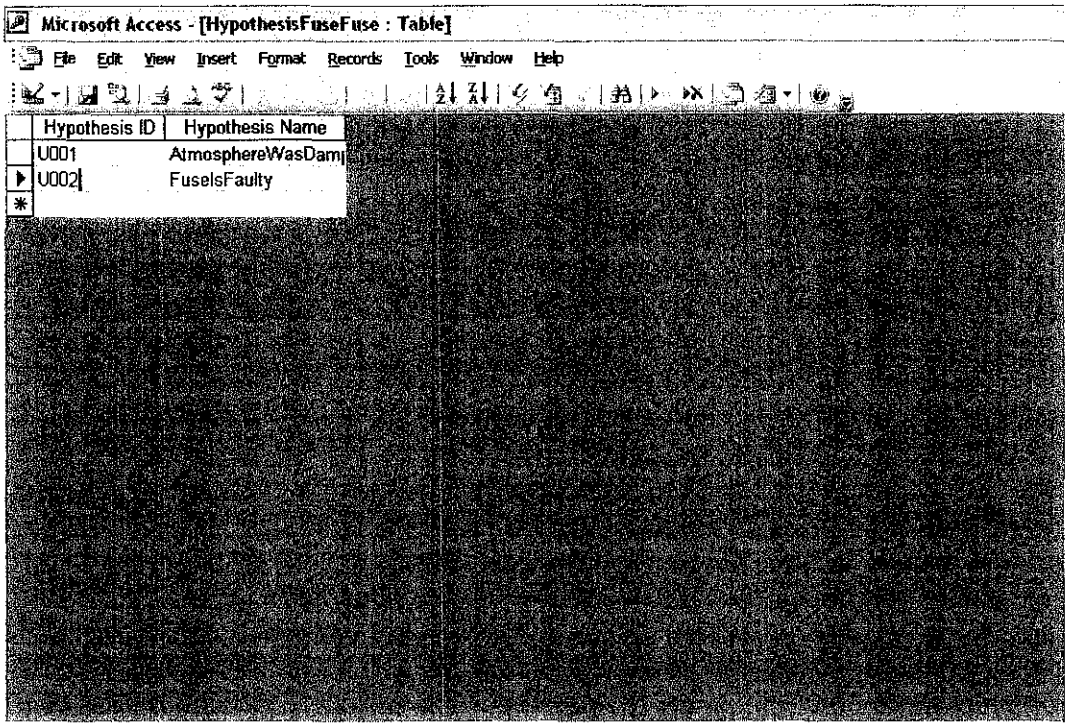
APPENDIX 5 EVIDENCE DATABASE



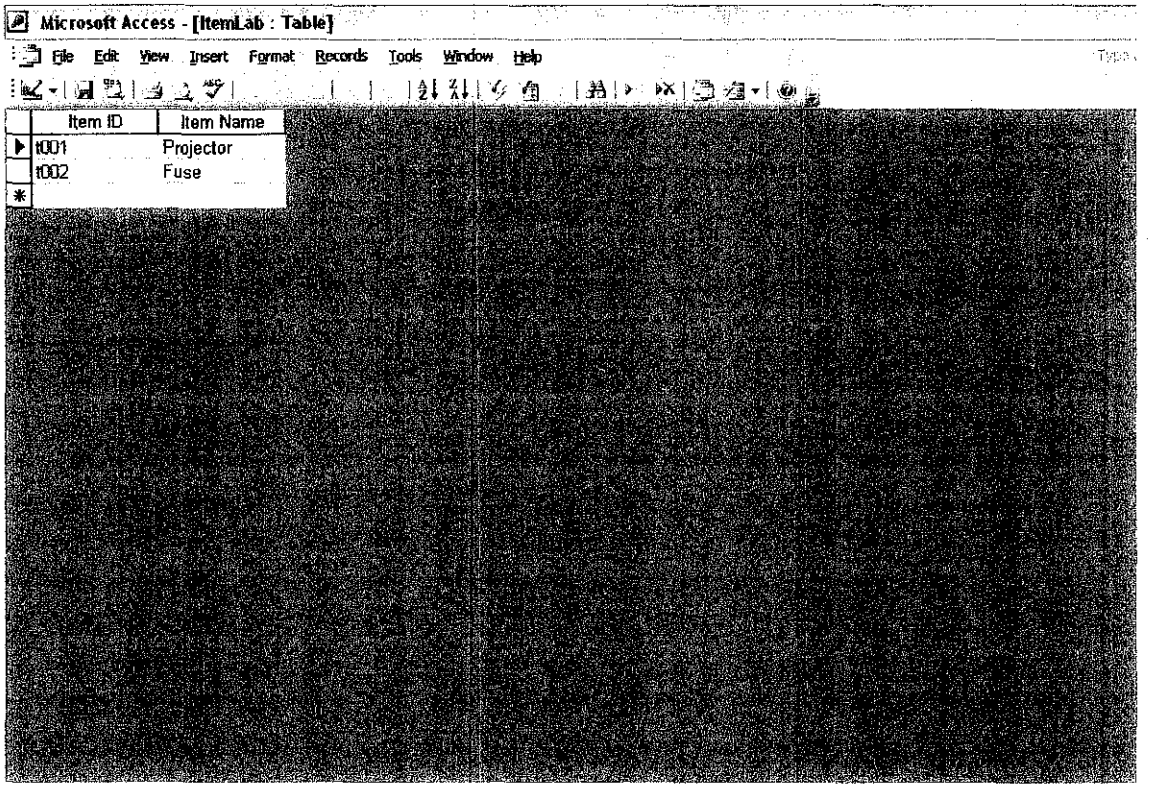
APPENDIX 6 CONTRADICTING EVIDENCE DATABASE



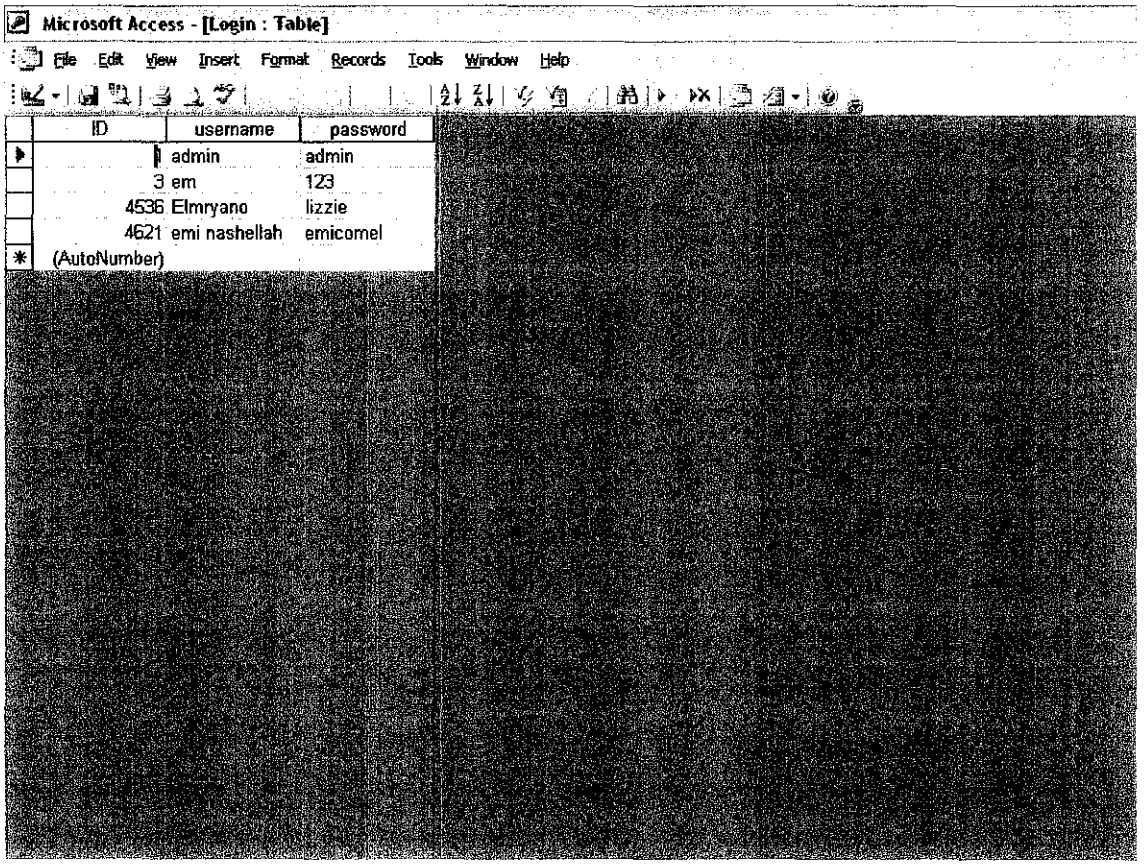
APPENDIX 7 HYPOTHESIS DATABASE



APPENDIX 8 ITEM DATABASE



APPENDIX 9 LOGIN DATABASE



APPENDIX 10 SUPPORTING EVIDENCE DATABASE