

**Online Clearance System (OC System)**

By

Zazilawati binti Zamri

Dissertation submitted in partial fulfillment of  
the requirement for the  
Bachelor of Technology (Hons)  
(Information Communication Technology)

NOVEMBER 2006

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1) Internet programming  
2) web sites -- Design

# **CERTIFICATION OF APPROVAL**

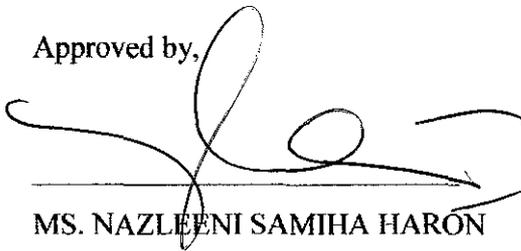
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Approved by,



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UNIVERSITI TEKNOLOGI PETRONAS  
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NOVEMBER 2006

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in the project, that the originality work is my own expect as specified in the references and acknowledgements and that the original work contain herein have not been undertaken or done unspecified sources or persons.



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ZAZILAWATI BINTI ZAMRI

## **ABSTRACT**

The purpose of this project is to design a system for UTP Security Department, Information Resource Centre Department and Finance Department specifically for the administration of students and staffs' administration management. The system will be web – based applications that can be executed using normal web browser for inter – platform capabilities. The project is divided into two terms, first the research on clearance system for final semester student and second development on the Online Clearance System (OC System). Research on the OC System will be based on the problem statement and objective of the project while the research for the current clearance system for final semester at UTP is the support idea for the project.

This document also gives further information about the system in the literature review/theory section. This section includes the features of the system, the benefits from using the system, and the data flow diagram of the intended system.

Part of the Final Year Project, student manage to get known with the business environment on how they manage their database, clearance system and the performance of the staff. In using Online Clearance System (OC System) give the best solution for the staff as the database plays an important asset for the staff. I would use distributed database in my system. A distributed database is a database that is under the control of a central database management system in which storage devices are not all attached to a common CPU. It may be stored in multiple computers located in the same physical location, or may be dispersed over a network of interconnected computers. Collections of data (eg. in a database) can be distributed across multiple physical locations. A distributed database is distributed into separate partitions/fragments. Each partition/fragment of a distributed database may be replicated (ie. redundant fail-overs, RAID like).

## **ACKNOWLEDGEMENT**

First and foremost I would like to recite my greatest gratitude to the Most Merciful Allah for giving me the opportunity in completing this manuscript on time and without much hassle or problem. Without His observance in giving me the chance in finishing the report, there might be major problem which can resulted in delay of turning in the report in the time constrain.

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## **ABBREVIATIONS AND NOMENCLATURES**

<b>UTP</b>	<b>:</b>	<b>Universiti Teknologi PETRONAS</b>
<b>DBMS</b>	<b>:</b>	<b>Database Management System</b>
<b>ICT</b>	<b>:</b>	<b>Information Communication Technology</b>

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Background of study**

Universiti Teknologi PETRONAS (UTP) was established on January 10, 1997 when PETRONAS was invited by the Malaysian government to set up a university. UTP offers a wide range of engineering and technology programmes at undergraduate and postgraduate levels complemented with a strong focus on Research and Development. The programmes are designed with high industry relevance to provide a dynamic learning environment.

Every year, Universiti Teknologi PETRONAS (UTP) has their Convocation Ceremony for the students that graduated in their respective fields of studies. Before the student can go for the Convocation ceremony, they need to do the clearance process at the end of the final Semester to make sure that the student is clear from any outstanding loans/debts/any other matters that need them to pay before the student can get their scroll during Convocation ceremony.

Currently, Universiti Teknologi Petronas is using manual system to do the clearance that creates a few problems to the student and also to the staff. One of the main problems is, in this day, the student need to go to the every department to get signature, stamp and date from respective department to verify that the student is clear from any outstanding loans or debt. The student need to check with the department manually, and sometime they tend not to get the full information they need such as the exact amount of summon, date summon being issued and etc. It takes time to complete the clearance

form as they need to queue or come again the next day because UTP have a lot of student that wants to do the clearance every semester.

The purpose of this project is to design and develop an online clearance system. The growing reputation of the Internet in the early 1990s has made most people nowadays turn to utilize it for their daily operation such as on-line transaction, getting information, e-mailing friends, interactive chatting and many more. The increase of their popularity has made the internet a vital part of our society. The access to the internet and interactive content of the World Wide Web (WWW) have made them great means for people to access, exchange, and process information. The Internet is a modern information relay system that connects hundreds of thousands of telecommunication networks and creates an "internetworking" framework. These applications create numerous of field area to be studied and therefore, it makes Internet become more well-liked year by year

This application is mainly for the purpose of the Security Department, Finance Department and Student in UTP which help them to update and alert about the Clearance System. The systems that will be created were web based application. Web based application can be executed using normal web browser for inter – platform capabilities. The system is designed to make the student more easily doing the clearance for graduation purpose. The systems are able to produce information on type of clearance status. The system also is able to update the entire data of a student and know who exactly the people who will graduate every year according to id, course and so forth.

Using this system, The Webmaster will act as the administrator for the system. The webmaster will administer the operations of the system according to the effectiveness of the system, its functionality, etc. Meanwhile, the staffs will be the person who will key in the data that needed in the system. Lastly, the student will use the system to make the Clearances. By using this system, Security Department and Finance Department can

easily update and manage the clearance system systematically. At the same time, the users that use this system will feel much easier.

## **1.2 Problem Statement**

There are no proper or effective platform provided by the university to store and record the information, and also a there is no proper way to retrieve certain data or information immediately at one place. The system mainly used is the manual or traditional way.

### **Scenario 1**

Students have difficulty to check their clearance status. In this day, they need to go to the each department and check with the department manually, and sometime they tend not to get the full information they need; such as the exact amount of summon, date summon being issued and etc. It takes time to complete the clearance form as they need to queue or come again the next day because UTP have a lot of student that wants to do the clearance every semester.

### **Scenario 2**

Student have difficulty to notice their summon status or have information on the type of summon and the amount of each summon. As we can see, the security staff always put the summon receipt on the wiper of a car or at the motorcycle handle, the receipt sometime can be blown away by the wind. So, sometimes student do not get the summon receipt. So, it makes the student more difficult to make the clearance at the security department. It is because Security needs to check all the receipts manually and it takes times.

### **1.2.2 Significant of the Project**

The system that will be developed will help the user to identify the information they need about clearance status especially for the student. It is mainly being developed in web-based application. The web-based system will guide the student to identify some

information about the Online Clearance System for the student. In this web-based system, the Webmaster will always update and maintain the information in the web, which they will act as the administrator.

The Staff of the Finance Department and Security Department will update the particular information needed from both departments. This system will be used by Webmaster, Security Department, Finance Department and Student. It also provides easier procedure to the Webmaster, Student, Security department and Finance Department.

On the other hand the system provides more systematic approach which can easily learn and understand by the user

### **1.3 Objective and Scope of Study**

Basically, there are a few problems initially that led to the idea of developing Final Year Project management system. Here, the issues will be discussed one by one:

#### **1. To automate manual system**

Most of technical work can be automated as long as it has the logic inside. But the concern is when it needs human intervention to make the process more accurate rather than too limited to the current configuration.

#### **2. To provide a user friendly platform**

Research shows that number of click required directly affect response rate. Therefore a platform will be designed to show function and rewards in a clear and easy to response way.

#### **3. To migrate from manual to computerize system**

To reduce paper based work, time constraint, and workload. Therefore, this system will help the staff to make the system clearance more easily and effectively.

#### **4. To ease the clearance process**

The student can do the clearance through online rather than go for every department such as security department and finance department to do the clearance. The system should be able to access from village itself.

The scope of study for this project is a full development of web based application which will make easier for student and for the administration and webmaster as well. The Online Clearance System is only for the Final Semester student in UTP. Student need to do their clearance process using this system. The entire department that involved in these clearance processes will also using this system to makes sure that the process will more easier and effectively and no miscommunication between student and staff.

The system basically serves two major functions which is one as clearance system to manage Final Year Student to do the clearance and the other one as the information based system that integrate and deliver information to the people involved in this system. During the development of the web based application, the research will be focused on the clearance system and distributed database itself. We need to know how the database distributes between these departments.

#### **1.4 Relevancy of the Project**

It is very relevant to implement Online Clearance System (OC System) based on current UTP environment. Most of students are able to access to the system, as their hostels are equipped with Local area Network (LAN) connection. For students who did not have a computer or their hostel not equipped with the LAN connection, they can access the system from the computers labs. In addition, due to the small scope of the project, it is belief that the project is relevant to be finished in times.

### **1.5 Feasibility of the Project within the Scope & Time Frame**

It is feasible for this project to be accomplished within the scope and time frame. Due to the small scope of the project, it is expected to meet the dateline, which is end of this semester.

## **CHAPTER 2**

### **LITERATURE REVIEW**

In an organization, good communication, a good database system and security system are the most critical factors in order to success in their business. This situation is also applied in our university. We know that during end of the final semester, every student need to do the clearance before they graduates. We need a good system to make sure it works well. From this, we can conclude that UTP must have a system for manage the clearance. The system must also be able to produce report on list how many students will graduate, categories by programme type such as mechanical engineering, civil engineering and etc.

Using this system, the administration department will act as the administrator for the system. The administrator will administer the operations of the system according to the effectiveness of the system, its functionality, etc. Meanwhile, the students will be the person or organization that initiates the system

#### **2.1 Web-based Application**

##### **2.1.1 The Web model**

Definition of the Web is a universe of network-accessible information, and I break the "full potential" into two by looking at it first as a means of human-to-human communication, and then as a space in which software agents can, though access to

vast amount of everything which is society, science and its problems, become tools to work with us.[1]The web is a very general concept -- one universal space of information. The concepts it requires such as identifiers and information resources (documents) are as general and abstract as possible. However, there have been some design decisions made which define some interfaces, and effectively define modules or agents which are independent. These agents are independent in many ways.[2]

### **2.1.2 The Web changes work and ways people learn**

In this new evolution web site is becoming one of the main medium for people to interact, communicated and worked. As we know mostly web is known as World Wide Web (WWW), and it was a transformative medium, as important as electricity [3]. The web also as been a new medium to people nowadays, and has been a placed where user/people gain knowledge. As Web helps establish a culture that honors the fluid boundaries between the production and consumption of knowledge. It recognizes that knowledge can be produced wherever serious problems are being attacked and followed to their root. Furthermore, with the Web it is easier for various experts to interact casually-in the academy or in the firm-and to mentor or advice students of any age. On top of this, the Web's great reach provides infinite access to resources beyond the region. The power of this reach comes fully into play when Web resources act to cross-pollinate and provide new points of view for a region's communities of practice. [4]

## **2.2 Introduction to Relational DBMS**

In a relational database all data are represented as tables. For example all data concerning customers are kept in a table name Customer for instance. Each table is represented by a number of rows (tuples) and columns. In a relational table, the order of rows officially is not an important issue. In other words, the order in which rows are referenced does not matter.

In each relational table, there is a primary key that acts as a unique identifier for an entity of a particular table. A primary key can be constructed from one or more than one columns. Usually, a primary is a single column. For example “owner\_no” for a table name Owner. In order for a relational database to maintain its integrity constraints, the primary keys must have the following properties:

- It must have a not null value for each instance of the entity
- The value of the primary key must be unique for each instance of an entity
- The value must not change or become null during the life of each entity instance.

Sometimes it requires more than one attribute to uniquely identify an entity. A primary key that made up of more than one attribute is known as a composite key.

Besides primary key, a foreign key is a key that may or may not exist in a relational database but still play an important role in maintaining the integrity between tables in a relational database. A foreign key is an attribute that completes a relationship between two or more tables by identifying the parent entity. Foreign keys provide a method for maintaining integrity in the data (called referential integrity) and for navigating between different instances of an entity. In fact, a foreign key must support every relationship between tables in a relational database.

Primary and foreign keys are the most basic components in a relational database. Each entity or row must have an attribute or attributes, the primary key whose values uniquely identify each instance of the entity. Every child entity must have an attribute, the foreign key, which completes the association with the parent entity.

### **2.2.1 Why I'm using distributed database method for this system?**

Database technology has taken us from a paradigm of data processing in which each application defined and maintained its own data, to one in which data is defined and administered centrally. During recent times, we have seen the rapid developments in network and data communication technology, optimized by the internet, mobile and wireless computing, and intelligent devices. Now with the combination of these two technologies, distributed database technology may change the mode of working from centralized to decentralize. This combined technology is one of the major developments in the database system area. Distributed database system allows user to access not only the data at their own site but also data stored at remote sites. There have been claims that centralized DBMSs will eventually be an 'antique curiosity' as organizations move towards distributed DBMSs.

A Distributed Database Management System consists of a single logical database that is split into a number of fragments. Each fragment is stored on one or more computers under the control of a separate DBMS, with the computers connected by a communications network. Each site is capable of independently processing user request that require access to local data (that is, each site has some degree of local autonomy) and is also capable of processing data stored on other computers in the network.

Users access the distributed database via application. Application are classified as those that do not require data from other sites (local applications) and those that do require data from other sites(global applications).we require a DDBMS to have at least one global application. A DDBMS therefore has the following characteristics:

- A collection of logically related shared data
- The data is split into a number of fragments
- Fragments may be replicated

- Fragments/replicas are allocated to sites
- The sites are linked by a communication network
- The data at each site is under the control of a DBMS
- The DBMS at each site can handle local application, autonomously
- Each DBMS participates in at least one global application

It is not necessary for every site in the system to have its own local database. For example:

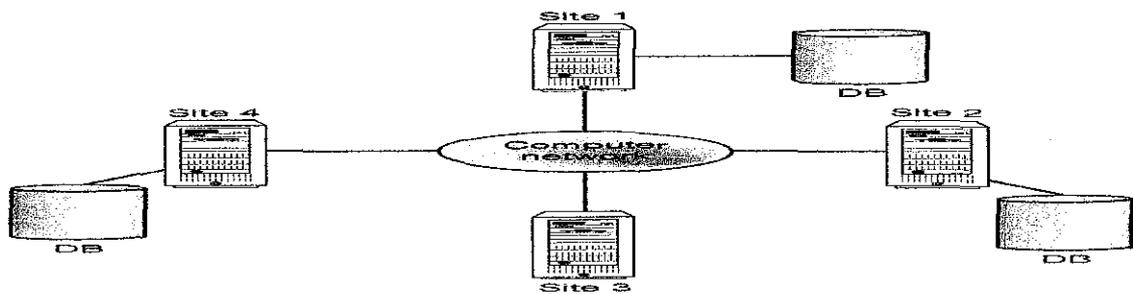


Figure 2.1: Distributed Database Management system

From this figure we can see that it is not necessary for every site in the system to have its own local database. A network linking computers will enable branches to communicate with each other and a DDBMS will enable them to access data stored at another branch office.

For my system, I would use Homogeneous Distributed Database system. A homogenous distributed database system is a network of two or more Oracle databases that reside on one or more machines. Figure 2.2 illustrates a distributed system that connects three databases: `hq`, `mfg`, and `sales`. An application can simultaneously access or modify the data in several databases in a single distributed environment. For example, a single query from a Manufacturing client on local database `mfg` can retrieve joined data from the `products` table on the local database and the `dept` table on the remote `hq` database.

For a client application, the location and platform of the databases are transparent. You can also create synonyms for remote objects in the distributed system so that users can access them with the same syntax as local objects. For example, if you are connected to database `mfg` but want to access data on database `hq`, creating a synonym on `mfg` for the remote `dept` table enables you to issue this query:

```
SELECT * FROM dept;
```

In this way, a distributed system gives the appearance of native data access. Users on `mfg` do not have to know that the data they access resides on remote databases.

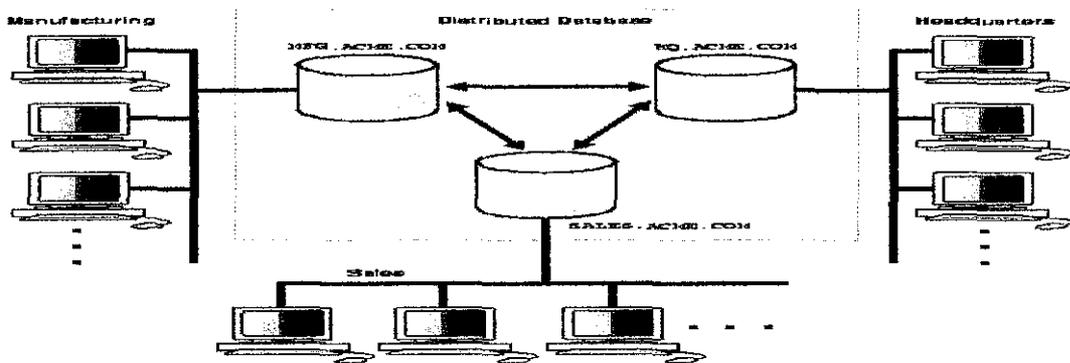


Figure 2.2: Homogeneous Distributed Database

An Oracle distributed database system can incorporate Oracle databases of different versions. All supported releases of Oracle can participate in a distributed database system. Nevertheless, the applications that work with the distributed database must understand the functionality that is available at each node in the system. A distributed database application cannot expect an Oracle7 database to understand the SQL extensions that are only available with Oracle9i.

Each database in a distributed database is uniquely identified by its global database name. Oracle forms a database's global database name by prefixing the database's network domain, specified by the `DB_DOMAIN` initialization parameter at database

creation, with the individual database name, specified by the `DB_NAME` initialization parameter.

For example, Figure 2.3 illustrates a representative hierarchical arrangement of databases throughout a network.

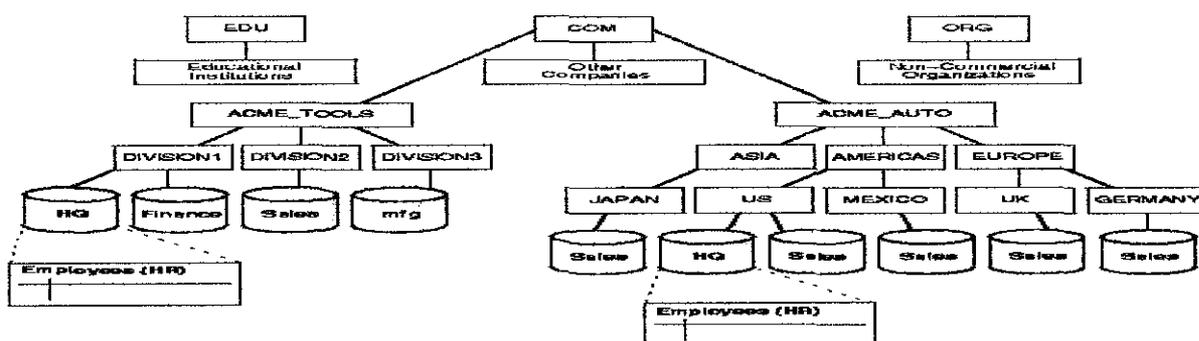


Figure 2.3: Hierarchical Arrangement of Networked Databases

The name of a database is formed by starting at the leaf of the tree and following a path to the root. For example, the `mfg` database is in `division3` of the `acme_tools` branch of the `com` domain. The global database name for `mfg` is created by concatenating the nodes in the tree as follows:

- `mfg.division3.acme_tools.com`

While several databases can share an individual name, each database must have a unique global database name. For example, the network domains `us.americas.acme_auto.com` and `uk.europe.acme_auto.com` each contain a `sales` database. The global database naming system distinguishes the `sales` database in the `americas` division from the `sales` database in the `europa` division as follows:

- sales.us.americas.acme\_auto.com
- sales.uk.europe.acme\_auto.com

## 2.3 Computer Security Threats

According to Theriault(2001)

Threats are those people, governments, companies or other organizations from which you'd like to protect your system. Threats can cause both accidental and intentional damage

According to P.Pfleeger(1997)

Circumstances that have the potential to cause lose or harm

It is clearly explain that threats were situation or environment in which can cause possible damage or lose in data values or accessing the data. The range of damage may include data being erased either intentionally or accidentally, data being changed in an undetectable manner, data being read or access by an authorized person and the worst is the whole system destroys.

In determining which threats to worry about, it's all depending on types of data that will be protected. If it is public information, then authorization on accessing the data will be not as crucial as protecting private and confidential data.

In a perfect world, threats would not exist and a person should be able to trust someone halfway around the world as completely as trusting a neighbour. However this isn't a perfect worlds, and there are people from whom you need to protect your company's private information.

### Threats from within

Internal threats were classified as a person who has authorized access to internal network. These persons typically have direct access to the internal network from behind a firewall. Normally those were persons which the company has put some level of trust in them. They can be employees, consultant, temps or even spies hired as valid employees. Innocent employees might overstep boundaries without intended to do wrong.

For example, an employee might granting himself as super user privilege which can be seen as a violation of security even if he does not perform any unauthorized activities while holding this privilege.

Employee might also in the form of laziness, will violate the written security policy or use poor security practices. These employees have no malicious intention but are nevertheless dangerous security threats.

Employees might share a password out of convenience and in doing so, the system being placed in a dangers situation. One way to overcome password sharing behavior is to make the process of creating new user easier, without compromising security; only administrator of a system can create such account. By doing this, then employees won't feel the need to share password.

Raising the awareness of the employees as to what constitutes a breach security can go a long way in helping company to avoid security problems, with the right attitude and some tactful user education; many potential threats can be eliminated.

### Threats from administrators

Administrator is a personal which company gives full trust on them. The problem is that people change job and those administrators may be working in some other companies that might become a competitor. As people move around, situation might change. a person who previously was an honest and loyal may become dishonest and disloyal when changing job environment. Some action that can be taken to overcome this threat might be by requiring auditing of any administrative task before run the process. procedures might be also needed in term of any scripts or procedure need to be reviewed by a second party before they can be performed. Different task can also being delegated to different administrators

#### Threats from end-users

Most of malicious act being done which were classified under this category were class as innocent employee. End users typically assigned a set of data with permission to view, modify, add to and possibly remove. They may have access to information about their own sales region or employee information, but of course not permitted to access other's employee records unless their job explicitly requires that level of access.

Although end users usually not malicious, but if accessing information were make to easy curious employee may be tempted to overstep their access level. Differentiate from group administrator which all of them were recognized by the management, end users can be totally outnumbered when comparing to administrator. Since computer can handle a large numbers of concurrent end users, and as those numbers increase, controlling those users behavior will become loose and loose. As total number of users become bigger, knowing a specific individual's habits or selecting specific users to watch carefully may become difficult.

#### External threats

In today computing environment, business normally being done with outside agencies or communities which likely outside from company's firewall. In explaining external threats lets look to definition given by this author:

According Theriault(2001)

An external threat is any person who does not have authorization to access your system or network. These people are typically outside of your organization.

### Security implementation need

Usually in old days, strong computer securities being implemented at the operating system level were effective security functionality has evolved. A user who has intention to use the machine will need to enter the username and password to log in the computer. Without both the username and password, it only dreams for the user to use the machine. However in the newer client/server and intranet environment, operating system (OS) system security controls can be bypassed. user may only used SQL plus application to access oracle database from remote machine using the client PC and bypassing the user login application of the server where the oracle database were stored.

There were many challenges to the system developers to ensure that a database of the system being developed were secure (Brain Tree White Paper) clearly stated that "both functional and operational challenges that must be surmounted to implement sound security at the database level". While relational database provide basic in authentication, authorization and auditing features, the true object oriented (OO) database security features were still in the cloud since it is still rarely in use. But of course those basic security features were incomplete and inflexible. Furthermore, databases were lacking easy to use, security specific management interfaces that

simplify the complex and time consuming task of administering security. Also it is hard to safely assign those to the security group without elevated privileges. Elevated privileges is a privileges granted as highest level in security administration and can registering other users, editing and assigning passwords and manipulate users account.

Security functionality and security management tools at the database level were very important. Any lack and incomplete of both function will increase an organization's exposure to internal or external, intentional or accidental unauthorized modification, destruction, theft or temporary unavailability or mission-critical data. The impact from above incident will actually give major problem to an organization. It may decrease productivity, a loss of competitive position and customer confidence as well as increased liability.

### Computer Security Principles

Although the database being mention is the database which being deploy on client/server architecture, but of course the control mechanism on the functionality must be applied also. There were three basic security principles in computing. Those were authentication, authorization and auditing.

#### *Authentication*

Authentication principles concern on verifying that a user or entity who request for access to data or a computer resource is in fact who they represent themselves to be. Its main focus is to ensure that the users were really an actual himself and not another person who may claim him or herself as that user. Usually many systems ask for user password to authenticate the user.

This method is the most cost effective and common method being used. The password being used will be personal for each user either being given by system administrator or

develop by his or herself. For more option the password should have expiry period, which is the password will be unusable after certain period. the system administrator or security personnel should determine how long the password should be used before it demolish.(Brain Tree White Paper) “This mechanism was the basis for all strong authentication mechanism” .Without a true user identify, enforcement of authorization controls and the creation of a useful audit trail are impossible.

### *Authorization*

Authorization procedure came after the user has been authenticated by the system. This process will check what type of data and computer resources that the user should be allowed to access. The system will also check what degree and level of access should be granted to the system. for example in using SQL Plus for Oracle 9i,after a user has been authenticated then the database server will check what type of access privileges and roles has been assigned to the user before allowing the user to access the database.

### *Auditing*

Auditing is a process of keeping records of what particular user has done one access has been allowed by the system. Audit trails allow for the detection of security breaches which is often referred to as intrusion detection. This procedure will ensure data integrity.

Those computer security principles must be applied at several levels in today’s complex multi-vendor computing environment because there is no true “enterprises-wide” security standard or product that has been proven to be viable.

## **CHAPTER 3**

### **METHODOLOGY/PROJECT WORK**

#### **3.1 Methodology**

Research and developing the Online Clearance System need the author to adapt software engineering paradigm as a discipline that integrates the process, methods and tools in the system development. The Author used System Development Life Cycle (SDLC) to ensures consistency and reproducible in the development area. SDLC also reduce risk associates with mistakes and shortcuts and enable to produce complete and consistent documentation for the projects. Planning, Analysis (Requirement Specification), Design, User Acceptance Testing and Delivery phase are five basic terms in SDLC. These terms are used according to SDLC model such as Waterfall Model, Spiral Model, Hybrid Model, or Prototyping. Each model has its advantages based on the project specification and requirement.

Building a system based on the web based application needs a repetitive model combined with prototyping. These five basic terms of SDLC is the best project development life cycle methodology. Iterative development ensures system is developed according to the module and constant review and testing are key element in the development process. Therefore these five basic terms of SDLC is suitable in the development process which allows the author to review each stage in the development process and testing procedures upon to the web environment model.

The development process begin with the author will play the role of the user and database administrator in defining problems, objective and requirement. This is achieved by soliciting the domain expert on the knowledge where knowledge is plays an important part on the development. Knowledge is both the understanding on the

main problem and the user requirement to solve it. Security Department, Finance Department, Webmaster and student's is the domain expert that will serve as the main reference in understanding the requirement and procedure.

Design and module development are the next procedures in the development process. Knowledge administrator will represent the knowledge acquired from interview and research is developed to solve problems according to the user environment. Knowledge administrator and the domain expert will review each completion of the modules and integration part will be conducted as the modules are completed based on the requirement.

To make the project become easy and successful to develop the author implement five phases that is Planning, Analysis (Requirement Specification), Design, User Acceptance Testing and Delivery for the System Development Life Cycle (SDLC). This five phase model describes a sequence of stages in which the output of each stage becomes the input for the next. These stages can be characterized and divided up in different ways.

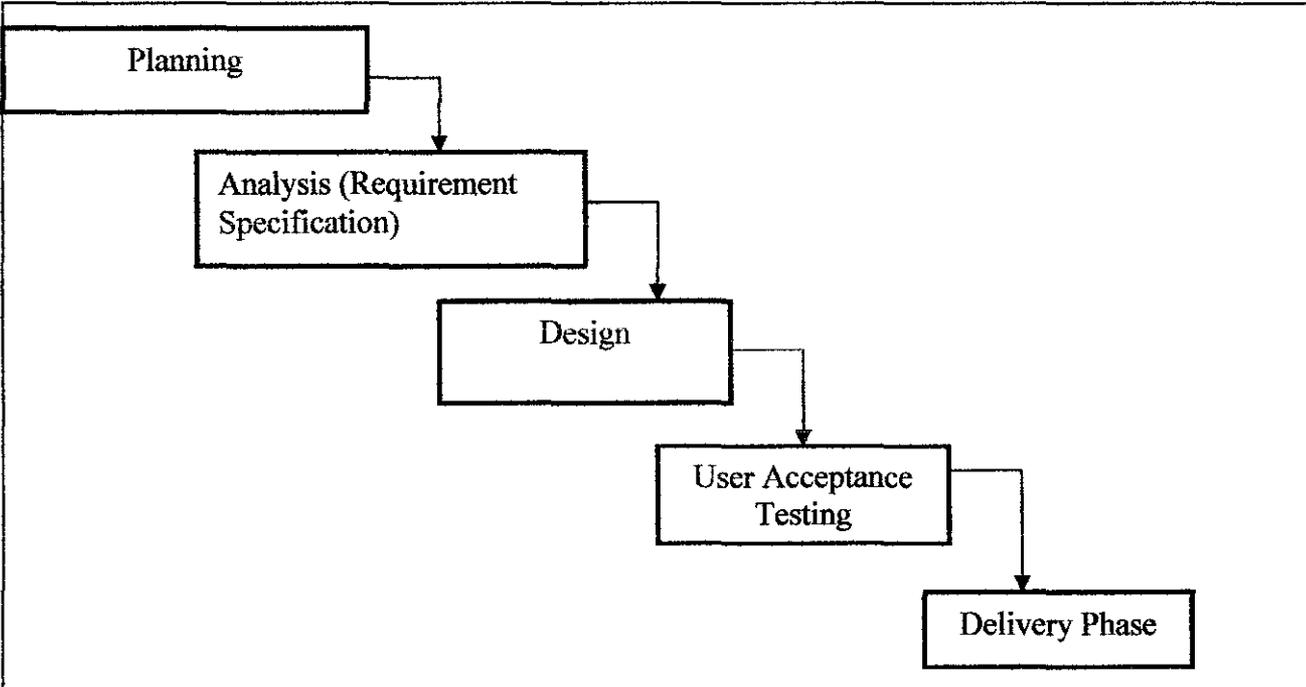


Figure 3.1.1: System Development Life Cycle

### **3.2 Project Planning**

This project planning is based on the author proposed timeline that has described earlier in the project Gantt chart (*refer to Appendix A*). Author has to follow certain stages in the project development life cycle based on the selected hybrid methodology which are planning, analysis (requirement analysis), design, user acceptance testing stages and delivery phase. Besides these five stages, there are also other stages in the project development life cycle such as testing and costing which author has to consider in completing the project.

In project planning phase, the author has done some research in searching suitable topic for the Final Year Project. The author has discussed and finalizes the appropriate topic for the FYP. The topic is Online Clearance System (OC System). The system has been purpose to design the Online Clearance System (OC System) for the Security Department, Finance Department and the student or staff at the university. There are certain features provide by the system where the user can customize the system base on their organization structure and needs in order to make the user manage the system easily.

After the topic has been approved by the FYP committee and supervisor, the author discussed the topic with the FYP coordinator for further information about FYP. Then author continue to the next step in completing the Final Year Project. After identifying the topic, the author has done some analysis about the topic selected. The activities include search for the literature review and supporting materials relevant with the topic. The author also collects some material about the existing manual system related to the topics. Materials include type of form that involved, procedure and policy used by the system.

### **3.2.1. Preliminary Study**

In preliminary study phase, author starts the project by doing research on the topic. This study phase will give a better and appropriate understanding of the business problem domain by analyzing the existing system. The research is done using several data gathering method such as interviewing with students and staffs, internet searching, experience from the industrial internship, and also from the books and journals. In order to have a clear view of the existing system (process) undertaken in the Security Department and Finance Department, an informal interview has been conducted with a few staff of the department on 15 April 2006. During the interview session, each of the process performs by Security Department staff and Finance Department Staff has been explained in details. The developer task will be easier in determining which information is required by the system in later phase by using all the information given as references

Author starts collecting all relevant articles and literature review on the topic in order to support and become the main references for the project. The preliminary study discussed about the overview of the topic, Online Clearance System. Author only focused and identifies scope, objective, methodology to be used and constraint that will be the most important part in the project. Scope and objective must be identified first and it must be reasonable and relevant to the topic. Methodology will be the guide in the completion of the project. Author will schedules all the phases in the project according to the methodology used. Constraint must be determined such as time and cost in order the author for not to costly for the project and the time is being managed effectively. Author gathers the data and information from questionnaire (*refer Appendix B*) and then the information will be translated into knowledge based.

### **3.2.2 Survey Phase**

Before undertaking any project, it is important to ensure that the project is worth looking at. For this purpose, a survey has been conducted though the distribution of questionnaires. There are 100 questionnaires that have distributed among student in

UTP and 10 questionnaires to the staffs. The questionnaire with the student and staff as the following:

Fifth year student	100 questionnaires
Staff	10 questionnaires

In this phase, it is just to make sure that the end user especially students who always having problem agree that this system should me develop to ease their application.

For the staff it is to confirm that they would not oppose the system proposed. Once the author confirmed that this project is beneficial, activities for the project will be planned. The Gantt chart for the plan project timeline is presented in the *Appendix A*.

From the survey conducted, the project scope and budget are established. The project scope is in the section 1.3.2 Scope of the Project, and the budget is available in Chapter 4, Result and Discussion. From this survey phase, author took all the information and knowledge from research and questionnaires bring it to the next phase, Feasibility Study.

### **3.2.3 Feasibility Study**

Feasibility study is one of the important parts in the project planning. In feasibility study, the author must consider some constraints in completing the project. Three most important constraint for the project are time, scope and cost. Time is the highest priority where author must determine all the tasks must accomplished in order to complete the project. From the tasks, author must determine time needed for each of the tasks.

Gantt chart is the tool that author used in planning the time frame for the project. The time given from the FYP committee is fixed and author must overcome and managed effectively for successful of the project. Scope of the project has been determined earlier at the preliminary phase. Scope is important where it can guide the author in

completing each tasks and objective of the project. Author must determined topics that related to the project and the user requirement specification.

The topics have been discussed with the supervisor to get more details on the FYP requirement. Cost is considered as own cost where author will used own money to overcome cost occurred during the progress of the project. From the feasibility study, author will know the feasible of the project, how to manage time which has given by the FYP committee in order to complete the project, the scope regarding project research and system development and cost that will occurred and how to manage it.

Usually there are numerous alternative ways to design the new system. So this phase will help to identify and analyze alternative solution as well as recommend a target system that will be designed and implemented. This phase begin with the feasibilities study. There are four areas that should be feasible. They are the technical, economic and schedule. This study is conducted on the proposed system in order to ensure whether the systems comply with any of the following options:

- The system budget and time has to be increased as the scope has significantly expanded.
- The system scope needs to be reduced.
- Need to find another alternative solution for the system.
- Stop the project

#### **3.2.4 Project References Research**

This phase involved author in data and information gathering from various sources such as internet, interviewing, questionnaire and reference books. The finding must be related to the topic, Online Clearance System (OC System). From the finding, all these material (data and information) will be used in completing the project and to support the system development.

### **3.2.5 Prepare the Preliminary Report**

Preliminary report is the final output from the project planning phase. In the preliminary report, it discussed the objective of the project, introduction of the project, scope, methodology being used for the project, literature review to support the project, discussion and recommendation for the project. To write down the report, author must follow the guidelines which have been provided earlier by the FYP committee. The report submitted to the FYP supervisor for marking and other detail explanation if needed.

### **3.3 Project Analysis (Requirement Specification)**

Project analysis phase involve analyze problem statement from the preliminary report and solve it as the project's product. Author specified certain problem and aimed to solve the problem as the project objectives. The final outcome of this project analysis phase would be the completion of system requirement documentation which detailed about the problem analysis, requirement analysis and specification and, data process and object modeling.

#### **3.3.1 Problem analysis**

Problem analysis is done in order to get well-known with the problem statement which stated earlier in the preliminary and feasibility study. The analysis shows the relevancy of the topic with the current problem. From the analysis, author divided into two parts, the research and the system development parts. Author must divide these two parts equally and time must be managed carefully as the time constraint is very limited.

In research part, author must identify the overall problem and objective in business environment in term of Online Clearance System (OC System). To make the case or the problem more detail, author has selected University of Technology Petronas (UTP) as the entity of the business in the research. . The author does some research on the OC System best architecture design, performances, basic requirements and system

requirement specifications. The author use internet and search other related material at library, questionnaire and interview in making the research of the topic. All these findings will be used in completion of the System Requirement Documentation. The research will take about one month to complete the findings and complete literature reviews to support the project. The author only focuses on the basic requirement for system functionality. These basic requirement will be discussed more detail in the System Requirement Documentation.

For the system development part, author identified what the functionality of the system and the requirement needed to accomplished the system. As been describing early, the system is design to make the student feel easier do the clearances. By using the system, it can eliminate the need of filling out forms and going to multiple departments when doing the clearances. Security Department and Finance Department can easily update and manage clearance process quickly and systematically.

### **3.3.2 Requirement Analysis and Specification**

This is the most important phase of the lifecycle. It is sometimes called requirement analysis. At this phase, users will express what they need or want out of the system. The requirement to be analyzed includes data, process and the interface. In. addition errors and omission of data and information at this phase will result in user dissatisfaction with the new system.

The objective of this phase is to gather and analyze user requirement. So, other users' expectation of the system should also be taken into consideration.

### **3.3.3 Data Process and Object Modeling**

Data process and object modeling is used in developing the Online Clearance System (OC System). The purposes are to make sure the entity for the system and the data is smoothly functioning and the workflow for the system is correctly used. In this phase,

the author used system flow model and the system architecture design model to illustrate the design of the data process and object modeling. The system flow model shows the workflow of the system and how the system is integrated from one object to another object. As any changes made to the system, the system flow model also will be changed. Author used the system flow model as the workflow of the system and as the guidance if the author has a problem when coming to the development phase.

### **3.3.4 System Requirement Documentation Submission**

The output of analysis phase would be the submission of system requirement documentation. In this documentation, author will explain more detail about the FYP than the preliminary report. The report specified more detail on system flow model, database architecture and the technical review of Online Clearance System.

## **3.4 Project Design**

This design phase will include four main sub phases which are architecture design, interface design, database design, and testing and debugging phase. The project phase is the most important phase in project development where if the project design failed, the other phases in the project development cannot be continued. Author must keep alert in this phase and the outcome from this phase, design and requirement review will be used in the development phase later.

### **3.4.1 Architecture Design**

In architecture design, author use the system flow model in designing the system. This process is to identify the process flow that will be use to design interface and module design. It is to define the interaction of all the system entity with the system .The outcome of this process is to come up with the architecture of the system which involve the process function, system database and external entity that will interact with the system. The architecture will describe on the relation between all the entities of the

system. This will include basic system requirement, hardware requirement, software requirement, tools used and also the list of system functionality.

### **3.4.2 Interface Design**

The main guidelines for this stage would be developing story board for user interface design. This storyboard will highlight each page in the website interface with the functionality and system flow included. As for this, the main outcome for this stage would be user interface prototypes that would be the author initial interface design and outline.

### **3.4.3 Database Design**

In database design, author prepared database architecture for the Online Clearance System. Backend design of the system will include relation database, file database and user information database. The system use Oracle 9i as the database architecture. Oracle 9i was chosen because of the availability of the software and the most suitable database tools to be integrated with Java software. All information about the user will be stored in the database. The information will retrieve if the is any changes or upgrading procedures occur to the database configuration. All information and process involved in the project will be depicted in the *Appendix C, Database Structure (ER Diagram)*.

## **3.5 User Acceptance Testing (Testing and Debugging)**

Testing and debugging procedure is done when the web interface and database architecture is completed. The purpose of this phase is to test whether the database is functioning as the author expected and to test integration between database, flow of the system and the interface. The test and debugging phase only focused on the small units of the system. This phase also sometimes called unit testing. After this phase is successful, the integration testing will be take place in order to make sure the system is function as the requirement and objectives.

### **3.6 Delivery Phase**

The new system will be place into the operation

### **3.7 Tools required**

#### **3.7.1 For development**

##### **Macromedia Dream weaver MX**

This software is used to design the site page so that it can be more organized and appropriate. Macromedia Dream weaver is a professional visual editor for creating and managing websites and pages.

Dream weaver will automatically generate the HTML code by just dragging the object onto the screen. Dream weaver is fully adaptable. The macromedia Dream weaver can develop HTML editing and also improve site management.

This software will be use for suited for Web development and can be embedded into HTML, Flash, XML, ASP, JSP and other programming tools. It offers an intuitive environment for building cross-platform sites and will be use for interface design and content layout

##### **Adobe Photoshop**

Photoshop Adobe will be used to create an attractive image to be placed in the site. Photoshop Adobe is used to create and manipulate digital images from a variety sources. Which include importing images from another graphics application or capture images from video. To create effective artwork, some basic concepts on how to work with digital images, how to produce high-quality image, how to work with a variety of file formats, and how to adjust the resolution and size of images should be understands first,

Adobe Photoshop also included sub feature that is Adobe Image Ready where it can provide an inclusive environment for designing complicated and good quality of web images. The tools and techniques are very useful to design web pages that include images, text and links. Another advantage of Adobe Photoshop and Adobe Image Ready is that it can support variety of file formats including BMP, TIFF, JPEG and GIF.

### Oracle 9i

This software will be use for the creation of the database. The database will be used to store any data such as username list, password, multimedia files and others. Oracle 9i were choose because of the application is the most suitable database tools to be integrated with JSP software.

### Netbeans 4.1

This software will be use for build and testing the system.

### Web browsers

This software will be use for testing and debugging application features

**Hardware:** Workstation with minimum specification to execute the above mentioned software.

### **3.7.2 For client usage**

**Software:** Compatible operating system with recommend browser to browse the application such as (Windows 98 and above with Internet Explorer 6 or Netscape Navigator with Java supported)

**Hardware:** Personal computer with minimum specification to execute the abovementioned software.

## CHAPTER 4

### RESULT AND DISCUSSION

This deliverable main describe how the different system component will relate to each other. The deliverable of this process will affect implementation design of the system component based on the design that is done parallel with the other design process. It is to decide the technology that will be use for the system component and the communication between all of the related components. Below is the table that shows the system component and its infrastructure design.

<b>System Component</b>	<b>Technology/Programming Language</b>
Interface	HTML
Input Verification	JavaScript
Database	Oracle 9i
System Interface and Database Communication	JSP
System Process	JSP
System Output and Report	JSP

#### 4.1 Analysis Phase

In this section, there are two main parts which is result and findings. The results and findings are prepared in such a way that is discussed by each of the methodology phases. This section will discuss the project in various points of view.

#### **4.1.1 Research objectives**

By using surveys and questionnaires, it gives an opportunity to study directly the characteristics of the populations and taps into construct such as beliefs, prejudices, preferences and opinion. In this survey, the population involved is UTP students, Security Department staff and Finance Department Staff. The purpose of the survey is to assess the population's opinion about the problems faced by them. Any improvement opportunity that is exists is also identified other than gathering information about the latest trends of UTP students.

This collection of information is analyzed to produce the prototype objectives. These objectives are then used as a basis to develop a prototyping plan that describes what requirements the system should meet and the concept of the system development. 100 students and 10 staff a have been selected to fill in the Research questionnaires. These selected people are assumed to represent UTP students, Security Department staff and Finance Department staff as overall view.

#### **4.1.2 Result of Finding –Questionnaire**

A research to find out whether the UTP should implement an Online Clearance System for Clearance Process had been conducted early in the development phase. In the Survey Phase, 100 questionnaires had been distributed to 100 students from Final Semester student. Based on the questionnaires distributed, the following results have been obtained.

Data Gathered:

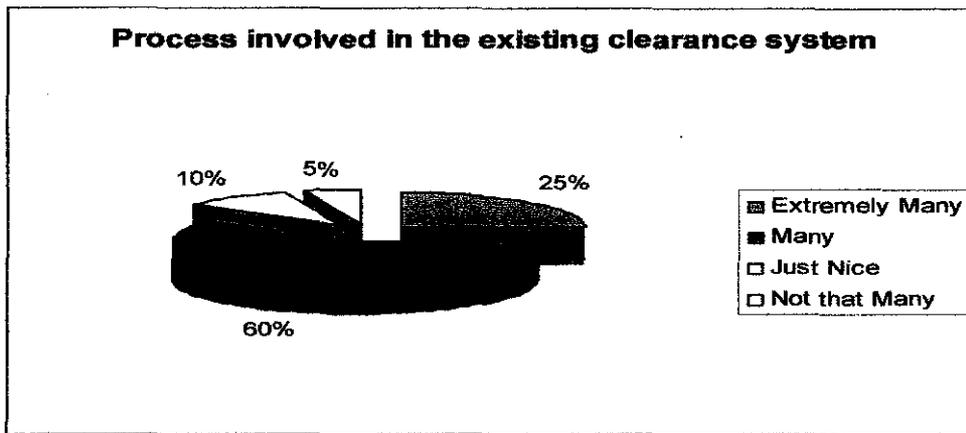


Figure: 4.1

**Results:**

From Figure 4.1, it seems that only 5% of the students felt that the current system is not that many process involved. 10% of the student felt that the process for the clearance system is just nice. 25% of them felt that the extremely many process involved in current system while 60% of the students felt that current system involved many process to do the clearance system

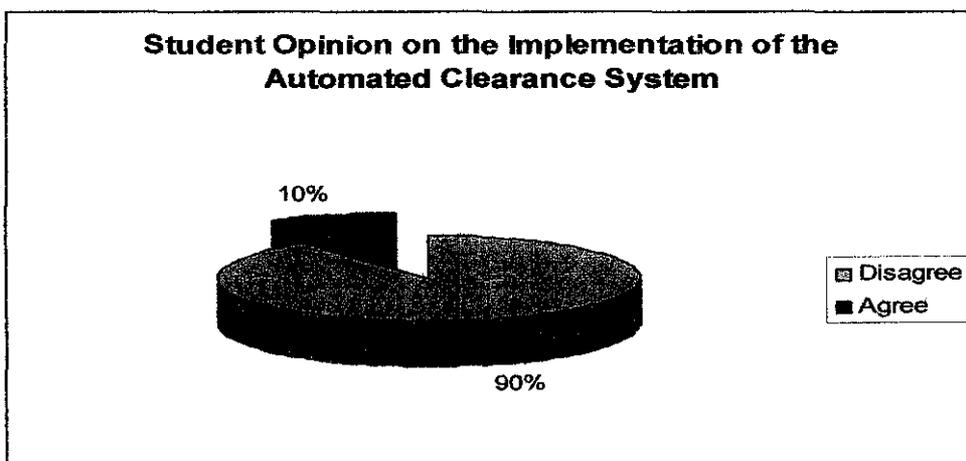


Figure: 4.2

**Results:**

Figure 4.2 show that majority percentage of 95% agrees while 5% disagrees with the implementation of the Online Clearance System.

**Discussion:**

According to the figure 4.1 and 4.2, more than half of the students are not satisfied with the existing system use. Among the factors that contribute to the dissatisfaction are misplace or missing document and etc.

Moreover, the current system's process taken longer time than it is supposed to be because the applicants need to go to the every department to do the clearance. The results in Figure 4.1 lead to the result in Figure 4.2. Due to the dissatisfaction with the current system, majority of the student agreed with the implementation of Online Clearance System. So, it can be concluded that is worth to develop the proposed system, as there is no resistance to change from the students. Besides that, the system wills fully utilized technology available in the UTP such as the LAN.

Data Gathered:

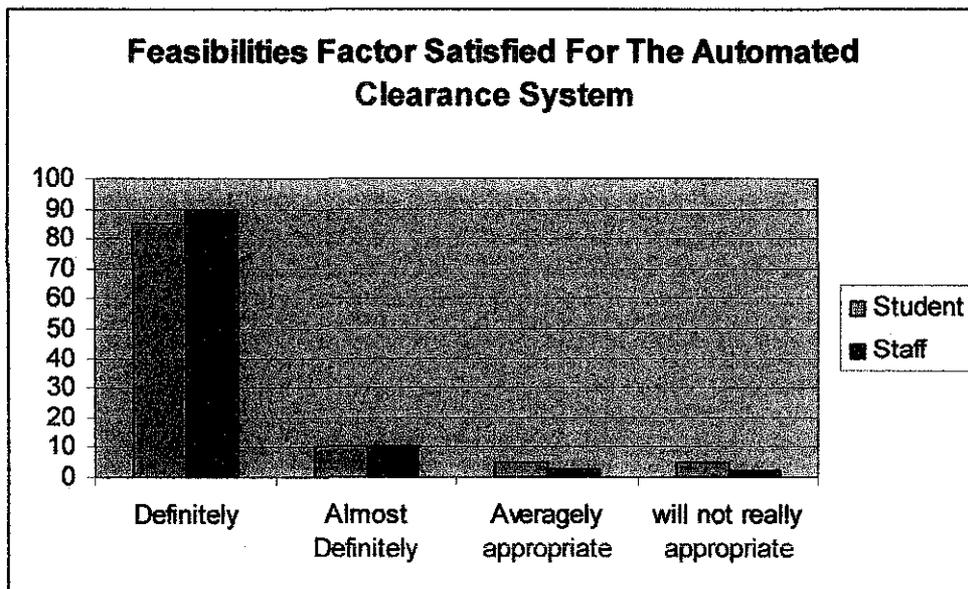


Figure: 4.3

**Results:**

From the Figure 4.3, it seems that 85% from 100 students who participated in the questionnaires agreed that the online system proposed would improve the Security Department and Finance Department management efficiency, 10% said it almost definitely, 5% said that it averagely appropriate while 5% said it will not really appropriate. 90% from staffs agreed that the Department would be more efficient with the implementation of the online system. However, 2% of them said that it will not really appropriate.

Those who disagreed that the online system will increase efficiency believe that it is not the system alone that determines the level of efficiency. Efficient staffs are another factor that determines whether an organization (for this project, the Security Department, and Finance Department) is efficient or not.

**Discussion:**

The result shows that more than three-quarter of the staffs and students believe that with the implementation of the new system, the Security Department, Information Resource Centre Department and Finance Department increase its efficiency. Efficiency here refers to the tasks in the department that are accomplished without error and on time. To increase the efficiency, the new system must be technically feasibilities.

The online system is very technically feasible. First, the project scope is relatively small. The basic data (manual data) and processes (manual processes) for the system are readily available. It just that the data and processes need to be refined and transformed into online system.

Besides that, the requirements for this project are easily obtained and in structured form which make the online system less risky. This is because when a system fulfills business specification and user requirements, it will be very usable and highly accepted by users.

In addition, the system proposed employ commonly used or stand technology such as pc and LAN, which are available in UTP environment. This project is also less risky as the user groups are familiar with pc and web-based application.

As a conclusion, the online system should be developed, as it satisfies technical aspect of the development. Furthermore, with the development of the online system, the efficiency of task undertaken in Security Department, Finance Department and Information Resource Centre department will increase.

Data Gathered:

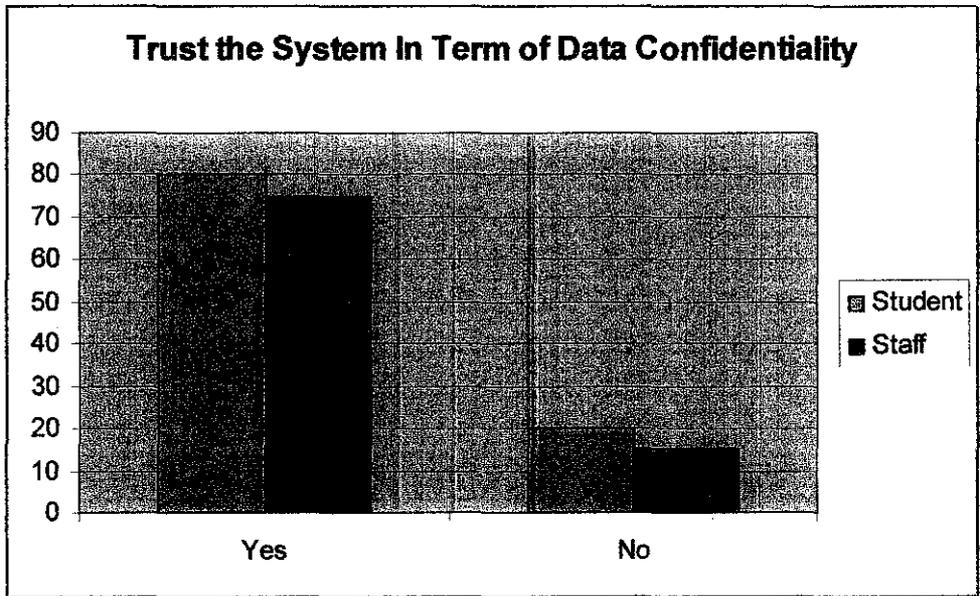


Figure: 4.4

**Discussion:**

From the questionnaire distributed, majority of students and staffs trust the online system in term of data confidentiality. In their opinion, they believe that the developer will include all the security concerns in the system. For example, the administrator must login before they can access the system. The student cannot access all the pages inside

the system. Besides that, the current system data also can be access by every staff in the Security Department without restriction. Yet, until this moment, there is no case involving misuse of data is caught.

From the result obtained, it can be concluded that the system is reliable and should be implemented.

#### **4.1.3 Result of Reliability Study**

Reliability study concerns with the trustworthy of this system. From the study conducted, users will use the system when they trust it. The system security is designed based on the objective. They are the secrecy, integrity and availabilities.

- **Secrecy:** Information should not be disclosed to unauthorized user. For example, a student should not be allowed to examine other students' clearance status.
- **Integrity:** Only authorized users should be allowed to modify data, For example, student may be allowed to see their clearance status, yet not allowed to modify them.
- **Availability:** Authorized user should not be denied access. For example, an authorized Security Department Staff, Finance Department Staff and IRC Department staffs who wishes to update the clearance status should be allowed to do so.

#### **4.1.4 Integrity Control**

Integrity control applied will protect this system from unauthorized use and update. This securities feature will include conditions that match the business function of the system. The integrity control is applied at the login page:

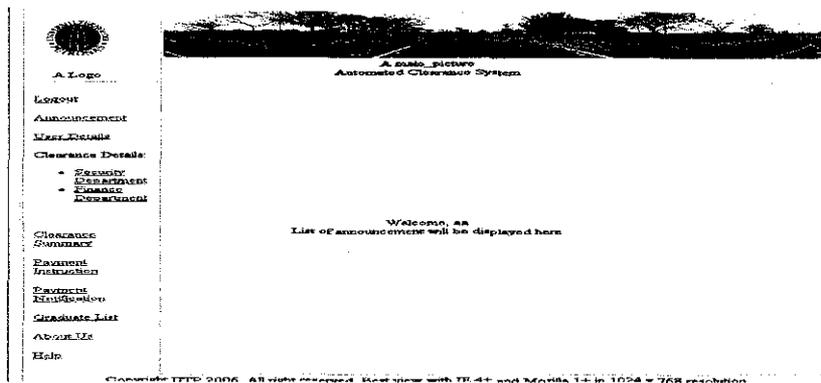


Figure 4.5 Main Menus for Student

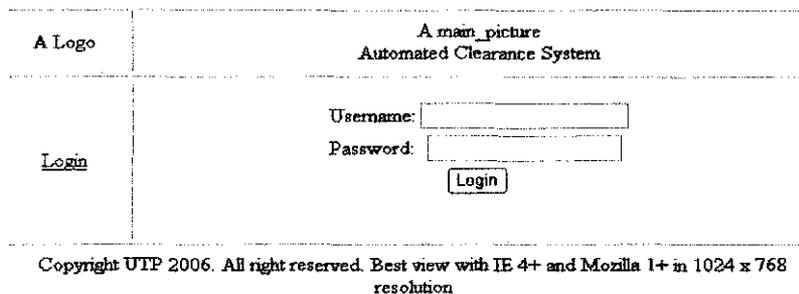


Figure 4.6 Login Page

The administrator enters his username and password, and click submits at the login button. The login phase is shown in *Figure 4.6*. If he is unauthorized user where the username is not match with any in the database, the system will prompt an error message such as the one show in *Figure 4.7*.

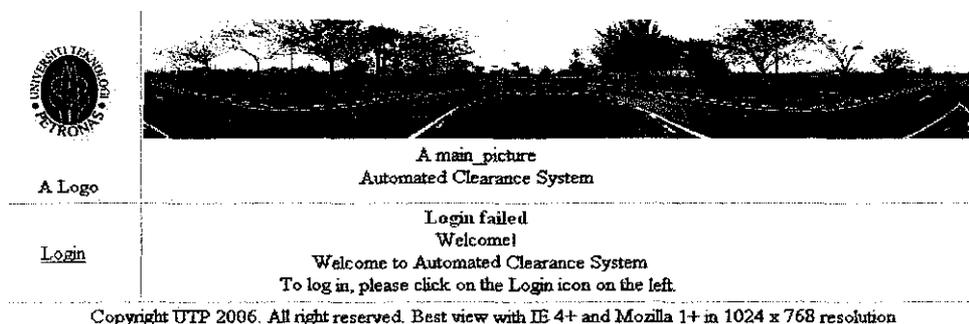


Figure 4.7 Error Message: invalid Login

## 4.2 Design Phase

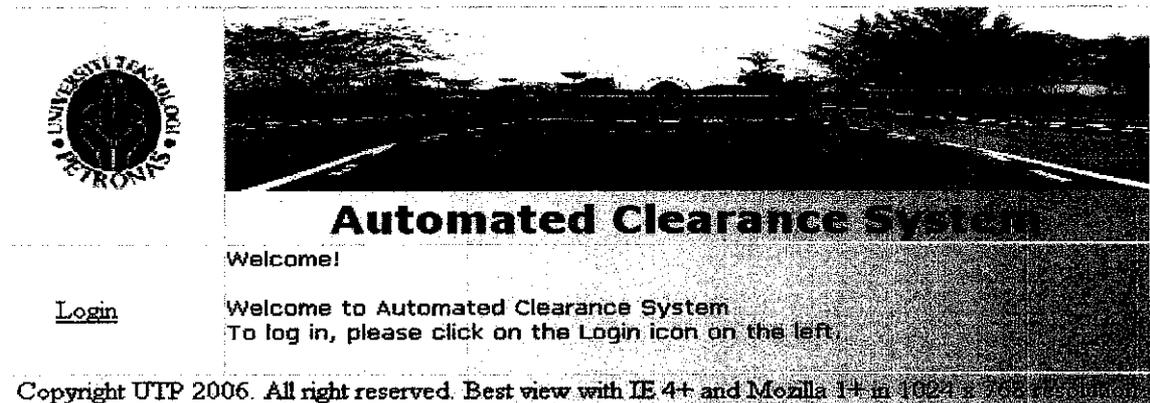


Figure 4.8: Main Page

This the main pages for Online Clearance System. We need to login if we want use this system.

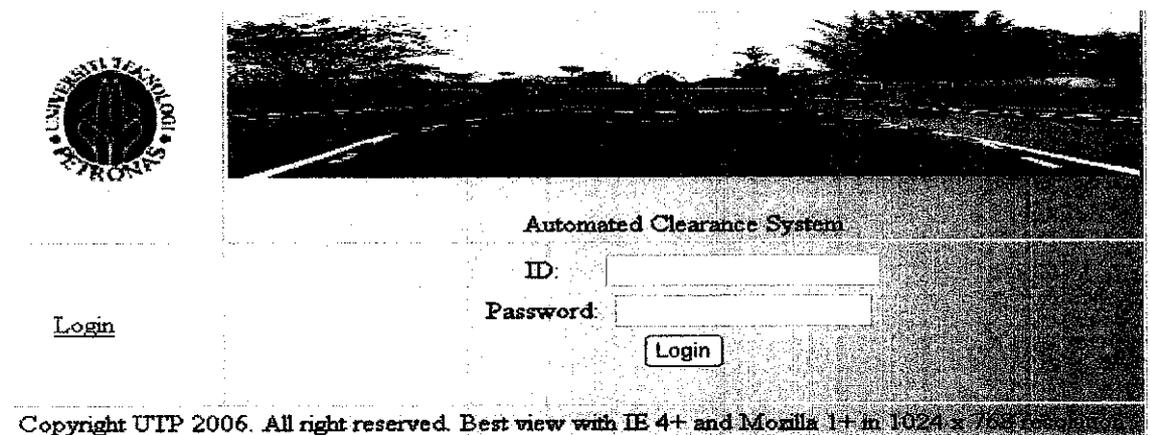


Figure 4.9: Login Page

This is the Login Page. User need to key in ID and Password before can use this system. We have 4 types of users which are Student, Staff Finance Department, Staff Security Department and Webmaster.

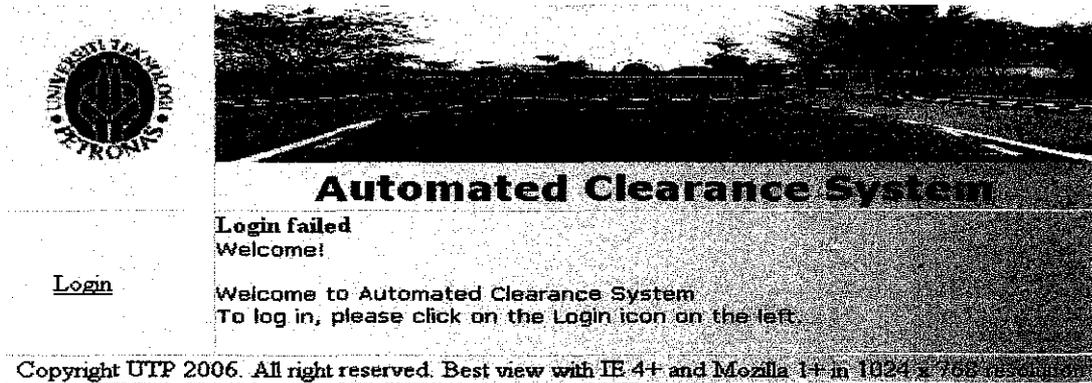


Figure 4.10: Login Failed Page

If the ID and Password did not match with the database, it will go too this pages. So, users need to login again with correct ID and Password.

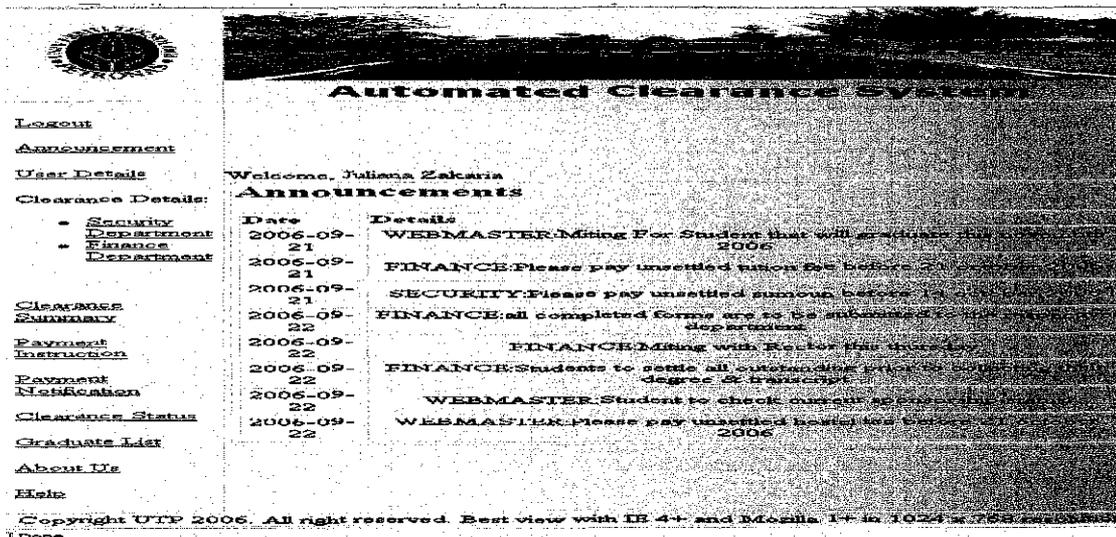


Figure 4.11: Main Interface (Student)

This the main pages for the student, as it will show you the related issue or announcement on this pages. As we can see on the left side of the page is the main menu.

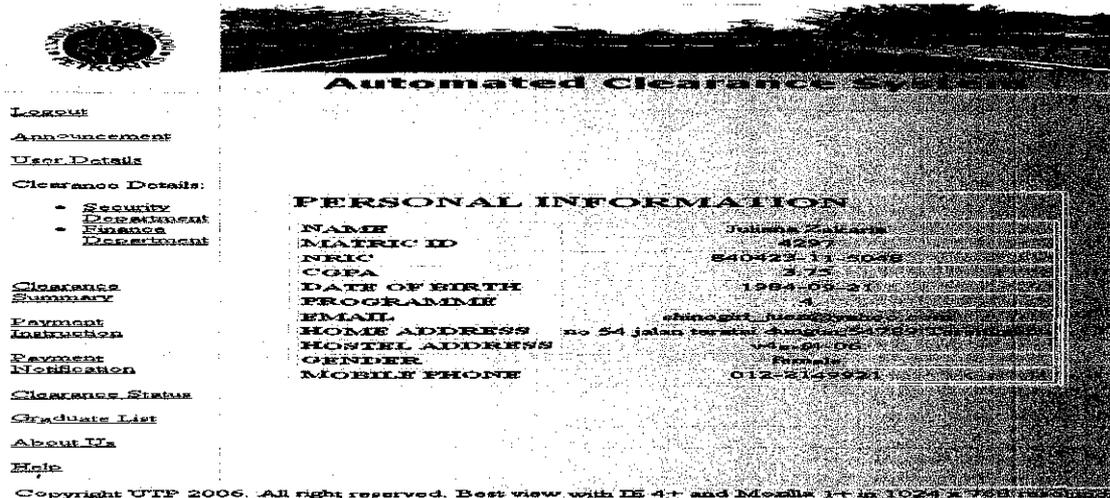


Figure 4.12: Main Interface (Student)

In figure 4.12, the page will appear all the information student need to know such as student name, matric ID, NRIC, CGPA and etc.

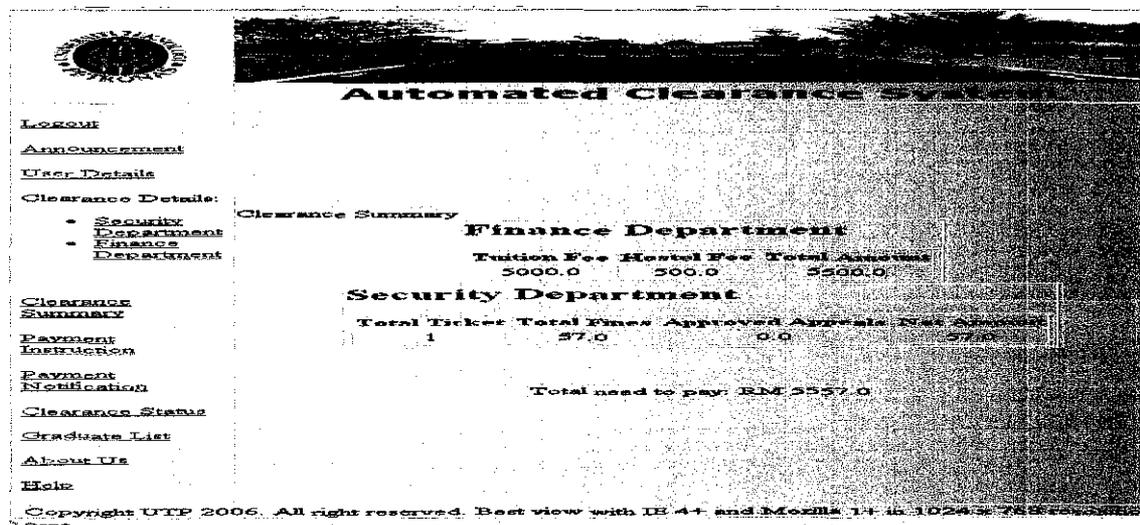


Figure 4.13: Clearance Summary Page (Student)

In this page shown in figure 4.13, it will display all the debt that need to pay when doing clearance process.

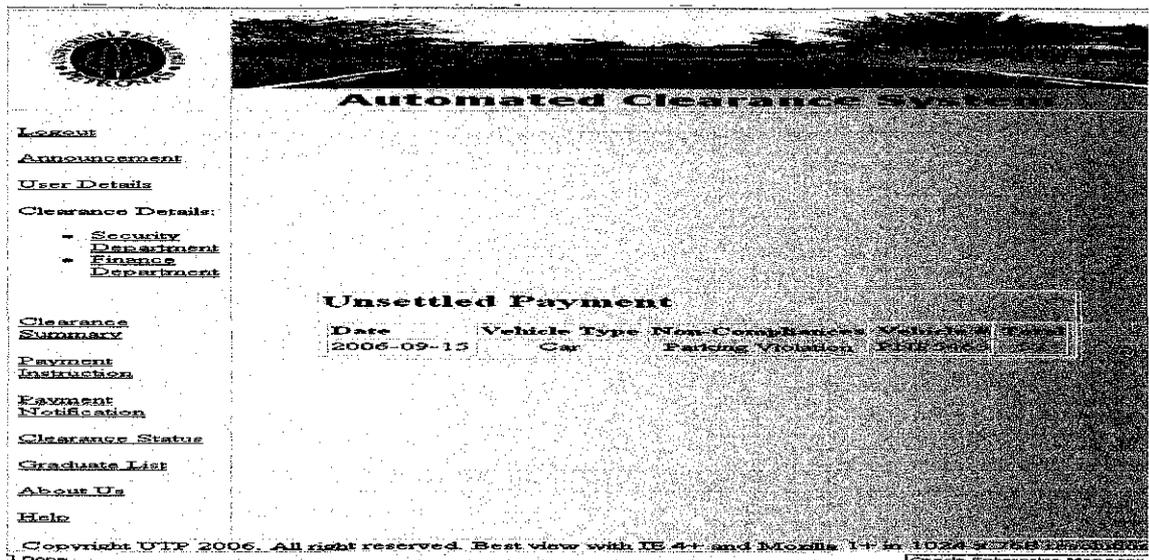


Figure 4.14: Unsettled Payment Page (Student)

In this page, it will display all summon that the student need to pay for Security Department.

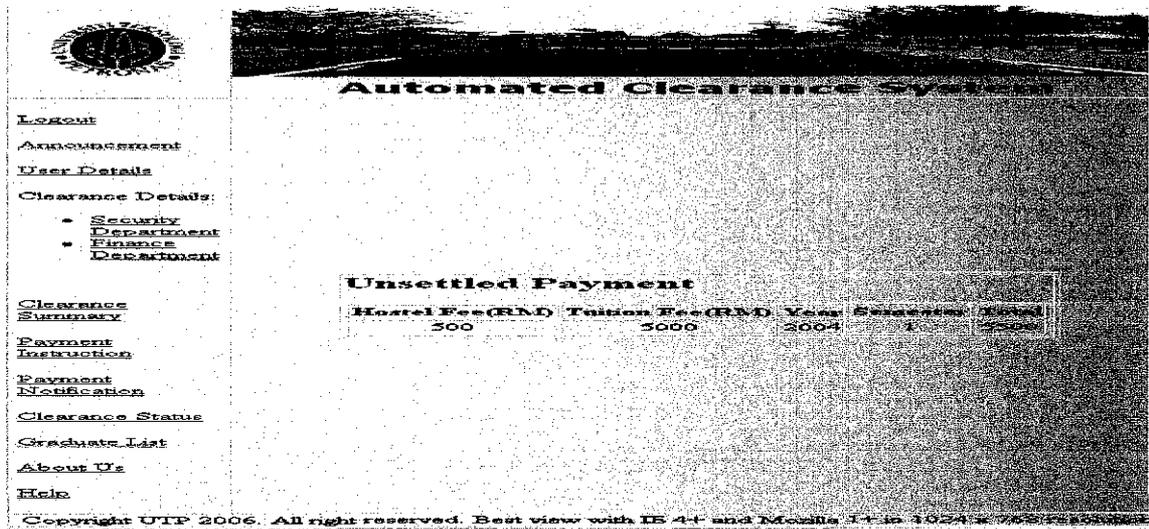


Figure 4.15: Unsettled Payment Page (Student)

In this page, it will display all debt that the students need to pay for Finance Department such as hostel fee, tuition fee and etc.

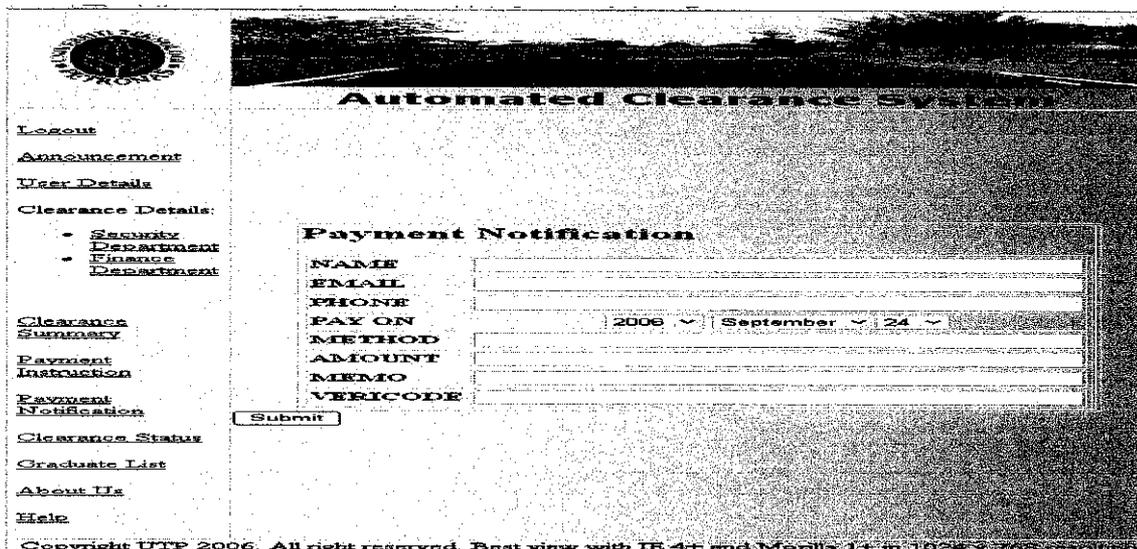


Figure 4.16: Payment Notification Page (Student)

In this page, student need to key in all the information needed in this payment notification to make sure student paid all the debt. After 2 days, student can login again and check their status in Clearance Status page.

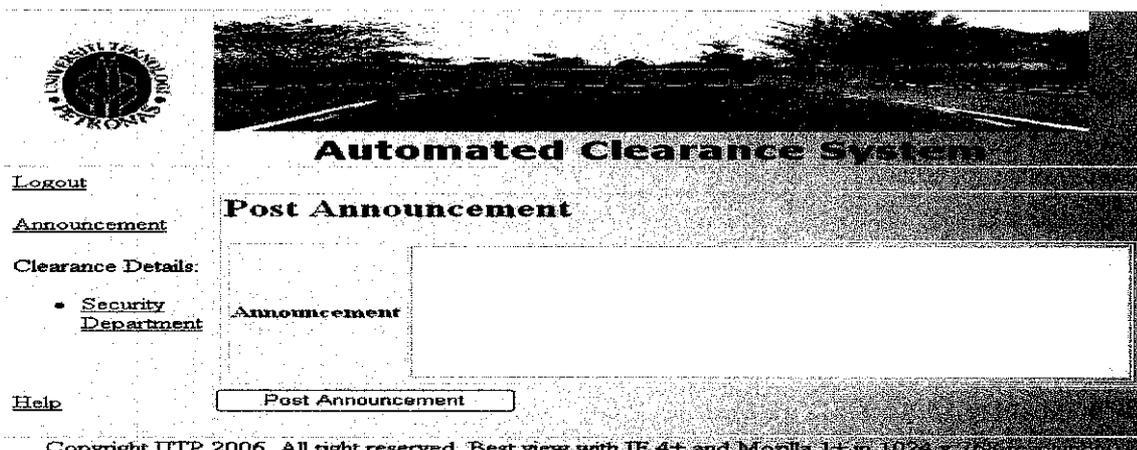


Figure 4.17: Post Announcement Page

In this page, staff security department, staff finance department and webmaster can post all the information related to the student.

**Automated Clearance System**

[Logout](#)

[Announcement](#)

**Clearance Details:**

- [Security Department](#)

**Unsettled Payment**

Matrix ID	Name	Date	Vehicle Type	Non-Compliances	Vehicle	Date	Status
4297	Juliana Zakaria	2006-09-15	Car	Parking Violation	PND-546		

[Add New](#)

[Help](#)

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Figure 4.18: Unsettled Page (Security Department)

In this page, it will display all the information about the student that did not pay their debt.

**Automated Clearance System**

[Logout](#)

[Announcement](#)

**Clearance Details:**

- [Finance Department](#)

**Unsettled Payment**

Matrix ID	Name	Hostel Fee	Tuition Fee	Year	Semester	Total	Status
4297	Juliana Zakaria	500	5000	2004	1	5500	

[Add New](#)

[Help](#)

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Figure 4.19: Unsettled Payment Page (Finance Department)

In this page, it will display all the information about the student that did not pay their debt.

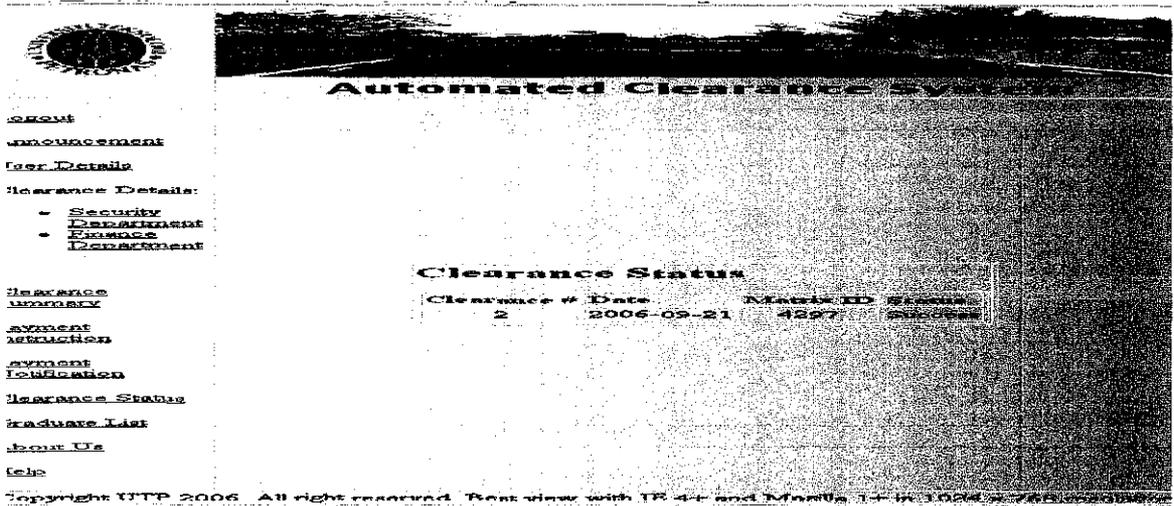


Figure 4.20: Clearance Status Page

In this page, it will display status about the clearance system whether success or pending

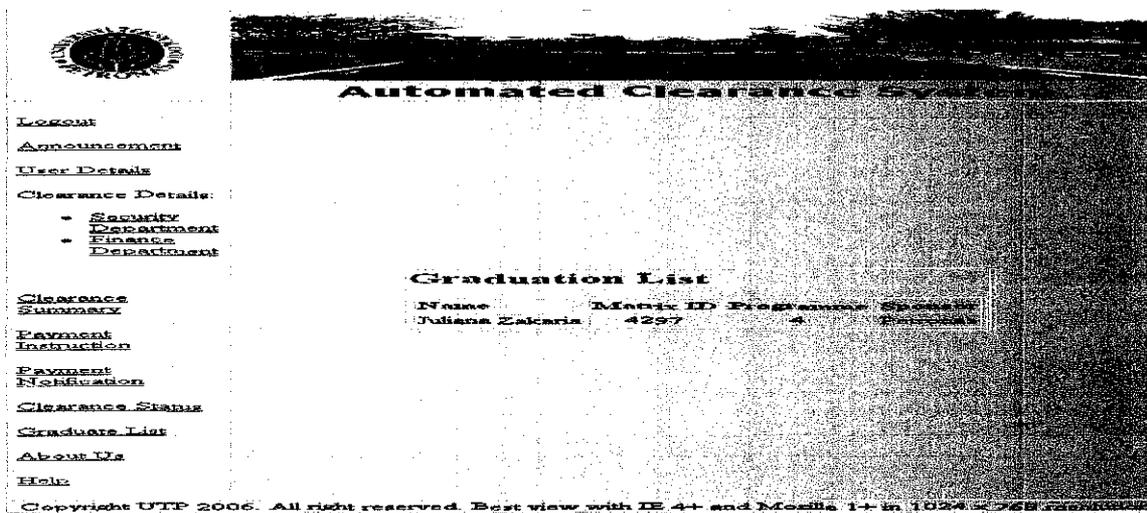


Figure 4.21: Graduation List Page

In this page, it will display all the student information that will graduate in particular year

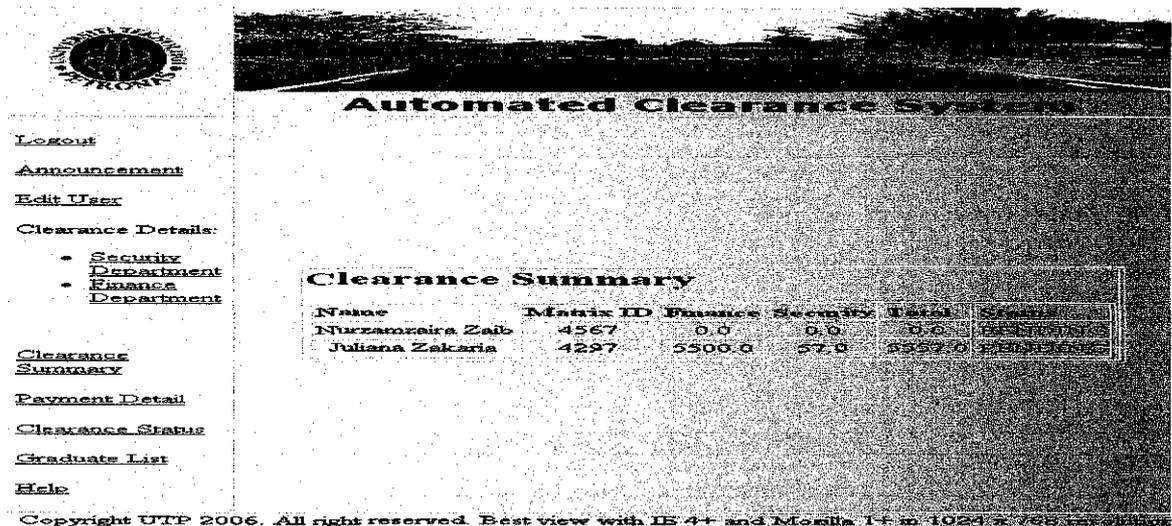


Figure 4.22: Clearance Summary Page

In this page, it will display all the student information and their summary and status for clearance process

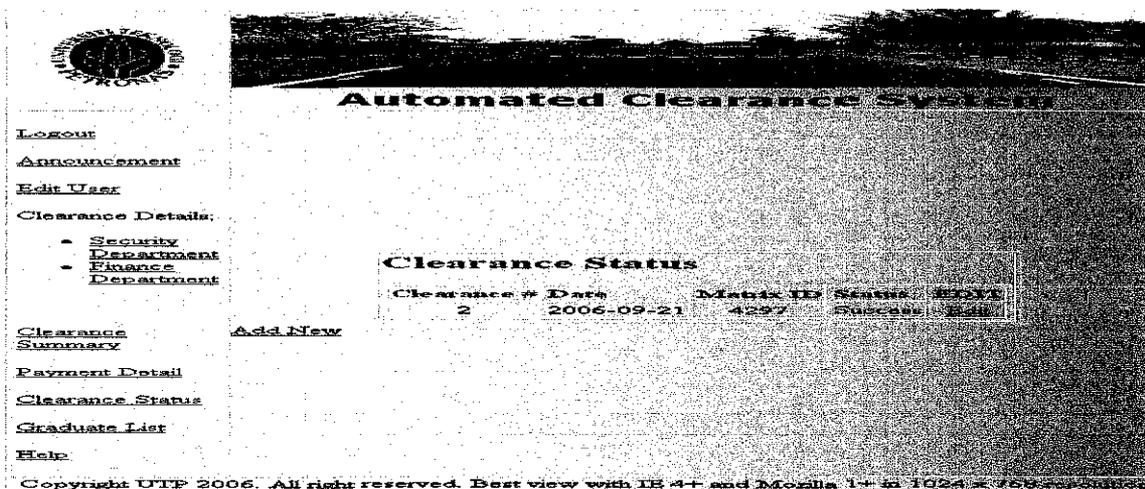
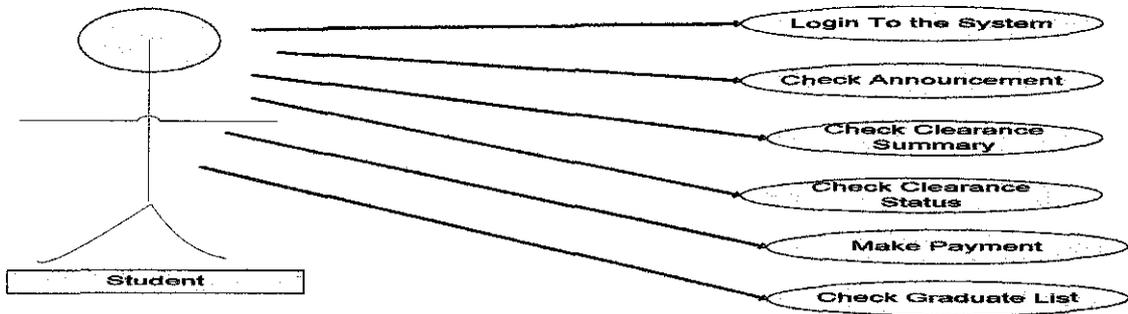


Figure 4.23: Clearance Status Page

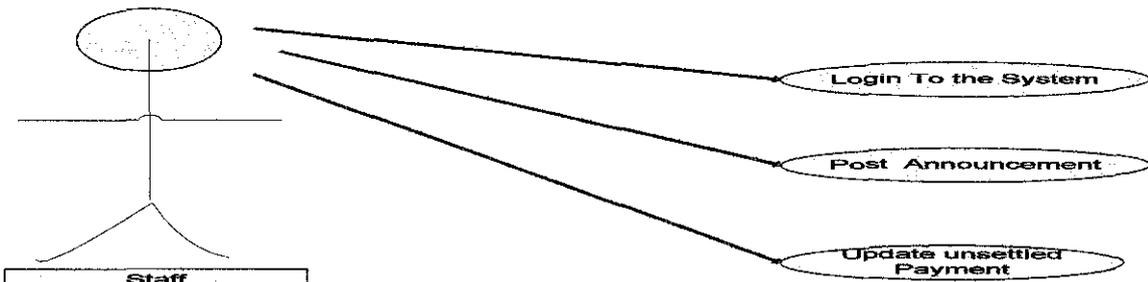
In this page, it will display all the student information and their status for clearance process. The webmaster will edit the status from pending to success if the student successfully makes a payment.

**System activity-Use Case Diagram:**

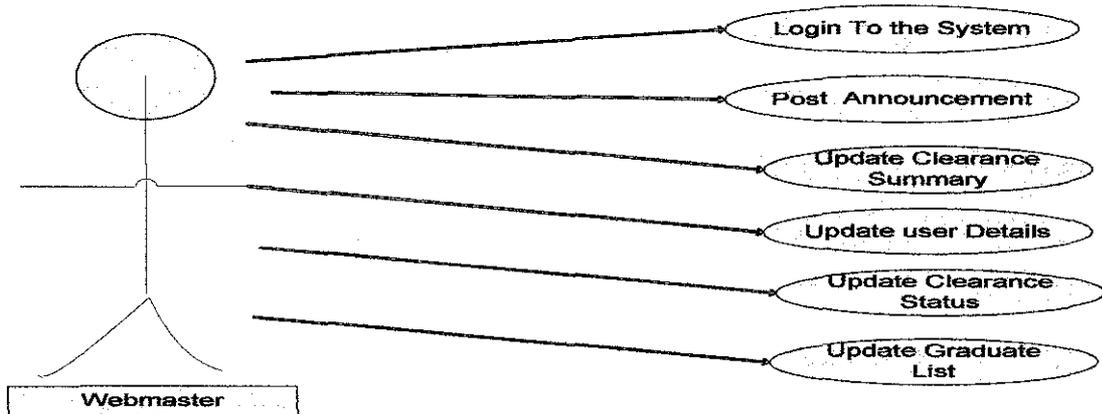
Use case diagram is used to model the activity to be done from a user perspective. The system has 3 main groups of user; the Student, Staff Security Department, Staff Finance Department and System Administrator



**Student activity**



**Staff activity**



**Webmaster activity**

### **4.3 System Testing Phase**

After done the design phase, the author implements all the design into the coding. In this system the author use Java server Pages (JSP) and Oracle 9i for the system and databases. After done all the coding, the authors do a testing and debugging procedure to test whether the database is functioning as the author expected and to test integration between databases, flow of the system and the interface.

#### ***White box testing***

##### **❖ Feature testing**

- To test every functions provided in the system
- To check whether the functions follow user and system requirement
- To identify the flaw and suitable corrections for each and every function

##### **❖ Integration testing**

- To test the integration of the functions
- To see whether movements from one function to another is as intended or not
- To identify necessary corrections to perform on each set of function with flaws or errors

##### **❖ Regression testing**

- To re-check the functions after corrections has been made
- To see whether corrections that has been met comply with the requirements

#### ***Black box testing***

##### **❖ System testing**

- to test the system as a whole and check each set of function together with their movements to ensure that system fulfill all requirements
- to familiarize with the system and see the product of each subset of the system

##### **❖ Load testing**

- To test the capability of the system in receiving and processing a huge and bursting amount of access and data

**Kind of testing:** White box and Black box

**Testers:**

- ❖ Internal testers
  - Internal user 1 acted as Student
  - Internal user 2 acted as Webmaster
- ❖ External testers
  - External user 1 acted as Staff Security Department
  - External user 2 acted as staff Finance Department

**Testing information:**

- ❖ Internal testers and external tester are selected among friends
- ❖ Both testers were given freedom to execute and run any function as desired.
- ❖ Each tester must record these information for each test case executed:
  - Input entered.
  - Output obtained.
  - Functions accessed.
  - List of functions executed.
- ❖ Testers were given 30 minutes to familiarize with the system and another 30 minutes to execute the test cases

**Testing results**

**a) Type of User: Student**

**Case 1 – Student login with error**

- a. Input :
  - i. Username: I4297
  - ii. Password: I429
- b. Condition: wrong password
- c. Output:
  - i. Error. Login failed.
  - ii. Invalid Password

**Case 2 – Student login, view main page**

- a. Input :
  - i. Username: I4297
  - ii. Password: I4297
- b. Condition: correct login information
- c. Output: Main Page
- d. Action: select user details
- e. Output: page user details

**b) Type of User: Webmaster**

**Case 1 – Webmaster login, view main page, view edit user**

- a. Input:
  - i. Username: I4064
  - ii. Password: I4064
- b. Condition: correct login information
- c. Output: Main Page
- d. Action: select edit user
- e. Output: page edit user

**c) Type of User: Staff Security Department**

**Case 1 – Staff Security department login, view main page, clearance details**

- a. Input :
  - i. Username: I4055
  - ii. Password: I4055
- b. Condition: correct login information
- c. Output: Main Page
- d. Action: select clearance details(security Department)
- e. Output: page select clearance details(security Department)

### **c) Type of User: Staff Finance Department**

#### **Case 1 – Staff Finance Department login, view main page, clearance details**

a. Input:

i. Username: I4473

ii. Password: I4473

b. Condition: correct login information

c. Output: Main Page

d. Action: select clearance details (Finance Department)

e. Output: page select clearance details (Finance Department)

### **4.4 The benefits of Online Clearance System**

- **Easy to Use**

Step-by-step wizards simplify the process of making the clearance. This system provided more systematic approach which can easily learn and understand by user. It also provide easier procedure to the both applicant and the security department.

- **Increases Productivity**

It reduces the time required to fill in applicant form where they can get form the JPSP department. Students can do the clearance online and do not need to fill in the forms.

- **Improves Communication**

It improves communication between Security Department, Finance Department and student.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Conclusion**

This project meets the objective that already stated earlier. It give the users step by step guidelines how to use this system and easy to learn. At the same time, it managed to ease the clearance process and successfully make the current system migrate to computerized system.

This project also provides the end user with and efficient way of doing the clearance before graduate and to minimize the manual transaction amongst the end user. In order to make all these succeed, we must develop a system that will help student and the staff to do and maintain the system itself. The government is heavily promoting the importance of IT by making great strides in education and training. The introduction of lower price PC hopefully will enable more people to have a PC at their home. So, this system also will help to promote the importance of IT since we can do the clearance online or through mobile rather than doing manually.

Although the system is developed within a small scope, yet it really benefits many parties. Some of the benefits are space saving, time saving, easy searching and retrieving of data and information, labor saving, cost displacement and value-added as mentioned in the problem statement section. In addition, the department can train its staff in using a computerized system. So that the staff would not have much problem when they required to use a more sophisticated system.

The information gains from research conducted are used in deciding whether the system is worth to be developed. Furthermore, at this project involves a small scope, it is feasible to be completed within three and four months period. As s conclusion, this project is worth to be developed and implemented as many processes become efficient with its implementation.

## **5.2 Recommendations**

In order to ensure the Online Clearance System achieve its objective, some recommendations have been made. This will help the future enhancement of the system. The suggestions have been divided into two sub-sections. First Enhancement, which are features those already in the application but needed adjustment to increase its “WOW” factor. Another one is addition, which is features not included in the application/system but when the features are in, I will assure you it will work just nice

### **5.2.1 Enhancement**

#### **Enhance the security of Online Clearance System**

As the developer for the system, it is believed that the system securities need to be enhanced. For this system, two major security concerns are taken into consideration. First is the authorization in accessing the system. Second is the session hold by the system. If one tries to change the session, the system will direct ask him to be login.

Both securities used for the system do not guaranty the system from any bugs or holes. For computer has been used as a server. This pc does not have firewall such as the one UTP server has. It is believed that when the system is integrated with UTP server, it will be more secure.

### **5.2.2 Addition**

- More user friendly, attractive interface for both web-based
- There some weakness in handling the data. Some of the features can be enhanced to produce a stronger and efficient information system. For example, the error detection does not cover all the function since I was focusing on finishing the main features within time constraints.

- The application has more detailed information and archiving that include summon record, categories of offence and etc
- Adding new features for web-based such as online payment
- The application is in the UTP network.

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## APPENDIX A

### ORACLE 9I

Database:ClearanceSystem

To make a connection with oracle:

```
connect ziela/ziela@ziela as sysdba;
```

To create schema:

```
CREATE USER "CLEARANCEUSER1" PROFILE "DEFAULT" IDENTIFIED BY "CLEARANCEUSER1"  
DEFAULT TABLESPACE "USERS" ACCOUNT UNLOCK;
```

To create grant:

```
GRANT CONNECT TO CLEARANCEUSER1  
/  
GRANT UNLIMITED TABLESPACE TO CLEARANCEUSER1  
/  
GRANT CREATE TABLE TO CLEARANCEUSER1  
/  
GRANT ALTER ANY TABLE TO "CLEARANCEUSER1"  
/  
GRANT SELECT ANY TABLE TO "CLEARANCEUSER1"  
/  
GRANT UPDATE ANY TABLE TO "CLEARANCEUSER1"  
/  
/
```

To make connection with database:

```
Connect CLEARANCEUSER1/CLEARANCEUSER1@ziela;
```

To create schema:

```
create schema authorization CLEARANCEUSER1;
```

To create table:

```
CREATE TABLE "CLEARANCEUSER1"."ANNOUNCEMENT" ("THEDATE" DATE NOT NULL, "DETAIL."  
VARCHAR2(1000 byte) NOT NULL) TABLESPACE "USERS" PCTFREE 10 PCTUSED 0 INITRANS 1  
MAXTRANS 255 STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645  
PCTINCREASE 0) LOGGING  
/  
CREATE TABLE "CLEARANCEUSER1"."STUDENT" ("STUDENT_NAME" VARCHAR2(10 byte) NOT NULL,  
"STUDENT_MATRIX_ID" NUMBER(10) NOT NULL, "STUDENT_NRIC" VARCHAR2(20 byte) NOT NULL,  
"STUDENT_CGPA" NUMBER(13, 3) NOT NULL, "STUDENT_DATE_OF_BIRTH" DATE NOT NULL,  
"PROGRAMME_ID" NUMBER(10) NOT NULL, "EMAIL" VARCHAR2(1000 byte) NOT NULL,  
"HOME_ADDRESS" VARCHAR2(1000 byte) NOT NULL, "HOSTEL_ADDRESS" VARCHAR2(1000 byte) NOT  
NULL, "GENDER" VARCHAR2(10 byte) NOT NULL, "MOBILEPHONE" VARCHAR2(20 byte),  
CONSTRAINT "STUDENT_PK11158164015515" PRIMARY KEY("STUDENT_MATRIX_ID") USING INDEX  
TABLESPACE "USERS"  
STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0) PCTFREE  
10 INITRANS 2 MAXTRANS 255) TABLESPACE "USERS" PCTFREE 10 PCTUSED 0 INITRANS 1  
MAXTRANS 255 STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645  
PCTINCREASE 0) LOGGING  
/  
  
CREATE TABLE "CLEARANCEUSER1"."CLEARANCE_STATUS" ("CLEARANCE_NUMBER" NUMBER(10)  
NOT NULL, "THEDATE" DATE NOT NULL, "MATRIX_ID_FK" NUMBER(10) NOT NULL, "STATUS"
```

```
VARCHAR2(30 byte) NOT NULL, CONSTRAINT "CLEARANCE_STA_PK51158351725218" PRIMARY
KEY("MATRIX_ID_FK") USING INDEX TABLESPACE "USERS"
STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0) PCTFREE
10 INITRANS 2 MAXTRANS 255, CONSTRAINT "SYS_C0012048_1" FOREIGN KEY("MATRIX_ID_FK")
REFERENCES "CLEARANCEUSER1"."STUDENT"("STUDENT_MATRIX_ID"), CONSTRAINT
"UNIQ_CL_NUM" UNIQUE("CLEARANCE_NUMBER"));
/
```

```
CREATE TABLE "CLEARANCEUSER1"."FINANCE" ("ID" NUMBER(10) NOT NULL, "STUDENT_ID_FK"
NUMBER(10) NOT NULL, "HOSTEL_FEE" NUMBER(10, 2) NOT NULL, "TUITION_FEE" NUMBER(10, 2) NOT
NULL,
"OTHER_PAYMENT" NUMBER(10, 2), "YEAR" NUMBER(10) NOT NULL, "SEMESTER" NUMBER(10) NOT
NULL, CONSTRAINT "FINANCE_FK21158329635609" FOREIGN KEY("STUDENT_ID_FK") REFERENCES
"CLEARANCEUSER1"."STUDENT"("STUDENT_MATRIX_ID"),
CONSTRAINT "SYS_C0012025_1_1" PRIMARY KEY("ID"));
/
```

```
CREATE TABLE "CLEARANCEUSER1"."GRADUATION_LIST" ("MATRIC_ID_FK" NUMBER(10) NOT
NULL, "SPONSOR" VARCHAR2(10 byte) NOT NULL, CONSTRAINT "GRADUATION_LI_PK31158354259578"
PRIMARY
KEY("MATRIC_ID_FK") USING INDEX TABLESPACE "USERS" STORAGE ( INITIAL 64K NEXT 0K
MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0) PCTFREE 10 INITRANS 2 MAXTRANS
255, CONSTRAINT "SYS_C0012051_1" FOREIGN KEY("MATRIC_ID_FK") REFERENCES
"CLEARANCEUSER1"."STUDENT"("STUDENT_MATRIX_ID")) TABLESPACE "USERS" PCTFREE 10
PCTUSED 0 INITRANS 1 MAXTRANS 255 STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1
MAXEXTENTS 2147483645 PCTINCREASE 0) LOGGING
/
```

```
CREATE TABLE "CLEARANCEUSER1"."PAYMENT_NOTIFICATION" ("NAME" VARCHAR2(10 byte) NOT
NULL, "EMAIL" VARCHAR2(10 byte) NOT NULL, "PHONE" VARCHAR2(12 byte) NOT NULL, "PAY_ON"
DATE NOT NULL, "CLEARANCE_NO" NUMBER(10), "METHOD" VARCHAR2(15 byte) NOT NULL,
"AMOUNT" NUMBER(10, 2) NOT NULL, "MEMO" VARCHAR2(1000 byte) NOT NULL, "VERICODE"
VARCHAR2(30 byte) NOT NULL, "STATUS" VARCHAR2(20 byte) DEFAULT 0 NOT NULL, "MATRIX_ID"
NUMBER(10) NOT NULL) TABLESPACE "USERS" PCTFREE 10 PCTUSED 0 INITRANS 1 MAXTRANS 255
STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0) LOGGING
/
```

```
CREATE TABLE "CLEARANCEUSER1"."PROGRAMME" ("PROGRAMME_ID"
NUMBER(10) NOT NULL, "PROGRAMME_NAME" VARCHAR2(100 byte) NOT
NULL, CONSTRAINT "SYS_C0012566" PRIMARY KEY("PROGRAMME_ID")
USING INDEX TABLESPACE "USERS" STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS
2147483645 PCTINCREASE 0) PCTFREE 10 INITRANS 2 MAXTRANS 255, CONSTRAINT "SYS_C0012567"
UNIQUE("PROGRAMME_NAME"));
/
```

```
CREATE TABLE "CLEARANCEUSER1"."SECURITY" ("ID" NUMBER(10) NOT
NULL, "STUDENT_ID_FK" NUMBER(10) NOT NULL, "APPROVED_APEAL" NUMBER(10) NOT NULL,
"TOTAL" NUMBER(10) NOT NULL, "THE DATE" DATE NOT NULL, "VEHICLE_TYPE" VARCHAR2(50 byte)
NOT NULL, "NON_COMPLIANCE" VARCHAR2(100 byte) NOT NULL, "VEHICLE_NUMBER" VARCHAR2(10
byte) NOT NULL, CONSTRAINT "SECURITY_FK21158309335390_1_1" FOREIGN KEY("STUDENT_ID_FK")
REFERENCES "CLEARANCEUSER1"."STUDENT"("STUDENT_MATRIX_ID"))
TABLESPACE "USERS" PCTFREE 10 PCTUSED 0 INITRANS 1 MAXTRANS 255
STORAGE ( INITIAL 64K NEXT 0K MINEXTENTS 1 MAXEXTENTS 2147483645 PCTINCREASE 0) LOGGING
/
```

```
CREATE TABLE "CLEARANCEUSER1"."STAFF" ("STAFF_ID" NUMBER(10) NOT NULL, "NAME"
VARCHAR2(10 byte) NOT NULL, "TELEPHONE_NUMBER"
VARCHAR2(12 byte) NOT NULL, "EMAIL" VARCHAR2(100 byte) NOT NULL, "DEPARTMENT"
VARCHAR2(20 byte) NOT NULL, "PASSWORD" VARCHAR2(100 byte) NOT NULL, CONSTRAINT
"STAFF_PK1158224093656" PRIMARY KEY("STAFF_ID")); /
CREATE SEQUENCE "CLEARANCEUSER1"."CLEARANCE_NOSEQ" INCREMENT BY 1 START WITH 1
MAXVALUE 1.0E28 MINVALUE 1 NOCYCLE
```

CACHE 20 NOORDER

/

CREATE SEQUENCE "CLEARANCEUSER1"."FINANCESEQ" INCREMENT BY 1  
START WITH 21 MAXVALUE 1.0E28 MINVALUE 1 NOCYCLE CACHE 20 NOORDER

/

CREATE SEQUENCE "CLEARANCEUSER1"."SECURITYSEQ" INCREMENT BY 1  
START WITH 41 MAXVALUE 1.0E28 MINVALUE 1 NOCYCLE CACHE 20 NOORDER

Database e-learning

connect ziela/ziela@ziela as sysdba;

CREATE USER "ELEARNINGUSER1" PROFILE "DEFAULT" IDENTIFIED BY "ELEARNINGUSER1"  
DEFAULT TABLESPACE "USERS" ACCOUNT UNLOCK;

GRANT "CONNECT" TO "ELEARNINGUSER1";

/

GRANT UNLIMITED TABLESPACE TO ELEARNINGUSER1

/

GRANT CREATE TABLE TO ELEARNINGUSER1

/

GRANT ALTER ANY TABLE TO "ELEARNINGUSER1"

/

GRANT SELECT ANY TABLE TO "ELEARNINGUSER1"

/

GRANT UPDATE ANY TABLE TO "ELEARNINGUSER1"

/

Connect ELEARNINGUSER1/ELEARNINGUSER1@ziela;

Create schema authorization ELEARNINGUSER1;

CREATE TABLE "ELEARNINGUSER1"."LOGIN" ("MATRIX\_ID" NUMBER(20) NOT NULL, "PASSWORD"  
VARCHAR2(20 byte) NOT NULL, CONSTRAINT "SYS\_C0012060" UNIQUE("MATRIX\_ID") );

## APPENDIX B

### Example Interfaces

	 <h2 style="text-align: center;">Automated Clearance System</h2>
<a href="#">Login</a>	<p>Welcome!</p> <p>Welcome to Automated Clearance System To log in, please click on the Login icon on the left.</p>
<p>Copyright UTP 2006. All right reserved. Best view with IE 4+ and Mozilla 1+ in 1024 x 768 resolution.</p>	

	 <h2 style="text-align: center;">Automated Clearance System</h2>
<a href="#">Login</a>	<p>ID: <input type="text"/></p> <p>Password: <input type="password"/></p> <p style="text-align: center;"><input type="button" value="Login"/></p>
<p>Copyright UTP 2006. All right reserved. Best view with IE 4+ and Mozilla 1+ in 1024 x 768 resolution.</p>	

	 <h2 style="text-align: center;">Automated Clearance System</h2>
<a href="#">Login</a>	<p><b>Login failed</b> Welcome!</p> <p>Welcome to Automated Clearance System To log in, please click on the Login icon on the left.</p>
<p>Copyright UTP 2006. All right reserved. Best view with IE 4+ and Mozilla 1+ in 1024 x 768 resolution.</p>	

Student:



## Automated Clearance System

Welcome, Juliana Zakaria

### Announcements

Date	Details
2006-09-21	WEBMASTER: Meeting For Students that will are taking...
2006-09-21	FINANCE: Please pay unsettled tuition fee before...
2006-09-21	SECURITY: Please pay unsettled amount before...
2006-09-22	FINANCE: all completed forms are to be submitted to...
2006-09-22	FINANCE: Meeting with Rector for the...
2006-09-22	FINANCE: Students to settle all outstanding debt...
2006-09-22	WEBMASTER: Student to check current memo...
2006-09-22	WEBMASTER: Please pay unsettled hostel fee before...

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## Automated Clearance System

Payment Notification

NAME	
EMAIL	
PHONE	
PAY ON	2006   September   24
METHOD	
AMOUNT	
MEMO	
VERICODE	

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Security Department:




## Automated Clearance System

[Logout](#)

[Announcement](#)

Clearance Details:

- [Security Department](#)

[Help](#)

Post Announcement

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### Post Announcement




## Automated Clearance System

[Logout](#)

[Announcement](#)

Clearance Details:

- [Security Department](#)

[Help](#)

### Unsettled Payment

Matrix ID	Name	Date	Vehicle Type	Non-Compliances	Vehicle	Batch	Date
4297	Juliana Zakaria	2006-09-15	Car	Parking Violation	PNP 5963	30	2006

[Add New](#)

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### Unsettled Payment

Matrix ID	Name	Date	Vehicle Type	Non-Compliances	Vehicle	Batch	Date
4297	Juliana Zakaria	2006-09-15	Car	Parking Violation	PNP 5963	30	2006

Finance Department:




## Automated Clearance System

[Logout](#)

[Announcement](#)

Clearance Details:

- [Finance Department](#)

[Help](#)

### Unsettled Payment

Matrix ID	Name	Hostel Fee	Tuition Fee	Year	Semester	File No	Date
4297	Juliana Zakaria	500	5000	2004	1	2200	2004

[Add New](#)

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### Unsettled Payment

Matrix ID	Name	Hostel Fee	Tuition Fee	Year	Semester	File No	Date
4297	Juliana Zakaria	500	5000	2004	1	2200	2004

## APPENDIX C

### Questionnaire:

#### **FYP QUESTIONNAIRE:**

I am a Final Year IT student, doing my Final Year Project. This questionnaire is to help me in getting some responds towards the acceptance of **Automated Clearance System (ACS System)** for the Security Department, Information Resource Centre Department, Finance Department and the student or staff at UTP specifically for the administration of students or staffs' at UTP. Please take a moment to fill in the questionnaire. Thank you.

- 1) Are there too many process involved in the existing clearance system?
  - a) Extremely many
  - b) Many
  - c) Just Nice
  - d) Not that many
  - e) Not at all
  
- 2) How many days usually taken to complete the clearance process?
  - a) Below 1 day
  - b) 2 days
  - c) 3 days
  - d) 4 days
  - e) 5 days and above
  
- 3) Would this circumstance give hassle to the community (students and staffs)?
  - a) Definitely
  - b) Almost definitely
  - c) Averagely annoying
  - d) Will not really annoying
  - e) Absolutely not
  
- 4) What is the major cause of the prolong time taken to complete the clearance process?
  - a) Manual and ineffective file management system
  - b) More than one departments (security, library and finance departments) need to be deal with
  - c) All of above
  - d) None of above

5) Would the existing system be best replaced by an online system along with Database Management System (DBMS) to enhance the efficiency and effectiveness?

- a) Definitely
- b) Almost definitely
- c) Averagely appropriate
- d) Will not really appropriate
- e) Absolutely not

6) By applying the online system, which is the best solution to resolve the problems arise?

- a) Notification by e-mail
- b) Posted posters
- c) Phone call
- d) SMS
- e) If others, please state \_\_\_\_\_

7) Do you think that new system will help to improve the Security Department, Library Department and Finance Department efficiency?

- a) Yes
- b) No

8) Can you trust the system in term of confidentiality, when it requires your personal data?

- a) Yes
- b) No

9) Give your suggestion to improve the existing clearance registration system?

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10) If the current system is changed into online system, what did you expect from the new system?

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## APPENDIX D

### Database Structure:

Clearance Status	
PK	<u>MATRIX_ID_FK</u>
	CLEARANCE_NUMBER THEDATE STATUS

Staff	
PK	<u>STAFF_ID</u>
	NAME TELEPHONE_NUMBER EMAIL DEPARTMENT PASSWORD

Payment Notification	
PK	<u>MATRIX_ID</u>
	NAME EMAIL PHONE PAY_ON CLEARANCE_NO METHOD AMOUNT MEMO VERICODE STATUS

Security Department	
PK	<u>ID</u>
	STUDENT_ID_FK APPROVED_APEAL TOTAL THEDATE VEHICLE_TYPE NON_COMPLIANCE VEHICLE_NUMBER

Announcement	
PK	<u>The Date</u>
	Detail

Graduation List	
PK	<u>MATRIC_ID_FK</u>
	SPONSOR

Login	
PK	<u>Matric ID</u>
	Password

Finance Department	
	<u>ID</u>
	STUDENT_ID_FK HOSTEL_FEE TUITON_FEE OTHER_PAYMENT YEAR SEMESTER

Programme	
PK	<u>PROGRAMME_ID</u>
	PROGRAMME_NAME

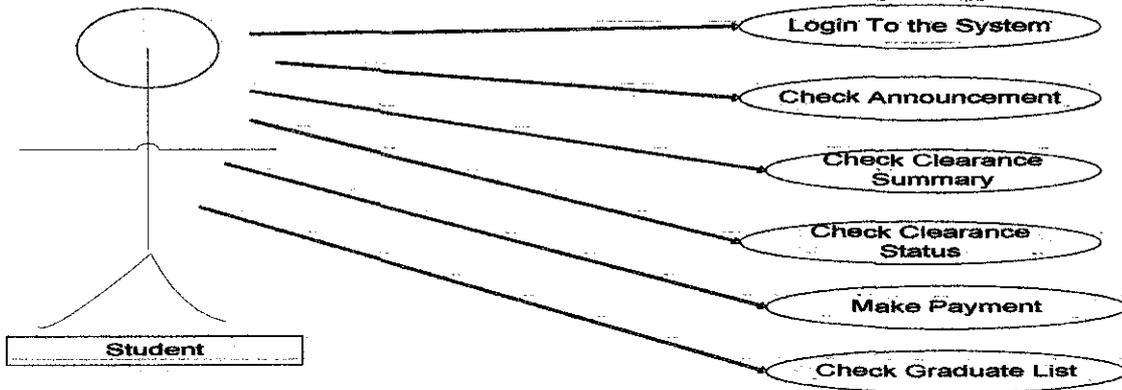
Student	
PK	<u>STUDENT_MATRIX_ID</u>
	STUDENT_NAME STUDENT_NRIC STUDENT_CGPA STUDENT_DATE_OF_BIRTH PROGRAMME_ID EMAIL HOME_ADDRESS HOSTEL_ADDRESS GENDER MOBILEPHONE



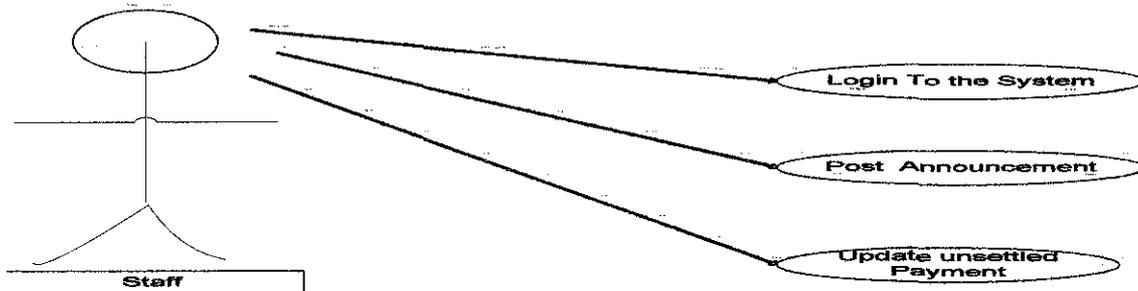
## APPENDIX F

### System activity-Use Case Diagram:

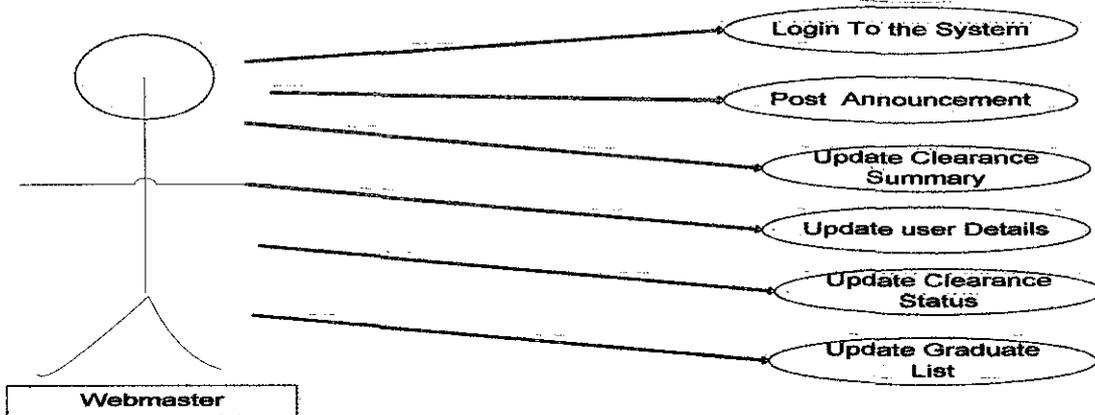
Use case diagram is used to model the activity to be done from a user perspective. The system has 3 main groups of user; the Student, Staff Security Department, Staff Finance Department and System Administrator



#### Student activity

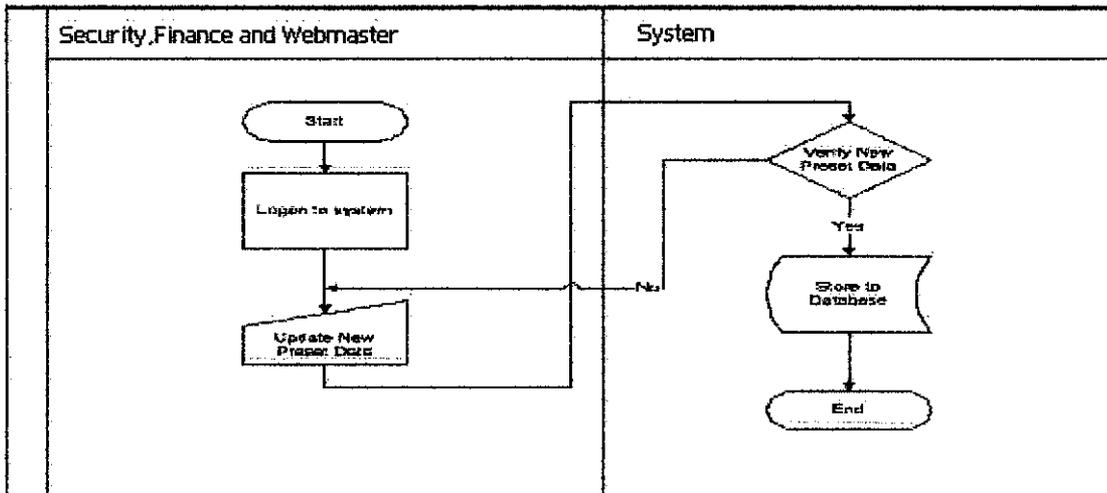


#### Staff activity

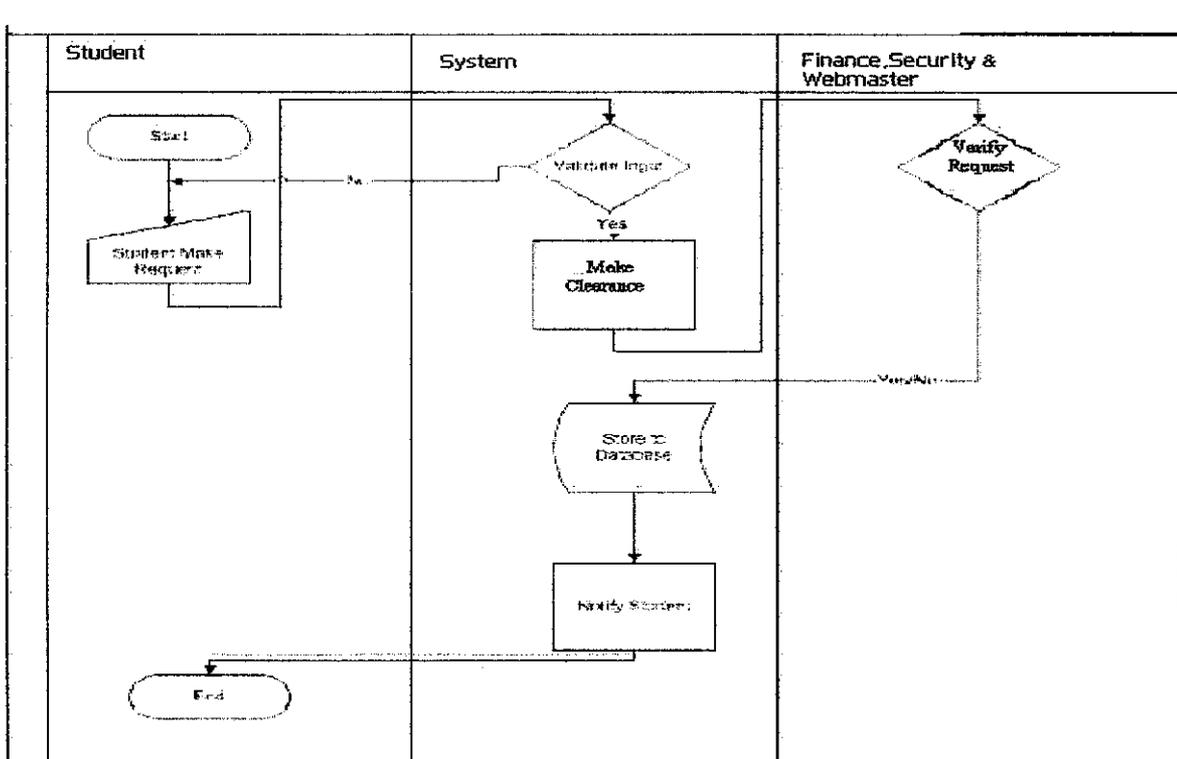


#### Webmaster activity

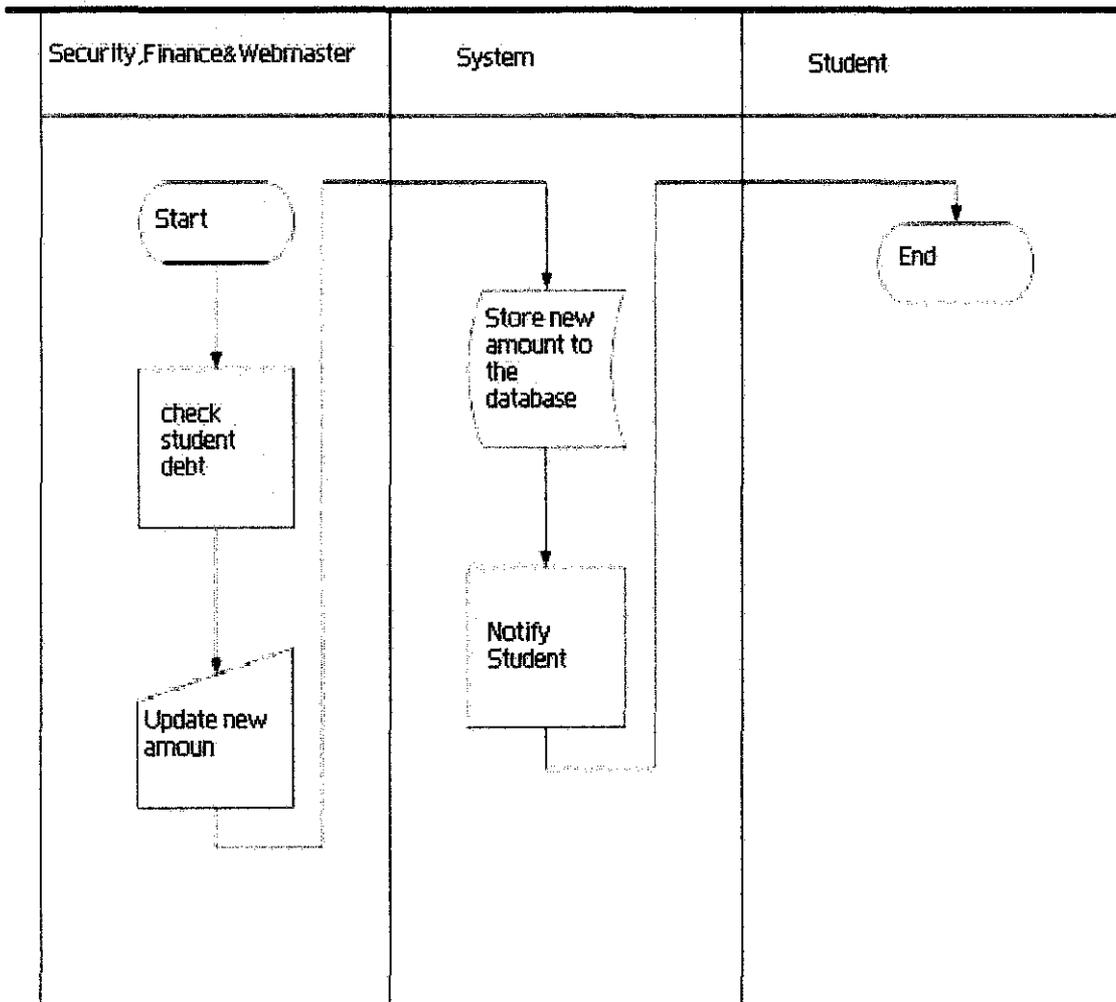
## APPENDIX G



**Update Present Data Process**



**Request Flow Diagrams**



**Clearance System Process Flow**



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PETRONAS

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## CLEARANCE FORM

### STUDENTS' DETAILS

NAME		IC/PASSPORT NO	
PROGRAMME		MATRIC NO	
KEY		TEL NO	
PERMANENT ADDRESS		MOBILE NO	
		EMAIL ADDRESS	
		SIGNATURE	
SPONSORSHIP			
DATE			

### REASON FOR DE-REGISTRATION (Please tick)

<input type="checkbox"/>	WITHDRAWAL - please attach with the relevant document
<input type="checkbox"/>	reason :
<input type="checkbox"/>	GRADUATED
<input type="checkbox"/>	OTHERS (please specify)
<input type="checkbox"/>	

### FOR RELEVANT ACTION BY RESPECTIVE DEPARTMENTS :

Please verify that the student is clear from any outstanding loans/debts/ any other matters by putting down your signature, stamp and date.

#### A. CO-CURRICULUM

(Library card has been cancelled and all equipment returned)

#### B. SECURITY

(Please take note that the car sticker is no longer valid and no outstanding compound)

#### C. SPONSORSHIP (if applicable)

(Please take note that the sponsor will be notified)

#### D. RESIDENTIAL COLLEGE

(Room key and other RC belonging have been returned in good order/condition)

#### E. INFORMATION AND RESOURCE CENTRE

(Library books has been returned in good condition and no penalty outstanding)

#### F. FINANCE

(Verified that student has no outstanding debt)

#### G. ADMISSION AND REGISTRATION UNIT

(Withdrawal from UTP)

#### H. EXAM AND RECORDS UNIT

(Graduating Students Only)

Earliest point to submit for withdrawal/other reason

\* Last point to submit for graduation student only