Examination Timetable Scheduling System (ETSS)

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ABSTRACT

This documentation is about the development of Examination Timetable Scheduling System or can be called ETSS. ETSS is to develop a university examination timetable that ensures not only that there will not be any clashes but also several constraints are satisfied, e.g. the seating capacity of exam hall should match as for as possible the number of students in the hall. The algorithm using can be referred to Graph colouring. ETSS uses Visual Basic 6.0 as a programming language. The database is stored in Access 97.

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Chapter 1 : INTRODUCTION

1.1 Background

The timetabling problem (TP) belongs to the NP-complete class of problems for which a general deterministic polynomial time algorithm is not known.

Each member in the NP class can be reduced in polynomial calculus, and each member can be solved in polynomial time by a non-deterministic algorithm or by a deterministic algorithm in a time that grows exponentially with the size of the problem. From the theoretical complexity point of view, the TP is NP-complete as a decision problem, i.e. to decide whether a solution does exist, and NP-hard as a solution problem, i.e. to construct a solution.

Nevertheless, human experts solve the TP in any country of the world every day. Everyone is able to assess a good timetable: it does not create holes in the teachers' personal tables, it should balance preferences, opportunities, didactic and practical issues, etc. thus, an evaluation function can be easily constructed, which a posteriori judges the timetable. On the other hand, it is very difficult to sate a set of rules which are a priori able to build a good timetable automatically.

Timetabling Research is concerned with studying methods of handling the various university timetabling problems, a substantial task given the size of the average university and the options available to students with the introduction of modularisation in most universities. Timetabling involves studying complexity issues, distributed timetabling systems, Implementations and Commercial packages, Interactive vs batch timetabling, relationship with other scheduling problems and techniques, including: Constraint Logic Programming, Genetic Algorithms, Graph Colouring, Expert Systems, Knowledge Based Systems, Heuristics, Operational Research methods, Simulated Annealing, Neural Networks and Tabu-search.

University examination time-tabling is a term or semester task for which university adopt different strategies depending on the size and the nature of their university. The strategy or method they choose often suits the facilities they have and which will fulfill their needs.

A timetable as defined by the Oxford Advanced Learner's Dictionary is a list showing the time at which certain events will take place. So the examination timetable is a list showing the time of examination. A systematic and precise examination timetable is needed in order to gain maximum benefit to the university as well as to the invigilators and students.

This project is about the development of an application software designed for generating a examination timetable scheduling system. This application is called Examination Timetable Scheduling System or ETSS. ETSS is specifically designed to be a user-friendly decision making support software for generating university timetables.

Strictly stated here is that ETSS is not designed to replace the talents of experienced scheduler, but to provide all the power of the latest technology available to him.

1.2 Purpose of the Project

The purpose of this project is to build a decision-support application software. To develop a University Examination Timetable that ensures not only that there will not be any clashes but also several complex constraints are satisfied as follows:-

1. The exam schedule of all students should be well spread out.
2. The seating capacity of exam hall should match as far as possible the number of students in the hall, etc.

ETSS will generate the timetable once the inputs required are entered by the user. Its database (e.g. a list of subjects and a list of invigilators) will store all the information needed for generating the examination timetables. With all the information stored in the system's database, the timetable will be generated. Finally, the timetables can be viewed.

The decision to build the decision-support software to generate the arisen from the manual timetable-generation method. The manual method is too time consuming as well as it involves a lot of clerical work. Typing and retyping, manual checking and rechecking slows down the timetable generation process.

Therefore, a decision-support application system is the solution for all the difficulties and troubles faced. But, as stated earlier it is not meant to reduce the scheduler's work of thinking about restrictions and time frames. He may use his previous scheduling experience to determine the troublesome restrictions and make it more flexible.

1.3 Objective of the Project

- To be easy to store and manipulate invigilators and other records.
- To be able to reduce the time for generating the examination timetables.
- To develop automation features.
- To incorporates a friendly interface and comes with full support
- To provide a user with a high quality solution to a problem but will allow that user to manually alter model constraints and objectives, generate different solutions and "home" in on a solution that the user is entirely happy with.
- To be easy to analyze

1.4 Scope of ETSS

The first version of this application software will be limited to generate the examination timetables for University of Malaya.

1.5 Hardware and Software Requirements

The hardware requirements for developing ETSS is as follows:

- microprocessor - IBM Compatible PC 166 MHz or better
- RAM - 32 MB or more memory
- Storage - 50 Mb free disk space
- Monitor - 17" Monitor or larger
- Input device - Mouse and Keyboard

The software requirements for developing ETSS is as follows:

- Operating system - Microsoft Windows 95/98 or later in standard
- Programming language visual basic enterprise edition version 6.0

1.6 Project Schedule

ID	Task Name	Start Date	End Date	Duration
1	Identifying problems, opportunities & objectives.	6/5/00	6/13/00	7d
2	Selecting methodology	6/13/00	6/21/00	7d
3	Determining information requirement	6/21/00	7/19/00	21d
4	Analyzing system needs	7/19/00	8/7/00	14d
5	Designing the system-program	8/7/00	8/15/00	7d
6	Designing the system - user interface	8/15/00	8/23/00	7d
7	Designing the system - database	8/21/00	8/29/00	7d
8	Checking	8/30/00	9/7/00	7d
9	Documentation	6/13/00	9/8/00	64d

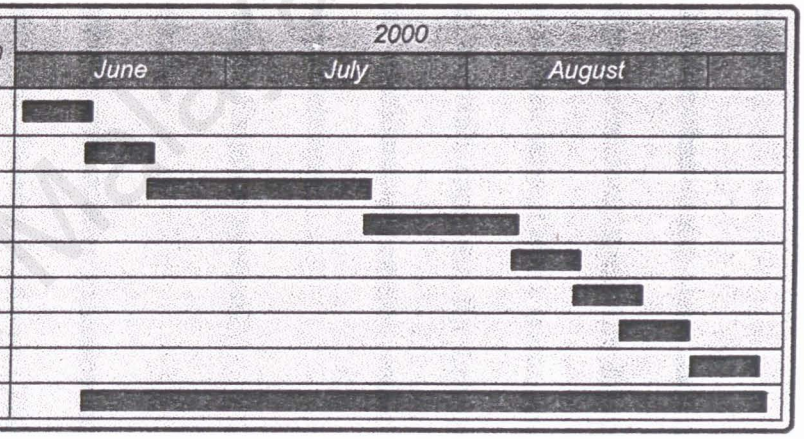

Figure 1.1 PROJECT TIMELINE FOR ETSS (GATT CHART)

Chapter 2 LITERATURE REVIEW

2.1 Introduction

Examination timetable has been designed and constructed either manually or computer generated since long ago. The first generation for the automation of the timetable process started since 1960's where the purpose is to simplify the managerial task. In 1964, a heuristic approach for timetabling was introduced by Broder and Cole. Since then, considerable research work has been carried out regarding the timetable scheduling techniques.

2.2 Two Example Existing systems

2.2.1 Example 1

The first example is the course selection and examination timetable system of National University of Ireland, Galway. The information is obtained from her information sheet on course selection and the examination timetable fall semester (1999/00) of faculty of arts. However, I just pick the information relevant to the course selection and examination timetable.

Information Sheet on Course Selection

3. No change to the lecture schedule or examination timetable can be made.

   Should two of the courses in which you are interested clash on either the lecture schedule or the examination timetable you must choose between the two.

5. Examinations

   (b) The provisional timetable for Examinations is included in the booklet.

   Courses being examined at the same time may not be selected. Departments will advise of arrangements for courses being examined by essay.

Examination Timetable Fall Semester (1999/00)

1. Courses which are timetabled to be examined at the same time must not be taken even where the lecture timetable permits.
2. Retain your copy of the examination timetable. Should examinations be rescheduled, you are assured of an examination if you select according to the original timetable.

   Book your homeward travel to allow for possible re-scheduling of examinations later than shown.
3. Examination venues will be posted in late November.
4. Examination sessions are as follows:

   a.m. - 9.30 a.m. - 12.30 p.m.

   p.m. - 2.30 p.m. - 5.30 p.m.

   Most examination papers are of three hours duration. Some, however, are of shorter duration and these are indicated on the course lists.
5. Only courses which are examined by formal examination papers are listed on the timetable. Arrangements in respect of courses examined by means of essays etc. will be notified by the department providing the course. Such arrangements must be strictly complied with.

(below is part of the examination timetable)

ARCHAEOLOGY

Departmental Office: Room 508, Floor 3, Tower 2.

Code	Course	Weighting	Examination Arrangements
AR221	Europe in the Age of Metal	2	Three hour examination

AR225	Hunters and Farmers in Early Europe	2	Three hour examination
AR321	The Archaeology of the Celtic World	2	Three hour examination
AR322	Ireland from the Viking Age to the Coming of the Anglo-Normans	2	Three hour examination
AR328	Irish Art from the early iron Age to the 8th Century	2	Essay
AR224	Ritual and Royalty: the royal sites of Ireland from prehistory to 1600 AD	2	Three hour examination
Or AR226	Death and Ritual in Prehistoric Europe	2	Three hour examination

Conclusion

This university try to reduce the load for scheduling the examination and course timetable. The students have to make sure that courses which are timetabled to be examined at the same time must not be taken even where the lecture timetable permits. However, University of Malaya Examination Timetabling System, students have more feasibility to choose the course because they only need to select the course which are no crashes but no need to consider examination timetable.

2.2.2 Example 2

Examination Timetabling in British Universities - A Survey

This paper was presented at The First International Conference on the Practice and Theory of Automated Timetabling in Edinburgh in 1995 and is based upon a survey of British Universities carried out around Spring 1995..

The Survey

The survey was split into four sections, but I just include three sections only. These were:

The Problem

Computer Usage

Constraints and

The Problem

In this section, the timetablers were asked to describe various features of their particular timetabling problem. In particular:

How many faculties/departments/students/exams are there?

How many periods are available?

How much space is available?

How many invigilators are required?

Obviously the more detailed information available, the more useful the results of the survey. It is, however, difficult to elicit such information without precise questions and precise questions often miss the mark when there is so much variation between problems. We found, for example, that a number of Universities did not use the concept of periods at all and that, in some cases, the amount of space available varies according to how many outside buildings are available.

Two questions that should have been included in the original survey are:

The number of candidate entries and

The number of seats available each period.

Some strange results came with the question "How many different lengths of exams are there?" It appears that some universities will allow extra time of a variable length to special needs students. This is the best explanation so far.

Computer Usage

The survey asked whether a computer was used, as a scheduler or merely to hold data, and how much time was spent on each part of the process.

Very few universities were forecoming with any documentation for their system and. Few reported using a commercial package although they may have been more reticent in answering the survey. The surveyer suspect that several universities have misunderstood the survey and claimed to have an automated scheduler whereas what they really have is a program that helps them do it themselves.

Constraints

This section asked about constraints used. Fourteen constraints were given and another eleven found that had not been previously thought of. Three questions were asked for each constraint:

Is the Constraint used?

How important is it? [1..10]

What percentage of exams does the constraint affect?

2.3 The Existing Algorithms

There are a quite a number of existing algorithm used for generating timetables. They are:

2.3.1 Constraint Logic Programming

CLP's potential lies in its power to tackle difficult combinatorial problems--such as those encountered in job scheduling, developing time tables, and routing--that stretch conventional programming techniques beyond their breaking point. Though CLP is still the subject of intensive research, it's already being used by large corporations, including the manufacturers Michelin and Dassault; the French railway authority SNCF; the airlines Swissair, SAS, and Cathay Pacific; and Hong Kong International Terminals, one of the world's largest privately owned container terminals.

Children of Prolog

As its name suggests, CLP is descended from logic programming, which shot to fame via the Prolog language, widely used in the Japanese 5th Generation project and the expert-systems boom of the mid-1980s. Its relatively poor efficiency (compared to procedural languages like C) hindered Prolog's commercial acceptance, and its use has declined in recent years. Now, by focusing on a particular problem domain, CLP languages make logic programs execute efficiently.

Prolog is based on first-order predicate logic, and the objects that it manipulates are pure symbols with no intrinsic meaning. For example, in the Prolog proposition ``likes (jim, baseball)" the constants ``jim" and ``baseball" have no deeper interpretation beyond syntactic identity (i.e., jim = jim). Execution of a Prolog program proceeds by a process called unification, which searches a database of such facts and finds those values that will satisfy a user's query. Unification is based on syntactic identity. Since Prolog tries to find the set of all solutions to a query, during

this search, a program may encounter many dead-ends to explore and then abandon by backtracking to an earlier state and trying a different branch. For complex problems, this search process can become greedy in both space and time, which is the root of Prolog's inefficiency.

In a CLP language, objects that have meaning in an application domain--for example, the integers or the real numbers, with their associated algebraic operations (e.g., addition and multiplication) and predicates (e.g., =, <, and >)--supplement this purely abstract logical framework. Hence, there isn't a single CLP language but a whole family of them defined for different application domains. A CLP programmer introduces arithmetic expressions called constraints (e.g., $X > 0$ or $Y + Z < 15$) into program s, which have to be satisfied for successful execution of the program. (For a more formal explanation of how CLP works, see ``Theme: Prolog," August 1987 BYTE).

In such a CLP system, the simple unification algorithm that lies at the heart of Prolog must be augmented by a dedicated solver for the particular domain of application. The solver can decide at any moment whether the remaining constraints are solvable. For efficiency's sake, solvers for CLP systems need to be incremental so that adding a new constraint to an already solved set does not force them all to be solved a second time. Constraint-solving algorithms are quite well understood from other branches of computing; you'll have used one if you've ever done goal-seeking in your Excel spreadsheet. For example, a useful solver for linear rational constraints is the well-known simplex method.

Another significant way in which CLP differs from Prolog is that it's perfectly happy to do mathematics with uninstantiated variables; therefore, in the absence of

complete information, the answer might be a symbolic expression like 10 - X or even a constraint like X > 23.

Constrained Search

A CLP program still needs to search a database of facts, but it can use constraints to rule out many possible outcomes and prune away large parts of the search tree. The improved efficiency that results is comparable to custom solutions written in C.

Using facts as constraints is to guide reasoning as a key part of everyday common sense. For example, a few minutes ago, a public-relations person called to ask if I'm interested in document management and to alert me to a press briefing next Wednesday in London. A glance at my calendar revealed that I'll be in Cambridge all next Wednesday--end of conversation. We no longer needed to explore my interest (or lack thereof) in document management because an absolute geographical constraint had lopped off that branch. Without such constraints, every little decision might set off an av alanche of philosophical speculation.

Herbert A. Simon, Nobel laureate and theorist of heuristic problem-solving, has used popular word-for-number puzzles to illustrate this pruning process. For example, in the puzzle DONALD + GERALD = ROBERT, there are 3,628,800 possible assignments of digits to letters, and it would take you several years to solve the problem by unconstrained search. Yet most of us can solve it in just minutes by incrementally applying constraints (e.g., T must be even) to rule out more and more options. ``An Eclipse program to solve the DONALD + GERALD = ROBERTWord Puzzle" shows a typical CLP program to solve this puzzle. (Mark Wallace of IC Parc wrote the solution.)

Slaying NP-Hard Dragons

This constrained-search ability makes CLP languages good at precisely those problems that conventional programming techniques find hardest: NP-hard search problems where the time needed for an unconstrained search increases exponentially (or worse) with the problem size.

Consider the simple problem of a commercial harbor that needs to schedule the loading and unloading of 10 ships using only five berths. There are many criteria for choosing the berth for a particular ship: Some berths are too small for some ships, some ships need to be turned around faster than others, some berths cost more than others, ships' intended cargoes are stacked nearer to certain berths, and so on.

You can find the optimal schedule by trying all permutations of ships in berths and calculating the cost of each, which means considering 510 (or around 10 million) alternatives. Assuming that your computer can try an alternative every millisecond, it can solve the whole problem in around 3 minutes. Now imagine it's a decade later, and business has been good and the harbor has expanded to 10 berths, with 20 ships to unload. Determining the optimal schedule now means trying 1020 alternatives, which will take 3000 million years on the same computer (of course, you can a nte up for an accelerator card and cut that to 300 million years).

There are many other problems in planning and scheduling that exhibit this kind of unreasonable scaling behavior for which an exhaustive search is not a feasible strategy. So how do you solve these problems? A naive but tempting approach is to divide the harbor in two and schedule each half using the old program, taking 6 minutes in all. Unfortunately, such a schedule is unlikely to be anywhere near optimal, and worse, you won't even know how far from optimal it is and how much money you are wasting. Actually running the 3000-million-year program for 6

minutes and choosing the cheapest alternative so far would give just as good (or bad) a result.

Where CLP languages score for this class of problem is that you can explicitly employ all the real-world constraints that are particular to the problem and so reduce the search space enormously. In our harbor example, adding a constraint like ``shipLength <berthLength" might immediat ely remove millions of possibilities. Languages like CHIP (Constraint Handling in Prolog) and Eclipse offer direct control over the search strategy (via the ``deleteff" function in the word-puzzle solution). If this still doesn't yield an optimal solution in reasonable time, you must then deploy approximation algorithms to reach a solution that lies close to the optimum with a high degree of probability. Researchers are working hard to integrate algorithms like hill-climbing, simulated annealing, and genetic algorithms into the newer CLP languages.

Don't get the idea that CLP can perform magic. You need a great deal of experience before you can choose the correct algorithms and correct expression of the constraints to get a good solution for big problems. Nevertheless, the interactive nature and highly expressive power of CLP languages makes it easy to experiment with different combinations. This results in much shorter and more maintainable programs than when using a procedural language.

2.3.2 SOLVING A TIMETABLING PROBLEM USING HYBRID GENETIC ALGORITHS

Genetic Algorithms(Gas) are heuristic search algorithms, based upon the principles of Charles Darwin's theory of evolution. The main idea of this theory is 'the survival of the fittest'. Just look at a species, the individuals compete with each other in order to survive. The strong individuals are well adapted to the environment; they have the most offspring, while weak individuals have few or no offspring. In this way, genes from strong individuals spread to an increasing number of individuals, while genes from weak individuals disappear. Offspring from highly fit parents may even be fitter than their parents. Therefore, the species becomes better adapted to the environment as time passes.

Solving a problem can also be understood as a process evolving towards perfect adaptation to an environment. Individuals can be seen as potential solutions, while the environment is the problem to be solved. The GA makes use of this observation by letting a population of solutions evolve towards a solution of the problem. Primitive selection mechanisms and genetic operators, crossovers and mutations, are used for this process. The crossover operator recombines a pair of solutions into two new solutions, while the mutation operator alters a single solution. The strong individuals are selected for reproduction. Then offspring are created by means of the genetic operators, and finally, weak individuals are replaced by the new individuals. This process of natural selection is based upon a fitness-function that evaluates the quality individuals 9 solutions) receive a higher fitness, resulting in a greater chance of getting selected for reproduction.

2.3.3 THE GRAPH COLOURING TECHNIQUE

The timetable problem may be expressed in terms of graphs. This is possible because certain techniques and algorithms used in graph colouring may be reinterpreted as timetable algorithms.

Bondy and Murty defines a graph G as an ordered triple (V(G), E(G), $\sim_G$) consisting of a non-empty set V(G) of vertices, a set E(G), disjoint from V(G), of edges, and an incidence function $\sim_G$ that associates with each edge of G an unordered pair (not necessarily distinct) vertices of G. The events (subjects) are represented by the vertices of the graph, and a pair of vertices are joined by an undirected edge if and only if corresponding subjects cannot take place at the same time. Scheduling the events subject to the constraint is therefore equivalent to colouring the corresponding graph such that no two adjacent vertices are of the same colour.

Unfortunately, good and efficient algorithms for colouring the vertices are not found in the literature. An exact method has been proposed by Randal-Brown and a heuristic method to improve this method has been proposed by Brelaz. They are, however, not practical for timetable with complex requirements. Moreduling events, for other factors have to be considered, e.g. lecturers may not want to teach more than two hours at a stretch.

2.3.4 Last A Comparison of GA-based Methods and Graph-Colouring Methods for solving the Timetabling Problem

Introduction

A simple timetabling problem could be described very easily. Let us consider a number of *events* E, a number of possible *slots* S, and a set C of *constraints* between the events of the type ``Event X must not happen in the same slot as Event Y". In other words, the purpose is to arrange all the events into the slots in such a way that the constrained events are not assigned to the same slot. This problem is quite interesting in operations research due to the fact that has a lot of practical applications. For example, the scheduling of examinations for students; the scheduling of classes, teachers and rooms in a university; and the scheduling of business meetings or congress conferences among many others.

It has been shown that this problem falls into the class of NP-complete problems, that is that no polynomial bounded algorithm is known yet for finding an optimal solution for all the possible instances of the problem. However, several different approaches have been applied to solve the problem. Among those, genetic algorithms (GA), which are methods of search and optimization based on the principles of natural evolution, have been found to produce very satisfactory results for instances of moderate and realistic size.

Another possible approach is to consider the events as a set of vertices E representing the *events*, and a set C of binary *constraints*, expressed as edges and then apply some of the known simple graph colouring algorithms for colouring the vertices in such a way that no two adjacent vertices have the same colour. Both approaches were compared with respect to the number of constraint checks done in each approach after generating a set of random graphs with different number of vertices and a wide range

of percentage of connectivity. Other experiments were performed in order to try other variations of the parameters of the genetic algorithm and to determine which set is the best; and finally, other types of constraints were also considered in the last experiment, particularly the *near-clash* constraint in which events with an edge constraint and assigned to different slots should be as separated as possible. Other types of constraints are: *Ordering* in which one event must happen before a set of N other events; *Exclusion* in which an event must not happen in any of N given slots; and *Specification* which establishes that an event must happen in a given slot.

The article is organized in the following way: Section 2 gives a brief description of the approaches used and section 3 describes the experiments and results obtained. Finally, section 4 summarizes the final conclusions.

Approaches used

The PGA, which is a a testbed for problem solving using genetic algorithms was used for running the genetic algorithms over the randomly generated graphs.

The conventional algorithm used were the Brelaz Algorithm and the greedy algorithm, that, according to the work reported in the literature, are among the most widely used algorithms for solving graph colouring problems.

Their characteristics can be summarized as follows:

For the PGA:

The representation of the chromosome used in PGA is of the form *abcde* where event 0 is put in slot *a*, event 1 in slot *b*, and so on.

The evaluation function is

$$f(c) = \frac{1}{1 + (\sum w_i m_i) << 55 >}$$

where c is a chromosome, m_i is the number of instances of a constraint violation of type i and w_i are the weights for each type of violation.

For the conventional algorithms:

The greedy algorithm is based on the *largest degree* heuristic, which orders the vertices by degree, that is, by the number of adjacencies of each vertex, and assigns the lowest numbered available colour to the vertex with the largest degree; and the Brelaz Algorithm based on the combination of the *largest degree* heuristic and the *colour degree* heuristic which looks for a vertex which has the largest number of colours used to colour its adjacent vertices.

Experiments and Results

Five different experiments were performed throughout the development of this investigation.

Experiment 1 has as purpose to compare the genetic algorithm with a fixed set of parameters and without any problem-specific knowledge, against the greedy and Brelaz algorithms with respect to the number of constraint checks. The constraints included in each tested file are only of the edge type. The files used in this experiment were those with 10, 20, 30, 40, 50, 60, 70, 80, and 90 vertices and with a different percentage of connectivity. Results show that the conventional algorithms generate a much smaller number of constraint checks than the genetic algorithm. The solutions produced by the genetic algorithm are not optimal for some cases, specially for files with more than 30 vertices and highly constrained.

Based on the results of experiment 1, the goal of experiment 2 is to compare the number of constraint checks and the quality of the solutions produced by the genetic algorithm used in experiment 1 against the same genetic algorithm but with some

parameters changed. Some parameters were changed in the genetic algorithm in order to add the concept of smart mutation with the options *E*and *S*which basically *E*refers to the way the event to be mutated is chosen (random, using roulette wheel, or tournament) and *S*indicates the way the new slot for that event is generated (random, choosing a free slot for that event, or using tournament). Even though the changing of the parameters certainly reduces the number of constraint checks produced in experiment 1, the quality of the solutions is not as good. It was found that the number of constraint violations produced was higher than that produced in experiment 1.

Given a graph $G = (V, E)$with a set $V$of vertices and a set $E$of edges, a *clique* is a subset of those vertices in which there exists an edge between any pair of vertices of that subset. Once that a maximal clique is discovered in each of the graphs to be tested using a predicate in prolog, experiment 3 investigates the effect in the number of constraint checks, when gathering the elements forming the clique at the beginning of the chromosome in order to avoid the rupture of the clique. After experimenting with different options in the parameters of the PGA and with several sets of random files it was found that the modification did not produce any drastic reduction (nor increase either) in the number of constraint checks. As an extension to experiment 3, in the sense that once the maximal clique and its size is found for each graph, experiment 4 works with the idea of colouring the elements of the clique with different colours in the initial population. After comparing the results obtained by doing this modification against those results produced in experiment 1, it is clear that the number of constraint checks drops very dramatically. By introducing smart mutation and one-point crossover the number of constraint checks is reduced further up to 99% in some cases.

Experiment 5 considers, in addition to the edge-type constraint, the *near-clash* constraint as well. The *near-clash* constraint consists of placing the events as separated as possible. It compares mainly the quality of solutions generated by the Brelaz algorithm and the number of constraint violations after a heuristic for solving the TSP (Traveling Salesman Problem) is used to rearrange the slots in such a way that the total number of violations is minimum.

Conclusions

The intention of the work presented in this article is mainly related to comparing the performance of genetic algorithms and conventional algorithms, specifically the Brelaz and Greedy algorithms, for solving the timetabling problem over a set of randomly generated problems. An additional objective was to compare the performance of the pure genetic algorithm itself, by varying some of the parameters and applying certain heuristics in order to conclude which particular set of parameters and/or heuristic works better for solving the problem. The main criteria of comparison in all experiments was the number of constraint checks that each algorithm does for a given problem.

Results in experiment 1 showed that the conventional algorithms produce a reduced number of constraint checks when compared against the genetic algorithm and testing for graphs with only edge constraints. Results obtained after adding smart mutation to the parameters of the PGA and performing experiment 2, that the number of constraint checks was reduced if compared against those produced by the genetic algorithm in experiment 1. However, the number of constraint violations in the results produced in experiment 2 was higher in general. The inclusion of the concept of *clique* in the random graphs by putting the elements forming it together at the initial

positions in the chromosome was relevant in the number of constraint checks only if the events were coloured with different colours as was done in experiment 4. If this is not done, as results drawn from experiment 3 show, the number of constraint checks is not affected. Experiment 5 shows that the addition of new constraint starts to produce a bad effect in the performance of the conventional algorithms, more specifically in the Brelaz given that a number of violated constraints is produced in the solutions after arranging the slots using a heuristic for solving the TSP.

Chapter 3 REQUIREMENT ANALYSIS

3.1 Development System Methodology

Rapid Application Development - Development Methodology

The traditional software development cycle follows a rigid sequence of steps with a formal sign-off at the completion of each. A complete, detailed requirements analysis is done that attempts to capture the system requirements in a Requirements Specification. Users are forced to "sign-off" on the specification before development proceeds to the next step. This is followed by a complete system design and then development and testing.

But, what if the design phase uncovers requirements that are technically unfeasible, or extremely expensive to implement? What if errors in the design are encountered during the build phase? The elapsed time between the initial analysis and testing is usually a period of several months. What if business requirements or priorities change or the users realize they overlooked critical needs during the analysis phase? These are many of the reasons why software development projects either fail or don't meet the user's expectations when delivered.

RAD is a methodology for compressing the analysis, design, build, and test phases into a series of short, iterative development cycles. This has a number of distinct advantages over the traditional sequential development model. Iteration allows for effectiveness and self-correction. Studies have shown that human beings almost never perform a complex task correctly the first time. However, people are

extremely good at making an adequate beginning and then making many small refinements and improvements. We should encourage and exploit this rather than fight it.

RAD projects are typically staffed with small integrated teams comprised of developers, end users, and IT technical resources. Small teams, combined with short, iterative development cycles optimizes speed, unity of vision and purpose, effective informal communication and simple project management.

An important, fundamental principle of iterative development is that each iteration delivers a functional version of the final system. It is a properly engineered, fully working portion of the final system and is not the same as a prototype. For example, the first iteration might deliver 100% of 10%, the second iteration 100% of 25%, etc

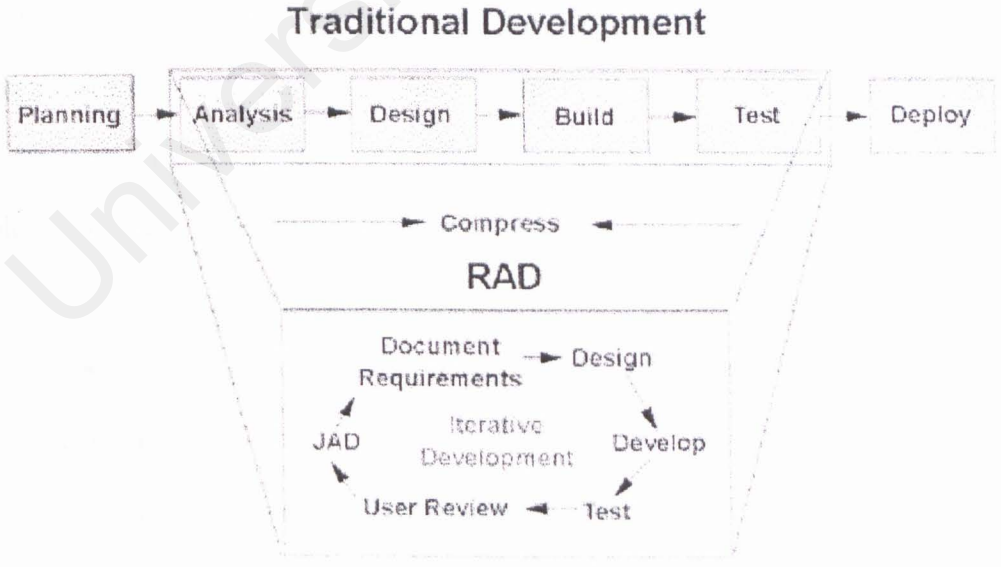

Figure 3.1 Comparison of RAD and traditional development

3.2 Gathering Information Technique

Software process data is gathered to learn how to make process improvements. The principles of successful data gathering are: The data is gathered with a specific objective; the choice of data is based on a model of the process being examined; the data gathering process itself is defined and managed, it is tailored to the needs of the organization, and it must have management support.

Among the technique used to define information requirements in the problem are: investigating hard data, interviewing, questionnaires, searching internet and reading. This is to understand what information users need to perform their jobs. The details of current system functions are needed to know: the who (the people who are involved), what (the activity), where (the environment in which the work takes place), when (the timing), and how the current procedures are performed) of the business under study. The reason using the current methods should be considered when designing any new system. However, if the reason for current operations is that "It's always been done that way", then the procedures should be improved. After the completion of this phase, the system functions and complete information on the people, goals, data, and procedures involved are gained.

Reading

- Books, encyclopedias, journals and dissertations

Surfing Internet

- there is a wealth of information on the Internet.

Search engine – Yahoo, Alta Vista, Britannica.com, Google, Direct Hit, dot com directory, NorthernLight, HotBot

Interviewing

- We cannot find the answers if we do not have the data. Interviewing skills are essential for gathering key data from people.
- Get the opinions of the interviewee and his or her feelings about the current state of the system, organizational and personal goals, and informal procedures.
    - Opinions may be more important and more revealing than facts.
    - To understand the organization's culture more fully by listening to the feelings of the respondent.
    - to find out as many of its goals as possible form interviewing.

Investigating hard data

- hard data reveal where the organization has been and where its members believe it is going. They include examination timetable samples and data capture forms.

3.3 Requirement Analysis

3.3.1 Functional Requirements

Functional requirements are called behavioral or operational requirement. Functional requirements define precisely what inputs are expected by the software, what outputs will be generated by the software, and the details of relationships that exist between those inputs and outputs. In short, functional requirements describe all aspects of interfaces between the software and its environment (that is, hardware, humans, and other software).

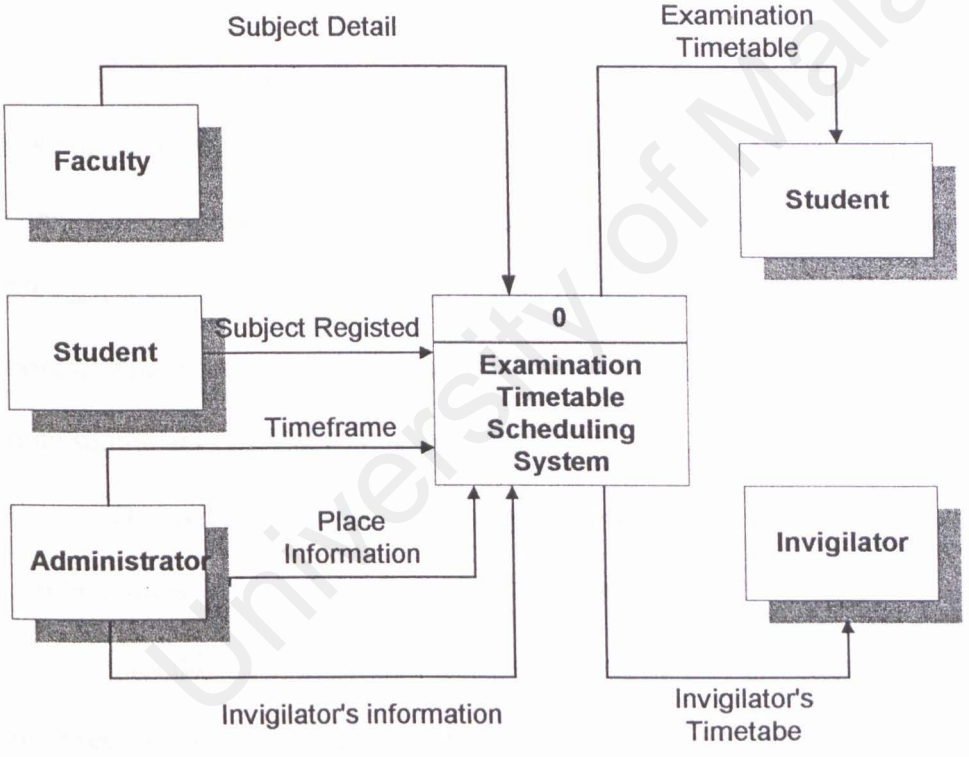

Figure 3.3 ETSS Context Diagram

3.3.2 Nonfunctional requirement

The nonfunctional requirement define the attributes of the system as it performs its job. They include a complete description of the system's required levels of efficiency, reliability, security, maintainability, portability, visibility, capacity, and standards compliance and so on.

This system requires high reliability of software that to behave consistently in a user-acceptable manner when subjected to an environment in which it was intended to be used.

Software efficiency refers to the level at which the software uses scarce system resources. Types of scarce resources include machine cycles (timing constraints), memory, disk space, buffers, and communication channels. Because of ETSS is a stand-alone system and it only interfaces with the outside world through its host computer and perhaps a user, then usually machine cycles and memory are the only significant efficiency considerations.

The system needs human engineering that to be the ease with which software can be requested to do jobs for which it was intended.

Testability, understandability, and modifiability are closely related. Specifying required levels of cohesion and coupling in the design is probably the best the industry has to offer at this point. Cohesion should be expressed as minimally acceptable for any one module and a minimally acceptable average for all modules in the design. Coupling should be expressed as maximally acceptable for any pair of modules and a maximally acceptable average for all pairs of modules in the design.

Certain languages are also inherently more understandable and thus more maintainable and modifiable. There is certainly a great deal of controversy concerning which languages fit into which categories, but most people agree that in general the higher the language, the easier it is to understand, modify, and maintain. "Higher" means that building blocks, primitive operations, control structures, and data types are closer to the application and further from the underlying machine. ;in addition some languages enable us easily to construct abstractions from available primitive elements and thus raise the effective level of the language.

Finally, specifying conformity to a previously written and approved set of programming standards. These standards should include, at a minimum:

Naming conventions

components

data

Invocation conventions

calling

interrupts

synchronization

message formats

Component header

format

content

In-line documentation style

Use of control constructs

Use of global/common variables

Use of named constants

Modularity standards

3.4 Programming Language

Visual Basic as a Microsoft Windows programming language. visual Basic programs are created in an Integrated Development Environment(IDE). The IDE allows the programmer to create, run and debug Visual Basic programs conveniently. IDE allows the programmer to create working programs in a fraction of the time that it would normally take to code programs without using IDEs. The process of rapidly creating an application is typically referred to as Rapid Application Development (RAD). Visual Basic is the world's most widely used RAD language.

Visual Basic is derived from the BASIC programming language. visual basic is a distinctly different language providing powerful features such as graphical user interfaces, event handling, access to the Win32 API, object-oriented features, error handling, structured programming, and much more.

Microsoft provides several versions of Visual Basic, namely the Learning Edition, the Professional Edition and the Enterprise Edition. The learning Edition provides fundamental programming capabilities. The Professional Edition provides a much richer set of programming capabilities than the Learning Edition and is the choice of many programmers to write Visual Basic applications. The Enterprise Edition is used for developing large-scale computing systems that meet the needs of substantial organizations

Visual basic is an interpreted language. however, the professional and enterprise edition allows visual basic code to be compiled to native code (i.e., machine language code). For this versions, it can produces .exe files and standalone. For earlier versions(4^{th} and earlier) all VB/Win programs must be distributed with the

VBRUNx00.DLL file (where x is the major version number). This DLL must accompany all VB/Win programs for these early versions, but only one such file should reside on every system where VB programs are used. The EXE file is not a real binary executable, but a binary is encapsulating the application which is in the form of so-called pseudocode.

The popularity and the poser of Visual Basic 6.0 also is the main reason I chose to use it. *Profit* by Microsoft was written mostly in Visual Basic. Most of the current version of Quicken was written in VB2. The viewer/launcher/installer in the oh-so-popular Way Cool [Topic] for Windows series of CD-ROMs was written in VB3. *Microsoft Project* was also developed in VB.

The award winning web page editor Hot Dog from Sausage Software (http://www.sausage.com) was written in VB.

Microsoft uses VB extensively for smaller utilities. 3 of the small apps in the Windows and Windows for Workgroups Resource Toolkits are written in VB. Also, if you have the Microsoft Bookshelf CD-ROM, you will notice that the MVOPTION.EXE program, which is an "options" program for MS Viewer, is created in VB.

Chapter 4: SYSTEM DESIGN

4.1 Preface

In this system design phase, we uses the information collected earlier to accomplish the logical design of the system.

Part of logical design of the information system is devising the user interface. The interface connects the user with the system and is thus extremely important.

The design phase also includes designing databases that will store much of the data need by decision makers in the organization. A well-organized database is the basis for all systems.

Finally, the analyst must design controls and backup procedures to protect the system and the data and to produce program design.

4.2 Database Design

A database is a self-describing collection of integrated records. It is self-describing because it contains a description of itself in a data dictionary. A data dictionary is also known as a data directory or metadata. A database is a collection of integrated records because the relationships among the records are stored in the database. This arrangement enables the DBMS to construct even complicated objects by combining data on the basis of the stored relationships. Relationships are often stored in overhead data. Thus, the three parts of database are the application data, the data dictionary, and the overhead data.

For a database to be effective, it's structure must logically reflect the users' view of their world. Of course, once the users' requirements have been modeled, they must be translated into a database design that accurately represents this model.

Table 4.1 Subject

Field No.	Field Name	Description	Field Type	Length
1	*SubjectCode	Subject code	Text	20
2	SubjectDescription	Subject description	Text	50
3	VenueCode	Venue code	Text	10
4	Date	Date	Date	Short date
5	Time	Time	Time	Short time
6	Enrollment	Enrollment	Text	10
7	Type	Type	Text	10
8	Offered	Offered in this semester	Yes/No	
9	Faculty	Faculty	Text	50
10	Status	Either specified by users or automated by computer	Yes/No	
11	RandomNumber	Random number	Number	Long Integer
12	GroupCode	Group code	Text	4
13	Accept	Check for group code	Yes/No	

Table 4.2 Venue

Field No.	Field Name	Description	Field Type	Length
1	*VenueCode	Venue code	Text	10
2	VenueDescription	Venue description	Text	50
3	Capacity	Capacity	Text	5
4	Used	Used space	Text	5
5	Status	Either specified by users or automated by computer	Yes/No	Short time

Table 4.3 Invigilator

Field No.	Field Name	Description	Field Type	Length
1	*InvigilatorCode	Invigilator code	Text	10
2	InvigilatorName	Invigilator description	Text	50

Table 4.4 subjectInvigilator

Field No.	Field Name	Description	Field Type	Length
1	*SubjectCode	Subject code	Text	10
2	*InvigilatorCode	Invigilator code	Text	10

Table 4.5 User

Field No.	Field Name	Description	Field Type	Length
1	*UserName	User name	Text	50
2	Password	Password	Text	50

Table 4.6 Faculty

Field No.	Field Name	Description	Field Type	Length
1	Faculty	Faculty	Text	50

Table 4.7 fridaySection

Field No.	Field Name	Description	Field Type	Length
1	FridaySection	Friday section	Time	Short Time

Table 4.8 section

Field No.	Field Name	Description	Field Type	Length
1	Section	Section	Time	Short Time

Table 4.9 holiday

Field No.	Field Name	Description	Field Type	Length
1	Holiday	Holiday	Date	Date

Table 4.10 range

Field No.	Field Name	Description	Field Type	Length
1	Day	Day	Date	Date
2	Time	Time	Time	Time

Table 4.11 specialDay

Field No.	Field Name	Description	Field Type	Length
1	Faculty	Faculty	Text	50

- **Primary key**

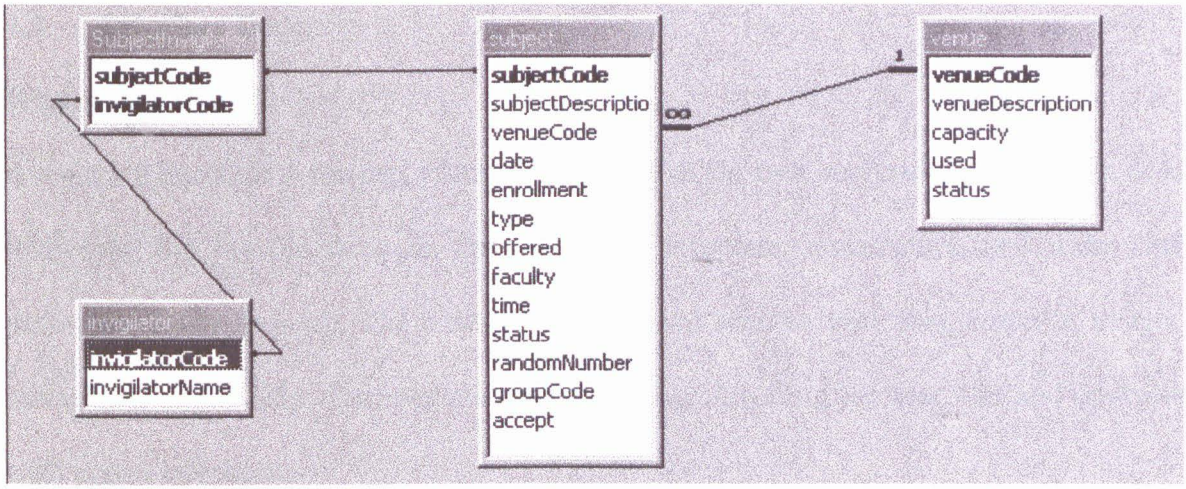

Figure 4.1 Relationship

4.3 Interface Design

What is interface?

A software interface is the part of an application that the user sees and interacts with. It is related to, but not the same as, the underlying structure, architecture, and codes that makes the software work. The interface includes the screens, windows, controls, menus, metaphors, online help, documentation, and training. Anything the user sees and interacts with is part interfaces.

Below are the main graphic user interface designs:

This is a splash screen

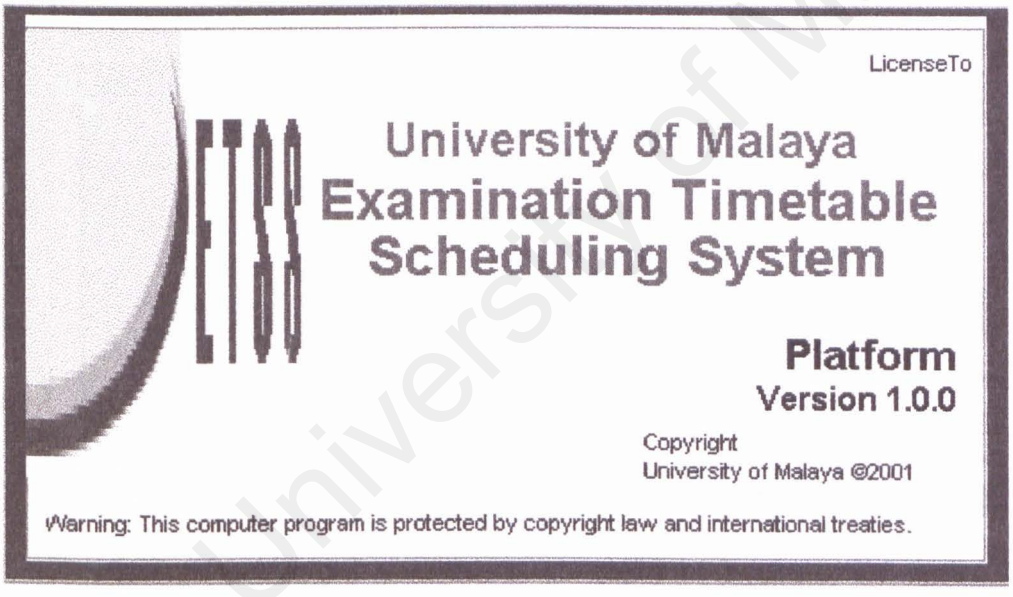

Figure 4.2 Splash Screen

This menu bar is the main point for accessing the data point for accessing the data entry/edit screens, like setup screens, file screens and set criteria screen. The menu bar can be seen in every screen shot except splash screen and user login screen.

Figure 4.3 menu bar

This screen shows a venue's summary information and is a gateway to screens where the specific venue data can be input or edited.

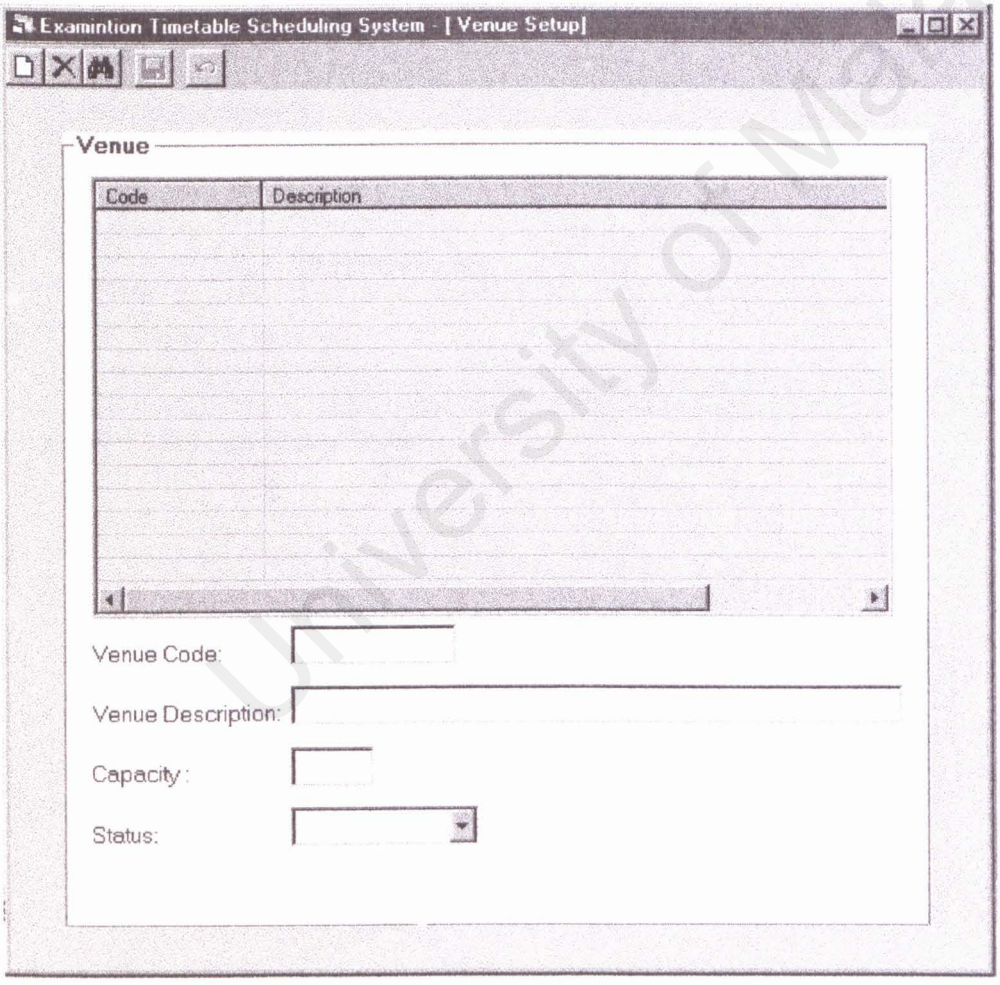

Figure 4.4 Venue Setup Screen

This screen shows a subject's summary information and is a gateway to screens where the specific subject data can be input or edited.

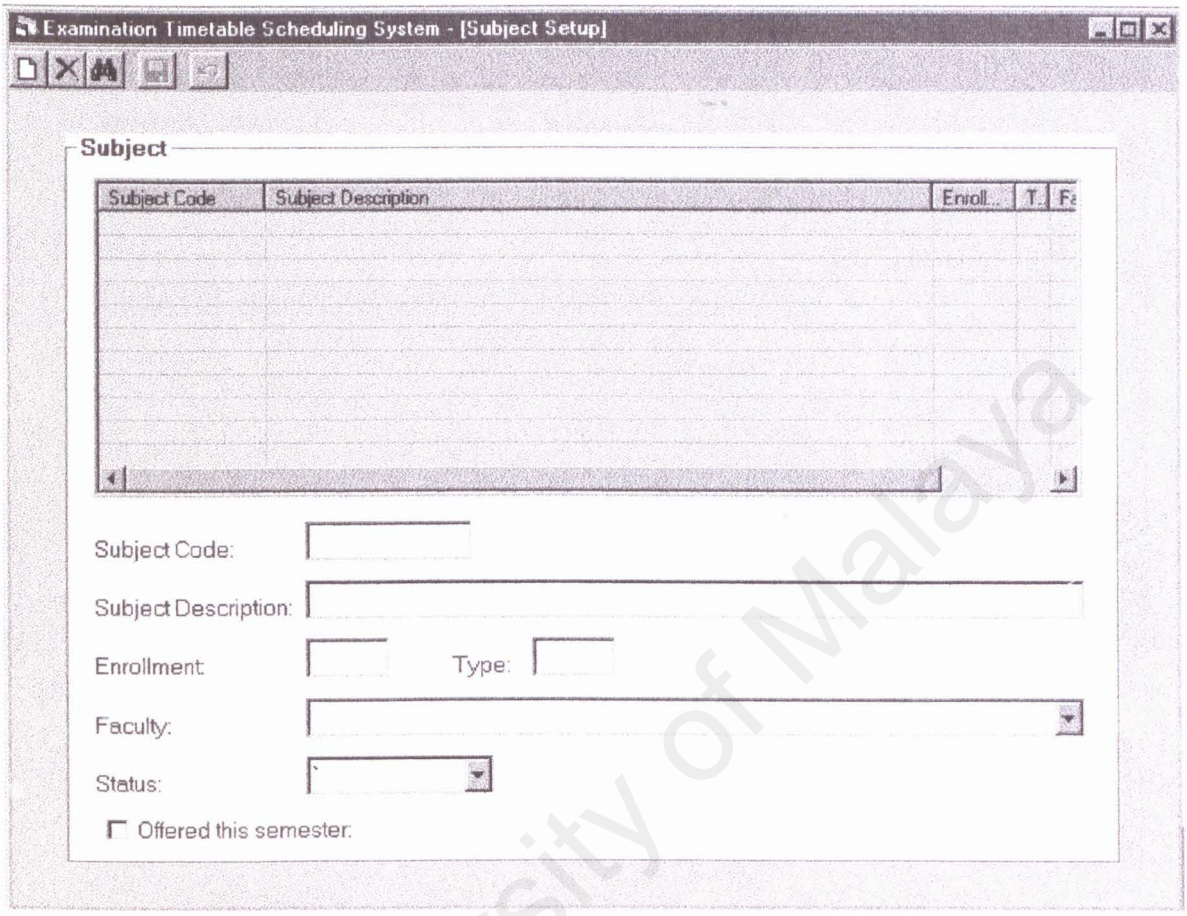

Figure 4.5 Subject Setup Screen

This screen is to inquiry what are the subjects that the invigilator in-charged.

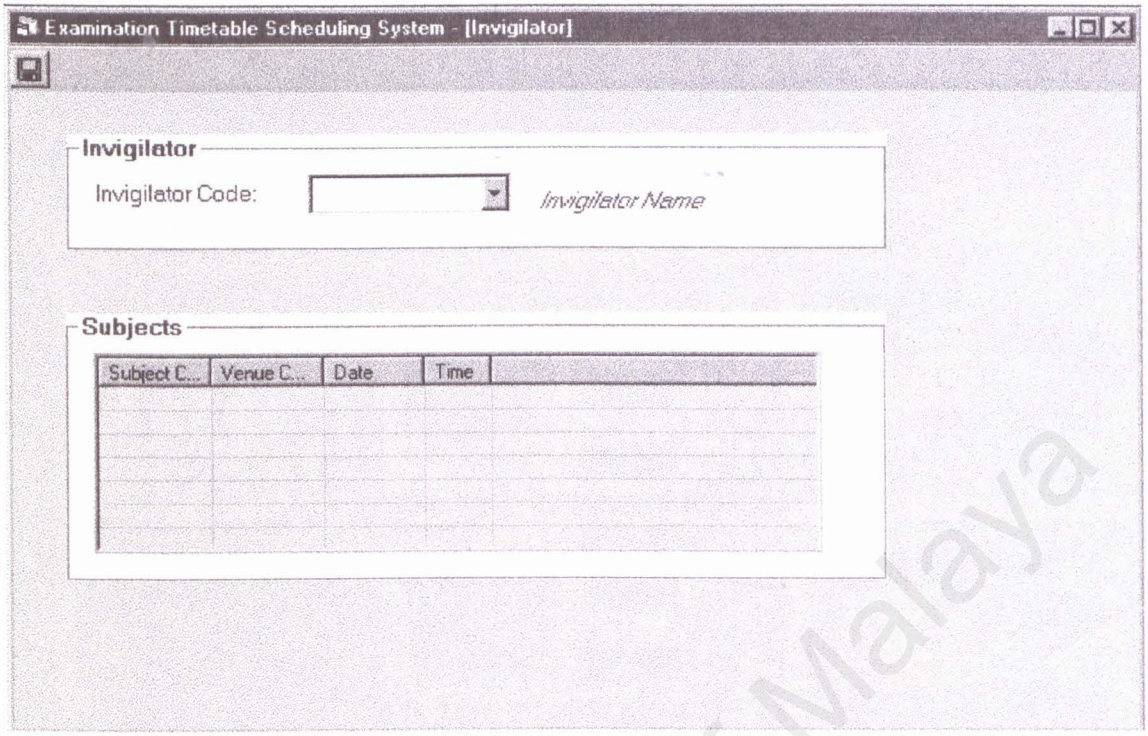

Figure 4.6 Invigilator Query Screen

This screen shows a examination timeframe information and is a gateway to screens where the data can be input or edited.

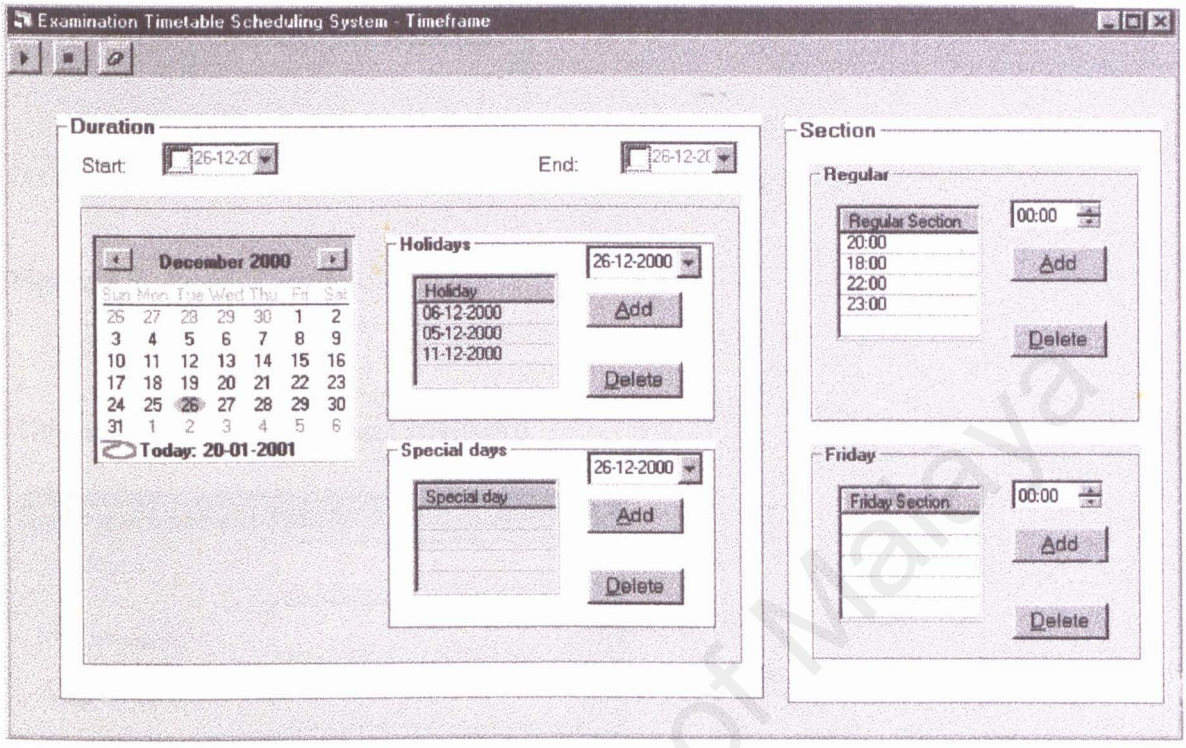

Figure 4.7 Set Criteria Screen

This screen is to login to the system.

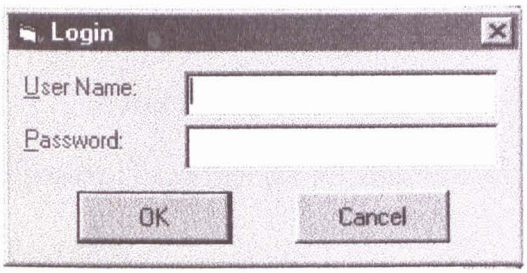

Figure 4.8 Login Screen

This screen is to change login password.

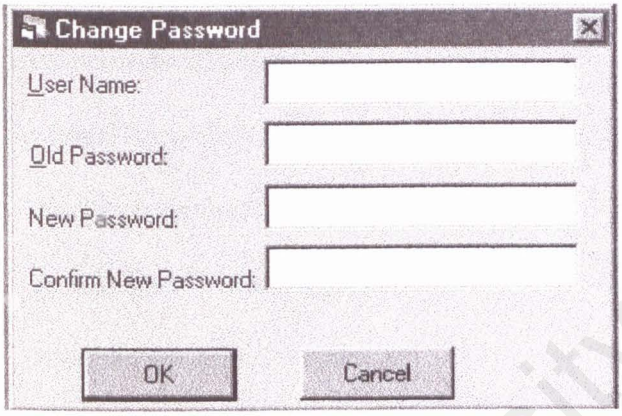

Figure 4.9 Change Password Screen

4.4 Program Design

Algorithm Design

Assigning resources optimally is the most important for ETSS. There are three algorithm used that are timeframe algorithm, auto number algorithm and random number algorithm.

1. Auto Number Algorithm

Purpose: assign a unique number to every subject

```
maxSubject = 1
open recordset(subject)
Do Until recordset(subject). EOF
   Randomnumber(subject) = maxSubject
   maxSubject = maxSubject + 1
   recordset(subject).movenext;
 Loop
Recordset(subject).update
```

2. Timeframe Algorithm

Purpose: set the timeframe for examination timetable

```
Open recordset(timeframe)
range = endDay – startDay
For i = 0 To range
ValidateDay = true
   If recordset(Holiday).RecordCount > 0 Then
      Do While Not recordset(Holiday).EOF
```

```
        If startDay = recordset(Holiday)field(holiday) Then
          Exit Do
        End If
        Recordset(Holiday).MoveNext
      Loop
    End If
    If validateDay Then
      Do While Not recordset(Section).EOF
        Recordset(timeframe)field(day) = startDay
        Recordset(timeframe)field(time) = recordset(section)field(section)
        Recordset(Section).MoveNext
      Loop
    End If
    startDay = startDay + 1
  Next i
```

Random Number Algorithm

Purpose: assign subject to the suitable time, venue and invigilator

```
Randomize  ' Initialize random-number generator.
Recordset(timeframe).open
count = 0
Do While count < maxSubject
  Do While Not rsvenue.EOF
    capacity = rsvenue("capacity")
    enrollmentTotal = 0
```

```
While enrollmentTotal < recordset(venue)field(capacity)
' Generate random value between 1 and max.
  randomNumber = Int(((maxSubject - 1) * Rnd) + 1)
  If IsNull(recordset(Subject)field(date)) Then
     'check subject group
     fncGroupSubject
     enrollment = recordset(subject)field(enrollment)
     enrollmentTotal = enrollmentTotal + enrollment
     recordset(Subject)field(Date) = recordset(Timeframe)field(day)
     recordset(Subject)field(Time) = recordset(Timeframe)field(time)
     count = count + 1
  End If

  Recordset(Subjec)t.MoveNext
 Wend
Recordset(venue).MoveNext
Loop
Recordset(Timeframe).MoveNext
Loop
```

CHAPTER 5 : SYSTEM IMPLEMENTATIONS

5.1 Introduction

System implementation is the physical realization of the database and application designs. On completion of the design stages, we are now in a position to implement the database and the applications. The translation process continues into machine code – the actual instruction that drives micro-coded logic in the central processing unit (CPU).

5.2 Development Environment

In development of a system, using the suitable hardware and software will help to speed up the entire system development. In below is the hardware and software tools used to develop and documented the entire system.

5.2.1 Hardware Configuration

Hardware Component	Description
Processor	Pentium II
Memory	32 MB

5.2.2 Software Tools for ETSS Development

Software	Module	Description
Microsoft Access 97	Database	Build the database to store and manipulate the data.
Visual Basic 6.0	Interface Design	Interface Design
Crystal Report	Report	View or Print all the examination timetable
Microsoft word 97	Documentation	Writing documentation

5.3 Programming Guidelines

to ensure software quality, there should be proper guidelines for selecting appropriate control structures, algorithms and data structures.

5.3.1 Control Structures

Control structures for a module are often preserved as the design is translated to code. Program structure should reflect the design's control structure. Program structure reflect the design's control structure. Code is written so that one can read a component easily from the top down and do not have to skip through the code. For example, I avoid to use goto statement.

Using parameter names and comments to exhibit coupling among components while I am writing my programs.

5.3.2 Algorithms

An algorithm is a sequence of steps to process a particular task. Performance is important in this application. That means, algorithms must be efficient. It also be necessary to balance execution time considerations with design quality, standards, and customer requirements. That means, I do not sacrifice clarity and correctness for speed.

5.3.3 Other guidelines

- Use meaningful variables and label names.
- Indent the source codes by functional segments

5.4 Summary

It is important to have a direct correspondence between program design components and program code components. Design characteristics, such as low coupling, high cohesion, and well-defined interfaces. Should be incorporated so that algorithms, functions, interfaces, and data structures can be traced easily from design to code and vice versa. Although the general purpose of the system may remain the same throughout the software's lifetime, its nature may change over time as customers perform enhancements and modifications.

CHATER 6 – TESTING

6.1 Introduction

All of the system's newly written or modified application programs must be tested thoroughly. Haphazard, trial-and-error testing will not suffice.

Testing is done throughout systems development, not just at the end. It is meant to turn up here to before unknown problems, not to demonstrate the perfection of programs, manuals, or equipment.

There are four objectives of testing. They are error detection, error removal, error tracking and regression testing. Error detection involves identifying errors. Error removal involves debugging and other strategies for identifying where the error occurs in the code, the process necessary to identify what in the code causes the error, and removing it Whenever an error has occurred anywhere in the software, it means that someone or something has failed. It is as important to find and correct the cause of the error as it is to fix the error itself. This is called error tracking. R rework to the code actually fixes the error, fixes it in one place and breaks it in another, or breaks the code in other places without actually fixing it at the point in the software where the fix was attempted.

6.2 Unit Testing

Unit testing focuses verification effort on the smallest unit of software design-the software component or module. Using the component-level design description as a guide, important control paths are tested to uncover errors within the boundary of the module. The relative complexity of tests and uncovered errors is limited by the constrained scope established for unit testing,.

They are many types of unit testing, e.g. ad hoc testing, white box testing black box testing. However, I use white box testing.

When using white box testing, I am involved directly with the structure of the code within a module or code segment. Code coverage is defined in terms of six types. Loop coverage is also part of white box testing.

Segment Coverage Each segment of code between control structures is executed at least once.

Branch Coverage or Node Testing each branch in the code is taken in each possible direction at least once.

Compound Condition Coverage when there are multiple conditions such as $(0 < x < 100)$ OR $(150 < x < 200)$ AND $(Y > 0)$

I test not only each direction, but also each possible combination of conditions, which is usually done by using a "truth table."

Basis Path Testing Each independent path through the code is taken in a predetermined order.

Data Flow Testing This approach is an attempt to find an analyzable, repeatable strategy that lies between basis path testing and full path testing. In this approach, I track specific variables through each possible calculation, thus defining a set of intermediate paths through the code, i.e., those based on each piece of data chosen to be tracked.

Data flow testing does tend to reflect dependencies, but it is mainly through sequences of data manipulations. This approach tends to uncover anomalies such as variables that are "used, but not initialized, " "declared, but not used, " and so on. It is not used to show how to package data usage to minimize dependencies among them, just as path testing is not used to package control structures with code segments to minimize dependencies. This dependency analysis strategy seems to be wholly absent from both software development concepts and software testing concepts.

Path Testing Path testing is where all possible paths through the code are defined and covered.

Loop Testing addition to these coverage measures, there are testing strategies based on loop testing. These strategies relate to testing single loops (WHILE loops, REPEAT-UNTIL loops, and FOR loops), concatenated loops(sequences of loops), and nested loops (one or more loops inside another loop). Loops are fairly simple to test unless dependencies exist among the loops or between a loop and the code it contains. In that case, the number of permutations of tests approaches infinity.

6.3 Integration Testing

Integration testing is a systematic technique for constructing the program structure while at the same time conducting tests to uncover errors associated with interfacing. The objective is to take unit tested components and build a program structure that has been dictated by design.

Top-down integration

Top-down integration testing is an incremental approach to construction of program structure. Modules are integrated by moving downward through the control hierarchy, beginning with the main control module (main program). Modules subordinate(and ultimately subordinate) to the main control module are incorporated into the structure in either a depth-first or breadth-first manner.

Referring to *Figure 6.1*, depth-first integration would integrate all components on a major control path of the structure. Selection of a major path is somewhat arbitrary and depends on application-specific characteristics. For example, selecting the left-hand path, component M_1, M_2, M_5 could be integrated first. Next, M_8 or (if necessary for proper functioning of M_2) M_6would be integrated. Then , the central and right-hand control paths are built. Breadth-first integration incorporates all components directly subordinate at each level, moving across the structure horizontally. From the figure, components M_2, M_3 and M_4 (a replacement for stub S_4) would be integrated first. The next control level, M_5, M_6 and so on, follows.

The integration process is performed in a series of five steps:

1. The main control module is used as a test driver and stubs are substituted for all components directly subordinate to the main control module.
2. Depending on the integration approach selected (i.e., depth or breadth first), subordinate stubs are replaced one at a time with actual components.
3. Tests are conducted as each component is integrated.
4. On completion of each set of tests, another stub is replaced with the real component.
5. Regression testing may be conducted to ensure that new errors have not been introduced.

The process continues from step 2 until the entire program structure is built.

The top-down integration strategy verifies major control or decision points early in the test process. Decision making occurs at upper levels in the hierarchy and is therefore encountered first. If major control problems do exist, early recognition is essential. If depth-first integration is selected, a complete function of the software may be implemented and demonstrated.

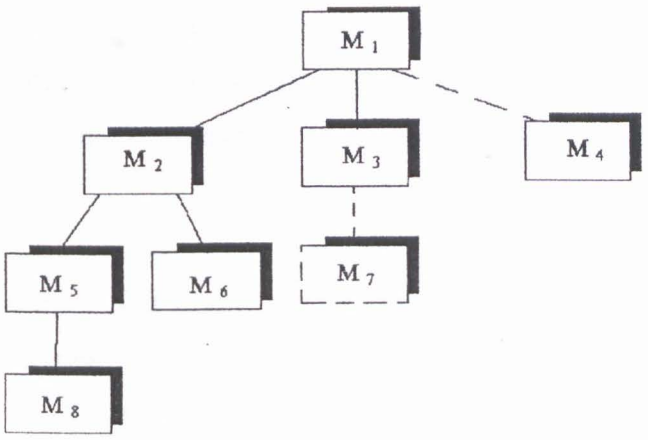

Figure 6.1

6.4 System Testing

System testing is a series of different tests whose primary purpose is to fully exercise the computer-based system. Although each test has a different purpose, all work to verify that system elements have been properly integrated and perform allocated functions.

6.5 Summary

Successful testing will result in quality software – software with fewer errors and which work according to specification and performance requirements. It will lead to dependable and reliable software.

CHAPTER 7 : SYSTEM EVALUATION

7.1 Introduction

Upon the completion of the project, the system's strength and limitation were evaluated. By comparing with the requirement specification, the system built has certain strengths and limitations. The following section explains in detail about this. Besides, suggestion for future enhancement has been written in the following section.

7.2 Problem Encountered and Solutions

7.2.1 Difficulties in Determining the Appropriate Development Tools

There are many development tools available in the market choosing a suitable tool was a critical process as all tools have their strengths and weaknesses. The availability of a technology or tool, its learning curve and hardware and software requirements for running the tool were major considerations during the stage to select or appropriate tool.

To solve this problem, advises and views from lecturers, course mates and seniors were sought. Besides, a great deal of reading and research from the internet and books regarding the matter also helped to clarify some doubts.

7.2.2 Difficulties in Programming

Most of the programming problems were encountered in the early stage of project development. The main reasons for this is that there was no prior knowledge of Visual Basic, SQL queries, codes and using the chosen development tools proficiently. As the project development goes on, most of these problems are solved due to better understanding and monitoring of the languages and tools through frequent use of the languages and tools, try and error way of experimentation with the languages of tools and exchanging knowledge within experienced friends. Microsoft MSDN Library for Visual Studio 6.0 is found to be very helpful resource for application development using products from Microsoft Visual Studio 6.0 family.

7.3 System Strengths

- **Simple and User-friendly Interface**

This ETSS is designed on the principal for ease to use. As such, GUI features have been integrated into the system allowing the use of usual object to navigate through the system. The learning curve is foreseen to be short and a user should be able to use the system with ease within minutes.

- **Login Name and Password**

The ETSS is a password-protected site for all the user. By giving authorized user a login name and password, unauthorized users are prohibited from accessing the records stored in the database.

- **System Transparency**

System transparency refers to the condition where the users do not need to know where the databases reside, how is the system structure, its database management system and anything related to the system built.

- **Validation on Input Data**

The system was developed to be robust enough to be robust enough to handle any invalid input into the system. Error messages will be displayed to guide the user whenever an invalid inputs is encountered.

7.4 System Limitations

Due to the time constraint, some of the system features could not be implemented. At the moment, the system has a number of limitations as outlined below:

- **Required Large Storage for Database**

The table fields in the database are all fixed-length. Which means that the storage allocated for each field are fixed although the field might not be fully filled. On the other hand, if the length of the data is longer than the field length, the remaining data will be truncated. Therefore, as more records are added into the database, storage waste will become more significant.

7.5 Future Enhancement

- **Support Multiple User**

Sharing of data between users will make the system can be used by more than one users simultaneously.

- **Support Networking Environment**

The system not only support stand-alone computer but network environment.

- **Provides Help File**

The context-sensitive help is provided to every screen in the ETSS system. To invoke help, a user just needs to press the F1 function key. This help makes ETSS easier to use for inexperience users.

7.6 Conclusion

This project is meaningful because we can apply the knowledge throughout the three-year course in University of Malaya i.e. software engineering, system analysis and design, database management and a new programming language – Visual Basic 6.0.

Although the Examination Timetable Scheduling System of University Malaya has make changes, basically the format doesn't change and can be said that it is an easier algorithm to be implemented. At the completion of the system, ETSS can be said to have achieved its objectives as well as the functional and non-functional requirements as planned at the start of this project.

APPENDIX

JADUAL WAKTU

PEPERIKSAAN

SEMESTER II

SESI 1998/1999

22 FEBRUARI HINGGA 25 MAC 1999

WAKTU PEPERIKSAAN BERMULA:

BAHAGIAN PAGI	:	PEPERIKSAAN BERMULA JAM 9.00 PAGI
BAHAGIAN PETANG	:	PEPERIKSAAN BERMULA JAM 2.15 (14:15) PETANG KECUALI HARI JUMAAT BERMULA JAM 3.00 (15:00) PETANG
BAHAGIAN MALAM	:	JAM 8.00 (20:00) MALAM

TEMPAT PEPERIKSAAN:

ARAS 1	:	ARAS 1, BANGUNAN PEPERIKSAAN
ARAS 2	:	ARAS 2, BANGUNAN PEPERIKSAAN
DTC	:	DEWAN TUANKU CANSELOR
DM	:	DEWAN MENGKULA
PE	:	PANGGUNG EKSPERIMEN
IPSP	:	BILIK SEMINAR A & B, INSTITUT PENGAJIAN SISWAZAH & PENYELIDIKAN
AUDI	:	AUDITORIUM, PERDANASISWA
FPP	:	FAKULTI PERUBATAN
FEP	:	FAKULTI EKONOMI DAN PENTADBIRAN
FSKTM	:	FAKULTI SAINS KOMPUTER DAN TEKNOLOGI MAKLUMAT
ALM_BINA	:	ALAM BINA, JABATAN ALAM BINA
PSUKAN	:	PUSAT SUKAN
MJ	:	MAKMAL JABATAN
BK1	:	BILIK KHAS 1, ARAS B, BANGUNAN PEPERIKSAAN
BK2	:	BILIK KHAS 2, ARAS B, BANGUNAN PEPERIKSAAN
BK3	:	BILIK KHAS 3, ARAS B, BANGUNAN PEPERIKSAAN
(P)	:	AMALI
(T)	:	TEORI

MAKLUMAN PENTING:

1. JADUAL WAKTU PEPERIKSAAN INI ADALAH TERTAKLUK KEPADA PINDAAN DARI MASA KE SEMASA.

2. PELAJAR-PELAJAR DINASIHATKAN SUPAYA:
   (1) MELIHAT PAPAN KENYATAAN TIAP-TIAP HARI DI PINTU UTAMA, ARAS 1, BANGUNAN PEPERIKSAAN ATAU DI PAPAN KENYATAAN SEKSYEN PEPERIKSAAN DI ARAS B, BANGUNAN PEPERIKSAAN ATAU DI PAPAN KENYATAAN DI FAKULTI/PUSAT/INSTITUT BERHUBUNG DENGAN PINDAAN KEPADA JADUAL WAKTU PEPERIKSAAN.

   (2) MENYEMAK JADUAL WAKTU PEPERIKSAAN TIAP-TIAP HARI UNTUK MEMASTIKAN PELAJAR-PELAJAR MENDUDUKI KERTAS PEPERIKSAAN YANG BETUL.

3. PELAJAR-PELAJAR DIKEHENDAKI HADIR DI TEMPAT PEPERIKSAAN 20 MINIT SEBELUM PEPERIKSAAN BERMULA.

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
AA401/AAEA3304	10/03/99	14:15	ARAS1	T
AA405/AAEA3301	13/03/99	14:15	ARAS1	T
AA466/AAEA3316	03/03/99	20:00	ARAS2	T
AA467/AAEA3317	02/03/99	14:15	ARAS1	T
AA493/AAEA2410	13/03/99	20:00	ARAS1	T
AAEA1112	11/03/99	14:15	ARAS1	T
AAEA1407	15/03/99	9:00	ARAS1	T
AAEA1409	21/03/99	14:15	ARAS1	T
AAEA2303	21/03/99	9:00	ARAS1	T
AAEA2305	08/03/99	14:15	ARAS1	T
AAEA2307	07/03/99	14:15	ARAS1	T
AAEA2308	09/03/99	14:15	ARAS1	T
AAEA2309	04/03/99	14:15	ARAS2	T
AAEA2415	01/03/99	9:00	ARAS2	T
AAEA3303	07/03/99	20:00	ARAS1	T
AAEA3311	06/03/99	14:15	ARAS1	T
AB415/JBEA3106	07/03/99	14:15	ARAS1	T
AB417/JBEA2107	06/03/99	14:15	ARAS2	T
AC010	04/03/99	9:00	ARAS1	T
AC011	15/03/99	9:00	ARAS1	T
AC012	17/03/99	9:00	ARAS1	T
AC020	02/03/99	14:15	PE	T
AC021	08/03/99	9:00	ARAS2	T
AC022	06/03/99	9:00	ARAS1	T
AC023	10/03/99	9:00	ARAS2	T
AC024;ACEA2106;ACEA3405	09/03/99	20:00	ARAS1	T
AC454/ACEA3107	08/03/99	14:15	ARAS2	T
ACAT0102	01/03/99	14:15	ARAS1	T
ACEA1103	10/03/99	9:00	ARAS2	T
ACEA1104	21/03/99	14:15	ARAS1	T
ACEA2107	12/03/99	9:00	ARAS2	T
ACEA2309	03/03/99	9:00	ARAS1	T
ACEA2310	08/03/99	9:00	ARAS1	T
ACEA2408	03/03/99	14:15	ARAS1	T
ACEA3304/AC475	05/03/99	9:00	ARAS2	T
ACEA3309	19/03/99	15:00	ARAS1	T
ACEA3406	12/03/99	9:00	DTC	T
ACEA3408/AC452	03/03/99	9:00	PE	T
AD401/AD470/ADEA3102	20/03/99	9:00	ARAS1	T
AD421/ADEA3307	05/03/99	15:00	ARAS2	T
AD431/ADEA3315	07/03/99	9:00	ARAS2	T
AD432/ADEA3319	03/03/99	9:00	ARAS2	T
AD447	02/03/99	14:15	ARAS1	T
AD448/AD483/ADEA3310	01/03/99	14:15	ARAS2	T
AD451/AD486/ADEA3317	08/03/99	20:00	ARAS1	T
ADEA1107	19/03/99	9:00	ARAS1	T
ADEA1108	12/03/99	15:00	ARAS1	T
ADEA2103	21/03/99	9:00	ARAS1	T
ADEA2305	09/03/99	14:15	ARAS1	T
ADEA2308	02/03/99	14:15	PE	T
ADEA2313	05/03/99	9:00	ARAS2	T
ADEA2316	14/03/99	9:00	ARAS1	T
ADEA2317	06/03/99	14:15	ARAS1	T
ADEA2318	03/03/99	9:00	PE	T
ADEA2319/AM406	16/03/99	14:15	ARAS2	T
ADEA2322	02/03/99	14:15	ARAS2	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
AH401	11/03/99	14:15	ARAS2	T
AH411	17/03/99	9:00	ARAS1	T
AH459/JEEA2110	02/03/99	9:00	ARAS1	T
AJ416	01/03/99	14:15	ARAS2	T
AJ438/SJES2438	05/03/99	20:00	ARAS2	T
AK323	01/03/99	20:00	ARAS1	T
AK412/AKEA3314	17/03/99	9:00	ARAS2	T
AK415/AKEA3315	03/03/99	9:00	PE	T
AK416/AKEA3316	08/03/99	14:15	ARAS2	T
AK417/AK333/AKEA2321	05/03/99	20:00	ARAS1	T
AK420/AKEA3320	02/03/99	14:15	ARAS2	T
AK440/AKEA3321	14/03/99	14:15	ARAS1	T
AKEA1106	04/03/99	9:00	ARAS1	T
AKEA1304	09/03/99	9:00	ARAS1	T
AKEA2101/AK303	12/03/99	15:00	ARAS1	T
AKEA2182/AK426	13/03/99	9:00	ARAS2	T
AKEA2305	28/02/99	14:15	ARAS1	T
AKEA2310	02/03/99	14:15	ARAS1	T
AKEA2314	04/03/99	9:00	ARAS2	T
AKEA2315	12/03/99	9:00	ARAS1	T
AKEA2316	14/03/99	14:15	ARAS1	T
AKEA2317	01/03/99	20:00	ARAS1	T
AKEA2319	16/03/99	20:00	ARAS1	T
AKEA3102	06/03/99	20:00	ARAS1	T
AKEA3310	01/03/99	14:15	ARAS1	T
AKEA3312	19/03/99	15:00	ARAS1	T
AKEA3317	01/03/99	9:00	ARAS2	T
AKEA3318	07/03/99	9:00	ARAS2	T
AKEA3319	03/03/99	20:00	ARAS1	T
AKGC6102	09/03/99	20:00	ARAS1	T
AKGC6103	04/03/99	20:00	ARAS1	T
AKGC6170	08/03/99	20:00	ARAS1	T
AL412/ALEA3302	02/03/99	14:15	ARAS1	T
AL428/ALEA3309	04/03/99	9:00	ARAS2	T
AL429/ALEA3305	14/03/99	20:00	ARAS1	T
AL430/ALEA3306	01/03/99	14:15	ARAS2	T
ALEA1103	15/03/99	14:15	ARAS1	T
ALEA1104	26/02/99	15:00	DTC	T
ALEA1105	18/03/99	20:00	ARAS1	T
ALEA2302	06/03/99	9:00	PE	T
ALEA2303	05/03/99	15:00	DTC	T
ALEA2307	20/03/99	9:00	ARAS1	T
ALEA2308	10/03/99	20:00	ARAS1	T
ALEA2309	07/03/99	9:00	ARAS2	T
ALEA3303	21/03/99	9:00	ARAS1	T
ANEA2102	15/03/99	9:00	ARAS1	T
ANEA2306	08/03/99	14:15	ARAS1	T
AP407/APEA2104	04/03/99	20:00	ARAS1	T
AP410/APEA3104	03/03/99	14:15	ARAS2	T
AP412/APEA3108	12/03/99	9:00	ARAS2	T
APEA1107	10/03/99	14:15	ARAS1	T
APEA1203	04/03/99	9:00	ARAS2	T
APEA2101	05/03/99	9:00	ARAS2	T
APEA2109	02/03/99	9:00	ARAS2	T
APEA2206	03/03/99	20:00	ARAS2	T
AQ415	07/03/99	20:00	ARAS2	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
AW403	09/03/99	14:15	ARAS2	T
AX401	13/03/99	9:00	ARAS1	T
AX402	11/03/99	9:00	ARAS1	T
AXGD6103	02/03/99	14:15	ARAS1	T
AXGD6104	06/03/99	9:00	ARAS1	T
AXGD6308	09/03/99	14:15	ARAS1	T
AXGD6309	09/03/99	14:15	ARAS1	T
AXGD6310	09/03/99	14:15	ARAS1	T
AXGD6311	13/03/99	9:00	ARAS1	T
AXGD6312	13/03/99	9:00	ARAS1	T
AXGD6313	13/03/99	9:00	ARAS1	T
AXGD6314	13/03/99	9:00	ARAS1	T
AYEA1102	16/03/99	14:15	ARAS1	T
AYEA1407	27/02/99	9:00	ARAS1	T
AYEA1408/TBEK1302	27/02/99	9:00	ARAS1	T
AYEA2311	16/03/99	14:15	ARAS1	T
AYEA2312	11/03/99	14:15	ARAS1	T
AYEA2315	06/03/99	14:15	ARAS1	T
AYEA2325	10/03/99	9:00	ARAS1	T
AYEA2326	20/03/99	9:00	ARAS1	T
AYEA2405	27/02/99	9:00	ARAS1	T
AYEA2407	27/02/99	9:00	ARAS1	T
AYEA2408	27/02/99	9:00	ARAS1	T
AYEA3309	08/03/99	14:15	ARAS1	T
AYEA3310	01/03/99	9:00	DTC	T
AYEA3321	03/03/99	14:15	ARAS1	T
AYEA3326	15/03/99	9:00	ARAS1	T
AYEA3330	19/03/99	15:00	ARAS1	T
AYEA3405	27/02/99	9:00	ARAS1	T
AYEA3407	26/02/99	9:00	ARAS1	T
AYEA3408	27/02/99	9:00	ARAS1	T
AZ104	06/03/99	9:00	ARAS1	T
AZ200	03/03/99	9:00	BK3	T
AZ201	27/02/99	9:00	ARAS1	T
AZ204	27/02/99	9:00	ARAS1	T
AZ205	27/02/99	9:00	ARAS1	T
AZ207	27/02/99	9:00	ARAS1	T
AZ300	08/03/99	9:00	PE	T
AZ401	27/02/99	9:00	ARAS1	T
AZ408	27/02/99	9:00	ARAS1	T
AZEA1103	01/03/99	14:15	ARAS2	T
AZEA1104	13/03/99	9:00	ARAS2	T
AZEA2182	04/03/99	9:00	ARAS1	T
AZEA2304	11/03/99	9:00	ARAS2	T
AZEA3303	15/03/99	9:00	ARAS1	T
AZEA3304	09/03/99	14:15	ARAS1	T
AZEA3308/AX400	17/03/99	20:00	ARAS1	T
BAEA2222	04/03/99	9:00	ARAS1	T
BAEA2223	01/03/99	14:15	ARAS1	T
BAEA3133	02/03/99	9:00	ARAS1	T
BAEA3142	19/02/99	10:00	ALM_BINA	T
BAEA3152	10/03/99	9:00	ARAS1	T
BAEA3222	12/03/99	20:00	ARAS1	T
BAGA4143	04/03/99	14:15	ARAS1	T
BAGA4228	06/03/99	14:15	ARAS1	T
BBEB1107/BPEP1126	05/03/99	9:00	DTC	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
CBGB5103	02/03/99	14:15	ARAS1	T
CBGB5104	04/03/99	9:00	ARAS1	T
CBGB5105	08/03/99	9:00	ARAS1	T
CBGB5106	19/03/99	9:00	ARAS1	T
CBGB5107	10/03/99	14:15	ARAS1	T
CBGB5108	01/03/99	9:00	ARAS1	T
CBGB5109	17/03/99	14:15	ARAS1	T
CBGB5110	11/03/99	14:15	ARAS1	T
CBGB6101	03/03/99	9:00	ARAS1	T
CBGB6306	05/03/99	9:00	ARAS1	T
CBGB6307	09/03/99	9:00	ARAS1	T
CBGB6316	12/03/99	9:00	ARAS1	T
CBGB6323	16/03/99	9:00	ARAS1	T
EA326/CAEA3204	20/03/99	9:00	ARAS1	T
EA330/CAEA2205	11/03/99	9:00	ARAS2	T
EA335/CAEA2203	09/03/99	9:00	ARAS2	T
EA412/CAEA3201	02/03/99	14:15	ARAS2	T
EA413/CAEA3208	21/03/99	14:15	ARAS1	T
EA431/CAEA3206	16/03/99	14:15	ARAS1	T
EB413/CBEB3301	15/03/99	9:00	ARAS2	T
EB414/CBEB2302	18/03/99	9:00	ARAS1	T
EB419/CBEB3307	01/03/99	20:00	ARAS2	T
EC502/EXGA2102	08/03/99	9:00	ARAS1	T
EE330/EEEE3312	05/03/99	15:00	ARAS2	T
EE331/EEEE3313	03/03/99	20:00	ARAS2	T
EE332/EEEE2102	14/03/99	14:15	ARAS1	T
EE407/EEEE3301	02/03/99	9:00	ARAS1	T
EE408/EEEE3302	12/03/99	9:00	ARAS1	T
EE410/EEEE3303	03/03/99	14:15	ARAS1	T
EE411/EEEE3309	15/03/99	9:00	ARAS1	T
EE412/EEEE3310	13/03/99	20:00	ARAS1	T
EEEE2104	07/03/99	9:00	ARAS2	T
EEEE2303	11/03/99	9:00	ARAS1	T
EG306/EGEE3308	04/03/99	20:00	ARAS1	T
EG328/EGEE2304	11/03/99	9:00	ARAS2	T
EG403/EGEE3307	19/03/99	15:00	ARAS1	T
EG405/EGEE3311	21/03/99	20:00	ARAS1	T
EGEE2102	09/03/99	14:15	ARAS1	T
EGEE2103	18/03/99	9:00	ARAS1	T
EGEE2303	07/03/99	14:15	ARAS1	T
EGEE3310	01/03/99	14:15	ARAS1	T
EL401	26/02/99	15:00	ARAS1	T
EP402/EPEE3306	21/03/99	20:00	ARAS1	T
EP405/EPEE3307	17/03/99	9:00	ARAS2	T
EP407/EPEE3305	03/03/99	14:15	ARAS2	T
EPEE2103	12/03/99	9:00	DTC	T
EPEE2104	13/03/99	14:15	ARAS2	T
EPEE2105	14/03/99	20:00	ARAS1	T
EPEE2111	01/03/99	9:00	ARAS2	T
EPEE3112	04/03/99	9:00	ARAS1	T
EPEE3113	18/03/99	9:00	ARAS1	T
EPEE3114	19/03/99	15:00	ARAS1	T
EPEE3304	16/03/99	14:15	ARAS1	T
EPGB2111	03/03/99	20:00	ARAS1	T
EPGB2112	01/03/99	14:15	ARAS2	T
EPGB2118	07/03/99	9:00	ARAS1	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
GTEB1072/GTEB1102	27/02/99	9:00	ARAS1	T
GTEB1081	26/02/99	9:00	ARAS2	T
GTEB1091	23/02/99	9:00	ARAS1	T
GTEB1111	27/02/99	9:00	ARAS2	T
GTEB1130;GTEB1131/GTEB1140;VG301	23/02/99	9:00	ARAS1	T
GTEB1150	22/02/99	9:00	ARAS1	T
GTEB1160	22/02/99	14:15	ARAS2	T
GTEW3003	18/03/99	9:00	ARAS1	T
GWEW1001	10/03/99	9:00	ARAS1	T
GXEW3001	19/03/99	9:00	ARAS1	T
GXEX1401	27/02/99	20:00	LAMP. A	T
GXEX1402	24/02/99	14:15	LAMP. B	T
GXEX1403	25/02/99	14:15	LAMP. C	T
IAEU1101	04/03/99	9:00	ARAS1	T
IAEU1102	03/03/99	20:00	ARAS1	T
IAEU1103	06/03/99	9:00	ARAS1	T
IAEU1201	02/03/99	14:15	ARAS1	T
IAEU2201	05/03/99	9:00	ARAS1	T
IAEU2202	07/03/99	9:00	ARAS1	T
IAEU3101	05/03/99	9:00	ARAS2	T
IAEU3113	12/03/99	9:00	ARAS1	T
IAEU3118	01/03/99	14:15	ARAS1	T
IAEU3203	18/03/99	9:00	ARAS1	T
IAGU6101	05/03/99	9:00	ARAS1	T
IAGU6102	19/03/99	9:00	ARAS1	T
IAGU6103	12/03/99	9:00	ARAS1	T
IB301	01/03/99	14:15	PE	T
IB302	08/03/99	9:00	ARAS2	T
IB401	03/03/99	20:00	ARAS1	T
IB403	20/03/99	9:00	ARAS1	T
IB406	03/03/99	9:00	ARAS1	T
IBEX1102	12/03/99	20:00	ARAS1	T
IBEX1204	04/03/99	9:00	ARAS1	T
IBEX1205	16/03/99	9:00	ARAS2	T
IBEX2104	12/03/99	15:00	ARAS1	T
IBEX2105	17/03/99	9:00	ARAS1	T
IBEX2106	16/03/99	14:15	ARAS2	T
IBEX2204	03/03/99	9:00	ARAS1	T
IBEX2205	15/03/99	14:15	ARAS1	T
IBEX2206	07/03/99	14:15	ARAS1	T
IBEX3104	08/03/99	14:15	ARAS1	T
IBEX3105	15/03/99	9:00	ARAS1	T
IBEX3106	13/03/99	9:00	ARAS2	T
IBEX3205	18/03/99	9:00	ARAS1	T
IBEX3206	19/03/99	15:00	ARAS1	T
IBEX3208	17/03/99	9:00	ARAS1	T
IDEU2102	03/03/99	20:00	ARAS1	T
IDEU3101	07/03/99	20:00	ARAS2	T
IDEU3103	10/03/99	9:00	ARAS1	T
IDEU3135	12/03/99	15:00	ARAS1	T
IDEU3139	21/03/99	14:15	ARAS1	T
IDGU6101	05/03/99	9:00	ARAS1	T
IDGU6102	19/03/99	9:00	ARAS1	T
IDGU6103	12/03/99	9:00	ARAS1	T
IEEH1102	03/03/99	20:00	ARAS1	T
IEEH1103	18/03/99	9:00	ARAS1	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
IQEU3105	11/03/99	9:00	ARAS1	T
IQEU3109	06/03/99	9:00	ARAS2	T
IQGU6101	05/03/99	9:00	ARAS1	T
IQGU6102	19/03/99	9:00	ARAS1	T
IQGU6103	12/03/99	9:00	ARAS1	T
ISEU1101	08/03/99	9:00	ARAS2	T
ISEU1102	06/03/99	9:00	ARAS1	T
ISEU1103	16/03/99	14:15	ARAS2	T
ISEU2101	04/03/99	9:00	ARAS1	T
ISEU2102	04/03/99	14:15	ARAS2	T
ISEU3103	18/03/99	9:00	ARAS1	T
ISEU3123	01/03/99	14:15	ARAS1	T
ISEU3125	20/03/99	9:00	ARAS1	T
ISEU3128	09/03/99	9:00	ARAS2	T
ISGU6101	05/03/99	9:00	ARAS1	T
ISGU6102	19/03/99	9:00	ARAS1	T
ISGU6103	12/03/99	9:00	ARAS1	T
IUEH1102	12/03/99	9:00	ARAS2	T
IUEH1103	05/03/99	9:00	ARAS2	T
IUEH2103	02/03/99	14:15	PE	T
IUEH2104	05/03/99	9:00	ARAS1	T
IUEH3104	12/03/99	9:00	ARAS2	T
IUEH3105	08/03/99	9:00	ARAS2	T
IUEH3106	11/03/99	14:15	ARAS1	T
IUEH3107	15/03/99	14:15	ARAS1	T
IUEH3108	04/03/99	9:00	ARAS1	T
IUEH3109	06/03/99	9:00	ARAS1	T
IUGA6101	12/03/99	9:00	ARAS1	T
IUGA6103	05/03/99	9:00	ARAS1	T
IUGA6105	13/03/99	9:00	ARAS2	T
IUGA6107	19/03/99	9:00	ARAS1	T
IXEB1102	06/03/99	14:15	ARAS1	T
IXEU2201	06/03/99	14:15	ARAS1	T
IXEU3101	03/03/99	14:15	ARAS1	T
IXEX1201	01/03/99	20:00	ARAS1	T
IXEX1202	10/03/99	9:00	ARAS2	T
IXEX2201	16/03/99	9:00	ARAS1	T
IXEX2202	16/03/99	9:00	ARAS1	T
IXEX3201	10/03/99	9:00	ARAS1	T
IXEX3202	16/03/99	9:00	ARAS1	T
JBEA2102	22/03/99	9:00	ARAS1	T
JBEA2104	13/03/99	20:00	ARAS1	T
JBEA2105	23/03/99	14:15	ARAS1	T
JBEA2106	01/03/99	20:00	ARAS1	T
JBEA2109	05/03/99	9:00	ARAS1	T
JBEA2111	10/03/99	14:15	ARAS2	T
JBEA2201	24/03/99	9:00	ARAS1	T
JBEA3102	12/03/99	20:00	ARAS1	T
JBEA3103	03/03/99	20:00	ARAS1	T
JBEA3105	05/03/99	9:00	ARAS2	T
JCEA1101	11/03/99	9:00	ARAS2	T
JCEA2101	22/03/99	14:15	ARAS1	T
JCEA2102	23/03/99	9:00	ARAS1	T
JCEA2104	24/03/99	14:15	ARAS1	T
JCEA2105	02/03/99	14:15	PE	T
JCEA2106	09/03/99	9:00	ARAS1	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
KMEM2244/KMEM2222	16/03/99	9:00	ARAS2	T
KMEM3154	09/03/99	14:15	ARAS2	T
KMEM3308/KM4056/KM456	10/03/99	14:15	ARAS1	T
KMEM3315/KM4057	16/03/99	14:15	ARAS2	T
KMEM3331/KCEP2252/KM4092	21/03/99	14:15	ARAS1	T
KMEM3364	05/03/99	9:00	DTC	T
KXEX1110	11/03/99	9:00	ARAS1	T
KXEX1141	18/03/99	14:15	ARAS1	T
KXEX1142	03/03/99	9:00	ARAS2	T
KXEX1150	09/03/99	9:00	ARAS1	T
KXEX2130	05/03/99	15:00	ARAS1	T
KXEX2160	05/03/99	15:00	ARAS1	T
KXEX2243	02/03/99	14:15	ARAS1	T
LJ307/LXEB2401	10/03/99	9:00	ARAS1	T
LJ315	03/03/99	14:15	ARAS1	T
LJ403	08/03/99	14:15	ARAS2	T
LJ407/LXEB3410	14/03/99	14:15	ARAS1	T
LJ416/LXEB3312	10/03/99	9:00	ARAS1	T
LJ418/LXEB3407	12/03/99	9:00	ARAS1	T
LM302	24/02/99	14:15	BK1	T
LM303/LXEB3102	01/03/99	20:00	ARAS1	T
LM304	08/03/99	14:15	ARAS2	T
LM306/LXEB2104	20/03/99	9:00	ARAS1	T
LM401/LXEB3101	05/03/99	20:00	ARAS1	T
LM402	01/03/99	9:00	ARAS2	T
LM405	12/03/99	9:00	ARAS1	T
LM502	17/03/99	9:00	ARAS1	T
LM503	06/03/99	9:00	ARAS1	T
LM512	13/03/99	9:00	ARAS1	T
LM517	12/03/99	9:00	ARAS1	T
LM519	15/03/99	9:00	ARAS1	T
LM521	19/03/99	9:00	ARAS1	T
LM522	10/03/99	9:00	ARAS1	T
LM523	01/03/99	9:00	ARAS1	T
LM524	08/03/99	9:00	ARAS1	T
LM527	08/03/99	9:00	ARAS1	T
LM528	15/03/99	9:00	ARAS1	T
LM530	03/03/99	9:00	ARAS1	T
LXEB1102	09/03/99	14:15	ARAS1	T
LXEB1103	10/03/99	14:15	ARAS2	T
LXEB1104	07/03/99	9:00	ARAS2	T
LXEB1105	05/03/99	15:00	ARAS1	T
LXEB1106	01/03/99	9:00	ARAS1	T
LXEB2101	08/03/99	9:00	ARAS1	T
LXEB2102	13/03/99	14:15	ARAS1	T
LXEB2103	03/03/99	9:00	ARAS1	T
LXEB2305	17/03/99	14:15	ARAS1	T
LXEB2306	17/03/99	14:15	ARAS1	T
LXEB3102/LM303	01/03/99	20:00	ARAS1	T
LXEB3308;LJ419	15/03/99	9:00	ARAS1	T
LXEB3311	04/03/99	9:00	ARAS2	T
PA401	19/03/99	15:00	ARAS1	T
PAEC1302	05/03/99	15:00	ARAS2	T
PAEC2301	05/03/99	15:00	ARAS2	T
PAEK1101	01/03/99	14:15	ARAS2	T
PAEK2101	06/03/99	9:00	ARAS2	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
PPET3102	11/03/99	20:00	ARAS1	T
PPET3103	09/03/99	9:00	ARAS2	T
PPEX1302	19/03/99	20:00	ARAS1	T
PPEX2101	06/03/99	9:00	ARAS2	T
PPEX2103	13/03/99	20:00	ARAS1	T
PSEK1152	03/03/99	20:00	ARAS1	T
PSET1204	02/03/99	9:00	ARAS1	T
PSET2203	01/03/99	14:15	ARAS2	T
PSET2204	03/03/99	9:00	ARAS2	T
PSET3202	12/03/99	9:00	ARAS2	T
PSEX1102	13/03/99	9:00	ARAS1	T
PSEX2102	06/03/99	9:00	PE	T
PT436	08/03/99	14:15	ARAS1	T
PT437	06/03/99	14:15	ARAS1	T
RDEA1303	16/03/99	14:15	ARAS1	T
RDEA2101	16/03/99	14:15	ARAS1	T
SB414/SB440	04/03/99	9:00	ARAS2	T
SB438	06/03/99	9:00	MJ	P
SB438	12/03/99	9:00	DTC	T
SB442	10/03/99	9:00	ARAS1	T
SB445	08/03/99	9:00	ARAS2	T
SB447	25/02/99	9:00	MJ	P
SB448/SB447	16/03/99	14:15	ARAS1	T
SBES3303	12/03/99	15:00	ARAS1	T
SBES3304	10/03/99	14:15	ARAS1	T
SBES3304	13/03/99	9:00	MJ	P
SBES3305	10/03/99	14:15	ARAS1	T
SBES3306	01/03/99	9:00	ARAS2	T
SBES3307	03/03/99	14:15	ARAS1	T
SBES3308	08/03/99	14:15	ARAS1	T
SC401/SPC401/SCES3110	05/03/99	20:00	ARAS1	T
SC402/SPC402/SCES3120	13/03/99	20:00	ARAS1	T
SC403/SPC403	14/03/99	14:15	ARAS1	T
SC404	16/03/99	9:00	ARAS2	T
SC424/SCES3324	12/02/99	15:00	ARAS1	T
SC430	16/03/99	14:15	ARAS1	T
SC436/SCES3336	07/03/99	9:00	ARAS1	T
SC441;SCES3311	12/03/99	9:00	ARAS2	T
SC442	09/03/99	14:15	ARAS1	T
SC445	04/03/99	14:15	ARAS2	T
SCES1200	12/03/99	15:00	ARAS1	T
SCES1210	01/03/99	14:15	PE	T
SCES1220	06/03/99	9:00	ARAS2	T
SCES1230	04/03/99	9:00	ARAS2	T
SCES2132	02/03/99	14:15	ARAS1	T
SCES2210	09/03/99	14:15	ARAS1	T
SCES2211	01/03/99	20:00	ARAS1	T
SCES2220	08/03/99	9:00	ARAS1	T
SCES2230	03/03/99	9:00	ARAS2	T
SCES2321	10/02/99	9:00	ARAS1	T
SCES2323	08/02/99	9:00	ARAS1	T
SCES2338	14/03/99	14:15	ARAS1	T
SCES2433	17/03/99	9:00	ARAS1	T
SCES3130	21/03/99	9:00	ARAS1	T
SCES3140	01/03/99	20:00	ARAS1	T
SCES3310	22/03/99	14:15	ARAS1	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
SN408	12/03/99	9:00	DTC	T
SN408	12/03/99	15:00	MJ	P
SN415	06/03/99	9:00	ARAS1	T
SN415	06/03/99	14:15	MJ	P
SN416	17/03/99	9:00	ARAS2	T
SN416/SN419/SN426	20/03/99	9:00	MJ	P
SN419/SN426	13/03/99	9:00	ARAS2	T
SN420/SN418	15/03/99	9:00	ARAS2	T
SN424/SN425	08/03/99	14:15	MJ	P
SN424/SN425	19/03/99	15:00	ARAS1	T
SN493	04/03/99	9:00	ARAS1	T
SN494	04/03/99	9:00	ARAS1	T
SNES2101	07/03/99	20:00	ARAS1	T
SNES2105	17/03/99	14:15	ARAS1	T
SNES2204	11/03/99	9:00	ARAS2	T
SNES3102	04/03/99	14:15	ARAS2	T
SNES3140	15/03/99	14:15	ARAS1	T
SNES3348	09/03/99	14:15	MJ	P
SNES3348	11/03/99	9:00	ARAS1	T
SNES3350	19/03/99	15:00	ARAS1	T
SNES3355	17/03/99	14:15	ARAS1	T
SPB402	01/03/99	14:15	ARAS2	T
SPB403	04/03/99	14:15	ARAS2	T
SPB403	22/03/99	14:15	MJ	P
SPB404	01/03/99	9:00	ARAS2	T
SPB404	20/03/99	9:00	MJ	P
SPB405	06/03/99	9:00	ARAS1	T
SPB405/SPB407	18/03/99	9:00	MJ	P
SPB407	22/03/99	9:00	ARAS1	T
SPB433	09/03/99	14:15	ARAS1	T
SPB434/SPB408	10/03/99	9:00	ARAS1	T
SPC404	20/03/99	9:00	ARAS1	T
SPC405	16/03/99	14:15	ARAS1	T
SPC406	18/03/99	9:00	ARAS1	T
SPC431	12/03/99	15:00	ARAS1	T
SPC432	14/03/99	9:00	ARAS1	T
SPC433	16/03/99	14:15	ARAS1	T
SPJ401	27/02/99	9:00	ARAS2	T
SPJ402	21/03/99	9:00	ARAS1	T
SPJ403	03/03/99	14:15	ARAS2	T
SPJ404	06/03/99	9:00	ARAS2	T
SPJ408	18/03/99	9:00	ARAS1	T
SPJ431	12/03/99	15:00	ARAS1	T
SPJ432/SPJ407	08/03/99	9:00	ARAS2	T
SPM401	16/03/99	14:15	ARAS1	T
SPM402	07/03/99	20:00	ARAS1	T
SPM403	05/03/99	9:00	ARAS1	T
SPM404	03/03/99	14:15	ARAS1	T
SPM405	01/03/99	14:15	ARAS1	T
SQES2142	19/03/99	9:00	ARAS1	T
SQES2145	11/03/99	9:00	ARAS1	T
SQES2146	02/03/99	14:15	ARAS1	T
SQES2146	09/03/99	14:15	MJ	P
SQES2147	09/03/99	9:00	ARAS2	T
SQES2147	10/03/99	14:15	MJ	P
SQES2349	03/03/99	9:00	PE	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
TBEH1301	15/03/99	9:00	ARAS1	T
TBEH1302	27/02/99	9:00	ARAS1	T
TBEJ1112	05/03/99	15:00	DTC	T
TBEJ1113	07/03/99	9:00	ARAS1	T
TBEJ1302	15/03/99	9:00	ARAS1	T
TBEL1302	01/03/99	14:15	PE	T
TBEP1112	05/03/99	15:00	DTC	T
TBEP1113	07/03/99	9:00	ARAS1	T
TBEP1301	15/03/99	9:00	ARAS1	T
TBEP1302	02/03/99	14:15	PE	T
TBEQ1301	15/03/99	9:00	ARAS1	T
TBEQ1302	06/03/99	9:00	ARAS1	T
TBER1301	13/03/99	14:15	ARAS2	T
TBER1302	07/03/99	20:00	ARAS2	T
TCEE1106	05/03/99	15:00	DTC	T
TCEE1107	09/03/99	14:15	ARAS1	T
TCEE1108	13/03/99	20:00	ARAS1	T
TCEE1109	11/03/99	14:15	ARAS1	T
TDEC1106	05/03/99	15:00	DTC	T
TDEC1107	11/03/99	14:15	ARAS1	T
TDEC1108	09/03/99	14:15	ARAS1	T
TDEC1109	07/03/99	9:00	ARAS1	T
TDET1106	07/03/99	9:00	ARAS1	T
TDET1107	05/03/99	15:00	DTC	T
TDET1108	09/03/99	14:15	ARAS1	T
TDET1109	11/03/99	14:15	ARAS1	T
TTEA1103	01/03/99	20:00	ARAS2	T
TTEA1104	03/03/99	14:15	ARAS1	T
TXGA3101	04/03/99	14:15	DM	T
TXGA3103	01/03/99	14:15	DM	T
TXGA3106	05/03/99	9:00	DM	T
TXGA3110	02/03/99	14:15	DM	T
TXGA3114	03/03/99	14:15	DM	T
TXGA3120	01/03/99	14:15	DM	T
TXGB3101	01/03/99	9:00	DM	T
TXGB3102	01/03/99	9:00	DM	T
TXGB3103	04/03/99	9:00	DM	T
TXGB3106	02/03/99	9:00	DM	T
TXGB3111	03/03/99	9:00	DM	T
TXGB3113	02/03/99	9:00	DM	T
TXGC3105	02/03/99	9:00	DM	T
TXGC3106	05/03/99	9:00	DM	T
TXGC3107	03/03/99	9:00	DM	T
TXGD3101	01/03/99	9:00	DM	T
TXGD3102	02/03/99	9:00	DM	T
TXGD3103	04/03/99	9:00	DM	T
UA401	21/03/99	9:00	ARAS1	T
UD401	21/03/99	9:00	ARAS1	T
UE401	19/03/99	15:00	ARAS1	T
UF401	11/03/99	9:00	ARAS1	T
UF402	05/03/99	20:00	ARAS2	T
UF403	17/03/99	9:00	ARAS2	T
UP401	01/03/99	20:00	ARAS1	T
UQ401	09/03/99	20:00	ARAS1	T
UQ402	13/03/99	14:15	ARAS2	T
UQ403	15/03/99	9:00	ARAS2	T

KOD KERTAS	TARIKH	MASA	TEMPAT	JENIS KERTAS
WMES3402/WXET3403/WRES3402/WKES3402	19/03/99	15:00	ARAS1	T
WMGA6312	08/03/99	9:00	ARAS1	T
WMGA6313	05/03/99	9:00	ARAS1	T
WMGA6314	11/03/99	14:15	ARAS1	T
WRES3301	05/03/99	15:00	ARAS2	T
WRGA6311	01/03/99	9:00	ARAS1	T
WRGA6312	05/03/99	15:00	ARAS2	T
WRGA6313	03/03/99	9:00	ARAS1	T
WRGA6314	07/03/99	9:00	ARAS1	T
WRGD6334	06/03/99	9:00	ARAS1	T
WXES1101/WXET1101/WXGD6101	10/03/99	9:00	ARAS1	T
WXES1107	06/03/99	9:00	ARAS1	T
WXES1201;WXET1201	01/03/99	9:00	ARAS1	T
WXES1270/WXET1270	05/03/99	9:00	FSKTM	P
WXES1401	03/03/99	9:00	ARAS1	T
WXET1107/KBEB0109	03/03/99	9:00	ARAS1	T
WXGB5002	01/03/99	9:00	ARAS1	T
WXGB5003	08/03/99	9:00	ARAS1	T
WXGB5004	06/03/99	9:00	ARAS1	T
WXGB5006	05/03/99	9:00	ARAS1	T
WXGB5041	03/03/99	9:00	ARAS1	T
WXGB5052	10/03/99	9:00	ARAS1	T
WXGD6106	01/03/99	14:15	ARAS2	T
YE402	15/03/99	9:00	ARAS2	T
YE403	19/03/99	15:00	ARAS1	T
YE404	21/03/99	9:00	ARAS1	T
YE405	17/03/99	9:00	ARAS2	T
YF301/IFEH2105	07/03/99	9:00	ARAS2	T
YF305/IFEH2102	01/03/99	20:00	ARAS2	T
YF306/IFEH2103	12/03/99	15:00	ARAS1	T
YF403	05/03/99	20:00	ARAS2	T
YF405	01/03/99	14:15	ARAS1	T
YF406	07/03/99	9:00	ARAS1	T
YL402	15/03/99	9:00	ARAS2	T
YL403	19/03/99	15:00	ARAS1	T
YL407	17/03/99	9:00	ARAS2	T
YP303	03/03/99	20:00	ARAS1	T
YP403	15/03/99	9:00	ARAS2	T
YP404	19/03/99	15:00	ARAS1	T
YP405	21/03/99	9:00	ARAS1	T
YP406	17/03/99	14:15	ARAS1	T
YS401	13/03/99	14:15	ARAS1	T
YS402	09/03/99	20:00	ARAS1	T
YS403	11/03/99	14:15	ARAS1	T

LAMPIRAN D

KOD KURSUS GTEB1001 (BAHASA INGGERIS)

FAKULTI	TEMPAT PEPERIKSAAN
AKADEMI PENGAJIAN ISLAM	ARAS 1, BANGUNAN PEPERIKSAAN
AKADEMI PENGAJIAN MELAYU	ARAS 2, BANGUNAN PEPERIKSAAN
FAKULTI BAHASA DAN LINGUISTIK	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI EKONOMI DAN PENTADBIRAN	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI KEJURUTERAAN/PROGRAM ALAM BINA	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI PENDIDIKAN	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI PERNIAGAAN DAN PERAKAUNAN	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI PERUBATAN	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI SAINS	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI SAINS KOMPUTER DAN TEKNOLOGI MAKLUMAT	ARAS 1, BANGUNAN PEPERIKSAAN
FAKULTI SASTERA DAN SAINS SOSIAL	ARAS 2, BANGUNAN PEPERIKSAAN
FAKULTI UNDANG-UNDANG	ARAS 1, BANGUNAN PEPERIKSAAN
PUSAT KEBUDAYAAN	ARAS 1, BANGUNAN PEPERIKSAAN
PUSAT SAINS SUKAN	ARAS 1, BANGUNAN PEPERIKSAAN

CATATAN:

UNIVERSITI MALAYA

JADUAL PENGAWASAN
(01.03.1999 – 25.03.1999)
PEPERIKSAAN SEMESTER II
SESI 1998/1999

SEKSYEN PEPERIKSAAN
UNIVERSITI MALAYA

01/03/1999 ISNIN PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA DR MD NOR OTHMAN		
CBEB3103 ; EB401	03:00 JAM	EN ABDUL LATIF HAJI SALLEH PROF MADYA MARGARET BOH TWANG HUI PN ONG FON SIM
CBGB5108	03:00 JAM	PROF MADYA DR MD NOR OTHMAN
JDEA3108 / AH403	02:00 JAM	DR ARIFF AHMAD
KE420	JAM	PROF MADYA DR MAHMOUD MOGHAVEMI
LM523	03:15 JAM	PN GRACE MANORANJITHAM GEORGE OBED SINGH
LXEB1106	03:15 JAM	PN NURHALIDA MOHAMED KHALIL PUAN ZURINA MD NOOR
SMES3401	02:30 JAM	PROF MADYA DR DAVID ANDREW BRADLEY @ HJ MOHD DAUD
WKGA6311 / WMGA6311	03:00 JAM	DR SITI SALWAH SALIM
WMES3310	03:00 JAM	NORAZAM MASTUKI
WRGA6311	03:00 JAM	EN LING TECK CHAW
WXES1201 ; WXET1201	03:00 JAM	CHONG TSEWAI HANNYZZURA AFFAL R RETNAKARA KURUP DR SYED MALIK FAKAR DUANI SYED MUSTAPHA PN ZAINAB BINTI AWANG NGAH
WXGB5002	03:00 JAM	EN TEH KANG HAI
PENGAWAS TAMBAHAN		
DR SHAMSULBAHRIAH KU AHMAD		
PN NING AH MOI		
EN CHE HASHIM HASSAN		

01/03/1999 ISNIN PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MOHD ZAKI ABDUL MUIN		
ACAT0102	02:00 JAM	PN SITI ROHAINI KASSIM
AFEA2103	02:00 JAM	PN NORAIDA BT ISMAIL
BAEA2223	03:00 JAM	PROF PETER CHARLES WOODS
BPEP1202	03:00 JAM	PN SHARIFAH AZAH BINTI SYED AHMAD
EGEE3310	02:30 JAM	PROF MADYA IDRIS JAJRI
IAEU3118	02:00 JAM	EN AB AZIZ AWANG KECHIK
IFEH1105	02:00 JAM	DR ABDUL KARIM ALI
IQEU3101	02:00 JAM	PN SERIPAH ZIN SAYED ALI
ISEU3123	02:00 JAM	DR AHMAD ZAKI HAJI BERAHIM@IBRAHIM
KBEB0201	03:00 JAM	EN MOHD RAFIE JOHAN
KEET3208	03:00 JAM	PROF MADYA DR SUBRAMANIAM S.NARAYANAN
KKEK1151	03:00 JAM	EN ABDUL AZIZ BIN ABDUL RAHMAN
KMEB1114	02:30 JAM	EN ISWADI BIN JAUHARI
KMEM1145	JAM	DR MOSTAFA KAMAL
		PROF MOHD ZAKI ABDUL MUIN
PBEB3103	02:00 JAM	KWAN POH WOH
		PROF. MADYA MOHAMMAD HARON
PPEC1107	02:30 JAM	CLAUDE LE SCOUR TAY
		DR SHAHRIR JAMALUDDIN
SEES2105	02:00 JAM	DR YAP SIAW YANG
SPM405	02:00 JAM	PROF MADYA KWEK KUAN HIANG
VXES3108	02:30 JAM	CIK WIRDATI MOHD RADZI
WKES3202	03:00 JAM	DR LEE SAI PECK
YF405	02:30 JAM	DR ANISAH AB GHANI
		PROF DR MAHFODZ MOHAMED
		PN RAIHANAH BT HJ AZAHARI
		PROF MADYA MD SALLEH BIN HJ. MD @ HJ. AHMAD

PENGAWAS TAMBAHAN

PN RODIAH ZAWAWI
PN MAZNAH OTHMAN
EN HAFIZ SALLEH

01/03/1999 ISNIN PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI PE		
KETUA PROF MADYA DR ZAINUDIN ARIFIN		
AQEA2370	02:00 JAM	ROSELINA A. SHAKIR
GGAB0172	JAM	CIK MAYUMI UMEZAWA
		EN SATORU ONO
SCES1210	JAM	DR LO KONG MUN
		PROF MADYA DR ZAINUDIN ARIFIN
SGES2310	02:00 JAM	PROF MADYA DR AZHAR HAJI HUSSIN
STES2307	01:30 JAM	PN EDAH MOHD ARIS
TBEL1302	02:30 JAM	DR ROSSANA RUGGIERO

02/03/1999 SELASA PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF. DR ABDUL WAHAB ALI		
AH459 / JEEA2110	JAM	EN SUFFIAN MANSOR
		PN NORHAYATI AB RAHMAN
BAEA3133	02:00 JAM	PN FAIZAH AHMAD
EE407 / EEEE3301	JAM	EN RAHMAN IBRAHIM
		EN AZHAR BIN HARUN
		PN YEW SIEW YONG
		PROF MADYA DR SITI ROHANI YAHYA
KAEA1243	02:30 JAM	EN MOKHTAR AZIZI MOHD DIN
		EN SOMENAHALLI VENKATA CHANDRA SEKAR
PSET1204	02:00 JAM	EN LOH KOK WAH
SGES2273	02:00 JAM	PROF MADYA DR AZHAR HAJI HUSSIN
SMES3322	02:30 JAM	DR ZAINOL ABIDIN IBRAHIM
PENGAWAS TAMBAHAN		
PN MAZNAH OTHMAN		
EN IBRAHIM AHMAD		
CIK SURAYA ISMAIL		
LOKASI ARAS2		
KETUA PROF LEE HOCK LOCK		
AEEA3320	02:00 JAM	EN AZHAR BIN MAD AROS
APEA2109	02:00 JAM	EN MUHD FADHIL NURDIN
EXEE1101	03:00 JAM	PN RASHIDA BEE BT MOHD ROWTHER
		PN YAP SU FEI
		DR YEOH KOK KHENG
GAEW2002	JAM	PROF MADYA AMIDA ADBUL HAMID
		EN AZARUDDIN MOHAMED
SMES2102	02:30 JAM	PROF MADYA KWEK KUAN HIANG
VXES1115	01:30 JAM	CIK SELINA KHOO PHAIK LIM
LOKASI DM		
KETUA DR ZURAIDAH MOHD DON		
TXGB3106	03:00 JAM	DR MULLAI ARUNACHALAM
TXGB3113	03:00 JAM	DR ZURAIDAH MOHD DON
TXGC3105	03:00 JAM	PN JANET YONG YANG ENG
TXGD3102	03:00 JAM	DR ZURAIDAH MOHD DON

02/03/1999 SELASA PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF MADYA TEH TIONG SA		
ADEA2322	03:00 JAM	PROF MADYA DR AZIZAN ABU SAMAH PROF MADYA TEH TIONG SA
AK420 / AKEA3320	02:00 JAM	DR AZIZAH HAMZAH
ES326 / ESEE2102	JAM	EN AB AZID HJ CHE IBRAHIM
JEEA3111	02:00 JAM	PN SITI AISHAH MAT ALI
SF403 ; SPF403	02:00 JAM	EN MOHD HAFIZ ABDUL RAHMAN EN PARAMASWARAN P. SUPPIAH EN YAAKUB ISMAIL PN CHE WAN JASIMAH BT. WAN MOHAMED RADZI PROF MADYA DR MOHD HAZIM SHAH ABDUL MURAD
SJES2443	02:30 JAM	PN ROSLINAH MOHAMAD
VXES3101	03:00 JAM	EN MEGAT AHMAD KAMALUDDIN MEGAT DAUD
LOKASI DM		
KETUA		
TXGA3110	03:00 JAM	PROF MADYA DATIN JAMALIAH MOHD ALI
LOKASI PE		
KETUA PROF MADYA HASHIM AWANG		
AC020	02:00 JAM	PN ALICE K D SAMUEL PILLAY
ADEA2308	02:00 JAM	EN MUSTAPHA KAMAL IDRIS
AREA3309	02:00 JAM	EN GHUFRAN REDZWAN
EXEE2101	03:00 JAM	PN LOKE WAI HENG
IUEH2103	02:00 JAM	EN ABDUL KADIR HAJI MUHAMMAD
JCEA2105	02:00 JAM	EN MOHD TAUFIK ARRIDZO MOHD BALWI PROF MADYA HASHIM AWANG
SFES3303	02:00 JAM	PROF MADYA AMIDA @ HAMIDAH ABDUL HAMID
SSES2310	02:00 JAM	PN PATHMARANEE NADARAJAH
TBEP1302	02:30 JAM	PROF MADYA DR CHOI KIM YOK

03/03/1999 RABU PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF DR NORAZIT SELAT		
AD432 / ADEA3319	JAM	PROF MADYA DR KHAIRULMAINI OSMAN SALLEH
JCEA3110	02:00 JAM	PROF DR NORAZIT SELAT
KXEX1142	02:15 JAM	EN AHMAD JAAFAR ABD HAMID
		EN NUKMAN YUSOFF
		DR BERNARDINE RENALDO WONG CHENG KIAT
		DR MOSTAFA KAMAL
		EN MOHD. FADHIL MOHAMMAD
		PN CHE WAN MARIAM SAAD
		..
		..
PAEX3101	02:00 JAM	EN GHAZALI HJ OSMAN
PSET2204	02:00 JAM	EN LOH KOK WAH
		EN RAHMAD SUKOR BIN AB SAMAD
SCES2230	02:30 JAM	DR IBRAHIM ALI NOOR BATCHA
SLES2104	02:00 JAM	DR SITI AISHAH ALIAS
SWES2303	02:00 JAM	PROF MADYA DR ONG HEAN CHOOI
VXES2102	02:30 JAM	PN SAREENA HANIM
LOKASI BK3		
KETUA PN KRISHNAVANIE A/P SHUNMUGAM		
AZ200	02:30 JAM	PN KRISHNAVANIE A/P SHUNMUGAM
LOKASI DM		
KETUA PROF MADYA WONG FOOK KHOON		
TXGB3111	03:00 JAM	PN KAMILA GHAZALI
TXGC3107	03:00 JAM	PROF MADYA WONG FOOK KHOON
LOKASI PE		
KETUA PROF MADYA MARGARET YONG		
ACEA3408 / AC452	03:00 JAM	CIK AGNES YEOW SWEE KIM
ADEA2318	03:00 JAM	EN AZHARUDDIN MOHD DALI
		PN FAUZA ABD GHAFAR
AK415 / AKEA3315	JAM	EN ABU HASSAN BIN HASBULLAH
AV406 / AYEA3331	02:00 JAM	EN JONNIE RASMADA HUTABARAT
PCET1206	JAM	PROF MADYA MARGARET YONG
SDES2105	03:00 JAM	PN NORLIDAH ABDULLAH
SJES2235	02:00 JAM	PN CHE WAN MARIAM SAAD
SQES2349	01:30 JAM	PROF MADYA DR SHAIFUL AZNI ABDUL AZIZ

03/03/1999 RABU PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF SURADI SALIM		
AE440 / AEEA3311	JAM	PROF MADYA DR ARUNA GOPINATH
AP410 / APEA3104	JAM	EN MUHD FADHIL NURDIN
AR308 / AREA2310	JAM	PROF MADYA DR MOHD RAZALI AGUS
AUEA1103	02:00 JAM	PROF MADYA DR LOH WEI LING
EP407 / EPEE3305	JAM	PROF MADYA DR PHANG SIEW NOOI
ER405 / EREE3302	JAM	DR SHAMSULBAHRIAH KU AHMAD
ESEE1101	02:30 JAM	DR HALIMAH AWANG
		PN NING AH MOI
		PN ROHANA JANI
IQEU2202	02:00 JAM	EN MOHD MUHIDEN BIN ABD RAHMAN
		PN SERIPAH ZIN SAYED ALI
JEEA1101	02:00 JAM	CIK ZURAINI HJ RAMLI
		EN HASHIM ISMAIL
		PN NORHAYATI AB RAHMAN
		PROF MADYA DR TON IBRAHIM
JFEA2109	02:00 JAM	PN SALINAH JAAFAR
KBEB0205	03:00 JAM	EN MOHD RAFIE JOHAN
KBEB0206	03:00 JAM	PROF MADYA DR AMRU BIN NASRULHAQ BOYCE
PPEC1109	02:30 JAM	PROF SURADI SALIM
SMES2401	02:30 JAM	PROF MADYA ITHNIN ABDUL JALIL
SMES3306	02:30 JAM	PROF MADYA DR CHEW AH CHUAN
SPJ403	01:30 JAM	PROF MADYA DR THOMAS BIER
VXES3105	03:00 JAM	EN ROSLI HUSSEIN
LOKASI DM		
KETUA CIK SITI ROHANA BINTI MOHD THANI		
TXGA3114	03:00 JAM	CIK SITI ROHANA BINTI MOHD THANI

M/SURAT35

03/03/1999 RABU MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF MADYA DR AZIZAN BAHARUDDIN		
AA466 / AAEA3316	01:30 JAM	PROF MADYA DR TEO LAY TEEN
AE438 / AEEA3304		PROF MADYA DATO' MAHADZIR MOHD KHIR
APEA2206	02:15 JAM	EN TENGKU NAUFAL TENGKU MANSOR
		PN NOR AINI ABDULLAH
EE331 / EEEE3313	02:30 JAM	DR TAN EU CHYE
		PN RASHIDA BEE BT MOHD ROWTHER
SFES1201	02:00 JAM	EN CHIN YEE LOONG
		PROF MADYA DR AZIZAN BAHARUDDIN

M/SURAT36

04/03/1999 KHAMIS PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF HO COY CHOKE		
AC010	02:00 JAM	EN LOOI SIEW TEIP
AKEA1106	02:00 JAM	CIK GEETHA GOVINDASAMY
		DR SYED OTHMAN SYED OMAR
		PN NOOR BATHI BADARUDDIN
AZEA2182	03:00 JAM	DR SHANTHI A/P THAMBIAH
BAEA2222	02:30 JAM	PN RODIAH ZAWAWI
CAEA1102	02:30 JAM	EN MOHD SARIF BIN IBRAHIM
CAEA3209 / CBEB2301	02:30 JAM	PN RUBI BT AHMAD
/ EB415		PN LIM CHUI CHOO
		EN THILLAISUNDARAM ARUMUGUM
CBGB5104	03:00 JAM	EN RAMLI BAHROOM
EPEE3112	02:30 JAM	PROF MADYA DR NORMA MANSOR
IAEU1101	02:00 JAM	WAN SUHAIMI WAN ABDULLAH
IBEX1204	02:00 JAM	DR ALI MOHAMMAD
IEEH3104	02:00 JAM	DR JONI TAMKIN B. BORHAN
ISEU2101	02:00 JAM	PROF MADYA DR ABDUL HALIM HJ MAT DIAH
		PROF MADYA WAN YAHYA WAN AHMAD
IUEH3108	02:00 JAM	PN NARIZAN BT ABDUL RAHMAN
SN493	02:00 JAM	PROF MADYA DR TEOH SENG BENG
SN494	02:00 JAM	PROF HO COY CHOKE
PENGAWAS TAMBAHAN		
PN NAZIATY MOHD YAACOB		
DR SAAIDAH ABDUL RAHMAN		

04/03/1999 KHAMIS PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF ABDUL GHANI KAMARUDDIN		
AEEA3312 / AE439	03:00 JAM	PROF MADYA MOHAMMAD REDZUAN OTHMAN
BAGA4143	03:00 JAM	EN NOOR ROSLY HANIF
IQEU2102	02:00 JAM	EN FAUZI DERAMAN
JEEA3109	02:00 JAM	EN ZAHIR AHMAD
KCEP3254	02:00 JAM	PROF ABDUL GHANI KAMARUDDIN
PEET2102	02:30 JAM	PN DEVIKAMANI M.M. MADHAVA MENON PN LEELA A/P KORAN
PEET3102	02:30 JAM	PN CECILIA CHEONG YIN MEI PN MOHANA KUMARI NAMBIAR
SGES2271	02:00 JAM	EN MUSTAFFA KAMAL SHUIB
SJ426	03:00 JAM	PROF MADYA DR LEE KING TAK
SMES2202 ; SM419	02:30 JAM	RADHA PROF MADYA DR MOHAMED RIDZA WAHIDDIN PROF MADYA DR SAADAH ABDUL RAHMAN
PENGAWAS TAMBAHAN		
EN ANAND SHANKAR		
PROF MADYA DR HILMI MAHMUD		
PN SITI FATIMAH SIRAJ		
LOKASI ARAS2		
KETUA PROF MADYA DR MOHAMED NOR CHE NOH		
AAEA2309	01:30 JAM	PROF DR CHENG GEK NAI
ADEA3101	02:00 JAM	PROF MADYA RICHARD FRANCIS DORALL
ISEU2102	02:00 JAM	EN ABDULLAH BIN YUSOF
JFEA2107	02:00 JAM	PROF MADYA DR OTHMAN MD YATIM
KMEM2123 / KMEM2146	JAM	EN THAM CHAN SENG
SDES2102	02:00 JAM	PROF MUHAMAD ZAKARIA
SDES3306	02:00 JAM	PROF PERUMAL RAMASAMY
SNES3102	01:00 JAM	EN KHAIRUDDIN HAJI ITAM
SPB403	01:30 JAM	DR AMIR FEISAL MERICAN ALJUNID MERICAN
VXES2108	02:35 JAM	PROF MADYA DR MOHAMED NOR CHE' NOH
LOKASI DM		
KETUA DR MAYA DAVID NEE KHEMLANI		
TXGA3101	03:00 JAM	DR MAYA DAVID NEE KHEMLANI

05/03/1999 JUMAAT PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF. MADYA DR MOHD SAPIYAN BABA		
AE445 / AEEA3315	JAM	PROF DR RANJIT SINGH DARSHAN SINGH
AG404	02:00 JAM	EN AHMAD ZUHDI BIN ISMAIL
AUEA3305	03:00 JAM	EN JASTWAN SINGH A/L HARNAM SINGH
CBGB6306	03:00 JAM	PROF MADYA DR MD NOR OTHMAN
IAEU2201	02:00 JAM	WAN SUHAIMI WAN ABDULLAH EN MOHD YUSOFF SENIK PN SERIPAH ZIN SAYED ALI
IAGU6101	03:00 JAM	DR JOHARI MAT
IDGU6101	03:00 JAM	PROF MADYA DR AB AZIZ MOHD ZIN
IEEH2104	02:30 JAM	PROF MADYA DR IDRIS AWANG
IEGA6104	03:00 JAM	PROF ABDULLAH @ ALWI HAJI HASSAN
IFGA6101	03:00 JAM	DR MOHAMED KHAIR HASB ELRASOUL AHMED
IHEH2103	02:00 JAM	PROF.DR ABDUL MONEM IBRAHIM OSMAN EL BADRAWI
IHGA6102	03:00 JAM	EN SHUKERI BIN MOHAMAD
IPEH2104	02:00 JAM	EN RAMLI BAHROOM
IQGU6101	03:00 JAM	ABDUL RASHID AHMAD
ISGU6101	03:00 JAM	DR AHMAD ZAKI HAJI BERAHIM@IBRAHIM
IUEH2104	02:00 JAM	EN ABDUL KADIR HAJI MUHAMMAD
IUGA6103	03:00 JAM	PROF DR MAHFODZ MOHAMED
JBEA2109	02:00 JAM	DR ROGAYAH BT. A. RAZAK
JDEA2206	03:00 JAM	EN NOR HISHAM OSMAN
JFEA2106	02:00 JAM	PROF MADYA DR OTHMAN MD YATIM
KE430	JAM	DR SYED MOHAMMAD SADDIQUE PAKISTAN
SJES3451	02:00 JAM	PROF MADYA TAN CHOON PENG
SMES2201	02:30 JAM	PROF MADYA DR WAN AHMAD TAJUDDIN WAN ABDULLAH
SPM403	JAM	PROF DR MUHAMAD RASAT MOHAMMAD
SSES2105	02:00 JAM	PROF MADYA DR NORMA CHE YUSOFF
WKES3312 / WMES3311	JAM	NOR ANIZA ABDULLAH
WMGA6313	03:00 JAM	PROF. MADYA DR MOHD SAPIYAN BABA
WXGB5006	03:00 JAM	DR DILJIT SINGH A/L BELWANT SINGH

PENGAWAS TAMBAHAN

PROF MADYA DR HILMI MAHMUD
EN SHAMZUDIN SULAIMAN
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05/03/1999 JUMAAT PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF KOH CHONG LEK		
AFEA2108	02:00 JAM	DR SABABATHY VENUGOPAL
AQ432	02:00 JAM	EN HANAFI HUSSIN
CAEA2103	02:30 JAM	PN DAISY LEE LEAN LOOI
KXEX2130	02:30 JAM	EN ABDUL RAHIM BIN ABDUL MANAF
KXEX2160	03:00 JAM	EN ANURDDIN ABDUL GHANI
		EN MAZLAN MOHAMAD JALI
		EN MOHD. AMIN BIN MOHD. DIN
		..
		..
LXEB1105	02:30 JAM	EN ABDUL SAMAD BIN ABDUL GHANI
		..
SHES1201	02:00 JAM	PROF KOH CHONG LEK
		PROF MADYA DR SAM CHOON KOOK
SLES2103	02:00 JAM	PROF MADYA DR PHANG SIEW MOI
PENGAWAS TAMBAHAN		
DR TAN EU CHYE		
PROF MADYA DR SITI ROHANI YAHYA		
PN SUSILA A/P MUNISAMY @ DORAISAMY		
LOKASI ARAS2		
KETUA PROF LEE BOON THONG		
AD421 / ADEA3307	JAM	PROF LEE BOON THONG
AEEA2306 / AE3006	03:00 JAM	PROF MADYA MOHAMAD ABU BAKAR
EA412 / CAEA3201	03:15 JAM	DR SUSELA DEVI SUPPIAH
		PN CHE RUHANA ISA @ MOHAMED ISA
EE330 / EEEE3312	02:30 JAM	DR JAMALUDDIN BIN MOHD YUNOS
		PROF GOVINDARAJULU NAIDU
		..
PAEC1302	02:00 JAM	PROF MADYA DR SHEELA JOYCELYN ABRAHAM
PAEC2301	02:30 JAM	PROF MADYA DR SOON TING KUEH NEE QUEK AI HWA
PBEK1111	02:00 JAM	PN FOZIAH BINTI MAHMOOD
VXES2101	02:30 JAM	EN ASHRIL YUSOF
VXES3121	03:00 JAM	EN ABDUL AZIZ ZAKARIA
WRES3301	JAM	MISS LAIHA MAT KIAH
WRGA6312	03:00 JAM	EN OMAR ZAKARIA

05/03/1999 JUMAAT MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA DR CHEN WEI		
AE444 / AEEA3308	02:00 JAM	EN ZULKARNAIN ABD RAHMAN
AK417 / AK333 / AKEA2321	JAM	EN ABU HASSAN BIN HASBULLAH
AV400	03:00 JAM	EN JAAFAR BIN JAMBI
KA420	03:00 JAM	PROF MADYA DR ISMAIL OTHMAN PROF MADYA DR KUAK YONG CHEW
KM4055 / KM471	02:00 JAM	PROF MADYA DR THAN CHEOK FAH
LM401 / LXEB3101	02:30 JAM	PN CHEONG MAY FONG PN KALAVATHY A/P MARUTHAVANAR PROF MADYA BADARIAH SAHAMID
SC401 / SPC401 / SCES3110	03:00 JAM	PROF MADYA DR CHEN WEI PROF MADYA DR ZAINUDIN ARIFIN
SFES2105	02:00 JAM	EN AMRAN MUHAMMAD
STES2301	01:00 JAM	PN EDAH MOHD ARIS
PENGAWAS TAMBAHAN		
EN ISMAIL BIN MUSIRIN		
EN AZHAR AHMAD		
LOKASI ARAS2		
KETUA PROF MADYA MD SALLEH BIN HJ. MD @ HJ. AHMAD		
AJ438 / SJES2438	03:00 JAM	DR NORDIN BIN HJ. MOHAMAD
SJES1250	01:30 JAM	MD HASHIM HJ YAHYA PN AMARJIT KAUR PROF MADYA DR SIM CHIAW HOCK
SMES2403	02:30 JAM	DR ZAINOL ABIDIN IBRAHIM
SZ442	01:30 JAM	PROF MADYA DR NORMA CHE YUSOFF
UF402	02:30 JAM	PROF MADYA DR ABDUL HALIM HJ MAT DIAH PN FATIMAH ALI PROF MADYA DATIN DR PAIZAH HJ ISMAIL
YF403	02:30 JAM	DR ANISAH AB GHANI EN OMAR @ WAN MAT WAN TEH PN RAIHANAH BT HJ AZAHARI PROF MADYA MD SALLEH BIN HJ. MD @ HJ. AHMAD

06/03/1999 SABTU PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF MADYA DATIN DR PAIZAH HJ ISMAIL		
IFEH2106 / YK301	02:00 JAM	PROF DR ABDUL MONEM IBRAHIM OSMAN EL BADRI
		DR SUWAID TAPAH
		DR MOHAMED KHAIR HASB ELRASOUL AHMED
		PROF MADYA DATIN DR PAIZAH HJ ISMAIL
		PROF MADYA DR IDRIS AWANG
		PROF MADYA MD SALLEH BIN HJ. MD @ HJ. AHMAD
IQEU3109	02:00 JAM	EN FAUZI DERAMAN
KEEE2233	03:00 JAM	EN AHAMAD BIN ABDULLAH
		EN AMIR TAKI YOUNISS AL-WAZZAN
		PROF MADYA DR RAVEENDRAN PARAMESRAN
PAEK2101	JAM	PN AZIZAH BT LEBAI NORDIN
PPEX2101	JAM	ROHANA ZUBIR
		PROF MADYA DR KHADIJAH ROHANI MD YUNUS
SCES1220	02:00 JAM	EN IZDIHAR BIN ISHAK
		PROF MADYA DR KAMALIAH MAHMOOD
SMES1201	02:00 JAM	DR HASAN BIN ABU KASSIM
		PROF MADYA ITHNIN ABDUL JALIL
SPJ404	01:30 JAM	PROF MADYA DR ABDUL HALIM ABDUL RASHID
VXES1101	02:30 JAM	CIK SELINA KHOO PHAIK LIM
VXES2110	02:00 JAM	EN SHABESHAN A/L M RENGASAMY
LOKASI PE		
KETUA PROF LIM MING HUAT		
ALEA2302	02:00 JAM	PROF DR AZIZAH KASSIM
ATEA2303	02:00 JAM	PROF SHAHARIL TALIB ROBERT
PDEJ3108	02:00 JAM	EN TIE FATT HEE
PSEX2102	02:00 JAM	SUMATHY K. KARUNAKARAN NAIR
		PN ZAHARAH BINTI HUSSIN
SJ401 / AJ401	03:00 JAM	PROF LIM MING HUAT
SM408	02:00 JAM	DR BURHANUDDIN KAMALUDDIN

06/03/1999 SABTU MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR LEE KIONG HOCK		
AKEA3102	02:00 JAM	PN ARBA'IYAH MOHD NOR PROF MADYA DATUK DR ABDUL LATIFF ABU BAKAR
EXEE1102	03:00 JAM	DR LEONG KAI HIN DR LIAW SHU HUI EN AZHAR BIN HARUN EN GOH KIM LENG EN MOHAMED ASLAM BIN GULAM HASSAN PN YEW SIEW YONG PROF DR LEE KIONG HOCK PROF MADYA DR MAHANI ZAINAL ABIDIN PROF MADYA DR NORMA MANSOR PROF MADYA IDRIS JAJRI PROF MADYA SADONO SUKIRNO PROF MADYA TEY NAI PENG
KMEM2124 / KMEM2212	03:00 JAM	PROF MADYA DR ABDUL GHAFFAR ABDUL RAHMAN PROF MADYA DR MANSOR FADZIL
PENGAWAS TAMBAHAN		
CIK NG SOR THO PROF MADYA SELLAPPAN PALANIAPPAN		
LOKASI ARAS2		
KETUA PROF DR YEAP EE BENG		
IEEH3106	03:00 JAM	DR JOHARI MAT
IFEH3105	02:00 JAM	DR JOHARI MAT
IPEH3104	02:00 JAM	EN AB MUMIN AB GHANI
JEEA2107	02:00 JAM	PN SITI AISHAH MAT ALI
PBEX3104	02:00 JAM	EN JASSEM ALI JASSEM
SG406	02:00 JAM	PROF DR YEAP EE BENG

07/03/1999 AHAD PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF SIEH MEI LING		
AD431 / ADEA3315	JAM	EN TAN WAN HIN ..
AKEA3318	02:00 JAM	PROF MADYA DATUK DR ABDUL LATIFF ABU BAKAR
ALEA2309	02:00 JAM	PN JAS LAILE SUZANA JAAFAR PN JULI EDO ..
CAEA2302	02:30 JAM	TANG KEAN ONN PROF SIEH MEI LING
EEEE2104	02:30 JAM	PN YEW SIEW YONG
JDEA2107	02:00 JAM	EN AHMAD RAMIZU B.ABBDULLAH EN NOR HISHAM OSMAN
LXEB1104	02:30 JAM	PN NURHALIDA BINTI MOHAMED KHALIL PN ZALINA ABDUL HALIM
PAET2101	02:00 JAM	DR AINI HASSAN PROF MADYA DR KULDIP KAUR @ KADIP KAUR KARAM SING
SDES2106	02:00 JAM	DR AHMAD SALIHIN HJ BABA
SJES1222	02:00 JAM	LIM KIM PIN DR DENG CHAI LING DR ROSLI RAMLI
YF301 / IFEH2105	02:00 JAM	PN RAIHANAH HJ ABDULLAH ..

07/03/1999 AHAD MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MOHAMED ABDUL MAJID		
AAEA3303 / AA439	02:00 JAM	CIK FAN PIK WAH
BBEB1241	03:00 JAM	DR AHMAD BIN RAMLY
BPEP2145 / BPEP1146	03:00 JAM	EN ROSLI SAID
IQEU3102	02:00 JAM	PROF MADYA DR ABDUL HAYEI ABDUL SHUKOR
KAEA1131 / SGES1131	02:00 JAM	DR AHMAD TAJUDDIN HJ IBRAHIM
		DR TAJUL ANUAR JAMALUDDIN
KAEA2143	02:30 JAM	EN ANAND SHANKAR
KEEE1111	03:00 JAM	EN ISMAIL BIN MUSIRIN
		EN ISMAIL MUSIRIN
PBET2302	02:00 JAM	PN FOZIAH BINTI MAHMOOD
PEET1201	02:30 JAM	DR MULLAI ARUNACHALAM
		PN CECILIA CHEONG YIN MEI
SFES3103	02:00 JAM	PROF MADYA DR AZIZAN BAHARUDDIN
SHES1202	02:00 JAM	PROF MADYA DR TAN ENG LEE
		PROF MOHAMED ABDUL MAJID
SNES2101	02:00 JAM	DR PARAMESWARI SOMASUNDRAM
SPM402	02:00 JAM	PROF MADYA DR SITI MERIAM ABDUL GHANI
PENGAWAS TAMBAHAN		
PN NORFIZAH MD ALI		
PROF MADYA DR MAHMOUD MOGHAVEMI		
..		
LOKASI ARAS2		
KETUA DR SUSELA DEVI SUPPIAH		
AQ415	02:00 JAM	EN SUFFIAN MANSOR
CBEB1101	03:00 JAM	DR SUSELA DEVI SUPPIAH
		EN THILLAISUNDARAM ARUMUGAM
		EN WAN SABRI WAN HUSSIN
		PN DAISY LEE LEAN LOOI
		PN HO SOW KIN
		PN KAZUYA HARAGUCHI
		PN LIM CHUI CHOO
		PN ZAKIAH BTE SALEH
		EN CHOONG KWAI FATT
		EN LEE SAI LEONG
		EN CYRIL HILARIS A/L PONNU
GIEW2003	02:00 JAM	DR ALI MOHAMMAD
IDEU3101	02:00 JAM	PROF MADYA DR AB AZIZ MOHD ZIN
TBEG1302	02:30 JAM	PN SONJA YUNUS
TBER1302	02:30 JAM	EN PIETER VON DER VORM

08/03/1999 ISNIN PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF GRACIE ONG SIOK YAN		
AC021	02:00 JAM	CIK AGNES YEOW SWEE KIM
IFEH1103	02:00 JAM	DR ABDUL KARIM ALI
IFEH1109	02:00 JAM	PN RAIHANAH HJ ABDULLAH
IFEH2104	02:00 JAM	DR ANISAH AB GHANI
		DR MOHAMED KHAIR HASB ELRASOUL AHMED
		PN RAIHANAH BT HJ AZAHARI
		PROF MADYA DR IDRIS AWANG
IFEH3107	02:00 JAM	PROF MADYA DATIN DR PAIZAH HJ ISMAIL
IPEH3108	02:00 JAM	EN AB MUMIN AB GHANI
ISEU1101	02:00 JAM	DR AHMAD ZAKI HAJI BERAHIM@IBRAHIM
IUEH3105	02:00 JAM	DR AHMAD HIDAYAT BUANG
SB445	01:30 JAM	DR MD YUSOFF MUSA
SN416	01:30 JAM	DR NOOR HASIMA BT A.K NAGOOR PITCHAI
SPJ432 / SPJ407	JAM	PN RIO HIROWATI SHARIFUDDIN
VXES3126	02:15 JAM	PROF GRACIE ONG SIOK YAN
LOKASI PE		
KETUA PN KUANG CHING HEI		
AZ300	02:30 JAM	PN KUANG CHING HEI

08/03/1999 ISNIN MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR RANJIT SINGH DARSHAN SINGH		
AD451 / AD486 / ADEA3317		JAM EN SOORYANARAYANA VARAHALU
AEEA2307	03:00	JAM EN JONNIE RASMADA HUTABARAT PROF DR RANJIT SINGH DARSHAN SINGH
AF444 / AFEA3311	02:00	JAM PROF MADYA DR KANTHASAMY NALLUSAMY
AKGC6170	02:00	JAM DR MAD SIDIN AHMAD ISHAK
AREA1104	03:00	JAM PN MELASUTRA MD. DALI
JDEA2205	02:00	JAM PROF MADYA DR TON IBRAHIM
KKEK1120	03:00	JAM PROF MADYA DR NIK MERIAM NIK SULAIMAN
KM4044 / KMEM3344 / KM475	02:00	JAM PROF MADYA DR MASJUKI HASSAN
PDET1102	02:00	JAM EN HABIB BIN MAT SOM EN LEW TAN SIN EN SHAHRIL @ CHARIL MARZUKI
PENGAWAS TAMBAHAN		
EN MOHAMAD ISKANDR MOHAMAD NOR		
LOKASI ARAS2		
KETUA EN ANURDDIN ABDUL GHANI		
ER404	02:30	JAM EN ANURDDIN ABDUL GHANI

09/03/1999 SELASA PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF SURADI SALIM		
BBEB2133	02:30 JAM	ZURAIMI MD ALI
CBEB2106	03:00 JAM	EN CYRIL HILARIS A/L M PONNU
		PN HO SOW KIN
		PROF MADYA BOH TWANG HUI MARGARET
EA335 / CAEA2203	JAM	EN THILLAISUNDARAM ARUMUGAM
ISEU3128	02:00 JAM	DR AHMAD ZAKI HAJI BERAHIM@IBRAHIM
KKEX2102	03:00 JAM	PROF K.B RAMACHANDRAN
KM4043	JAM	PROF MADYA QUA HOCK CHYE
PPET3103	02:00 JAM	CIK MELATI BT SUMARI
		EN MAHZAN BIN ARSHAD
		EN SANDIYAO SEBESTIAN
		PROF MADYA DR ABD RAHIM ABDUL RASHID
		PROF SURADI SALIM
SFES2304	02:00 JAM	PROF MADYA AMIDA @ HAMIDAH ABDUL HAMID
SLES2302	01:30 JAM	PROF MADYA DR PHANG SIEW MOI
SQES2147	01:30 JAM	PROF MADYA DR RAJA SHUIB RAJA HASSAN
SWES2304	02:00 JAM	DR LEELAVATHY RAJENDRAN @ PONNAMPALAM
SXEX1100	02:00 JAM	RADHA C.P MENON
		EN AMIR ROHAIZAT MEOR RAZAK
		EN MOHD ZUHDI MARSUKI
		PN SITI NURANI BT MOHD NOOR
VXES1107	02:30 JAM	EN RAHMAN IBRAHIM

09/03/1999 SELASA PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF MADYA DR MOHD ANIS MD NOR		
ATEA3375 / AT450	JAM	PROF MADYA DR MOHD ANIS MD NOR
AW403	JAM	CIK ZALEHA AHMAT
		EN S. PONNUSAMY
		EN TEOH SOON CHONG
		PN NORODZOH HJ SIRIN
		PROF MADYA DR AZIZAN ABU SAMAH
IPEH2105	02:00 JAM	EN AB MUMIN AB GHANI
JEEA2108	02:00 JAM	CIK ZURAINI HJ RAMLI
		EN ZAHIR AHMAD
KAEA1122	02:30 JAM	EN AZHAR AHMAD
		PROF MADYA DR KUAK YONG CHEW
KBEB1215	03:00 JAM	EN ANANDAN A/L SHANMUGAM
KK4075 / KKEK3305	02:00 JAM	DR MOHAMED AZLAN HUSSAIN
KMEM3154	JAM	EN SHAMSUDDIN AHMED
PBET1104	02:00 JAM	PN KHATHIJAH ABDUL HAMID
		PN NORINI BINTI ABAS
VXES3104	02:00 JAM	PN SOLHA BINTI HUSIN

10/03/1999 RABU PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF YONG HOI SEN		
AYEA2325	02:00 JAM	PN NOOR SHUHANA BINTI ZAMHURI
BAEA3152	03:00 JAM	EN YONG KUAN
CBEB1103	03:00 JAM	DR AININ BT SULAIMAN
		DR SUSELA DEVI SUPPIAH
		EN ABDUL LATIF HAJI SALLEH
		PROF MADYA DR DUNSTON S T AYADURAI
EXEE3101	03:00 JAM	PROF MADYA DR SITI ROHANI YAHYA
GWEW1001	02:05 JAM	EN TEH KANG HAI
IDEU3103	02:00 JAM	EN ROSLAN BIN MOHAMED
IFEH2110	02:00 JAM	EN MOHD MUHIDEN BIN ABD RAHMAN
IXEX3201	03:00 JAM	EN WAN IBRAHIM HJ WAN MAMAT
KCEC2120	02:00 JAM	DR S. RAMACHANDRAN
LJ307 / LXEB2401	03:15 JAM	PROF MADYA WAN ARFAH BINTI WAN HAMZAH
LJ416 / LXEB3312	02:15 JAM	CIK IZURA MASDINA MOHAMED ZAKRI
LM522	03:15 JAM	PROF MADYA ABU BAKAR B MUNIR
PBEX2104	02:00 JAM	ROHANAH HUSSAIN
		EN JASSEM ALI JASSEM
PDEJ3105	02:00 JAM	PN NORJANNAH ISMAIL
SB442	01:30 JAM	DR NORZULAANI KHALID
SDES3312 / SD409	02:00 JAM	PROF MADYA DR KAMARUDDIN MOHD YUSOFF
SEES3355	02:00 JAM	PROF MADYA DR MOHD ZAKARIA ISMAIL
SJ403	03:00 JAM	PROF MADYA DR ABDUL HALIM ABDUL RASHID
SPB434 / SPB408	01:30 JAM	PROF YONG HOI SEN
WKES3101	03:00 JAM	PN ZARINAH MOHD KASIRUN
WMES3303	03:00 JAM	EN PHANG KEAT KEONG
WXES1101 / WXET1101	JAM	PN ZAINAB BINTI AWANG NGAH
/ WXGD6101		PROF MADYA SELLAPPAN PALANIAPPAN
WXGB5052	03:00 JAM	DR DILJIT SINGH A/L BELWANT SINGH

PENGAWAS TAMBAHAN

PROF MADYA YAP CHAW YEN
EN ABDUL RAHIM BIN ABDUL MANAF
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10/03/1999 RABU PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR MUHAMAD ZAKARIA		
AA401 / AAEA3304	02:00 JAM	CIK GEETHA GOVINDASAMY
		PROF MADYA DR CHIA OAI PENG
APEA1107	01:30 JAM	CIK SITI HAJAR ABU BAKAR AH
CBGB5107	03:00 JAM	DR M FAZILAH ABDUL SAMAD
ESEE1104	02:30 JAM	DR LIAW SHU HUI
		PROF MADYA DR MAHANI ZAINAL ABIDIN
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EXEE2102	03:00 JAM	EN GOH KIM LENG
		PN ZARINAH BINTI YUSOF
		PROF JOMO KWAME SUNDARAM
		PROF MADYA SADONO SUKIRNO
KMEM3308 / KM4056	JAM	EN YAU YAT HUANG
/ KM456	EN	RAHIZAR RAMLI
SBES3305	02:00 JAM	PROF DR MUHAMAD ZAKARIA
SM415	02:00 JAM	PROF MADYA DR ALIAS DAUD
PENGAWAS TAMBAHAN		
EN ROSLI OMAR		
..		
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LOKASI ARAS2		
KETUA PROF MAK CHAI @ MAK LIAN FONG		
AEEA2311 / AE315	02:30 JAM	EN DANNY WONG TZE KEN
JBEA2111	02:00 JAM	SANET MD NASIR
		EN MOHD TAUFIK ARRIDZO MOHD BALWI
LXEB1103	02:30 JAM	EN ABD MUHSIN AHMAD
		PN SITI ZAHARAH BT JAMALUDDIN
PPEC2201	02:30 JAM	EN HUSHIM SALLEH
SIES2240	02:00 JAM	PROF MADYA DR ROSNA MAT TAHA
SN424 / SN425	03:00 JAM	EN MD ABU OMAR AWANG
SXEX1101	02:00 JAM	PROF MAK CHAI @ MAK LIAN FONG
SXEX1102	02:00 JAM	EN ABDUL GHAPOR HUSSIN
		EN MOHD ZUHDI MARSUKI
		PROF MADYA DR DAVID ANDREW BRADLEY @ HJ
		MOHD DAUD
LOKASI FPP		
KETUA DR. WILLIAM CHAN		
VXES3144 / VXES3143	JAM	DR. WILLIAM CHAN

11/03/1999 KHAMIS PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MASITAH HASAN		
AG402	02:00 JAM	EN MUSTAFFA BIN ABDULLAH
AX402	JAM	DR SHANTHI A/P THAMBIAH
BBEB2144 / BQEQ2144	02:30 JAM	EN MOHD SARIF BIN IBRAHIM
BPEP2242 / BPEP3244	03:00 JAM	MOHD NAZRI YUSOF
CBGB5110	02:30 JAM	DR AININ BT SULAIMAN
EEEE2303	02:30 JAM	EN AZHAR BIN HARUN
IQEU3105	JAM	EN ISHAK BIN HJ SULIAMAN
KKEK2153	03:00 JAM	EN EZZAT CHAN ABDULLAH/CHAN BENG KUAN
KKES3141	03:00 JAM	EN ABDUL AZIZ BIN ABDUL RAHMAN
KXEX1110	02:30 JAM	EN ALI ABBAS KHIDHAIR
		EN MOHAMMAD JINDRA BIN ARIS
		PROF MADYA DR TEE TIAM TING
		PROF MADYA DR TEH SER KOK
		PROF MASITAH HASAN
PCET1202	JAM	PN ALICE K D SAMUEL PILLAY
SEES2104	03:00 JAM	PROF MADYA DR MHD RADZI ABAS
SGES2309 / SG405	02:00 JAM	PROF MADYA MOHAMAD ALI HASAN
SJES2250	02:00 JAM	PROF MADYA NIK AHMAD KAMAL NIK MOHAMAD AMIN
SNES3348	02:00 JAM	PROF MADYA DR NONI AJAM
SQES2145	01:30 JAM	PROF MADYA DR SHAIFUL AZNI ABDUL AZIZ
SWES2103	02:00 JAM	DR NORZULAANI KHALID
UF401	02:30 JAM	EN AB AZIZ AWANG KECHIK
		EN ABDUL RASYID LAHU MUHAMMAD
		EN MOHD YUSOFF SENIK
		EN FAUZI DERAMAN

PENGAWAS TAMBAHAN

DR TITIK KHAWA

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11/03/1999 KHAMIS PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF K. SOOSAY NATHAN		
AAEA1112	02:00 JAM	EN HENG KAY SONG @ HING KAY ENG
AV404 / AYEA3319	02:00 JAM	EN MD NASRUDIN BIN MD AKHIR
AYEA2312	02:00 JAM	PROF K. SOOSAY NATHAN
BPEP1136	03:00 JAM	EN IBRAHIM AHMAD
CBEB3104	03:00 JAM	EN RAMLI BAHROOM
		EN LEE SAI LEONG
IUEH3106	02:00 JAM	PROF MADYA SIDI AHMAD ABDULLAH
KCEP1104	03:00 JAM	DR IMTIAZ AHMED CHOUDHURY
KK4082 / KKEK3312	02:00 JAM	PROF MADYA LEONG YUB CHOONG
SMES2301	02:30 JAM	DR HASAN BIN ABU KASSIM
TAEA1108	02:30 JAM	EN WAN IBRAHIM HJ WAN MAMAT
TCEE1109	02:30 JAM	PN FAUZIAH TAIB
TDEC1107	02:30 JAM	PROF MADYA NG PECK HOON
TDET1109	02:30 JAM	EN SREETHARAN A/L KRISHNAN KUTTY
WMGA6314	03:15 JAM	EN ABDULLAH GANI
YS403	JAM	DR AHMAD HIDAYAT BUANG
PENGAWAS TAMBAHAN		
EN PALANIAPPAN A/L RAMASAMY		
DR MOSTAFA KAMAL		
DR ISKANDAR IDRIS BIN YAACOB		
LOKASI ARAS2		
KETUA PROF MADYA DR TIOH NGEE HENG		
AH401	03:00 JAM	EN AHMAD RAMIZU BIN ABDULLAH
		EN ZAKARIA YUSOF
JDEA1101	02:00 JAM	EN AHMAD RAMIZU BIN ABDULLAH
		EN NOR HISHAM OSMAN
		PN ROHANI MOHD YUSOFF
JEEA2109	02:00 JAM	EN HASHIM ISMAIL
JEEA3110	02:00 JAM	EN HASHIM ISMAIL
		PN NORHAYATI AB RAHMAN
KBEB1118	02:00 JAM	EN YAU YAT HUANG
PAEX2102	02:00 JAM	LEE MOON KEEN
		PROF MADYA DR SOON TING KUEH NEE QUEK AI HWA
SC441 ; SCES3311	JAM	PROF MADYA DR TAN GUAN HUAT
		PROF MADYA DR TIOH NGEE HENG
SLES2107	01:30 JAM	PROF MADYA ABDUL RANI ABDULLAH
SSES2106	02:00 JAM	PROF MADYA WONG KHOON MENG
LOKASI FEP		
KETUA PN ROHANA JANI		
ESGC2114	03:00 JAM	PN ROHANA JANI

12/03/1999 JUMAAT PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS2		
KETUA PROF GOVINDARAJULU NAIDU		
ACEA2107	03:00 JAM	PROF MADYA TANG SOO PING NEE CHAN
AP412 / APEA3108	JAM	DR FAIZAH BT YUNUS
		EN MOHD FAUZI AYOB
CBEB1102	03:00 JAM	ZAINOL BIN ABDULLAH
EREE1101	02:30 JAM	DR SHAMSULBAHRIAH KU AHMAD
		EN/PN YEOH KOK KHENG
		PROF MADYA GOVINDARAJULU NAIDU
		CIK NG SOR THO
		..
IFEH1108	02:00 JAM	PROF MADYA DR IDRIS AWANG
IQEU1102	02:00 JAM	EN ISHAK BIN HJ SULIAMAN
		EN MOHD MUHIDEN BIN ABD RAHMAN
IUEH1102	02:00 JAM	PN NARIZAN BT ABDUL RAHMAN
IUEH3104	02:00 JAM	DR AHMAD HIDAYAT BUANG
KCEP2219	JAM	ABD HALIM HAKIM ABD AZIZ
KMEM2242	02:30 JAM	EN MOHAMMAD JINDRA BIN ARIS
		EN POH SIN CHEW
PSET3202	02:00 JAM	EN KHAIRUDDIN BIN MD TAIB
VXES1108	02:30 JAM	CIK SELINA KHOO PHAIK LIM
LOKASI DTC		
KETUA PROF MADYA MARGARET YONG		
ACEA3406	JAM	PROF MADYA MARGARET YONG
AREA2308	02:00 JAM	PN MELASUTRA MD. DALI
CAEA2208 / EA339	02:30 JAM	EN CHOONG KWAI FATT
		..
		..
EPEE2103	02:30 JAM	PROF MADYA DR NORMA MANSOR
SB438	01:30 JAM	PROF MADYA DR ROSNA MAT TAHA
SDES2103	03:00 JAM	PROF MADYA DR WANG CHEE WOON
SFES3106	02:00 JAM	PROF MADYA DR AZIZAN BAHARUDDIN
SJ421 / AJ415	03:00 JAM	DR DENG CHAI LING
SSES2309	02:00 JAM	DR ROSLI HASHIM
SZ449	01:30 JAM	PROF MADYA DR NORMA CHE YUSOFF

12/03/1999 JUMAAT MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR MAHFODZ MOHAMED		
AFEA2119	03:00 JAM	DR RAJANTHERAN MUNIANDY
BAEA3222	02:00 JAM	PN RODIAH ZAWAWI
IBEX1102	02:00 JAM	EN ABDULLAH BIN YUSOF
		EN WAN ZAILAN KAMARUDDIN WAN ALI
		PROF DR MAHFODZ MOHAMED
JBEA3102	02:00 JAM	EN AB RAZAK MOHD KASSIM
		EN NUWAIRI HAJI KHAZAAI
PBEX1301	02:00 JAM	PN NORINI BINTI ABAS
SMES1202	02:00 JAM	THANGARAJO PONNUSAMY
		PROF MADYA DR MOO SIEW PHENG
SMES3402	02:30 JAM	PROF MADYA DR SITI MERIAM ABDUL GHANI
STES2106	02:00 JAM	DR DURRIYYAH SHARIFAH HAJI HASSAN ADLI

PENGAWAS TAMBAHAN

PN NOOR FADHILAH BINTI MAT NAYAN
PN JAMILAH IBRAHIM

13/03/1999 SABTU PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF JOHN KUNA RAJ		
AA405 / AAEA3301	02:00 JAM	PROF MADYA HJ. OBAIDELLAH MOHAMAD
BPEP2252	03:00 JAM	PN SHARIFAH AZAH BINTI SYED AHMAD
BQEQ2146 / BBEB2143	02:00 JAM	WAN NOR AZRIYATI WAN ABD AZIZ
KAEA1142	02:30 JAM	EN MOKHTAR AZIZI MOHD DIN
KAEA2224	03:00 JAM	PN ZAINAH BT IBRAHIM
		PROF MADYA DR KUAK YONG CHEW
KEEE1151	03:00 JAM	DR TITIK KHAWA
		PROF MADYA DR MOHAMAD ROM TAMJIS
KKEK1133	03:00 JAM	DR CHUAH CHENG HOCK
		DR MOHAMED KHEIREDDINE BIN TAIEB AROUA
KKEK2144	03:00 JAM	DR MOHAMED AZLAN HUSSAIN
KKES2212	03:00 JAM	PN FARIDAH MOHD TAHIR
KMEB1115	02:00 JAM	DR P N RAO
LXEB2102	02:30 JAM	PN SUDHA PILLAY
		EN KHOO BOO TEONG
SDES3310	02:00 JAM	DR SARNI MAT JUNIT
SG421 / SGES3302	JAM	PROF JOHN KUNA RAJ
SLES2301	02:00 JAM	PROF MADYA DR WAN KHADIJAH WAN EMBONG
YS401	03:00 JAM	EN ABDUL KADIR HAJI MUHAMMAD
PENGAWAS TAMBAHAN		
EN AMIR TAKI YOUNISS AL-WAZZAN		
EN AHAMAD BIN ABDULLAH		
..		
LOKASI ARAS2		
KETUA PROF MADYA DR YAP BENG LIANG		
AG401	JAM	EN ROSLAN BIN MOHAMED
AG450	JAM	EN ZULKARNAIN ABDUL RAHMAN
EPEE2104	02:30 JAM	EN MUHAMMAD ASRI BIN MOHD ALI
JFEA3105 ; RREA2103 / RREA1103	02:00 JAM	EN ABDUL RAZAK ABDUL KARIM
JXEA1103	02:00 JAM	EN NUWAIRI HAJI KHAZAAI
		EN ZAHIR AHMAD
		PROF MADYA DR YAP BENG LIANG
KBEB0208	02:00 JAM	PROF MADYA DR MOHD AFANDI MUHAMMAD
SVES1251	02:00 JAM	DR ROSLI HASHIM
TBER1301	02:30 JAM	PN JAGDISH KAUR GURDEEP SINGH
UQ402	02:30 JAM	EN ISHAK BIN HJ SULIAMAN
		PN SERIPAH ZIN SAYED ALI
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VXES3127	03:00 JAM	EN ABDUL AZIZ ZAKARIA

14/03/1999 AHAD PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF. FAISAL HJ ALI		
ADEA2316	02:00 JAM	EN ABDULLAH NAIB
AEEA2305 / AE3005	03:00 JAM	EN SIVACHANDRALINGAM SUNDARA RAJA PROF MADYA DR LOH WEI LING
IFEH1102	02:00 JAM	PN RAIHANAH BT HJ AZAHARI
IPEH1104	02:00 JAM	EN AB MUMIN AB GHANI
IQEU1101	02:00 JAM	EN MUSTAFFA BIN ABDULLAH
JCEA2107	02:00 JAM	PROF MADYA ZAINAL ABIDIN BORHAN EN SAMSUDIN SUHAILI PN NOOR HASNOR BT MOHAMAD NOR
KA430	03:00 JAM	DR ROSLAN HASHIM PROF FAISAL HJ ALI
KCEP2131	02:00 JAM	IR. B. A. BONGERS
KMEB2124	02:00 JAM	DR ISKANDAR IDRIS BIN YAACOB
PDET2202	02:00 JAM	EN TEOH HENG TEONG
PPEC2101	01:30 JAM	DR IBRAHIM HASHIM
PPET2102	02:00 JAM	DR SHAHRIR JAMALUDDIN
SFES3351	02:00 JAM	PROF MADYA DR AZARAE HAJI IDRIS
SJES2460	02:00 JAM	PROF MADYA DR WANG ANN LEE
SMES1204	02:00 JAM	CIK ROZAINAH MOHD ZAKARIA DR DIETMAR HENRICH
SPC432	02:00 JAM	PROF MADYA DR MOHAMMAD NIYAZ KHAN
TBEB1302	02:30 JAM	EN PIETER VON DER VORM
VXES2111	02:00 JAM	PN NADHRATUL WARDAH BT HJ SALMAN
VXES3125	02:35 JAM	PROF MADYA DR MOHAMED NOR CHE' NOH
PENGAWAS TAMBAHAN		
EN AMIR TAKI YOUNISS AL-WAZZAN		

M/SURAT79

14/03/1999 AHAD MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA DR TAN EU CHYE		
AL429 / ALEA3305		JAM PN MALINI RATNASINGAM
EPEE2105	02:30	JAM DR TAN EU CHYE
		EN MUHAMMAD ASRI BIN MOHD ALI
		DR ALI BOERHANNOEDDIN

M/SURAT80

15/03/1999 ISNIN PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF KHALID MOHAMED NOR		
AAEA1407	02:00	JAM CIK WONG YOKE NYEN
AC011		JAM PN SITI ROHAINI KASSIM
AEEA2310	02:00	JAM PROF MADYA LEONG SAU HENG
ANEA2102	03:00	JAM PROF MADYA DR AZIZAN ABU SAMAH
AUEA1104	02:00	JAM PN RUHANAS BT HARUN
AYEA3326	02:00	JAM ..
AZEA3303	03:00	JAM PN RAIHANAH HJ ABDULLAH
CBGB5102	03:00	JAM DR LANG CHIN YING
CBGB5109	03:00	JAM PROF MADYA DR MD NOR OTHMAN
EE411 / EEEE3309		JAM PN LOKE WAI HENG
GIEW2002	02:00	JAM DR ABDUL KARIM ALI
		DR SUWAID TAPAH
IBEX3105	02:00	JAM EN AHMAD ZUHDI BIN ISMAIL
KAEA2202	02:30	JAM FARIDAH OTHMAN
		FARIDAH OTHMAN
		EN ABDUL AZIZ BIN ABDUL RAHMAN
KEEE3453 / KE450		JAM PROF KHALID MOHAMED NOR
		..
LM519	03:15	JAM PROF MADYA DR KHAW LAKE TEE
LM528	03:15	JAM PN SHARIFAH SHUHANAH SYED AHMAD
LXEB3308 ; LJ419	02:45	JAM PN GRACE MANORANJITHAM GEORGE OBED
		SINGH
PMEX1102	03:00	JAM DR SHARIFAH NORUL AKMAR SYED ZAMRI
SM413 / SMES3309	02:00	JAM EN TAIFUNISYAM TAIB
		PROF MADYA DR MOHD ZAMBRI ZAINUDDIN
SMES3404	02:30	JAM DR RAJA MUSTAPHA RAJA HASSAN
SN402	01:30	JAM PROF MADYA DR TEOH SENG BENG
TBEH1301	02:30	JAM EN JOSE ANTONIO MARTINEZ MARIN
TBEJ1302	02:30	JAM PN ONG SHYI NIAN
TBEP1301	02:30	JAM EN AHMAD KAMIL BIN GHAZALI
TBEQ1301	02:30	JAM EN JAMIAN MOHAMAD
PENGAWAS TAMBAHAN		
EN AHAMAD BIN ABDULLAH		
EN MOHD. AMIN BIN MOHD. DIN		
EN MAZLAN MOHAMAD JALI		

15/03/1999 ISNIN PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MASITAH HASAN		
ALEA1103	02:00 JAM	EN MOHAMED NAZARI JAAFAR
		PN SITI NOR AWANG
		PROF MADYA DR ROZIAH OMAR
AT451 / ATEA3306	JAM	EN HANAFI HUSSIN
AUEA2308	03:00 JAM	EN JASTWAN SINGH A/L HARNAM SINGH
BPEP2204	03:00 JAM	EN NOOR ROSLY HANIF
IBEX2205	02:00 JAM	DR ALI MOHAMMAD
IQEU2201	02:00 JAM	EN SYED ABDURAHMAN HJ SYED HUSSIN
		PROF MADYA DR ABDUL HAYEI ABDUL SHUKOR
IUEH3107	02:00 JAM	SITI ZUBAIDAH ISMAIL
KAEA1121	03:00 JAM	MOHD ALI ABD RAZAK
KKEK1111	02:00 JAM	DR HACHARAN SINGH A/L D KARTAR SINGH
KKEK1211	02:00 JAM	PROF MASITAH HASAN
KKEK2221	02:00 JAM	DR WAN MOHD ASHRI BIN WAN DAUD
KKES1111	02:00 JAM	EN MOHAMAD ISKANDR MOHAMAD NOR
SCES3333	02:00 JAM	PROF MADYA CHAN CHEE YAN
SDES2305	02:00 JAM	PROF MADYA DR MOHD SOFIAN AZIRUN
SFES2234	02:00 JAM	PROF MADYA AMIDA @ HAMIDAH ABDUL HAMID
SJES3454	02:00 JAM	DR OMAR MOHD RIJAL
SNES3140	02:00 JAM	PROF MADYA DR NONI AJAM
STES2303	02:00 JAM	DR DURRIYYAH SHARIFAH HAJI HASSAN ADLI
SWES2301	02:00 JAM	DR ROFINA YASMIN BTE DATO OTHMAN
WMES3304	JAM	NORIZAN MOHD YASIN
PENGAWAS TAMBAHAN		
DR NIK ABDULLAH NIK MOHAMED		
EN YONG KUAN		
EN HJ AHMAD EZANEE		
LOKASI ARAS2		
KETUA EN SHABESHAN A/L M RENGASAMY		
KBEB1217	03:00 JAM	EN ANANDAN A/L SHANMUGAM
PDEX2301	JAM	EN SHABESHAN A/L M RENGASAMY

16/03/1999 SELASA PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR WONG CHIOW SAN		
AYEA1102	02:00 JAM	GEETHA GOVINDASAMY
		EN ICHIRO SUGIMOTO
		PN NOOR SHUHANA BINTI ZAMHURI
		PROF MADYA DR TAN OOI CHEE
AYEA2311	02:00 JAM	DR HOU KOK CHUNG
EA431 / CAEA3206	JAM	DR M FAZILAH ABDUL SAMAD
		PN LIM CHUI CHOO
		PROF MADYA BOH TWANG HUI MARGARET
EPEE3304	02:30 JAM	PN RAJA NORIZA BINTI RAJA ARIFFIN
JEEA2211	02:00 JAM	PROF. DR ABDUL WAHAB ALI
KCEP2114	02:00 JAM	IR. B. A. BONGERS
KMEB2127 / KMEB3311	03:00 JAM	PROF MADYA QUA HOCK CHYE
RDEA1303	JAM	PN ELEEZA ZAINUDDIN
RDEA2101	02:30 JAM	EN HANAFI HUSSIN
SB448 / SB447	01:00 JAM	PROF HELEN NAIR
SC430	02:00 JAM	PROF HO CHEE CHEONG
SDES3301 / SDES2303 /SD403	02:00 JAM	PROF TAN NGET HONG
SFES2302	01:30 JAM	PN SITI NURANI BT MOHD NOOR
SGES2274	02:00 JAM	PROF MADYA DR KHOO TENG TIONG
SJ423	01:30 JAM	PROF FON WAI CHU
SJES2426	02:00 JAM	EN CHANG TIAN HOCK
SJES2441	02:30 JAM	DR MOHD KHANAFIAH ISMAIL
SM416	02:00 JAM	PROF DR WONG CHIOW SAN
SPC405	02:00 JAM	PROF MADYA DR TIOH NGEE HENG
SPC433	02:00 JAM	DR ABDUL HAMID YAHAYA
SPM401	02:00 JAM	DR BURHANUDDIN KAMALUDDIN
SZ462	01:30 JAM	PROF MADYA DR MOHD ZAKARIA ISMAIL
PENGAWAS TAMBAHAN		
EN ISMAIL NAASIRUDDIN		
EN MOHAMMAD JINDRA BIN ARIS		
LOKASI ARAS2		
KETUA PROF MADYA WAN YAHYA WAN AHMAD		
ADEA2319 / AM406	03:00 JAM	DR RAJANTHERAN MUNIANDY
		EN TAN WAN HIN
IBEX2106	02:00 JAM	EN WAN ZAILAN KAMARUDDIN WAN ALI
IHEH1101	02:00 JAM	CIK SITI ARNI BASIR
ISEU1103	02:00 JAM	PROF MADYA WAN YAHYA WAN AHMAD
KMEM3315 / KM4057	03:00 JAM	DR SOLOMON DARIUS GNANARAJ
PDET1101	02:00 JAM	SEPTY RUZUI SYARIF
		EN SHABESHAN A/L M RENGASAMY
		PN ZAINUN AWANG NGAH
VXES3123	02:00 JAM	ASHRIL YUSOF
	02:30 JAM	

17/03/1999 RABU PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR MUHAMAD ZAKARIA		
AC012	JAM	PROF MADYA MARGARET YONG
AEEA1104	02:00 JAM	EN SIVACHANDRALINGAM SUNDARA RAJA
		PN SHAKILA PARWEEN BTE YACOB
		PROF MADYA DR LOH WEI LING
AFEA2318	02:00 JAM	EN KRISHNAN MANIAM
		PROF MADYA DR THILAGAWATHI KANAGARETNAM
AH411	03:00 JAM	PROF MADYA LEONG SAU HENG
CBGB5101	03:00 JAM	PROF MADYA DR TAN LEE PENG
EXGA2110	03:00 JAM	DR SYED AZMAN BIN SYED AHMAD NAWAWI
IBEX2105	02:00 JAM	SITI ZUBAIDAH ISMAIL
		PN NARIZAN BT ABDUL RAHMAN
		PN RAIHANAH HJ ABDULLAH
IBEX3208	02:00 JAM	DR JONI TAMKIN B. BORHAN
KAEA2233	02:00 JAM	DR WAN MOHD ASHRI BIN WAN DAUD
		EN SOMENAHALLI VENKATA CHANDRA SEKAR
		EN MOHKTAR AZIZI MOHD DIN
KE476 / KEEE3336	JAM	FARIDAH OTHMAN
		NORHAYATI SOIN
		EN ROSLI OMAR
LM502	03:15 JAM	EN KHOO BOO TEONG
SCES2433	02:00 JAM	PROF MADYA CHAN CHEE YAN
SHES1200	02:00 JAM	PROF MADYA DR AMRU BIN NASRULHAQ BOYCE
		PROF MADYA DR RAMLI ABDULLAH
STES2304	02:00 JAM	PROF DR MUHAMAD ZAKARIA
PENGAWAS TAMBAHAN		
PROF MADYA LEONG YUB CHOONG		
EN ISMAIL NAASIRUDDIN		

LOKASI ARAS2		
KETUA PROF MADYA SIDI AHMAD ABDULLAH		
AK412 / AKEA3314	JAM	PROF MADYA RAHMAN SHAARI
EP405 / EPEE3307	02:30 JAM	DR SAAIDAH ABDUL RAHMAN
KKEK3161 ; KK4021	03:00 JAM	DR CHE ROSMANI CHE HASSAN
UF403	01:30 JAM	EN ABDUL AZIZ AWANG KECHIK
		PN KHADIJAH BT MOHD KHAMBALI @ HAMBALI
VXES3106	03:15 JAM	CIK WIRDATI MOHD RADZI
YE405	03:00 JAM	PROF ABDULLAH @ ALWI HJ HASSAN
YL407	02:30 JAM	PROF MADYA SIDI AHMAD ABDULLAH

17/03/1999 RABU MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA SELLAPPAN PALANIAPPAN		
ESEE2301	02:30 JAM	PROF MADYA SELLAPPAN PALANIAPPAN
IQEU2204	02:00 JAM	ABDUL RASHID AHMAD EN MUSTAFFA BIN ABDULLAH

M/SURAT90

18/03/1999 KHAMIS PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA DR HUSSAIN MOHAMED		
AFEA2109	03:00 JAM	PN SHARIFAH AISHAH BINTI OSMAN
		PROF MADYA DR RAJAKRISHNAN RAMASAMY
AUEA2310	02:00 JAM	PROF MADYA DR HUSSAIN MOHAMED
JDEA2104	02:00 JAM	PN SALINAH JAAFAR
KMEB3331 / KMEM3341	JAM	..
/ KM461		..
/ KM4061		
KXEX1141	02:15 JAM	PN ASMA AHMAD SHARIFF
		PN SITI AISHAH HASHIM ALI
PDET3101	02:00 JAM	EN GHAZALLI BIN OTHMAN
		EN HABIB BIN MAT SOM
		EN SHAHRIL @ CHARIL MARZUKI
		PN NOORSHAH MOHD SALLEH
		PROF MADYA DR LEO ANN MEAN

PENGAWAS TAMBAHAN

PN MARIANI BINTI MD NOR
PN NOOR FADHILAH BINTI MAT NAYAN
PN JAMILAH IBRAHIM

M/SURAT91

18/03/1999 KHAMIS MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PN MALINI RATNASINGAM		
ALEA1105	02:00 JAM	CIK ZALEHA AHMAT
		EN S. PONNUSAMY
		EN TEOH SOON CHONG
		PN MALINI RATNASINGAM
		PN NORODZOH HJ SIRIN

M/SURAT93

19/03/1999 JUMAAT PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF VOON PHIN KEONG		
ACEA3309	03:00 JAM	PROF LIM CHEE SENG
AEEA2312	02:00 JAM	PN SHAKILA PARWEEN BTE YACOB
AEEA2313	02:00 JAM	PROF K. SOOSAY NATHAN
AFEA2112	03:00 JAM	PROF MADYA DR RAJAKRISHNAN RAMASAMY
AKEA3312	02:00 JAM	DR MAD SIDIN AHMAD ISHAK
AV408	03:00 JAM	PROF VOON PHIN KEONG
AYEA3330	02:00 JAM	DR HOU KOK CHUNG
EG403 / EGEE3307	JAM	PROF LEE HOCK LOCK
EPEE3114	02:15 JAM	EN KUPPUSAMY SINGARAVELLOO
ESEE2201	02:30 JAM	DR HALIMAH AWANG
IBEX3206	02:00 JAM	DR ALI MOHAMMAD
JFEA2108	02:00 JAM	MOHD. EFFINDI SAMSUDDIN
KAEA1125	02:00 JAM	PROF MADYA MOHAMED REHAN KARIM
KM4053 / KMEM3316	02:30 JAM	PROF MADYA DR ZAHARI TAHA
PA401	JAM	EN HUSSIN BIN NOOR
PCET2204	JAM	EN LEONARD RAJAN JEYAM
PPEK2143	02:15 JAM	PROF CHIAM HENG KENG
SJES3455	03:00 JAM	PROF MADYA DR WONG WING YUE
SM411 / SMES3325	02:00 JAM	PROF MADYA DR ABU BAKAR AHMAD
SNES3350	02:00 JAM	PROF MADYA DR TAN ENG LEE
SWES2305	02:00 JAM	PROF TUSHAR KANTHI MUKHERJEE
UE401	JAM	EN MOHAMED ASLAM BIN GULAM HASSAN
UT401	02:30 JAM	DR JOHARI MAT
WMES3402 / WXET3403 / WRES3402 / WKES3402	JAM	PN HANNYZZURA AFFAL
YE403	03:00 JAM	PN PATMAWATI BINTI IBRAHIM
YL403	03:00 JAM	EN ABDUL KADIR HAJI MUHAMMAD
YP404	02:30 JAM	DR SHARIFAH HAYAATI SYED ISMAIL
PENGAWAS TAMBAHAN		
PN JAMILAH IBRAHIM		
PN NOOR FADHILAH BINTI MAT NAYAN		
PN MARIANI BINTI MD NOR		

M/SURAT94

19/03/1999 JUMAAT MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA DR ANANDA KUMAR A/L PALANIAPPAN		
PPEX1302	02:00 JAM	DR ANANDA KUMAR A/L PALANIAPPAN
PENGAWAS TAMBAHAN		
EN HUSHIM SALLEH		

20/03/1999 SABTU MALAM

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA MOHAMMAD RADUAN MOHD ARIFF		
ATEA2306	02:00 JAM	PN MALINI RATNASINGAM PROF MADYA MOHAMMAD RADUAN MOHD ARIFF
LOKASI FEP		
KETUA PROF SHYAMALA NAGARAJ		
ESGC2115	02:30 JAM	PROF SHYAMALA NAGARAJ

21/03/1999 AHAD PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR AZIZAH KASSIM		
AAEA2303	01:30 JAM	PN SHARIFAH AISHAH BINTI OSMAN PROF MADYA DR TEO LAY TEEN
ADEA2103	03:00 JAM	EN MOHAMED NAZARI JAAFAR
AF461 / AFEA3316	03:00 JAM	..
AFEA1103	02:15 JAM	PROF MADYA DR KANTHASAMY NALLUSAMY
AFEA3315	03:00 JAM	EN KRISHNAN MANIAM
ALEA3303	02:00 JAM	PROF DR AZIZAH KASSIM
EREE2312	02:30 JAM	EN ANURDDIN ABDUL GHANI
GAEW3001	JAM	EN MUHD FADHIL NURDIN PN SITI NOR AWANG
GSEW1002	JAM	PROF MADYA S.PANCHATCHARASIVAM PROF MOHAMED ABDUL MAJID
JFEA2110	02:00 JAM	DR ARIFF AHMAD
PN402	JAM	EN AB GHANI SHAMSUDDIN PN AZIZAH BT LEBAI NORDIN
SCES3130	02:00 JAM	DR CHRISTOPHER GUNASEELAN JESUDASON
SFES2153	02:00 JAM	EN AMRAN MUHAMMAD
SGES1202	02:00 JAM	DR AZMAN ABDUL GHANI DR NURAITENG TEE ABDULLAH
SJES1310	01:00 JAM	PROF MADYA DR KURUNATHAN RATNAVELU
SJES2234	01:30 JAM	PN RIO HIROWATI SHARIFUDDIN
SMES3324	JAM	ANIS FARIDAH MD NOR
SPJ402	03:00 JAM	DR NORDIN BIN HJ. MOHAMAD
UD401	02:00 JAM	EN ABDUL RASYID LAHU MUHAMMAD
YE404	02:30 JAM	PN PATMAWATI BINTI IBRAHIM
YP405	03:00 JAM	CIK SITI ARNI BASIR
PENGAWAS TAMBAHAN		
EN HUSHIM SALLEH		
EN ABD JALIL OTHMAN		

M/SURAT100

22/03/1999 ISNIN PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF. A. WAHAB ALI		
JBEA2102	02:00 JAM	EN NUWAIRI HAJI KHAZAAI
		EN MOHD TAUFIK ARRIDZO MOHD BALWI
		EN WONG KHEK SENG
		PN INDIRAWATI @ INDRAWATI ZAHID
JEEA2101	02:00 JAM	PROF A WAHAB ALI
		CIK ZURAINI HJ RAMLI
		EN MOHD KOHARUDDIN MOHD BALWI
		PN NOOR HASNORBT MOHAMAD NOR
		..
SCES2338	02:00 JAM	DR WAN JEFREY BASIRON
SPB407	01:30 JAM	PROF MADYA DR SHAIFUL AZNI ABDUL AZIZ
PENGAWAS TAMBAHAN		
PN MUNZATINA KHAMIS		
EN KHONG WYE KEEN		
PN ROSNAH BT SADRI		

M/SURAT101

22/03/1999 ISNIN PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF YAACOB HARUN		
JCEA2101	02:00 JAM	PROF YAACOB HARUN
		PROF MADYA DR TON IBRAHIM
PAEX2304	JAM	KON SUI PHIN
		NIRMALA SOMASUNDRAM
		PROF MADYA DR ABD RAHIM ABDUL RASHID
SCES3310	02:00 JAM	PROF MADYA DR MHD RADZI ABAS
PENGAWAS TAMBAHAN		
EN HUSHIM SALLEH		
EN ABD JALIL OTHMAN		

M/SURAT104

24/03/1999 RABU PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF MADYA DR RAUZAH HASHIM		
JBEA2201	02:00 JAM	DR ROGAYAH BT. A. RAZAK
		..
		..
JEEA2104	02:00 JAM	EN AB RAZAK MOHD KASSIM
		EN HASHIM ISMAIL
		EN NOR HISHAM OSMAN
		PN NORHAYATI AB RAHMAN
SC403 / SPC403	JAM	DR IBRAHIM ALI NOOR BATCHA
		PROF MADYA DR RAUZAH HASHIM
PENGAWAS TAMBAHAN		
EN KHONG WYE KEEN		
PN ROSNAH BT SADRI		
EN MOHD ZUHDI MARSUKI		

M/SURAT105

24/03/1999 RABU PETANG

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF DR NORAZIT SELAT		
JCEA2104	02:00 JAM	PROF DR NORAZIT SELAT
		PROF MADYA HASHIM AWANG

M/SURAT106

25/03/1999 KHAMIS PAGI

SUBJEK	TEMPOH	PENGAWAS
LOKASI ARAS1		
KETUA PROF. MADYA ZAINAL ABIDIN BORHAN		
JXEA2201	02:00 JAM	PROF. MADYA ZAINAL ABIDIN BORHAN
		EN WAN ZAILAN KAMARUDDIN WAN ALI
		..

BIBLIOGRAPHY

1. M.R.Garey and D.S.Johnson, Computer and intractability, Freeman, San Francisco, 1979.
2. G.J.Sussman and G.L.Steele Jr., 'Contraints: a language for expressing almost-hierarchical description', A.I., 14, 1-39 (1980)
3. J.H.Holland, Adaptation in Natural and Artificial Systems, University of Michigan Press, Ann Arbor, MI, 1975
4. D.E.Goldberg, Genetic Algorithms in Search, Optimization and Machine Learning, Addison-wesley, Reading, MA, 1989
5. Akkoyunlu, E.A. A Linear Algorithm for Computing University Timetable. The Compputer Journal, Vol.16, No.4 (1973) pp.347-350
6. Almond, M.A University Faculty Timetable. The computer journal, Vol. 12, (1969) pp. 215-217
7. Kenneth E. Kendall and Julie E. Kendall, "Systems Analysis and Design", 4th Edition, Prentice Hall International, Inc., 1999, 759
8. M.D. Alan, "Software Requirements Revision", 2nd edition, 1993, Prentice Hall International, Inc,
   1993, 212, 307-337
9. http://www.dai.ed.ac.uk
10. http://www.byte.com
11. http://www.asap.cs.nott.ac.uk
12. http://oneworld.org
13. http://www.burks.bton.ac.uk

14. http://www.cs.ubc.ca

15. http://www.cs.feik.cvut.cz

CODING

```
Option Explicit
Private blnNeedSave As Boolean
Private blnNewRecord As Boolean
Private blnDelete As Boolean
Private msCurrentRecord As String
Private connFaculty As New Connection


'to check whether the record have changed
Private Sub recordChanged()
   blnNeedSave = True
   Me.Toolbar1.Buttons("Save").Enabled = True
End Sub


Private Sub listFaculty_BeforeLabelEdit(Cancel As Integer)
    'to ensure the listview's item cannot be changed
   Cancel = 1
End Sub


Private Sub listFaculty_ItemClick(ByVal Item As MSComctlLib.ListItem)
   msCurrentRecord = Item.Key
   If blnDelete = True Then
      fncDelete
   Else
      Me.txtFaculty = Item.Key
      Me.txtFaculty.SetFocus
   End If
End Sub


Private Sub txtfaculty_Change()
   recordChanged
End Sub


Private Sub Form_Load()
   frmSetupFaculty.Width = 8640
   frmSetupFaculty.Height = 7320

   'to align the screen to the middle
   frmSetupFaculty.Left = (Screen.Width - frmSetupFaculty.Width) \ 2
   Me.MousePointer = vbHourglass
   connFaculty.Open "DSN=ETSS"

   'to list all the faculty name
   Dim rsfaculty As Recordset
   Dim newitem As ListItem
   Set rsfaculty = New Recordset
   rsfaculty.Open "select * from faculty", connFaculty, adOpenForwardOnly, adLockReadOnly
   Do Until rsfaculty.EOF
      Set newitem = Me.listFaculty.ListItems.Add(, rsfaculty("faculty") _
      , rsfaculty("faculty"))
```

```
    rsfaculty.MoveNext
  Loop
  Me.listFaculty.Enabled = False
  Toolbar1.Buttons("Save").Enabled = False
  Toolbar1.Buttons("Cancel").Enabled = False
  Me.MousePointer = vbArrow
  connFaculty.Close
End Sub


Private Sub Toolbar1_ButtonClick(ByVal Button As MSComctlLib.Button)
  On Error Resume Next
  Select Case Button.Key
    Case "Edit"
      Me.listFaculty.Enabled = True

      Toolbar1.Buttons("Cancel").Enabled = True
      Toolbar1.Buttons("Save").Enabled = False
      Toolbar1.Buttons("Delete").Enabled = False
      Toolbar1.Buttons("Edit").Enabled = False
      Toolbar1.Buttons("New").Enabled = False

      Me.txtFaculty.SetFocus

    Case "Cancel"
      fncCancel

    Case "New"
      fncClear

      blnNewRecord = True
      blnNeedSave = True

      Me.listFaculty.Enabled = False

      Toolbar1.Buttons("Cancel").Enabled = True
      Toolbar1.Buttons("Save").Enabled = True
      Toolbar1.Buttons("Delete").Enabled = False
      Toolbar1.Buttons("New").Enabled = False
      Toolbar1.Buttons("Edit").Enabled = False
      txtFaculty.SetFocus

    Case "Delete"

      blnDelete = True

      Me.listFaculty.Enabled = True

      Toolbar1.Buttons("Cancel").Enabled = True
      Toolbar1.Buttons("Save").Enabled = True
      Toolbar1.Buttons("Delete").Enabled = False
      Toolbar1.Buttons("New").Enabled = False
      Toolbar1.Buttons("Edit").Enabled = False

    Case "Save"
      Me.MousePointer = vbHourglass
```

```
        fncUpdateRecord

        Me.MousePointer = vbArrow

    End Select
End Sub


'to insert or update a record
Private Sub fncUpdateRecord()
    Dim rs As Recordset

    If Me.txtFaculty.Text = "" Then
        MsgBox "you haven't type or select the faculty but it is a must!"
        Me.txtFaculty.SetFocus
        Exit Sub
    End If
    'to insert a new record
    If blnNewRecord Then
        If fncValidatePrimary Then

            Set rs = New Recordset
            rs.Open "select * from faculty where faculty = '" _
                & Trim(Me.txtFaculty.Text) & "'", mConn, adOpenKeyset, adLockOptimistic

            rs.AddNew
            rs!faculty = Trim(Me.txtFaculty.Text)
            rs.Update
            rs.Close
            Set rs = Nothing
            blnNewRecord = False
            Dim newitem As ListItem
            Set newitem = Me.listFaculty.ListItems.Add(, Me.txtFaculty, Me.txtFaculty)
        Else

            'highlight text
            Exit Sub
        End If
    'to update a record
    Else
        If Trim(Me.txtFaculty.Text) = msCurrentRecord Then
            fncSubUpdate

        Else
            If fncValidatePrimary Then
                fncSubUpdate

            Else
                Exit Sub
            End If
        End If


    End If
    blnNeedSave = False
```

```
    Toolbar1.Buttons("Cancel").Enabled = False
    Toolbar1.Buttons("Save").Enabled = False
    Toolbar1.Buttons("Delete").Enabled = True
    Toolbar1.Buttons("Edit").Enabled = True
    Toolbar1.Buttons("New").Enabled = True


updateComplete:
    Exit Sub
updateFailed:
    ShowADOError
    GoTo updateComplete

End Sub


'to check existing record
Private Function fncValidatePrimary() As Boolean
    Dim rscheckfaculty As Recordset
    Set rscheckfaculty = New Recordset
    rscheckfaculty.Open "select faculty from faculty", mConn, adOpenForwardOnly, adLockReadOnly
    Do Until rscheckfaculty.EOF
        If Me.txtFaculty.Text = rscheckfaculty("faculty") Then
            MsgBox "You have type a faculty which is already exist, please type another one!"
            rscheckfaculty.Close
            Set rscheckfaculty = Nothing
            fncValidatePrimary = False
            Me.txtFaculty.SetFocus
            SendKeys "{Home}+{End}"
            Exit Function
        End If
        rscheckfaculty.MoveNext
    Loop
    rscheckfaculty.Close
    Set rscheckfaculty = Nothing
    fncValidatePrimary = True
End Function


'to clear the screen
Private Sub fncClear()
    Me.txtFaculty.Text = ""
End Sub


Private Sub ShowADOError()
    'spin through the errors collection and display the constructed error messasge
    Dim ADOError As Error
    Dim sError As String
    For Each ADOError In mConn.Errors
        sError = sError & ADOError.Number & "-" & _
            ADOError.Description & vbCrLf
        Next ADOError
        MsgBox sError
```

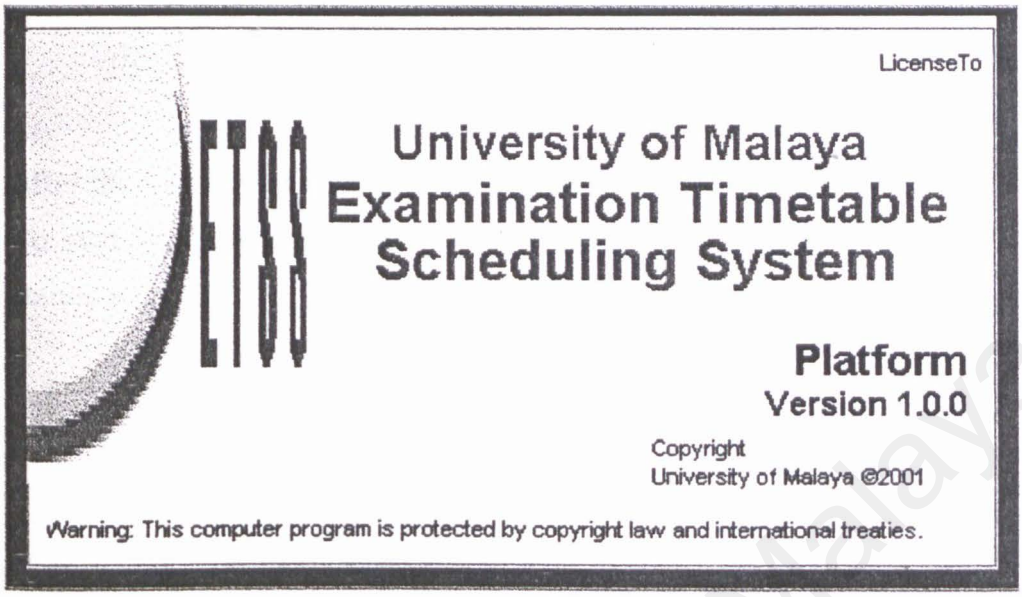
```
End Sub

'to delete a record
Private Sub fncDelete()
   connFaculty.Open "DSN=ETSS"
   Dim rsDelete As Recordset
   Me.MousePointer = vbHourglass


   Set rsDelete = New Recordset
   Dim response As Integer
   blnDelete = False
   response = MsgBox("Are you sure you want to delete this record?" & msCurrentRecord, vbOKCancel,
"Delete Record")
   If response = vbOK Then
      rsDelete.Open "select * from faculty where faculty = '" & msCurrentRecord & "'", connFaculty, _
         adOpenKeyset, adLockOptimistic

      rsDelete.Delete
      Me.listFaculty.ListItems.Remove (msCurrentRecord)
      'rsDelete.MoveLast
   Else
      fncCancel
   End If

   fncClear

   Toolbar1.Buttons("Cancel").Enabled = False
   Toolbar1.Buttons("Save").Enabled = False
   Toolbar1.Buttons("Delete").Enabled = True
   Toolbar1.Buttons("Edit").Enabled = True
   Toolbar1.Buttons("New").Enabled = True

   Me.MousePointer = vbArrow
   connFaculty.Close

End Sub


Private Sub fncCancel()
   blnNewRecord = False
   blnNeedSave = False
   blnDelete = False

   Me.listFaculty.Enabled = False
   Toolbar1.Buttons("Cancel").Enabled = False
   Toolbar1.Buttons("Save").Enabled = False
   Toolbar1.Buttons("Delete").Enabled = True
   Toolbar1.Buttons("Edit").Enabled = True
   Toolbar1.Buttons("New").Enabled = True

   fncClear

   Me.txtFaculty.SetFocus

End Sub
```

```
Private Sub fncSubUpdate()
   Dim rs As Recordset
   Set rs = New Recordset

   rs.Open "select * from faculty where faculty = '" _
      & msCurrentRecord & "'", mConn, adOpenKeyset, adLockOptimistic

   rs!faculty = Trim(Me.txtFaculty.Text)
   rs.Update
   rs.Close
   Set rs = Nothing
   Dim olditem As ListItem
   Set olditem = Me.listFaculty.ListItems.Item(msCurrentRecord)
   olditem.Key = Me.txtFaculty
   olditem.Text = Me.txtFaculty
End Sub
```

USER MENU

Table of Contents

USER MENU



INTRODUCTION

ETSS is the short form for Examination Timetable Scheduling System. This is a system that incorporates many functions of the Examination Section for University of Malaya. ETSS comprises several components, each representing on aspect of the examination timetable functions.

ETSS is designed to create an examination timetable for University of Malaya. However, it is you, the user who is going to really bring the system to life. The system is created to serve you. But in order for the system to serve you well, accurate and timely input of data to ETSS is vital.

CHAPTER 1 INSTALLING ETSS

Before you can use this system, you must first run the ETSS setup program. The setup program will install all the files needed from the installation disks to your hard disk. Please check that your computer fulfills all the hardware and software requirements.

To install ETSS from Windows, follow these steps:

1. Insert the ETSS Setup disk in drive A.
2. Click on the windows98 start button, then on "Run".
3. Type "a:\setup.exe" in the dialog box, then click on "OK" of press <Enter>. (if the disk is in drive b:, substitute b: for a:).
4. Follow the instructions on the screen.

After the installation is completed, setup will create a new program group called ETSS. To start ETSS, simply click on the program item named ETSS from the Window's startup menu.

CHAPTER 2 GETTING STARTED

This chapter presents an overview of the ETSS environment and guide you step by step where and how to start the ETSS.

2.1 ETSS System Login

Step:

1. Before using the ETSS, a window will be prompted for your User ID and password.
2. Key in your User ID and the valid password, then click *OK* button.
3. To abort the system, your can click the *Cancel* button.

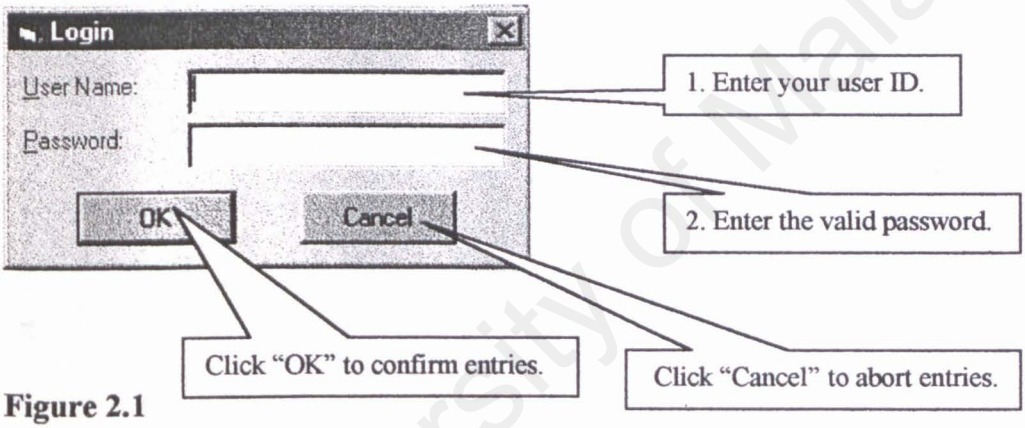


Figure 2.1

2.2 ETSS Menu bar and ETSS Toolbar

On a successful login, the initial ETSS window will be shown. Figure 2.2 shows the initial display format, a window with a menu called the ETSS menu bar and a toolbar called the ETSS Toolbar.

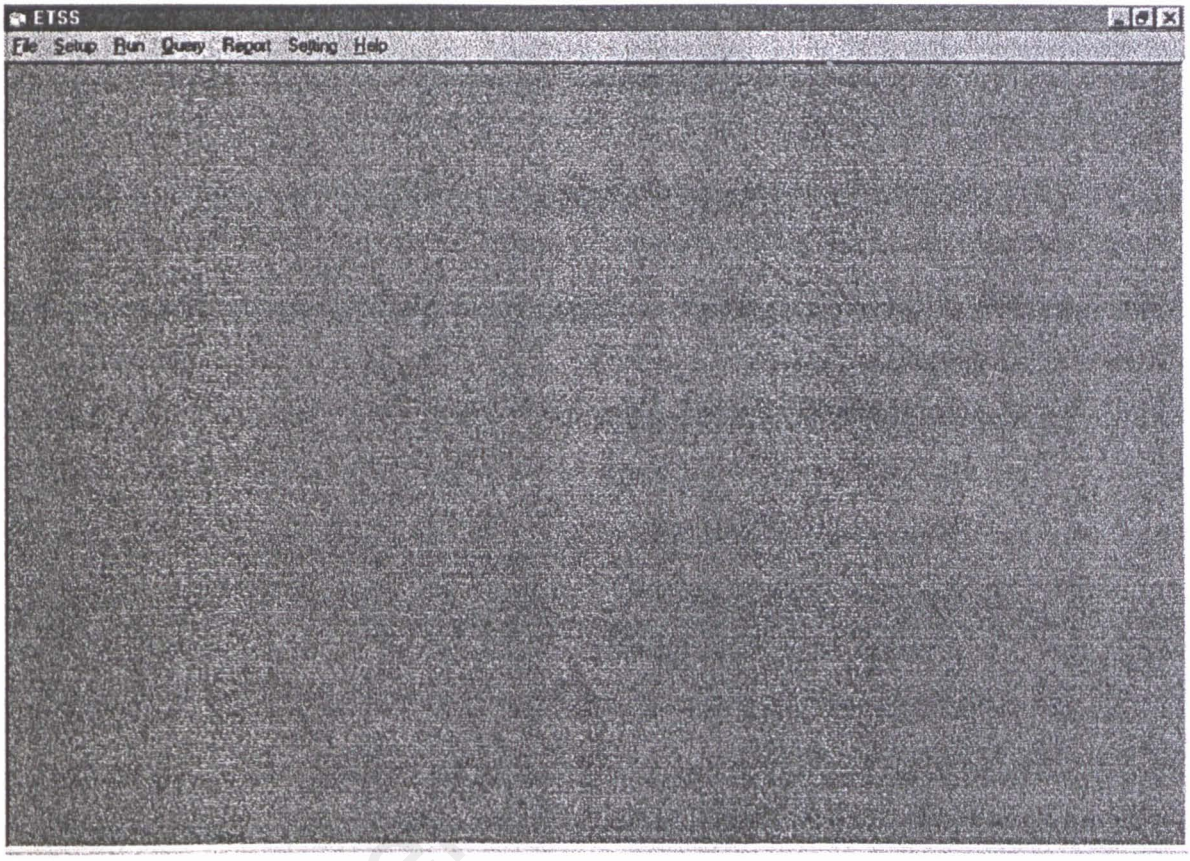


Figure 2.2 Main Menu

CHAPTER 3 Main Screen Menu

3.1 Menu Items

There are seven menus under the menu bar: File, Setup, Run, Query, Report, Setting, Help.

An underlined character in the menu item menu that you can bring the menu down by typing the *Alt* + *f* to bring the File menu down.

Figure 3.1 Tips on Using Command Keys.

There are submenus nested in the main menus.

I.

File	**Shortcut key**
Date	*CTRL + D*
Venue	*CTRL + V*
Invigilator	*CTRL + I*
Exit	*CTRL + Q*

A key that corresponds to a command name on a menu, such as CTRL+P. *Also known as* an accelerator key or a keyboard shortcut

Figure 3.2 Tips on Using Shortcut Keys.

II.

Setup

Subject

Venue

Invigilator

Faculty

Subject Group

III.

Run

Set Criteria

IV.

Query

Date

Venue

Invigilator

V.

Report

Examination Timetable

Invigilator Timetable

VI.

Setting

Change Password

VII.

Help

About ETSS

CHAPTER 4 MAIN SCREEN

4.1 Setup

Before you can use this system to create the examination timetable of University Malaya, you must setup all the information needed. There are three modes in this kind of form (Setup). You can choose any mode you need by clicking the toolbar buttons.

- **Insert mode**

  If you want to insert a new record, you must first click the "New" button. Type in the data then click the "Save" button

- **Delete mode**

  If you want to delete a record, you must first click the "Delete" button. All the records will be listed in a table. From the table you click the record you want to delete. There will be a message box to confirm you decision to delete the record. If you click "OK" button. Then will delete this record permanently. If you click "Cancel" button, then you will abort this process.

- **Edit mode**

  If you want to edit or update a record, you just first click the "Edit" button. All the records will be listed in a table. From the table you click the record you want to update. After that, you click the "Save" buttons. The record is updated.

Sometimes you want to cancel the mode you already chose, you can click "Cancel" button to cancel you mode that you are situated.

Firstly, you must setup the entire faculty in University Malaya. It is to make sure when you setup subject, you can choose the faculty name that offer that subject.

Then, you can setup subject, invigilator and venue.

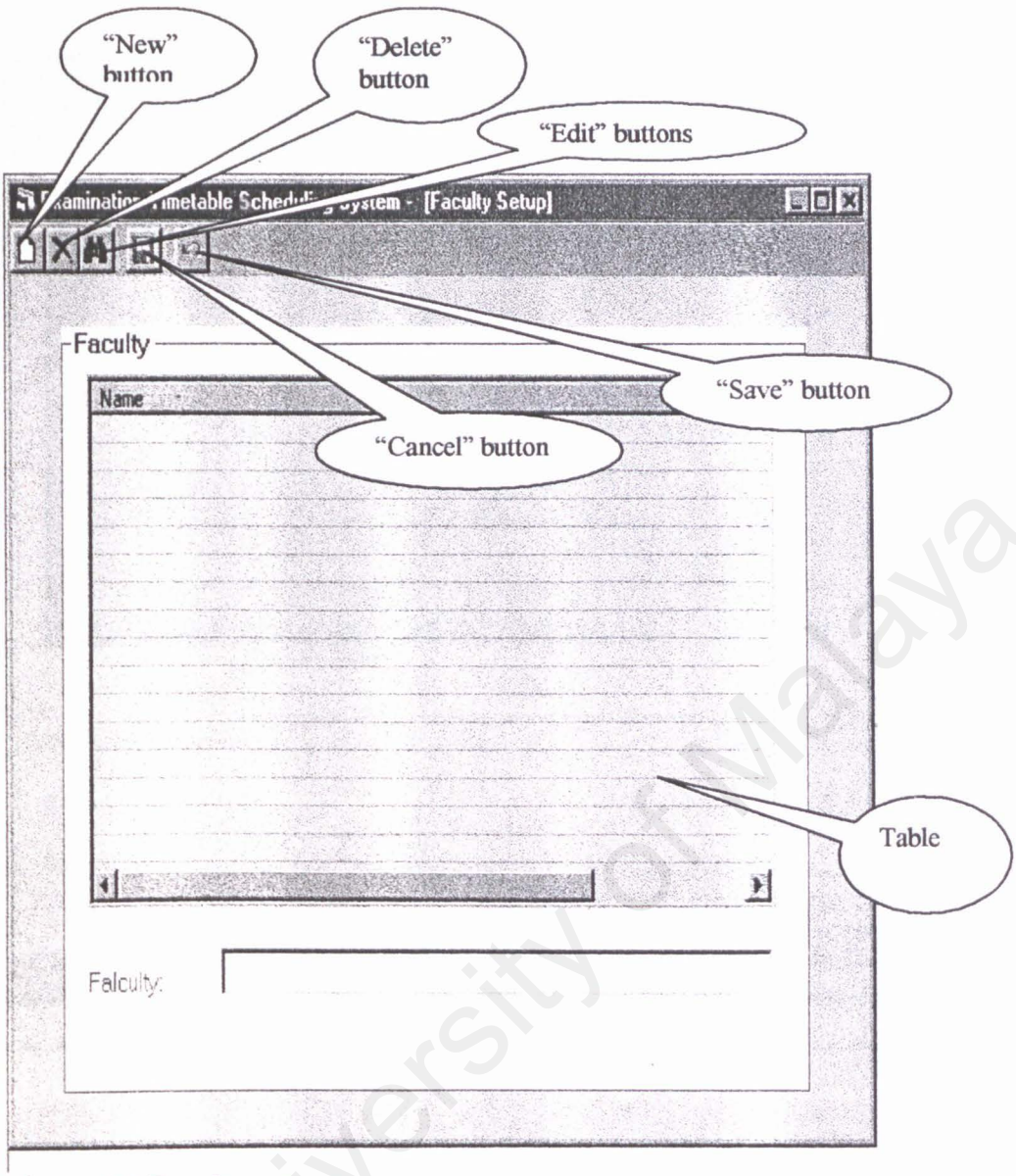


Figure 4.1 Faculty setup screen

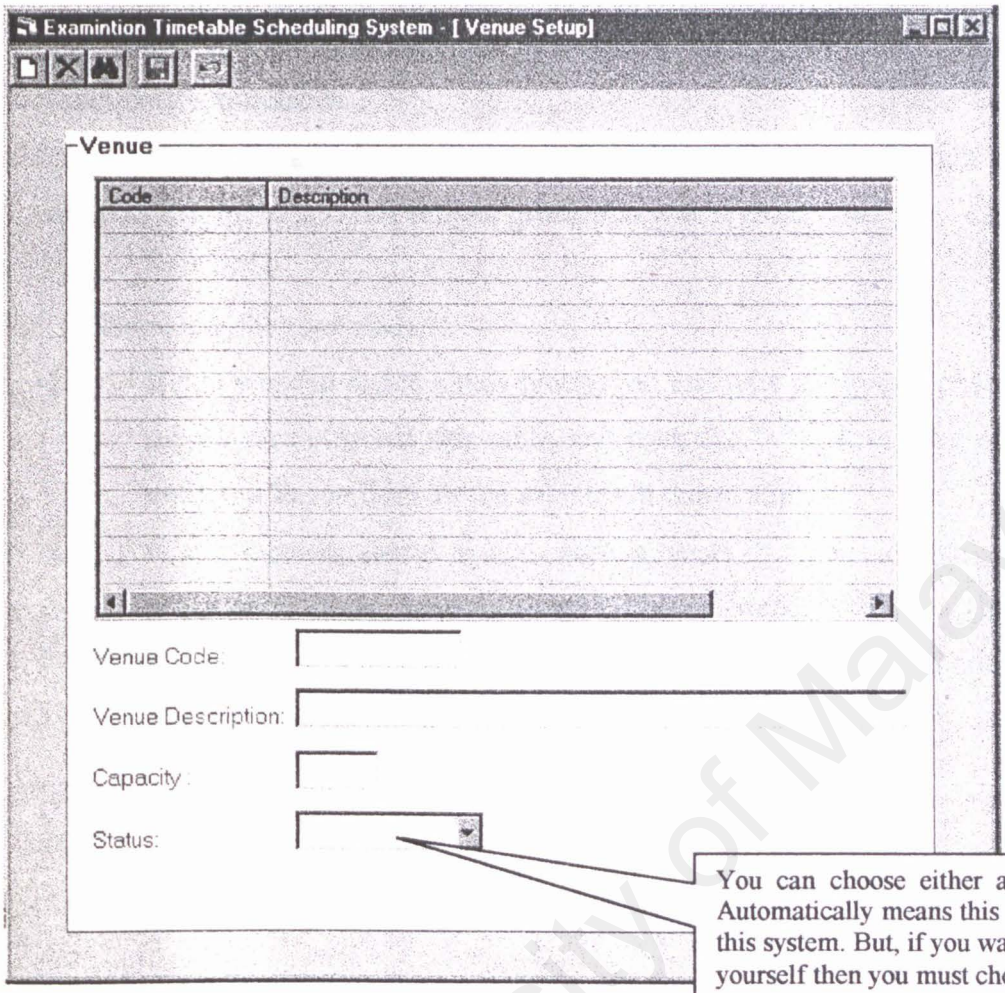


Figure 4.2 Venue Setup

The subject group setup is special, so it needs more explanation. You have to group the subjects that are not allowed to be allocated the same session in the examination timetable.

The left side table is to list all the subjects and the right side table is to list the subjects that belong to this subject group that you have selected.

There may be two cases:

1. If you want to create a new group, you just type in a group code and then chose a subject from the left side table, and click the ">" button. You can repeat this step until you have chose all the subjects in this group.
2. If you want to delete or add more subjects in to one group, you just select the group code. If you want to delete a subject, you have to select the subject from the right side table and click "<" button. If you want to add a subject, you have to select the subject from the left side table and click ">".

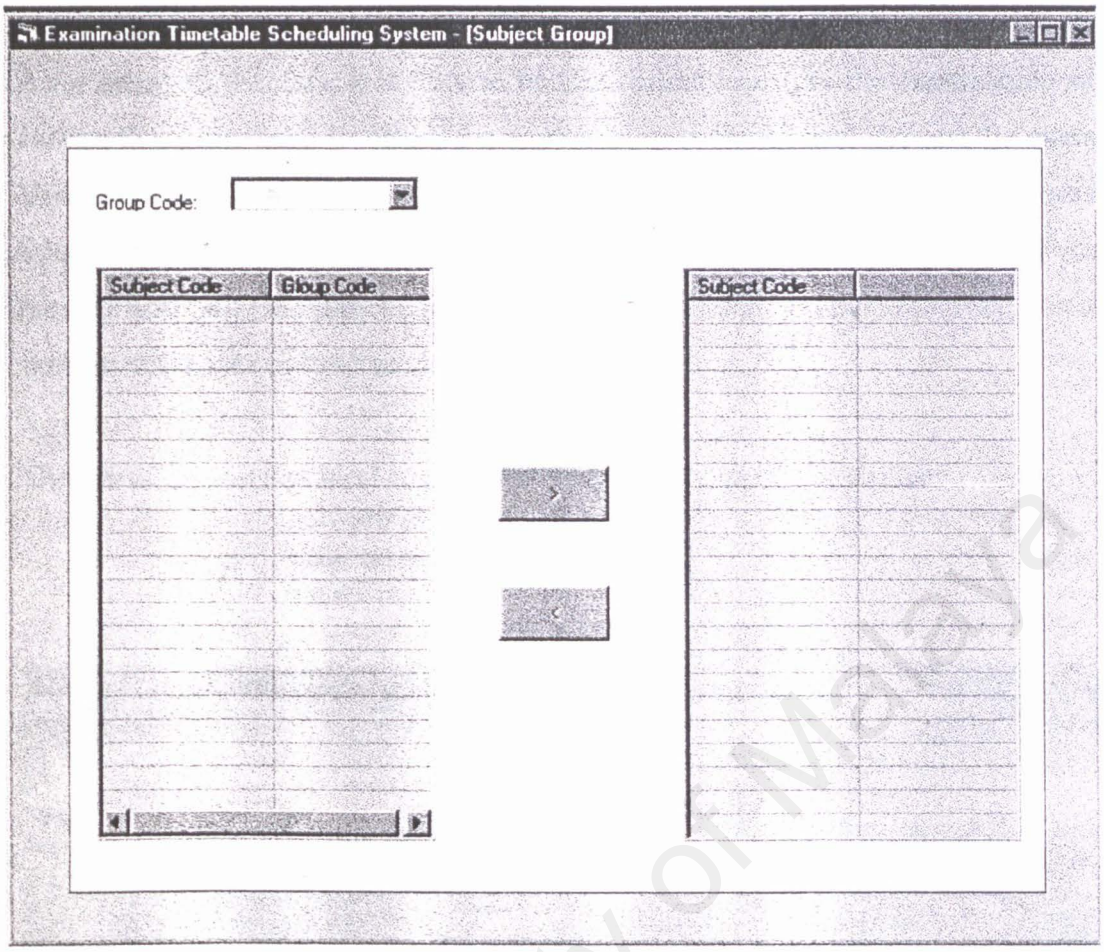


Figure 4.3 Subject Group Setup

4.2 Run

After setup all the data, it is time to let this system to create the examination timetable. Before that, you have to select the examination start and end date of the examination. You also have to specify the holidays, which is between the duration of this examination. Special days is refer the special subject which have to be executed in a special venue, like lab and normally, the date allocated is before the formal examination date. Besides, you need to decide the normal section and Friday section.

The last step, you just need to click the "Run" button from the toolbar.

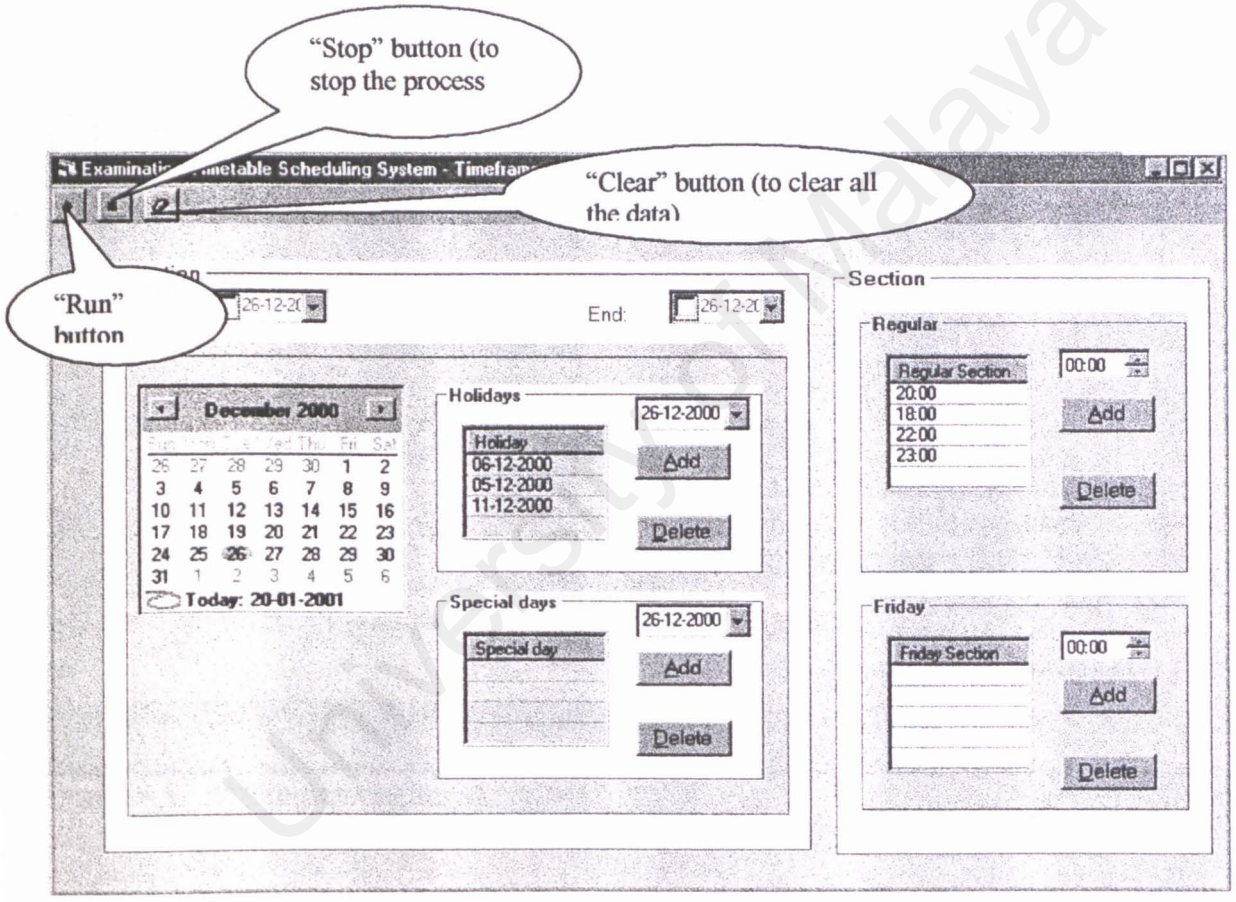


Figure 4.4 Set Criteria Screen

4.3 File

Sometimes, you need to change the examination timetable, then you need to use this few screens. They are date, venue and invigilator.

After you have selected the subject code, these screens will show the resources which are allocated to this subject. You can change them by select the resources and then click the "Save" button from the toolbar.

To exit the ETSS application

- choose "Exit" in the file menu

The Exit command will automatically close all currently open documents.

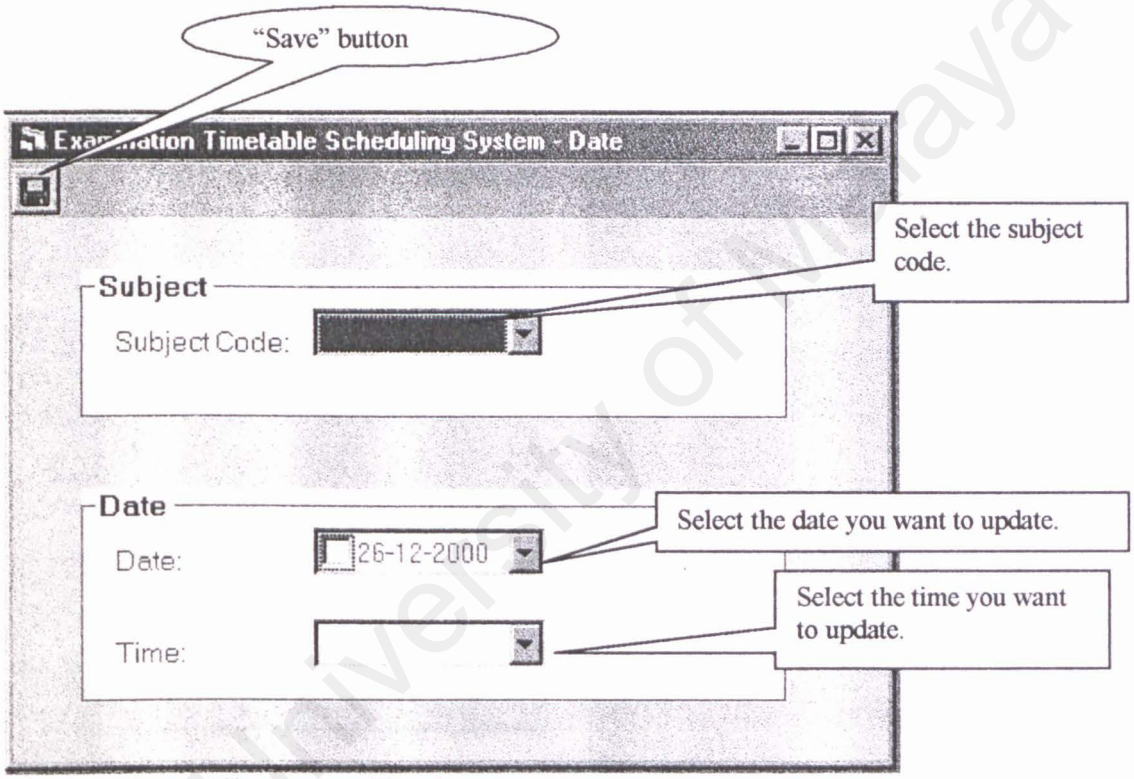


Figure 4.5 File Screen (Date)

4.3 View

There are two ways to view the data which already be generated , they are from date and time or invigilator.

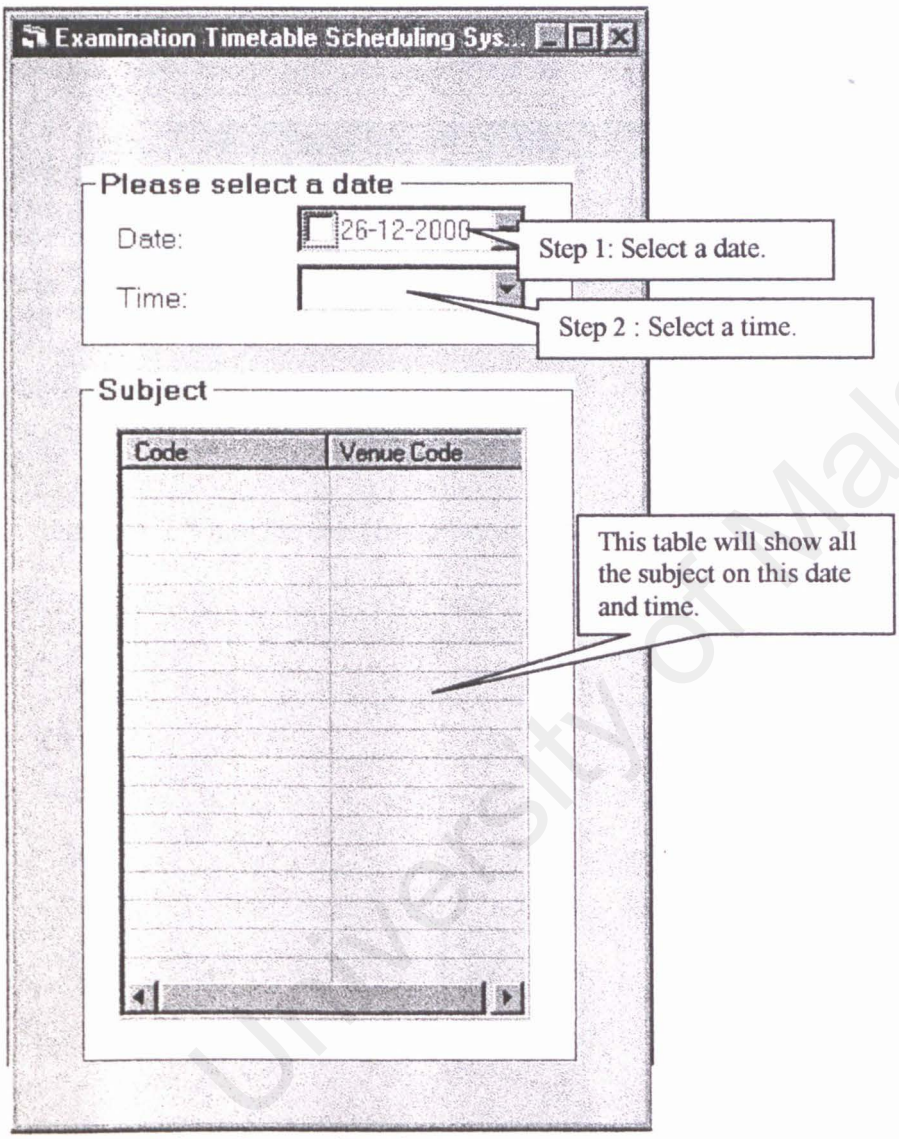


Figure 4.6 View Screen (Date)

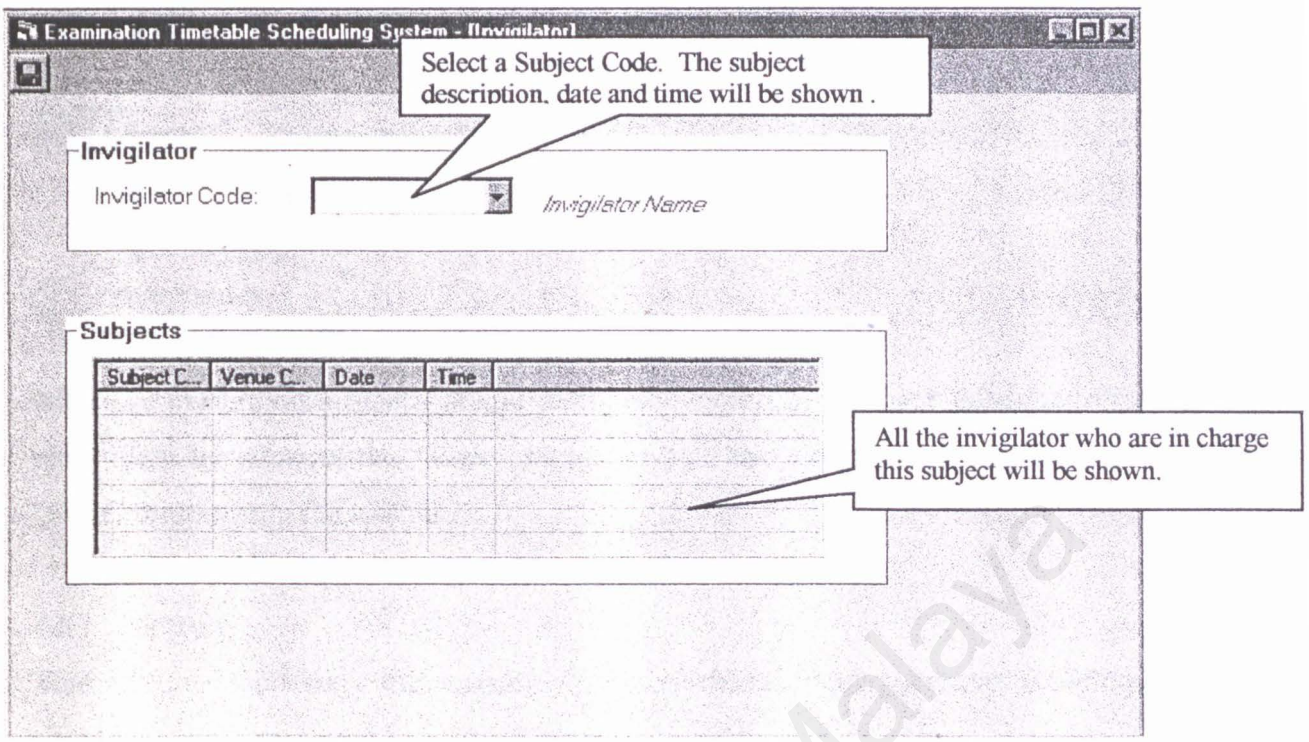
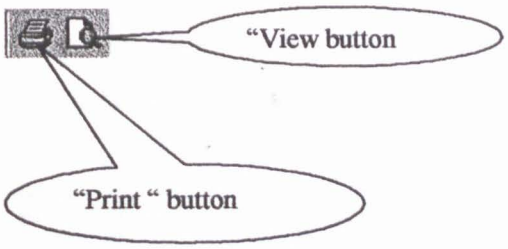


Figure 4.7 View Screen (Invigilator)

4.4 Report



After the examination timetable and invigilator timetable has been generated. You can view them by clicking the "View" button or you also can print them out by clicking "Print" button from the toolbar.

4.5 Setting

This system emphasizes the security. You can change your password avoiding other people use your password to access this system.

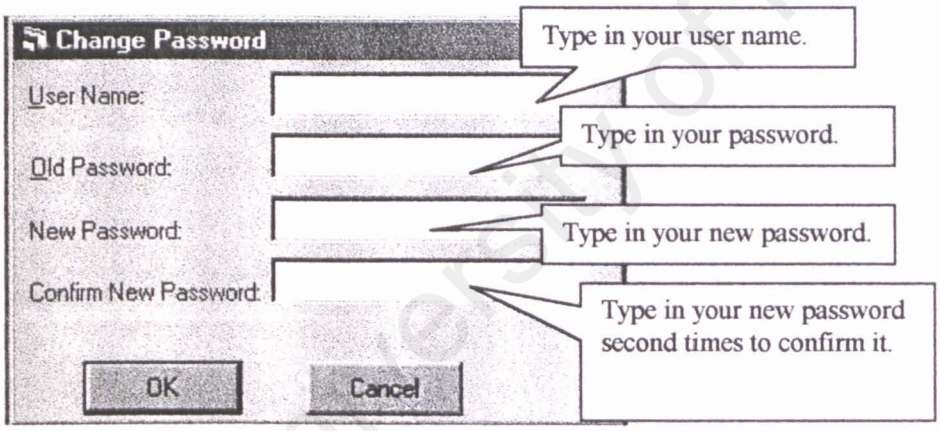


Figure 4.8 Change Password

4.6 Help

From the submenu you choose about, then you will see this screen. This screen is about this system and you can view the system info by clicking "System Info" button.

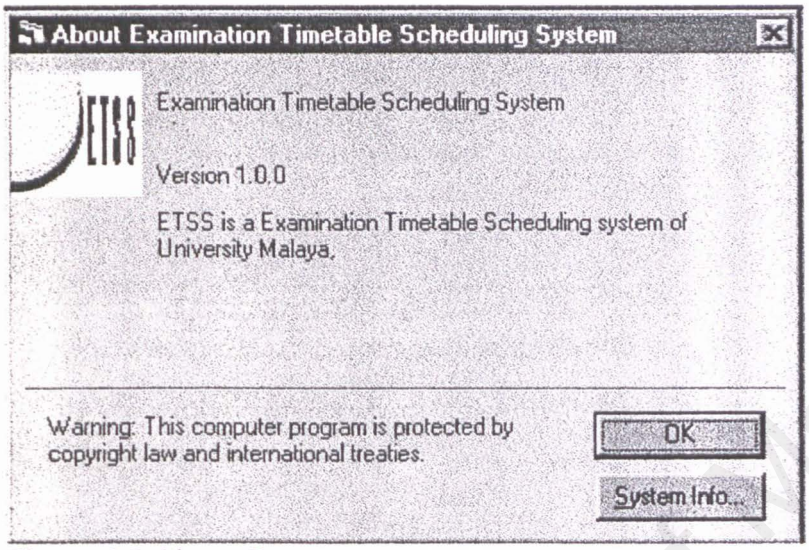


Figure 4.9 About Screen