



MIDLANDS STATE UNIVERSITY
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MSU WORK-RELATED LEARNING TRIP SCHEDULE SYSTEM

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Abstract

Technology is changing rapidly and there is need to adjust so as to improve the economy and how businesses operate in Zimbabwe. This research gives a detailed overview of Work related learning with the main thrust of solving current problems in their way of operation, at the same time with the main of implementing new technologies in Zimbabwe that will help improve our economy through the improvement of business operations. The system will enable the Work related learning department to work with a computerized system that is more efficient and reliable at any time. The system is web-based thus users can access it at any location at any time. Major reason for carrying out the research is to curb the problems of the current system at the same time increasing organizational competence.

Declaration

I, **Fungai Dube**, do hereby declare that I am the sole author of this dissertation. I authorize Midlands State University to lend this dissertation to other individuals and institutions for the purpose of scholarly research.

Signature _____

Date _____/_____/_____

Approval

The dissertation entitled “MSU Work Related Learning web-based trip scheduling system” by **Fungai Dube** meets the regulations governing the award of the degree BSc Honors degree in Information Systems by the Midlands State University. It has been approved for its contribution to intellectual knowledge and literal presentation.

Supervisor’s signature_____

Date_____/_____/_____

Dedication

I would want to dedicate this to my lovely and caring Parents words alone cannot show how much I appreciate your efforts but the grace of God shall be with you always and my prayers will always be to wish the best for you. You were my pillar of strength when I was weak and your advices made me reach this far. My love for you will never fade and the Lord will continue blessing you abundantly for all your good works.

Acknowledgements

So much thanks to the Lord Almighty, who has always been the shield and the route to which I followed to reach this far in life, my soul will always magnify his name. And also my sincere gratitude goes to my supervisor **Mr. T.Mzikamwi** for his support and guidance throughout my project research. I would also want to thank the MSU Work related learning team for their unwavering support in my research since they assisted me with all the information I required. Finally all thanks goes to my father and mother for all the sacrifices they made with the sole aim of making me successful as far as education is concerned. I greatly appreciate, may the Almighty bless you.

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List of acronyms

Php	Hypertext Preprocessor
SQL	Standard Query language
CBA	Cost Benefit Analysis
ROI	Return On Investment
DFD	Data Flow Diagram
ER	Entity Relationship
EER	Enhanced Entity Relationship

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The proposed MSU Work Related Learning Trip scheduling system will provide solutions to the problems faced by the WRL department and these will be highlighted in the chapter. This section explains the problems faced by Work Related Learning department at MSU that led to the development of the proposed system by the researcher.

1.2 Background of the study

Work Related learning department deals with students on attachment or work related learning period. It is a department that ensures that all students are supervised and assessed, it also deals with disciplinary issues related to students on attachment. However, the department the department does not have a computerized system to create its trip schedules. The current system in use is time consuming and consumes lots of time and effort to come up with an error free schedule.

The department faces lots of challenges like repeating trips, missing other destinations that may result in students being supervised late, unbalanced allocation of trips among departments and mostly collision of trips with departmental activities. The researcher find it useful to develop a computerized trip scheduling system for work related learning department as a way to solve these problems.

1.2.1 Organizational background

The University was opened on March 2001 by President of Zimbabwe. It is an institution that offers tertiary education and it is owned by the government. The University is a multi-campus institution meaning it has several campuses located at different places but with its main campus located at Gweru in Senga location. It has six state campuses and offers various degree programs in nine faculties. MSU has a large number of students from various places in the country also from other countries with Professor VN Muzvidziwa as the Vice Chancellor of the University.

1.2.2 Organizational Structure

According to (Page and Brin,2001) Organizational structure determines how the roles ,power and responsibilities are assigned, controlled and coordinated, how information flows between the different levels of management. It simply illustrates the movement of information in an organization. At Midlands State University we have the Vice chancellor who reports directly to the Chancellor being the top management, followed by two pro-Vice Chancellors. Then comes the deans of faculties, bursar, librarians, registrar and directors of several departments, they all report to the Vice Chancellor. The Organizational Structure of Midlands State University will be shown by the diagram below:

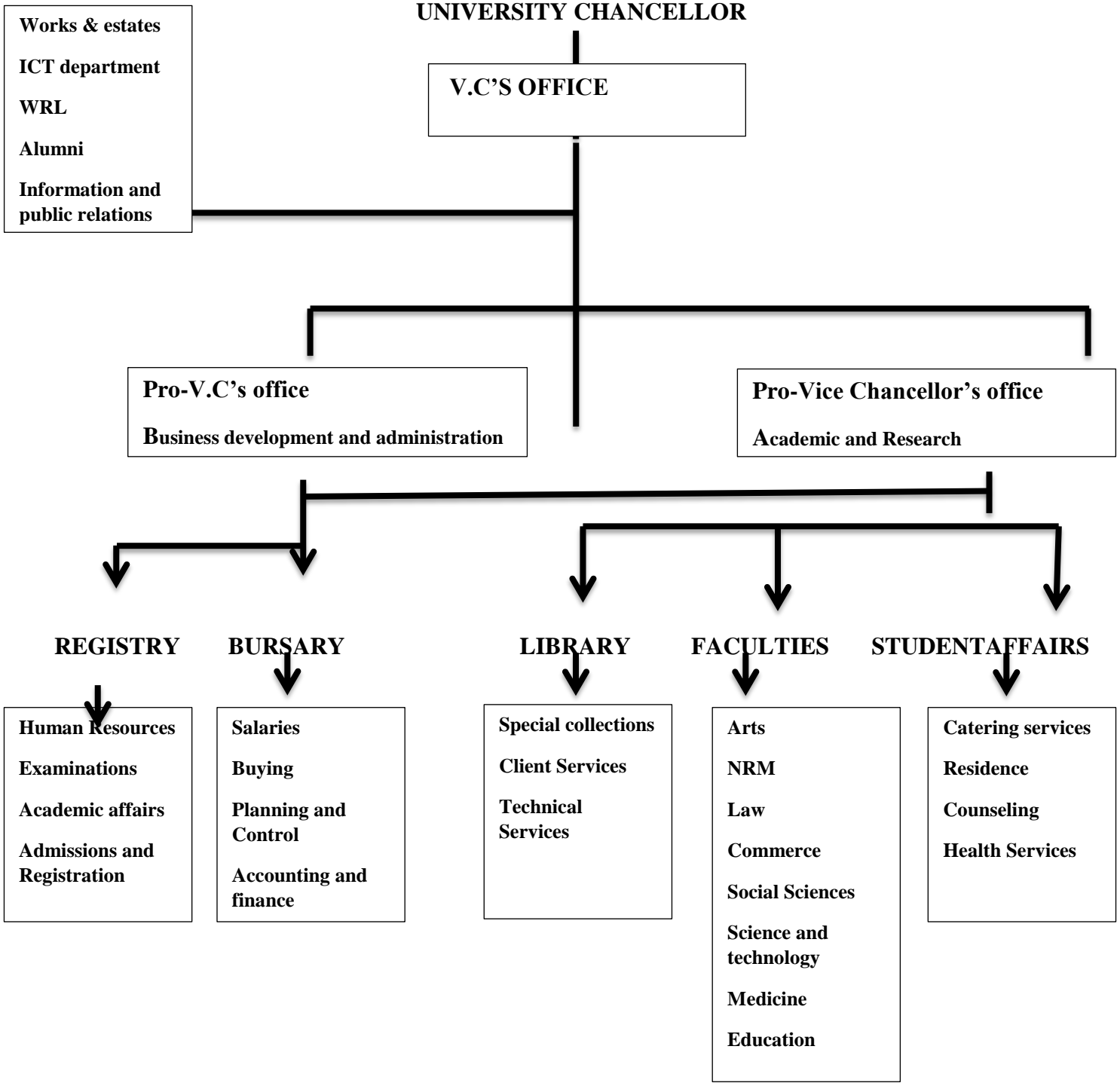


Figure.1.1 Organizational Structure

1.2.3 Vision

To be a goal driven University by ensuring the quality of its graduates and interested entities.

1.2.4 Mission Statement

- ❖ Helping the economy by breeding marketable graduates
- ❖ To become the best University in ICT
- ❖ To become the leading University in the country

1.3 Problem definition

The manual system in use is time consuming; it could take up to 3weeks to come up with an almost perfect schedule. In most instances departments may be slotted twice on the same trip or a vehicle may be given two different trips on the same date and these errors mostly show up late and this result in having to redo some trips

Unbalanced allocation of trips among departments, during drafting a Schedule for WRL trips every department is given a slot with the date they are supposed to do the trip, unfortunately the current system starts by allocating trips to departments with a large number of students of WRL ,slotting those departments with a smaller number at the end of the schedule as a result, other departments are left out not attended to and with outstanding trips.

The manual system does not check for the participation of those going for trips by making sure those going log in their details on the start date of the trip and log off when the trip ends. Collision of trips with departmental programs, the manual system in use does not cater for departmental programs as a results there is a collision of the dates WRL trips with the dates of departmental programs and at the end this results in trips not taking place

1.4 Aim of the study

The trip scheduling system will provide a thorough computerized system that assists the WRL department in producing a trip schedule for each semester. The main aim is to cater for the problems with the current system.

1.5 Objectives of the study

The system is set to meet the following objectives:

- To enable coordinator submit the reserved dates for other departmental agenda.
- To generate a web-based trip schedule.
- To avoid unbalanced allocation of trips among various departments.
- To develop a schedule that does not collide with departmental programs for the semester.
- Generation of reports on trips done per month by specifying trips done by each department and by each driver.
- Create a log book for the trips to avoid absenteeism.

1.6 Methods and Instruments

The system will use the following instruments:

❖ MySQL

My Structured Query Language is an open source database which consists of Apache. The researcher chose to use MySQL because, It can work on different platforms.

❖ PHP programming language

It is a general purpose programming language that is also compatible with many platforms. Since the researcher chose MySQL it will be compatible with PHP. PHP is also server side scripting language.

❖ Adobe Dreamweaver CS6

This is software for website design and development and consists of different site management tools.

❖ Sublime text editor

1.7 Justification of the study

The proposed system will cut costs of resources such as time and paperwork by computerizing information. Resources and efforts are saved thus reducing workload on the workers and the system will be more manageable than the current system in use.

1.8 Conclusion

The aim of the chapter was to give an introduction of the proposed system outlining the objectives of the system and it was thoroughly done. The next chapter will be the complete planning of the system.

CHAPTER 2: PLANNING PHASE

2.1 INTRODUCTION

The chapter will explain more about the benefits of the proposed system as compared to the costs which will be incurred in coming up with the system. The main aim of the planning phase is to determine whether it is worth to adopt the proposed system or not. The value of the system to the organisation is also considered and the requirements in coming up with the system. The chapter will further explain on the risks, time, costs and resources which will help in coming with the proposed system.

2.2 BUSINESS VALUE

Business value refers to the welfare of an institution. The system enhances efficiency as it reduced data duplication, human errors and data redundancy. It is set on improving service delivery especially to students on work related learning period.

MANAGERIAL VALUE

Decision making is made easier as the department will be able to produce the trip schedule in time and reduce the risk of other faculties being left out of the schedule. The system will also flatten the organisational structure as the lines of reporting are cut through an online service.

EEMPLOYEE KNOWLEDGE

With the introduction of the system in work related learning department, it will serve as platform to acquire technological skills. The system will make work faster and easier for the employees as well as increasing their knowledge especially in the IT sector .The system also caters for unwanted absenteeism for lecturers and drivers going on work related learning trips.

CUSTOMER VALUE

In this case we are looking at the students on work related learning period, the system will enable the students to get supervised and assessed on time thus enabling students to stay focused and also to know their progress. It also reduces the risk of other students not supervised or assessed.

2.3 FEASIBILITY ANALYSIS

It is an analysis of the system to find out if it is feasible. It looks at the cost benefit analysis, hardware and software to be used in coming up with the system, economic feasibility and operational feasibility. Thompson (2003) stipulates a feasibility study as a controlled process for identifying problems and opportunities, determining objectives, describing situations, successful outcomes, and accessing the range of costs and benefits associated with several alternatives of solving a problem.

2.3.1 TECHNICAL FEASIBILITY

The study determines on whether the existing hardware and software can carry out the proposed system. Will the current equipment meet the needs of the proposed system. The management will decide whether the organisation will outsource or develop the system in-house.

2.3.1.1 TECHNICAL EXPERTISE

In order to come up with the proposed system there must be enough people in the department who are willing to work with the system. The MSU Work Related Learning Department already have an administrator who is computer literate thus making it easier to implement the proposed system in the department.

2.3.1.2 Software and hardware requirements

To come up with the proposed system, the following are important in developing the system these are listed below:

Table 2.1 SOFTWARE AND HARDWARE REQUIREMENTS

ITEM	SPECIFICATIONS	QUANTITY AVAILABLE	QUANTITY REQUIRED
Internet browser	Firefox 3.0	4	1
Back up	Dual core, 4gig RAM	1	1
Operating software	Windows 8/10	4	4
Desktop Computer	4gig RAM core i3	4	4
Ethernet Cable	100 meter reel	6	4
Xampp		1	1
Database	MySQL	1	1
Adobe Dreamweaver CS6		6	4
Printer		3	1

2.3.2 Economic feasibility

This is the study of the costs and revenues that the organisation will incur in coming up with a project. It the cost benefit analysis whereby the organisation analyse if the financial benefits of the system outweigh the costs incurred in coming up with the system. For a project to be viable the benefits must exceed the costs.

2.3.2.1 Cost benefit analysis

Brent (2007) asserts cost benefit analysis as a way of noting the pros and cons of options together with expenses for transactions. It is an analysis to determine the strengths and weaknesses of an alternative, in this case these are strengths and weaknesses of the proposed system in monetary value.

- **Development Costs**

According to Horton (2011) development costs are expenditure that is incurred from researching, growing and introducing a new product or service. These are costs that come up in developing a project, these may be hardware or software costs, research costs or expenditure in maintenance of the system after it is implemented. These are shown in the table below:

Table 2.2 Costs of development

Item	Quantity	Amount USD
Operating software	4	80
Ethernet Cable	4	25
Back-up Server	1	170
Desktop Computer	4	1200
Printer	1	200
Total		1650

- **Operational Costs**

These incur when using the system, these may be day to day costs or monthly costs. The table below indicate the operational costs of the proposed system.

Table 2.3 Operational Costs

OPERATIONAL COST	VALUE (\$)
System Maintenance	300
Computer Consumables	250
Training	200
Other expenses	150
TOTAL	900

- **TANGIBLE BENEFITS**

These are benefits measured in monetary terms and can be quantified. Below is a list of the tangible benefits.

Table 2.4 Tangible Benefits

ITEM	BENEFIT VALUE (\$)
Reduced Operational Expenses	1500
Reduced Stationery	800
Reduced Labour	950
TOTAL	3250

- **INTANGIBLE BENEFITS**

These are benefits that are not measured in monetary terms. These are improved department services and goodwill. The table below sums up the costs and benefits to give the resulting profit.

Table 2.5 Cost Benefit Analysis

BENEFIT	VALUE (\$)
Tangible Benefits	3250
Estimate of intangible benefits	6000
Total Benefits	9250
Development Costs	1650
Operational Costs	4000
Total Costs	5650
NET BENEFIT(total benefits less total costs)	3600

Conclusion

In this case the project is viable as the benefits indicate to exceed the costs to be incurred in developing and running the project.

- **Return on Investment (ROI)**

It is the return after costs, in other words these are benefits after the expenses of implementing the project.

$$\text{ROI} = \frac{\text{Gain from investment} - \text{cost of investing}}{\text{Cost of investing}} \times 100$$

$$= \frac{9250 - 5650}{5650} \times 100$$

$$= 63.7\%$$

- **Payback period**

The time required to pay back the cash used when developing a project. A project is said to be viable if it has a short payback period.

Table 2.6 Payback Period

Year	Cash flow	Cumulative Cash flow
0	5650	1200
1	5000	700
2	4000	9250
3	7000	800

$$\text{Payback Period} = \frac{\text{Cost of investment}}{\text{Annual Net Cash Inflows}} \times 12\text{months}$$

$$\text{Payback Period} = 1 \left(\frac{5650}{9250} \times 12\text{months} \right)$$

$$= 1 \text{ year and 6 months}$$

Conclusion

The payback period is 1 year 6 months.

- **Net Present Value based on a discount factor of 15%:**

Discount Factor = $1 / (1 + r)^t$; where r = Discount rate and t = time

Present Value = Value in Year x Discount Factor

Net Present Value = Total of Present Values

Table 2.7: net present value

Year	Value in Year (\$m)	Discount Factor	Present Value (\$m)
0	-18 700	1	- 18 700
1	13 000	0.87	11 304
2	33 500	0.76	25 331
3	43 500	0.66	26 602
Net Present Value			44 537

The net present value appears to be greater in amount thus the project is feasible.

2.4 SOCIAL FEASIBILITY

This is the study to determine if people accept the project and the effect of the project on users by considering whether the people need training or not. The effect of the proposed system on the employees of MSU will be increased morale as workload is reduced. It also reduce tiresome of work as most of the paperwork is reduced by the system and some of the work can be done remotely out of the work place.

2.5 OPERATIONAL FEASIBILITY

This is the measure of how well the solution (proposed system) will work in the organisation. It determines if the users will be able to use the system or if there is need for training the users of the system. The other goal of operational feasibility is to ensure the acceptance of the system by the management, employees and other stakeholders. In this case the system was concluded to be feasible.

2.6 RISK ANALYSIS

Risk analysis is a method used to assess and point out the potential factors that might delay or jeopardize the success of a project. The process is done so as to try and control the risks identified. Below are some of the risks identified:

❖ Technical risks

Power cuts may be a challenge which may hinder the development of a system therefore backup power must always be in place. The hard drives might crash during the development of a system thus compromising the production. This might be a setback since data may be lost in the process. Therefore a backup must always be available at each stage of the development of a system.

❖ Time factor

Estimation on the project completion may be biased thereby finishing time of the project may be compromised and resources may be few or too many for the activities since these are estimates thus wastage of resources may occur

❖ Security

The system should be privately accessible thus security measures must be in place in case of the system being hacked thus the system is designed with the use of passwords and usernames to log in.

❖ Users

The other challenge may be the resistance of change from the users. Fear of the unknown is the major problem when introducing a new system therefore workshops has to be held to teach users about the new system and train them.

2.7 STAKEHOLDER ANALYSIS

This is the process of assessing the system and its potential changes to the interested parties. It identifies the needs of the stakeholders in the system , what the system will deliver to interested parties. Below are some of the stakeholders of the system and how the system will affect them

Organisational Staff

The system will reduce the workload of the staff at work related learning department by computerising everything. The use of paperwork is completely phased out thus making work easier for the staff.

Students

The system will give a platform for students where they can access the schedule so that they are aware of their visits and stay prepared for their assessment and supervision.

Finance Management

The system greatly impress management as it cuts lots of costs of paperwork and costs associated with repeating trips.

Operation management

They supported the system as the operation of the department will increase efficiently and manageable.

2.8 PROJECT WORK PLAN

It is used by project managers to record the time needed to complete the project, it is an estimate on the completion of the project. The work plan will state what needs to be done and when. It will be illustrated by a table below:

Table 2.8 Project Timing Table

Phase Activity	Start	End	Duration(weeks)
Proposal	05/11/18	29/11/18	4
Planning	04/01/19	21/01/19	2
Analysis	22/01/19	25/02/19	5
Design	26/02/19	26/03/19	5
Implementation	27/03/19	03/04/19	1
Maintenance	20/04/19	On-going	On-going
Documentation	05/11/18	20/04/19	17

2.8.1 GANTT CHART

It is a graphical view of work done or production completed in specific period of time. It keeps track of the progress of the project from the start to the end of the project. The duration of the project against time and activity are shown through the chart. It is a visual view of tasks over time. Below is a Gantt chart of the proposed system.

PHASE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Project proposal	█																
Planning					█												
Analysis							█										
Design												█					
Implementation																	█
Documentation	█																

Fig 2.1 Gantt chart

2.9 Conclusion

The feasibility study techniques were identified, the risk analysis and the work schedule are drafted. The project appeared to be viable in all the feasibility study techniques. The next chapter will further explain focus on the analysis of the system and the techniques used in gathering information.

CHAPTER 3 ANALYSIS PHASE

3.1 INTRODUCTION

The chapter of the project thoroughly searches the problems with the system in use in order to reach organisational goals. The chapter will explain more on the methods that were used by the researcher in obtaining information when developing the new system.

3.2 INFORMATION GATHERING METHODOLOGIES

The researcher used three methods namely observations, questionnaires and interviews. The techniques are used to gather relevant data they help in developing the project. The student will decide and compare on the best method to use depending on the one with greater advantages.

3.2.1 OBSERVATIONS

The researcher will be collecting data by just observing on-going behaviour of users when using the system. It is a primary source of acquiring information. Using the data observed the researcher concluded that the current system in use is not fully computerised. Drafting of the schedule is done manually, late submission of the placement routes by other departments.

Advantages

- ❖ You can observe what people actually do or say rather than what they say they do especially helps in identifying those who ignore the use of log books
- ❖ It is simple and gives greater accuracy of data as observed by the researcher

Disadvantages

- ❖ Some of the problems could not be seen by just observing , hence it could not give adequate information.
- ❖ The researcher could not observe everything and everyone at once

3.2.2 QUESTIONNAIRES

It is a document with structured questions for the purpose of acquiring information. The method gives room for users to answer the questionnaire freely as it is anonymous. The questionnaires were given to users of the system by the researcher and the researcher managed to get the following feedback

Advantages

- ❖ Many users were open to this method as it was not interruptive, some could fill in the paper on their free time
- ❖ It was a quick way to gather lot of information from different users
- ❖ Easy visualization and understandable

Disadvantages

- ❖ Dishonest answers were given some users who just fill in the paper as a way of just completing the questionnaire
- ❖ Some understood the questions in different ways thus leading to incorrect data being obtained

3.2.3 INTERVIEWS

This is a process of gathering information verbally by interacting with the users face to face, having a conversation whereby the researcher asks questions and answers are given. In this case the researcher was the interviewer and users of the system were the interviewee. The researcher in this case conducted unstructured interview where questions were asked randomly. The following are the feedback from the interview.

Advantages

- ❖ It was easier for the researcher to correct the misunderstanding of questions therefore correct information was gathered.
- ❖ Mutual cooperation and co-operation between parties was established
- ❖ Collection of fresh and new information

Disadvantages

- ❖ Some while being interviewed lack of attention
- ❖ The researcher could not interview some users as the process is interruptive, some didn't have free time for the conversation.

3.4 ANALYSIS OF THE SYSTEM

There is need to completely assess the current system in every way possible to point out the weaknesses and losses associated with the use of it so as to give the management a reason to adopt the development of the new system.

3.4.1 DESCRIPTION OF CURRENT SYSTEM

Lecturers compile a list of students on work related learning period in an order whereby there is a list of level 3.1s and 4.1s and also a list of visiting students. The itinerary lists will indicate the destinations of the work place of students as well as the number of students per destination. The lecturers will then submit these details to the work related department to now draft a trip schedule for these destinations. The work related learning department will then draft a trip schedule where they allocate various destinations to various faculties provided they have students in a certain destination for supervision and assessment. Several University drivers are allocated these destinations where they travel with lecturers to conduct their supervision and assessment of students. A log book is created where drivers and lecturers going for a trip will log in their details on the day of departure and arrival as a way of tracking those who miss trips. In case of some programs that might miss their work related learning trips, a date will be drafted again where they can go for their trip.

3.5 PROCESS ANALYSIS

It is the detailed explanation on how each process operates in the project. The activity diagram shows the activities involved in the project. It shows users series of stages in coming up with the system. Below is the activity diagram of the project.

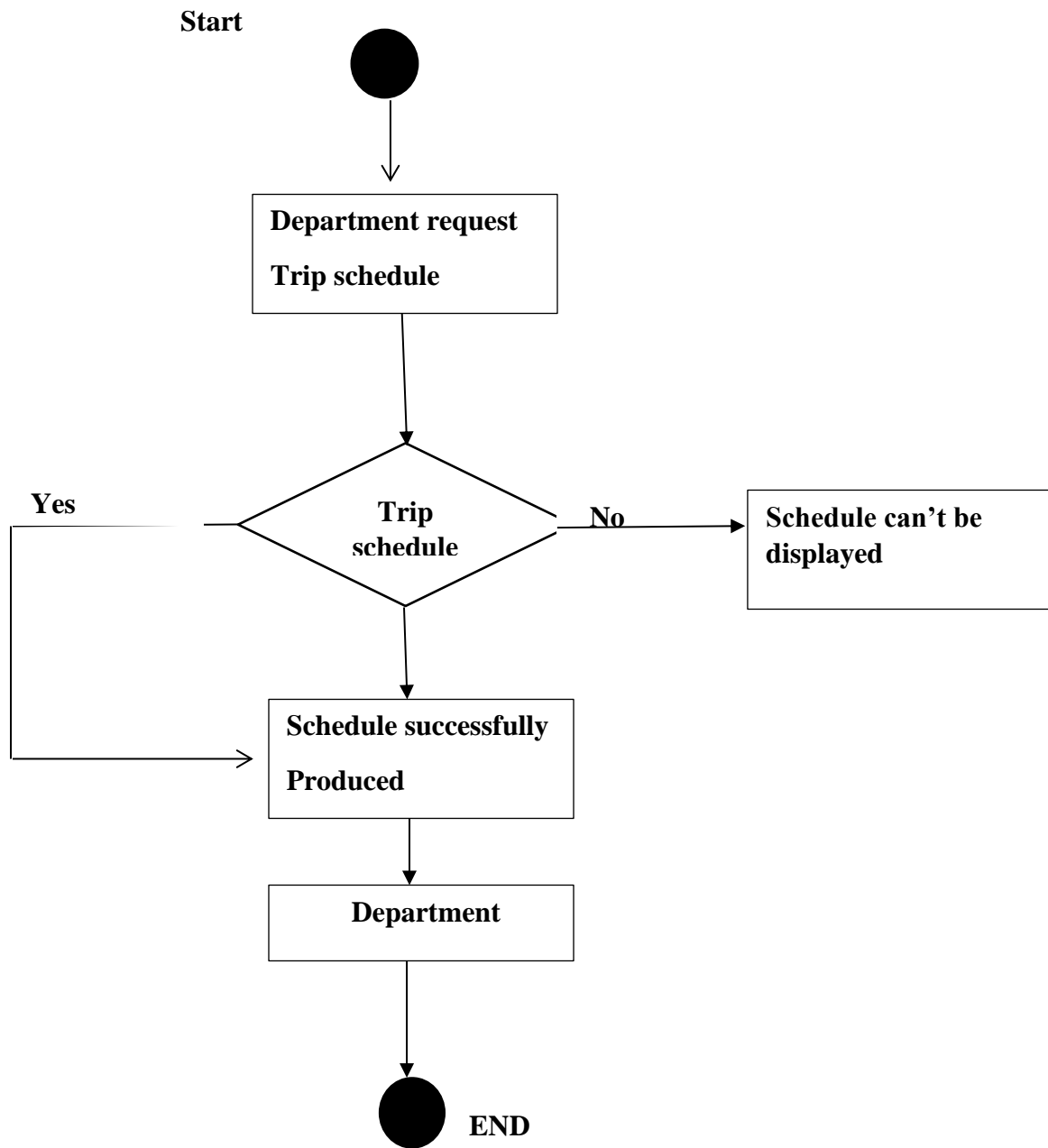
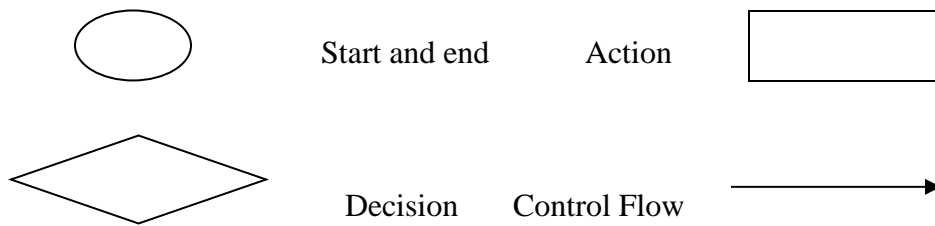


Fig 3.1: Activity diagram

Key



3.6 DATA ANALYSIS

Data analysis is the process of extracting information from data collected. The process cleanses data collected from the previous stage using information gathering techniques with the goal of discovering useful information and supporting decision making. The following methods will be used to analyse data and show the movement and relationship of data through diagrams, these are:

- I. Data flow diagram
- II. Context diagram

3.6.1 CONTEXT DIAGRAM

It is sometimes called a level 0 data-flow diagram, it shows the flow of information between the system and its entities. The boundaries of the system are shown through the diagram and the entire system if represented. Below is the context diagram of the current system.

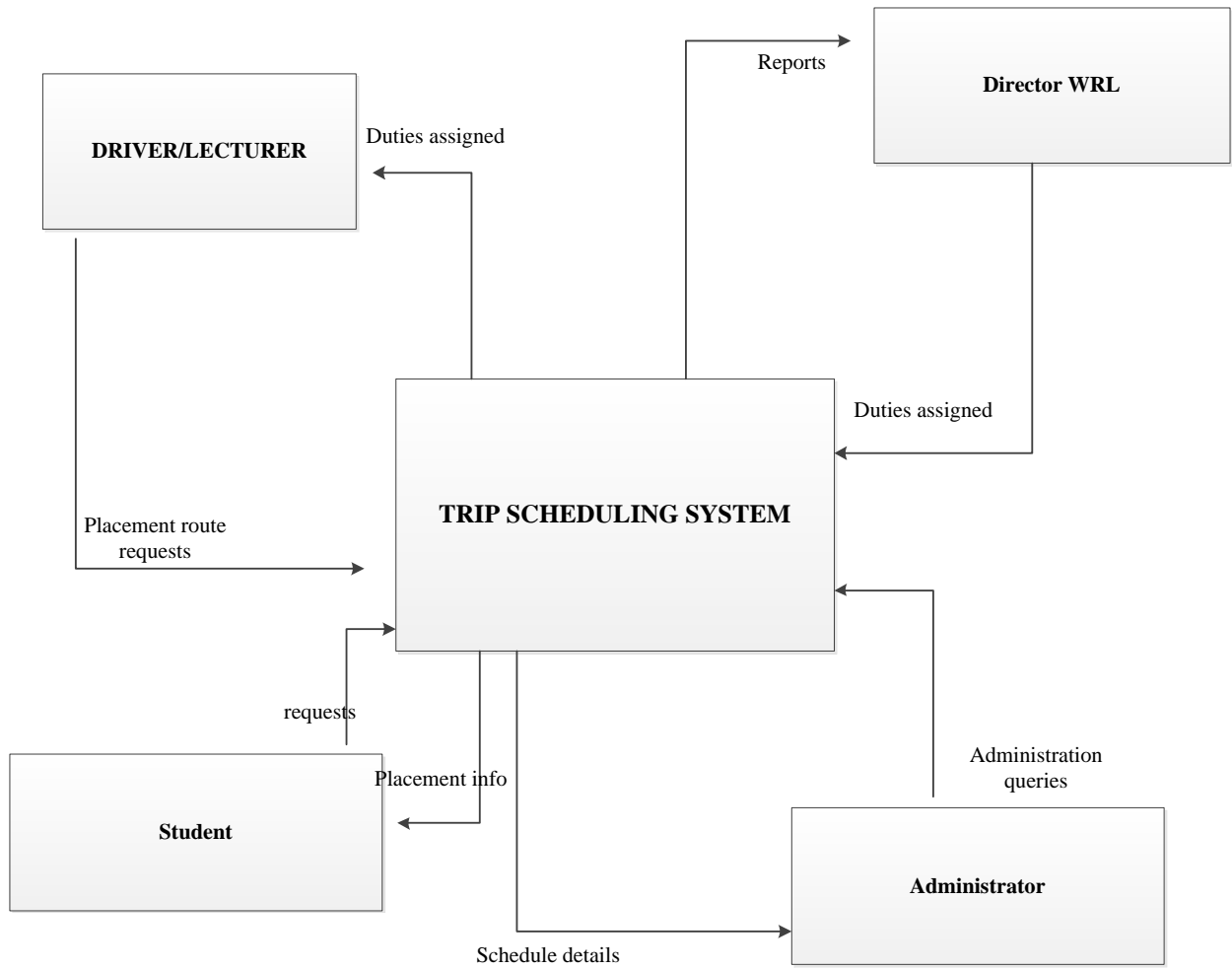
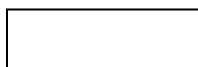


Fig 3.2 Context Diagram

Key



Entities



Information System

3.6.2 DATAFLOW DIAGRAM

It is a way of representing a flow of data of a system, it provides information on outputs and inputs of each entity. According to Miller, Vandome and McBrewster (2010), data flow diagram is a graphical representation of the flow of data through the system

Advantages of data flow diagrams

- ❖ It helps in identifying boundaries of the system
- ❖ It is easier to understand
- ❖ It supports the logic behind the dataflow within the system

Disadvantages of data flow diagrams

- ❖ Physical considerations are left out
- ❖ Takes long time to create

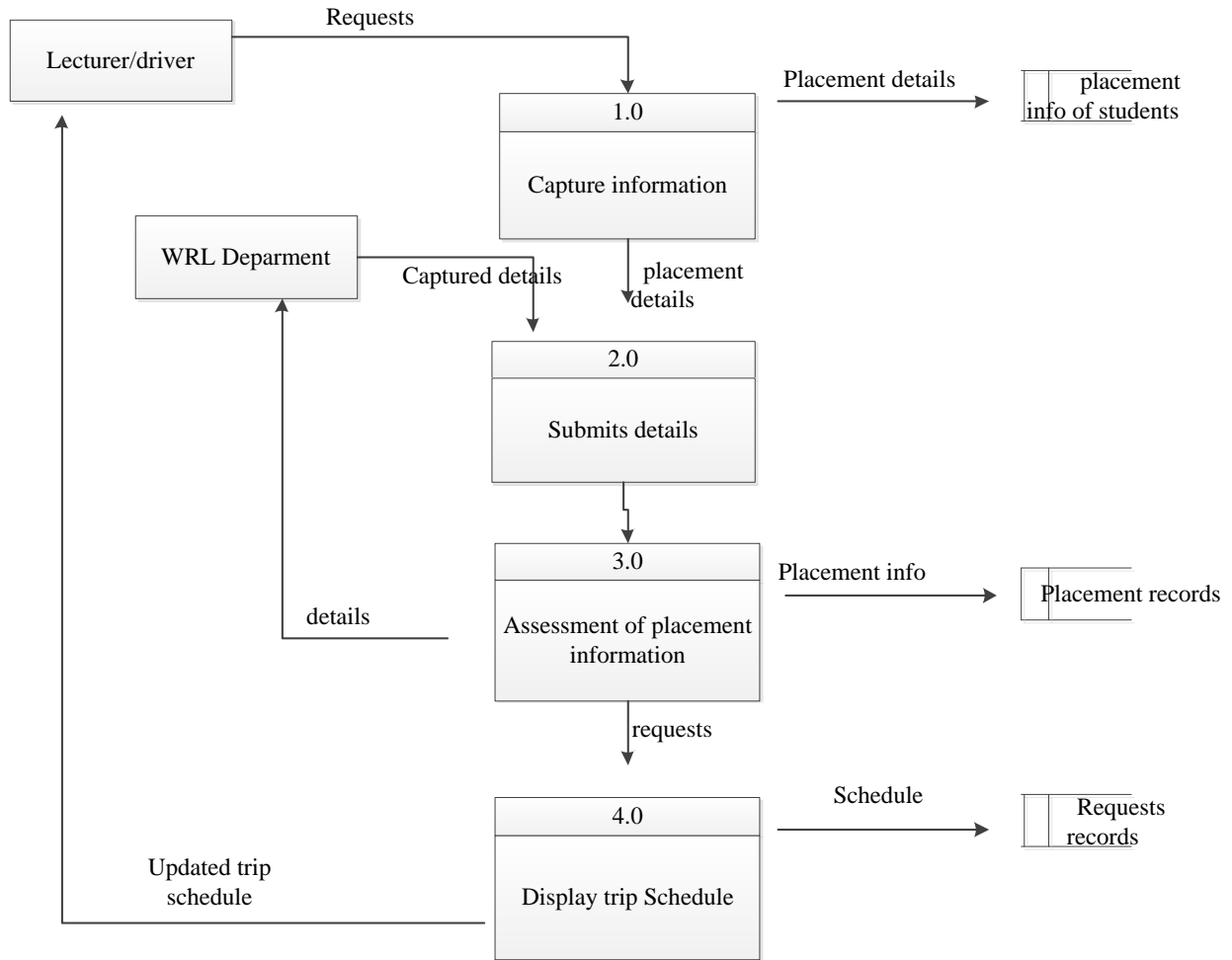
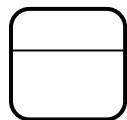
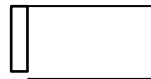


Fig 3.3 Data flow diagram for the existing system

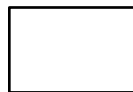
Key



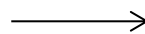
Process



data file



Entity



flow of data

3.7 Weakness of the existing system

- With the current system being manual and paper trailing, it would require weeks for one to give a schedule that is accurate.
- The department has no way of properly checking for the log books and making sure they are fill in with correct information
- Unbalanced allocation of trips among departments.
- The university drivers and lecturers going on work related trips find it hard to use the log books as they sometimes travel and arrive during the odd hours.

3.7.1 Evaluate Alternatives

When developing a new system there are various alternatives that are used to come up with the system. In this case various alternatives will be compared to come up with the best for use in implementing the new system. The following are the alternatives to be compared and discussed before choosing to develop the trip scheduling system.

- Outsourcing
- Improving the old system
- In-house development

3.7.2 Outsourcing

This is whereby a company hires another company to handle operations or provide services. The tasks are performed on the site of the hiring company's facilities or at external locations. Outsourcing is sometimes called contracting out. Outsourcing is done as a way of lowering costs and free up resources. However, the option has many disadvantages for an organisation to adopt thus the option is not viable.

3.7.3 Improvement

This is the betterment of the system in use by improving its weaknesses and its functional areas. The process is less expensive as it does not require any implementation costs since the system will be already in use. However, the MSU work related learning department does not have the trip scheduling system thus the option is not applicable here or not viable.

3.7.4 In-house development

In this scenario the organisation will be using its IT department to develop the new system using its resources. The alternative comes with many advantages as compared to the other alternatives discussed earlier. It is less costly than other alternatives hence it is the selected method.

3.8 Requirement Analysis

This is the detailed examination of the requirements of the system. It is critical to the success of the project as it includes those tasks that go into determining the needs of the new system for example requirements of various stakeholders. There are two types of requirement analysis to be discussed below namely functional requirements and non-functional requirements.

3.8.1 Functional Requirements

- ❖ All placement routes should be shown.
- ❖ Should produce a trip schedule at any given time
- ❖ Should produce reports on trips done and those left
- ❖ Data integrity should be done through validation of the system
- ❖ Computerised log book for lecturers and drivers giving reports of the log book
- ❖ A central database for placement routes.

3.8.1.1 Use Case diagram for the current system

It is the simplest representation of the user's interaction with the system. It shows the relationship of the system with different entities. The diagram is made up of actors and use case to show the interaction of users and the system. Below is the use case diagram to illustrate the current system in use.

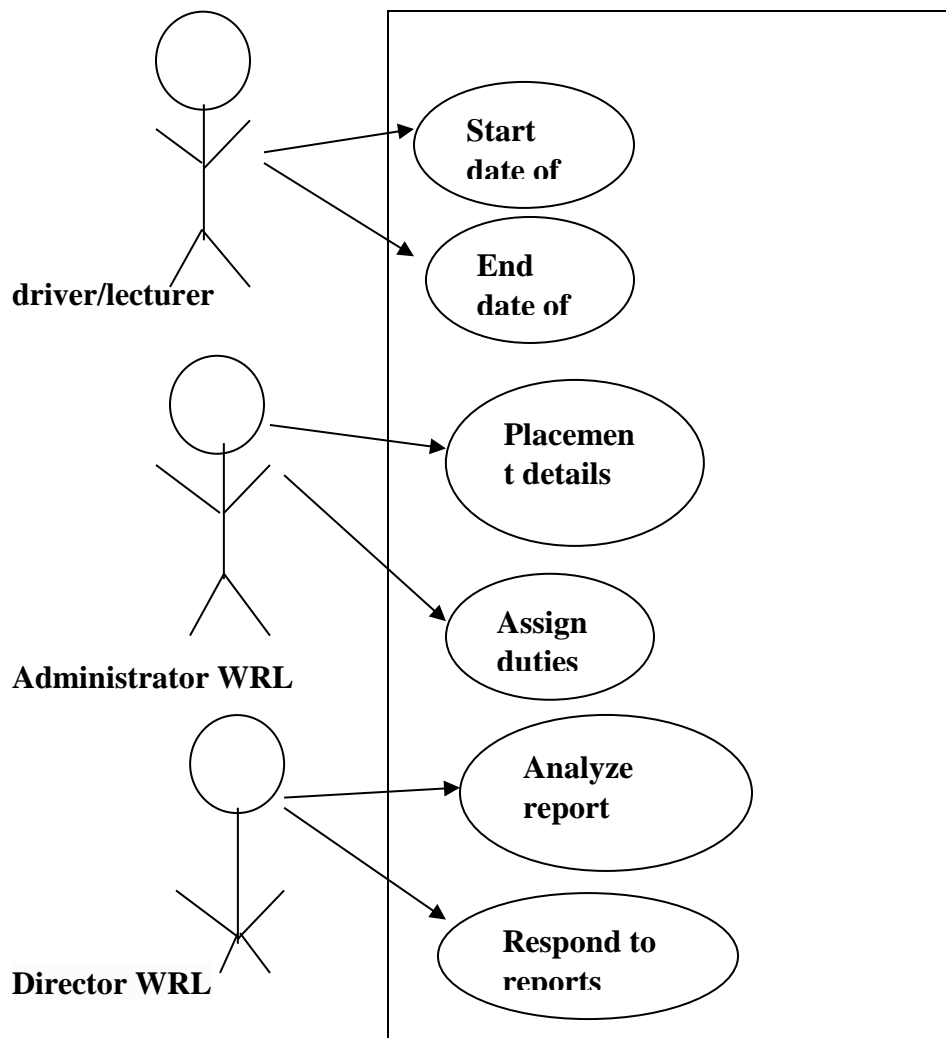





Fig 3.4 Use case diagram

	Actors
	Use case
	Illustrators

3.8.2 Non-functional requirements

These are requirements that are not necessary but at the same time they are important for a system. These are known such as usability, security and compatibility. Below are some of the non-functional requirements that users expect to see when using the system.

Graphic user interface

- ❖ The new system should be user friendly thus it should be simple so that users can use easily without any complication.
- ❖ The design of the system should be clearly designed so that users can understand thus this also cut time of training users.

Error Handling

- ❖ Capturing of placement routes
- ❖ Analysing the destinations and number of students per destination
- ❖ Extraction of data
- ❖ When producing the schedule

Security Constrains

- ❖ The system should allow user to access the information using passwords and usernames.
- ❖ The management of the database must be effective to prevent data form being lost, data encryption must be done in the database.
- ❖ Users must make use of hard to guess passwords that contain a mix of numbers and letters, and change it frequently.

Technical constraints

- ❖ The system should be user friendly and easier to maintain, in case of the need to technically fix the system, must not be costly.

3.9 Conclusion

The chapter was thoroughly done by identifying the information gathering techniques and the best alternative to be used when implementing the system. The next chapter will look at the design of the system and explaining how each design will be used by the users of the system.

CHAPTER 4: DESIGN

4.1 Introduction

The design of the project as a whole will be given in detail in this section. A summary of the new system will be shown using the context diagram and the dataflow diagram to make it easier to see how the proposed system will be working.

4.2 System Design

It is a process of defining the elements or components of a new system and data that goes through the system. It is meant to satisfy all specific needs and requirements of an organisation through a well-functioning system, the project must clearly show the design of all inputs, processes and outputs. The project must meet the following facts:

❖ **Reliable**

The project must be trustworthy to users and able to provide information wherever it is accessed. The new system must be dependable and in good performance. It should also be able to solve problems with the current system and should be an aid for fast decision making by providing reports when needed.

❖ **Effective**

The proposed system must be successful in providing the desired results thus it must meet all its objectives and cut all the problems with the current system. It must provide correct solutions to every request and accurate answers.

❖ **Maintainable**

The proposed system must be capable of being maintained thus should give room for upgrades whenever they are required or needed.

❖ **Secure**

The system should be fastened so as not to give way for security breach. Confidentiality of users information must be a key element thus different access levels must be provided to users.

❖ **Description of the new project**

The project is proposed for the Work Related Learning department to produce trip schedule. The Administrator creates user accounts for the Coordinators /lecturer, drivers and director then the coordinator provided information on placement routes to the administrator. The administrator capture information on placement routes and then produce a trip schedule. Coordinators will access the trip schedule through by logging in the system using their user accounts. The reports are given to the director on the placement routes

4.2.1 Inputs

- ❖ Placement details
- ❖ User details
- ❖ Username
- ❖ password

4.2.2 Processes

- ❖ Create user account
- ❖ Generate list of placement routes
- ❖ Reports of trip schedule

4.2.3 Outputs

- ❖ Trip schedule
- ❖ List of placement routes
- ❖ Reports of log book

4.2.4 Context Diagram

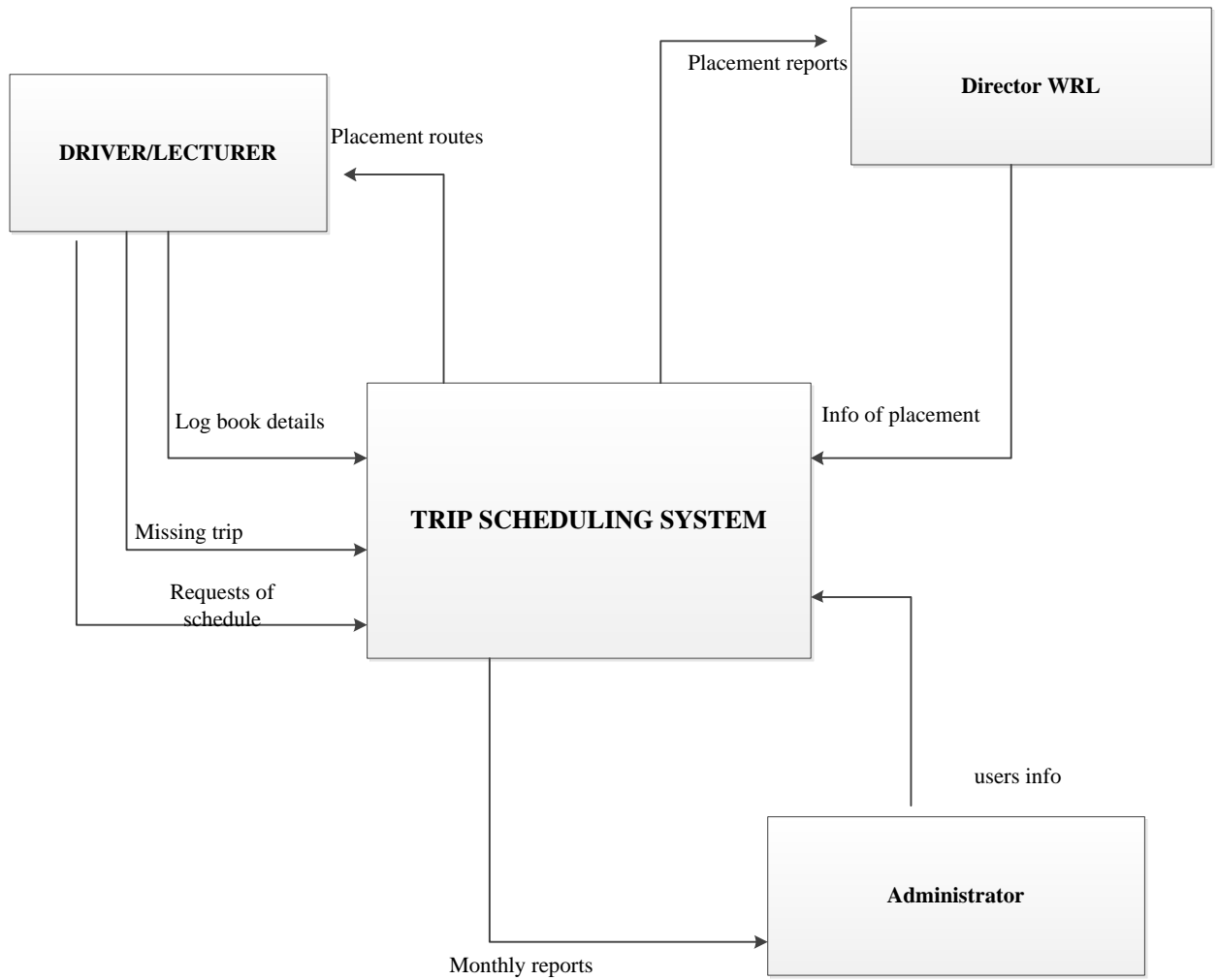
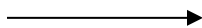


Fig 4.1 context diagram

KEY:

Data flow



4.2.5 DFD Diagram

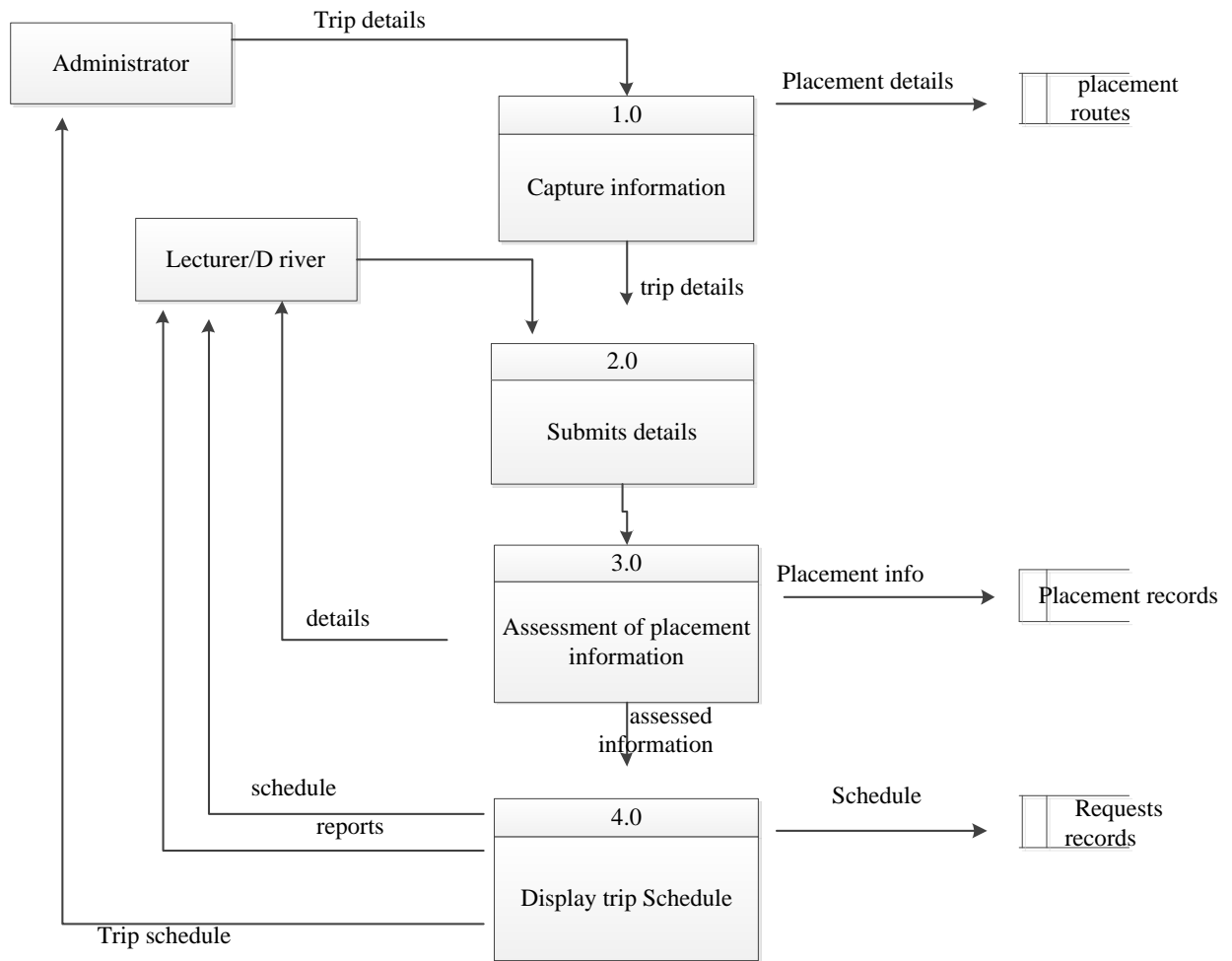


Fig 4.2 Dataflow diagram

4.3 Architectural Design

These are components of a structure of the system that are combined or unified into a functional whole. The architect is responsible for making changes regarding anything to do with the architectural design of the system. Architectural design consists of components like servers and Ethernet cable.

4.3.1 Client-Server Approach

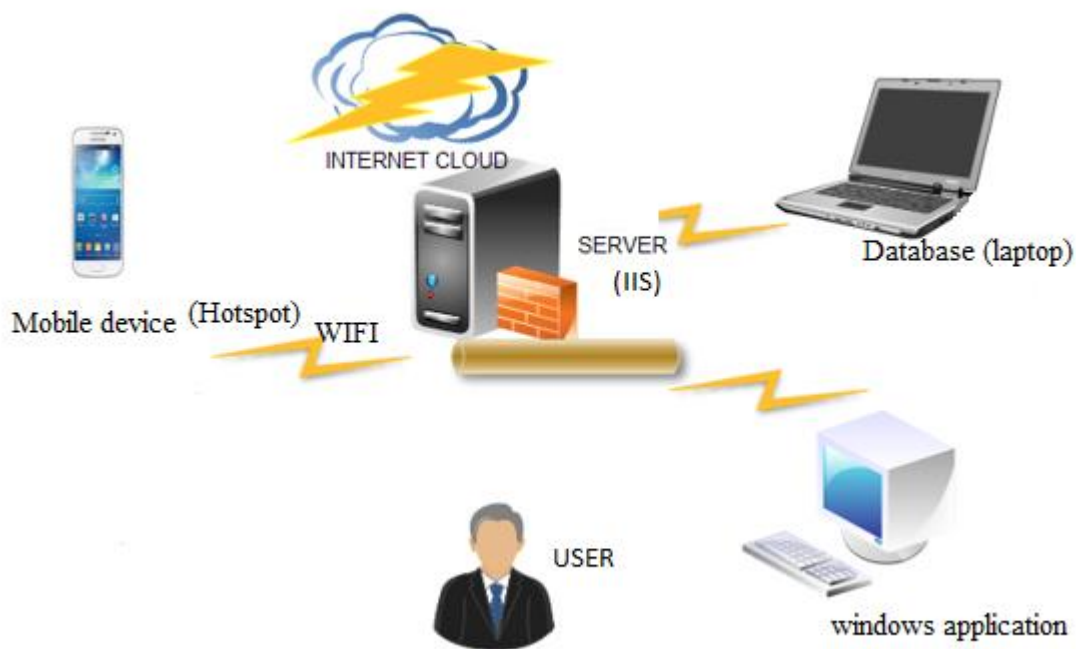


Fig 4.3 client – server approach

It is a distributed application structure that partitions tasks or workloads between servers and service requesters. The client does not share any of its resources but will be using the server's content or service function.

4.4 PHYSICAL DESIGN

It shows the software and hardware layout or arrangement of the proposed system and how it is physically linked together as one. The physical design shows how the new system will be used physically or accessed physically by users. It clearly shows the hardware needed to have access of the system.

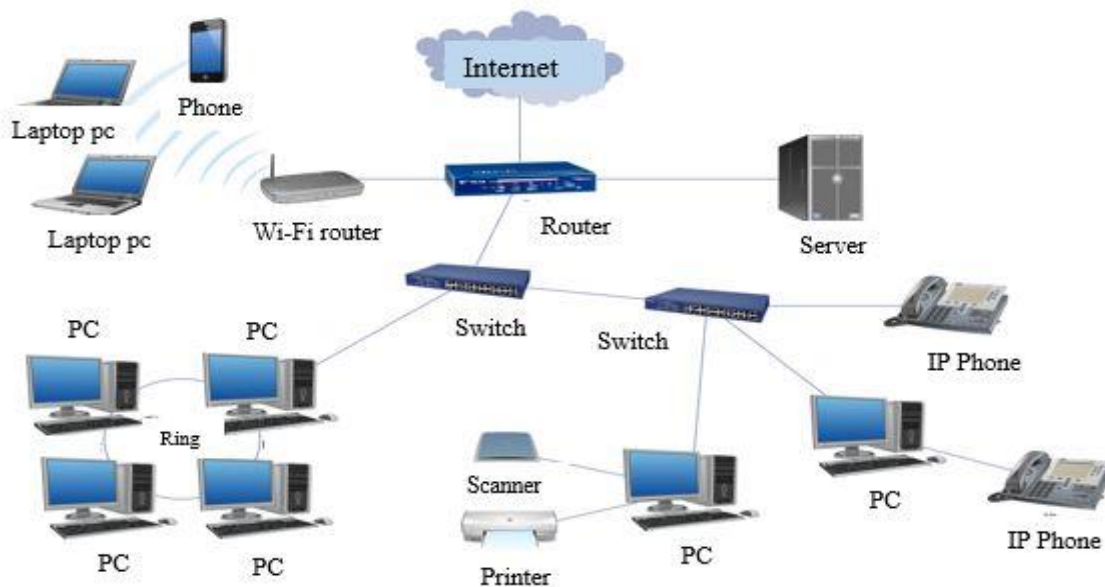


Fig 4.4 physical design

4.5 DATABASE DESIGN

Database design identifies all entities of the project. The relationship between entities is shown and the database should promote consistency and data integrity thus the success of the system depends on the database. The design of the database is important as it is the repository of user's data. The database can be backed up and also allows manipulation of data.

4.5.1 DATABASE ARCHITECTURE

It shows the way in which users are linked to the database, users are given certain access levels thus there are certain levels that users cannot view except for the system's administrator. The administrator and users access the database without disturbing any schema and they are given access independently. Below is the diagram showing the database design:

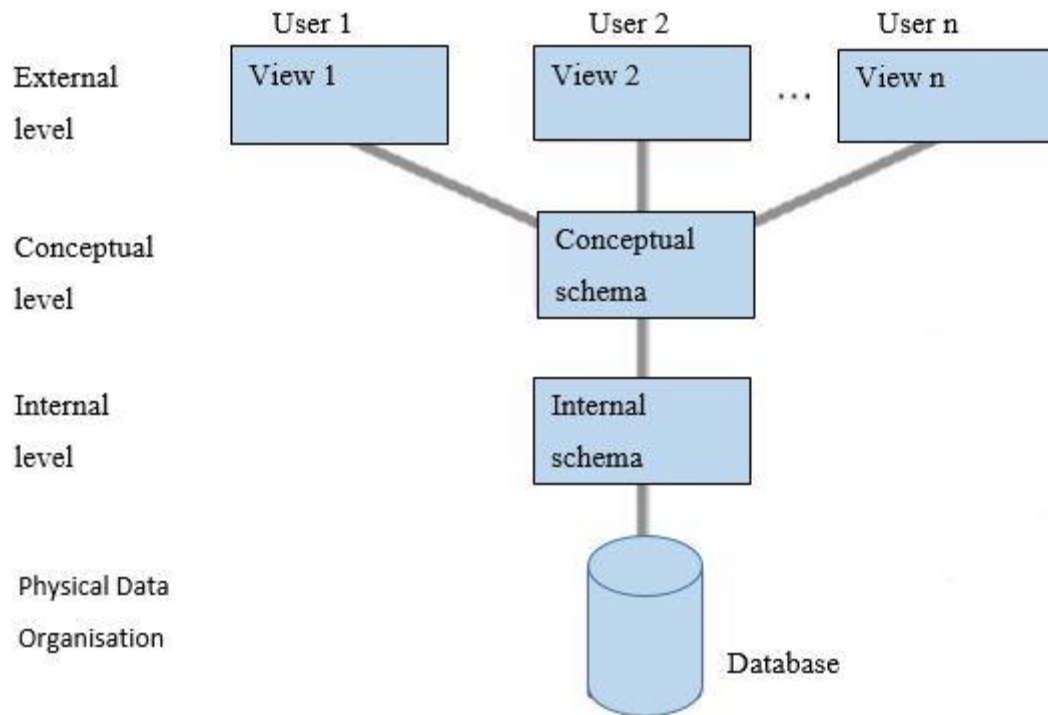


Fig 4.5 database levels

4.5.2 DATABASE TABLES

Table 4.1 Users table

Name	Data type	length
ID	integer	12
Name	string	15
Surname	String	10
Username	VarChar	13
Password	VarChar	11

Table 4.2 Placement Routes

Name	Data type
Location	String
Number of students	Integer
Date	Date

Table 4.3: Departments

Name	Type of data
ID	Integer
Name	string
Justification	String

4.5.3 EER Diagram

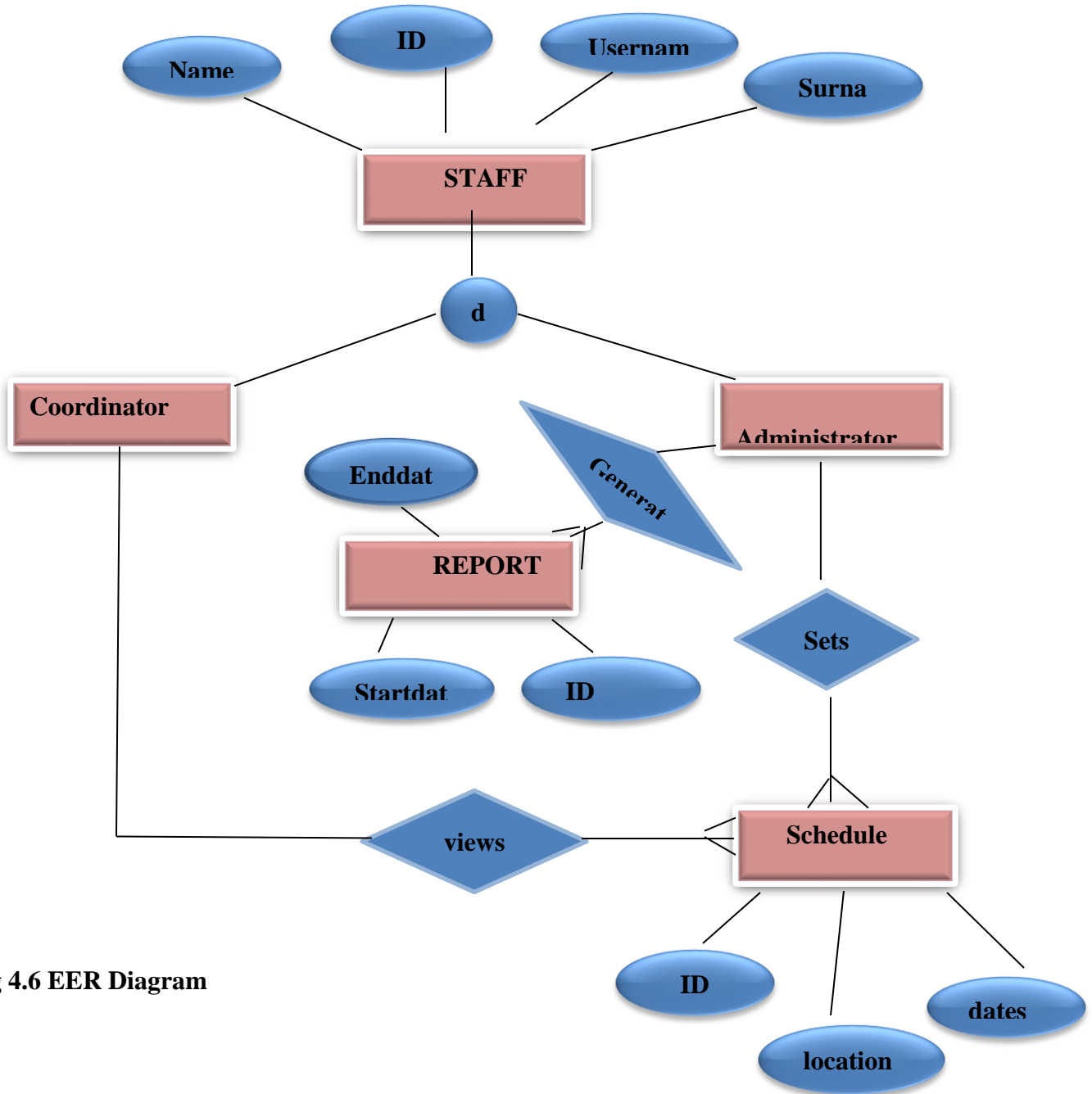


Fig 4.6 EER Diagram

4.6 PROGRAM DESIGN

4.6.1 PACKAGE DIAGRAM

It is a diagram used to represent how packages relate to each other in a model. It simplifies projects. Below is the package diagram for the proposed system:

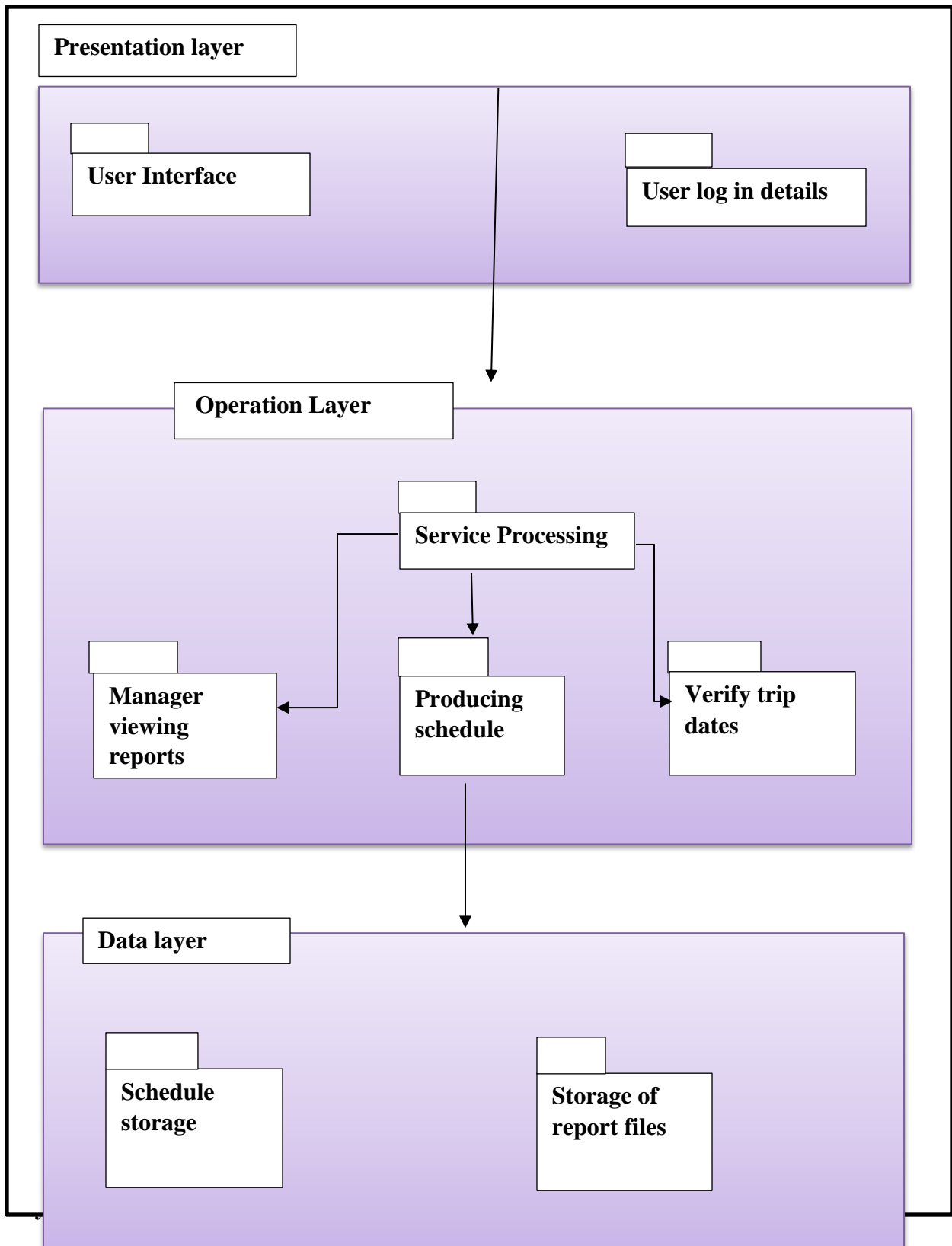


Fig 4.7 package diagram

4.6.2 CLASS DIAGRAM

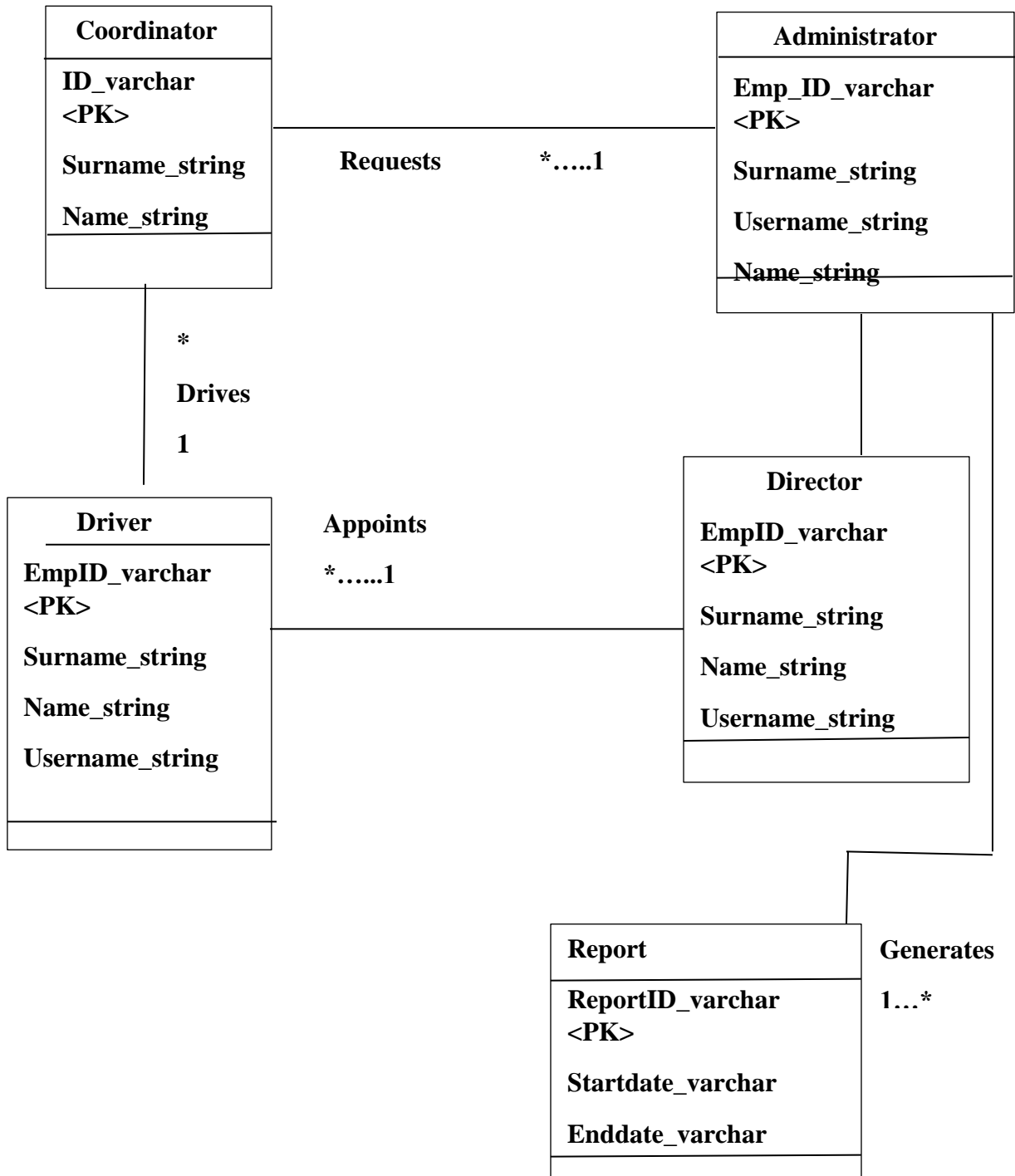


Figure 4.8: Class Diagram

4.6.3 SEQUENCE DIAGRAM

These are diagrams that are used to show objects that work together hand in hand. The main aim is to focus on how objects interact over time to meet a specific task. Below is a sequence diagram for work related learning department.

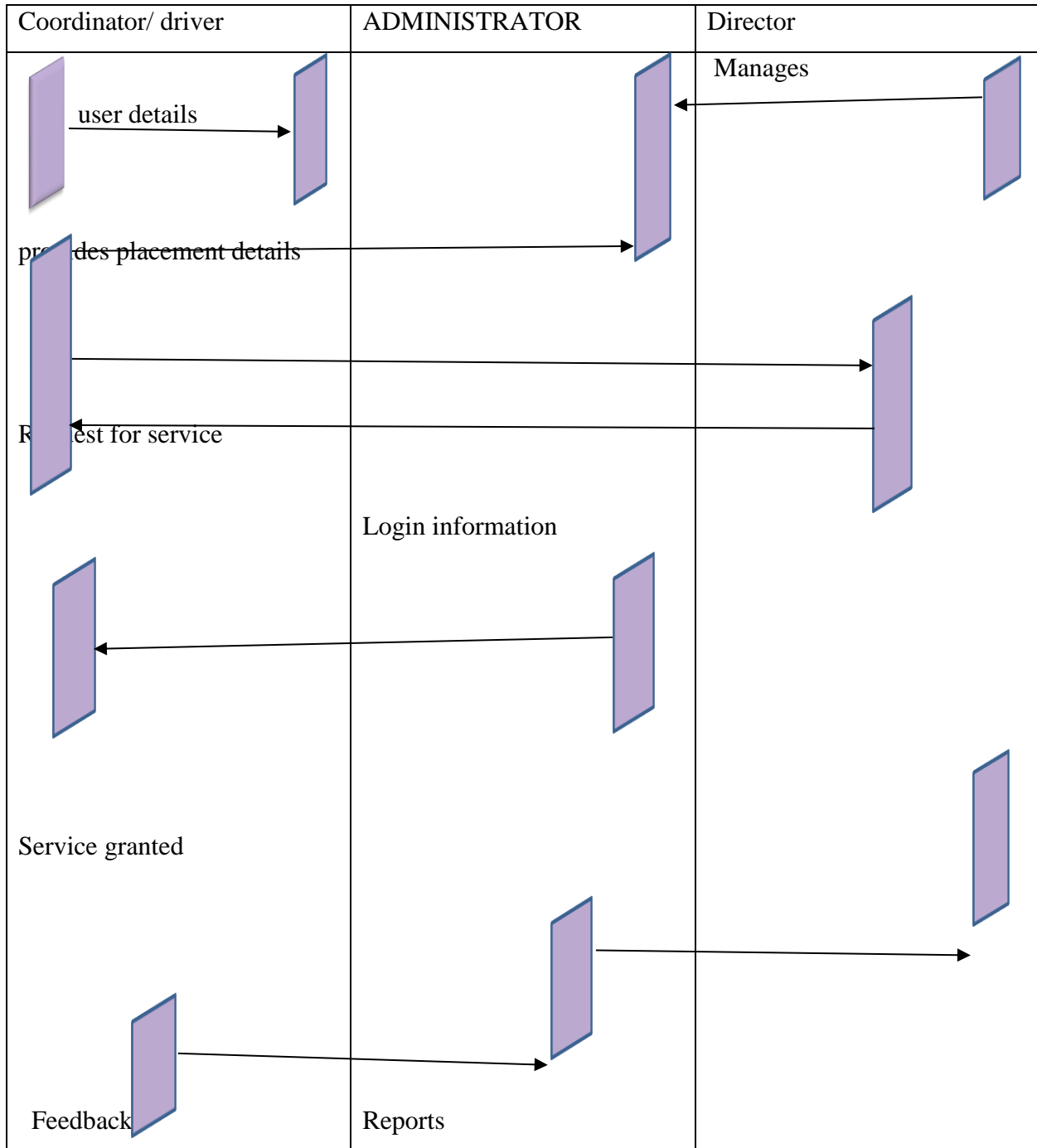


Figure 4.9: Sequence Diagram

4.7 INTERFACE DESIGN

It enables the interaction between users and the computer, it comprises of menus , commands ,input and output forms as wells as icons so that users can interact with the computer. Interface design makes it easier for users to use the computer by giving the visual design and icons which are easily understandable.

4.7.1 MENU DESIGN

This is the design of the functionality of the system as a whole that gives instructions to users so that they can navigate through the system. Menus are easier to use and understand, it clearly shows the users what is required per each menu by giving the user what is to be performed per menu. Menu design consists of the main menu and sub menus which are derived from the main menu or which are part of the main menu.

4.7.1.1 MAIN MENU

The main menu acts as the home page of the system that shows up as soon as a user open the web page of the system. In this case it contains information like log in menu and organisational logo. Below is the diagram showing the main menu of the system:

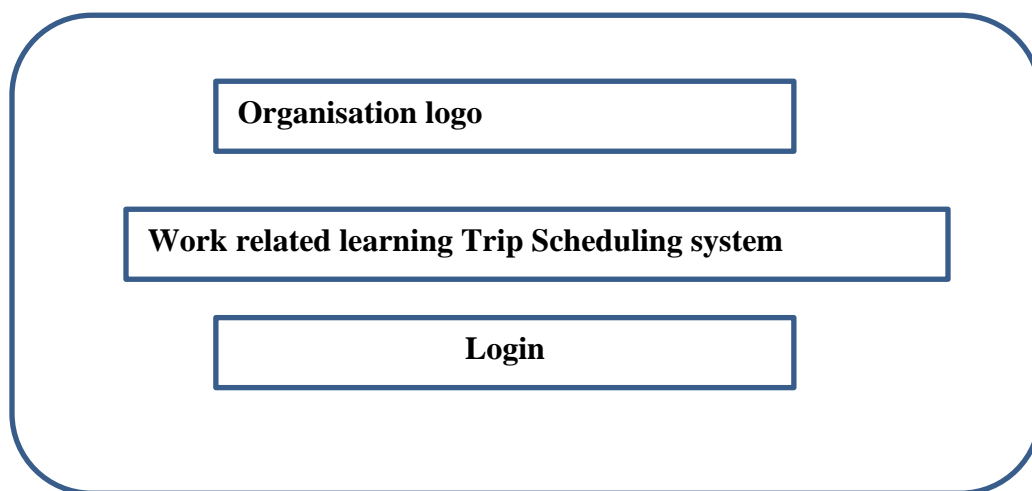


Fig 4.10 main menu

4.7.1.2 SUB- MENUS

These are menus that appear after the user is successfully logged into the system. The new system will consists of the department list , placement routes and administrator page as the submenus of the system.



Fig 4.11 administrator page

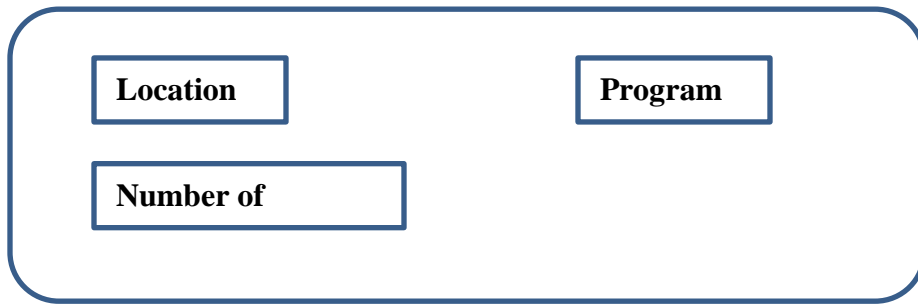


Fig 4.12 placement routes page

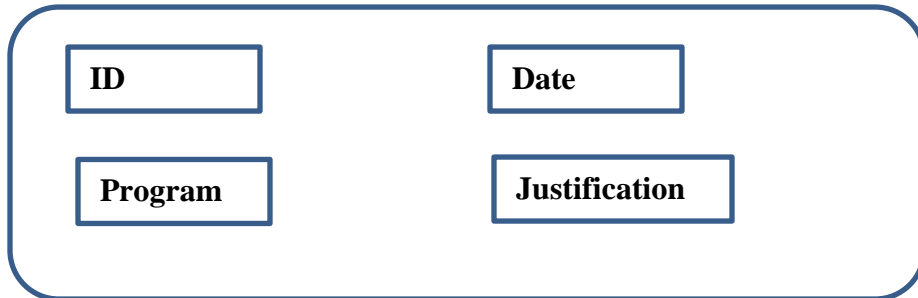


Fig 4.13 Department list

4.7.2 INPUT DESIGN

This is the design of the data to be entered into the system, at this design stage validation of user input is done as a way of ensuring data integrity.

4.7.2.1 Creating user account

Name	<input type="text"/>
Surname	<input type="text"/>
Password	<input type="text"/>
Confirm password	<input type="text"/>
<input type="button" value="SAVE"/>	<input type="button" value="CLEAR"/>

Figure 4.14: account creation form

4.7.2.2 Adding New placement details

Route name	<input type="text"/>
ID	<input type="text"/>
Number of students	<input type="text"/>
Description	<input type="text"/>
<input type="button" value="SAVE"/>	<input type="button" value="CLEAR"/>

Figure 4.15: Adding placement details

4.7.3 OUTPUT DESIGN

This is the design of the processed information, how the processed data will be displayed on the screen. It is important to as it simplifies data to the users.

4.7.3.1 Placement report

		REPORT		
Placement ID	Location	Number of students	of	Description

Figure 4.16: Placement Report

4.7.3.2 Department List

		REPORT	
ID	Program	Dates	Justification

Figure 4.17: Department List Report

4.7.3.4 Supervised Students Report

		REPORT	
ID	Program	Dates	Justification

Fig 4.18 supervised students report

4.8 PSEUDO CODE

User Login

Start

Select system

Enter username and password

If (username and password) valid **Then**

Login successful

Else

Login failed

End.

User's form

Start

If user is administrator **Then**

If(add user) **Then**

 Enter user details and add

End if

Else if (delete user)

 Enter username to be deleted

Else (view reports)

 Enter reports to be viewed

End if.

If user is Coordinator **Then**

If(view placement routes) **Then**

 Verify routes

End if.

Else (view verified routes)

End if.

If user is Coordinator **Then**

If (provide placement details) **then**

 Show trip schedule

End if

Else if (placement details are not provided)

 Do not show trip schedule

End if

Else (View trip schedule)

 Enter route name

 Show trip schedule

End if.

End if
Exit

4.9 SECURITY DESIGN

These are processes and methodologies on how the system will be authenticated or how the confidentiality and integrity of the system will be archived. This is the design of measures to securely protect or safeguard information of users. There are three areas of security which are discussed below:

4.9.1 PHYSICAL SECURITY

This is the protection of data , hardware , networks and the personnel from physical actions that can cause serious damage to the system , these actions include theft , vandalism and natural disasters like fire. The physical location of the system should be monitored by surveillance cameras , access control cards and fire suppression systems to protect the system.

4.9.2 NETWORK SECURITY

It consists of measures, rules and regulations that monitor and prevent unauthorized access, misuse and modification of computer network. It protect the usability and integrity of network and system data. There are various measures in ensuring network security and these are mentioned below:

❖ Antivirus and antimalware software

These are used to scan for malware, remove malware and fix the damage. These malware can be viruses or worms. Malware may affect the network and lie dormant for days or weeks without showing its signs.

❖ Firewalls

It puts a barrier between internal network and outside networks like internet. It makes use of rules to block or allow traffic. A firewall can be a hardware or software with the main aim of blocking access of a network from other networks.

❖ VPN

Virtual private network encrypts the connection from an end point often over the internet. It authenticates communication between a device and a network.

4.9.3 OPERATIONAL SECURITY

Operational Security is also known as procedural security, its main aim is to protect sensitive data falling into the wrong hands. It discourages users from sharing log in credentials. It consists of five major steps in ensuring security, which are identification of sensitive data ,identify possible threats ,analyse security hole or vulnerabilities, assess threat levels and lastly apply suitable measures to deal with the threats.

4.10 CONCLUSION

The main goal of the phase was to outline the components and elements of the Design of the new system in all aspects. The researcher managed to clearly state all elements involved in the design of a new system and thus the chapter was thoroughly done. The next chapter will be discussing on the implementation phase of the system like how the proposed system will be implemented and the methods to be used.

CHAPTER 5: IMPLEMENTATION PHASE

5.1 INTRODUCTION

Implementation of the system is of great importance as it should be done correctly in a way that the system meets all the requirements of the users. This includes testing of the system to ensure that it meets all its expected functions. Coding of the system is also done as well as choosing the proper way to implement the new system. The chapter also discuss on the ways of maintaining the system and the future developments that are expected on the system.

5.2 CODING

Coding is essential in coming up with a project as it assists the developer to meet the goals and objectives of the system to be developed. According to Maracas (2012), coding refers to a technical process which assembles undefined data into short letters or digits which are easy to enter. In this research the developer used PHP, Xampp and Adobe Dreamweaver for developing the software thus the code and database of the system. Adobe Dreamweaver was used for interface designing and for the text editing, the researcher used the sublime text editor. The code is used to debug the system and also for system testing for example module testing and acceptance testing

5.3 TESTING

It is the arrangement of steps that are carried out to ensure the correctness of the system and to produce quality software. Beizer (2007) defines system testing as performing sequential tests to see the functionality and identify problems of the system. Testing of the system makes it easier to correct and prevent future errors and make the system bug free. There are numerous methods that are used in testing the system, below is a diagram showing the methods of testing and will be discussed below.

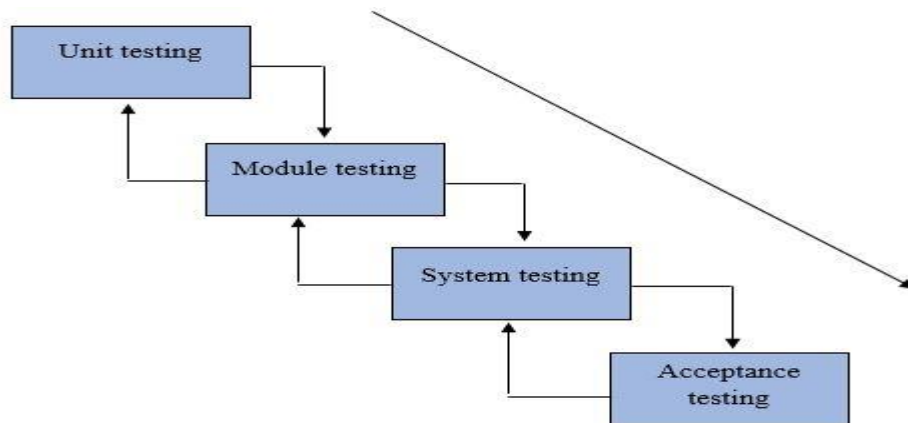


Fig.5.1 stages of testing

5.3.1 UNIT TESTING

This is a process whereby testable units of the system are tested independently to check if they operate or function correctly. The main objective is to check if a particular component of the system is functioning as expected. There are two types of unit testing which are discussed below.

5.3.1.1 BLACK BOX TESTING

This is the software testing which is done by the tester without the knowledge of the code or internal structure of the system. Programming and implementation knowledge is not required. The system is the one which will be referred as black box since its functionalities will not be known by the tester.

5.3.1.2 WHITE BOX TESTING

The method requires the tester to know the knowledge of the code or the internal structure of the system. It focuses on source code, algorithms and inner part of the system. The tester needs much knowledge or expertise to focus most on all components that were used to develop parts the system. Below is a diagram with an example of how white box testing works.

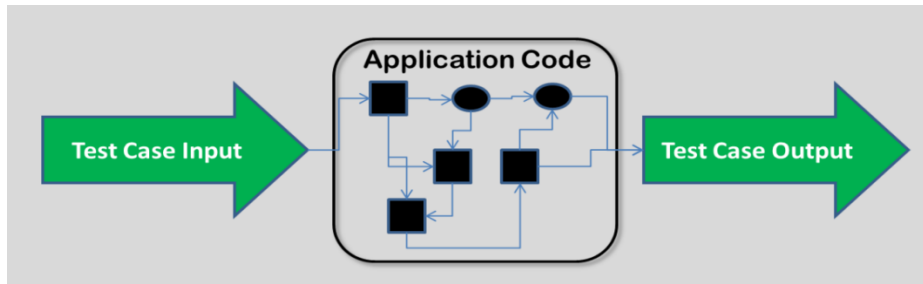


Fig.5.2 white box testing

5.3.2 MODULE TESTING

This is a method of testing the system in modules before it is fully integrated. It is easier to test the system in modules as errors and bugs can be easily identified and fixed than testing the system as a whole, it will be complicated and some errors may not be identified. Modules are easier to handle and to prevent the system from future errors and to increase the functionality of the system, it is necessary to test all modules of the system before they are combined to become one functional part.

5.3.3 SYSTEM TESTING

After all the modules and units are tested successfully and considered functional they are then combined into a single functional part called a system. The system is then tested to see if the combined modules are functioning correctly as intended and to identify errors that may pop up as a result of integrating the system modules. Testing of the system involves finding out if it meets all the objectives of the new system.

5.3.3.1 Verification of System vs Objectives

Objective 1

WRL-Trip Scheduling

fungai dube Online

Department List

Home Logof

+ Reserved Dates

Show 10 entries Search:

ID	Department	Date	Justification
1	Economics	2019-03-30	Defence day
2	Computer Science	2019-04-15	Dissertation defense
3	Information system	2019-03-31	Defence day
4	Human resources management	2019-04-30	Defense day
5	Information system	2019-04-18	National Holiday Independence
6	Applies to All	2019-04-07	Weekend
7	Applies to All	2019-04-08	Weekend
8	Applies to All	2019-04-13	Weekend

Fig 5.3 objective 1

Objective 2

WRL-Trip Scheduling

fungai dube Online

Schedules

Home Logof

Show 10 entries Search:

Driver	Student #	Fullname	Department	Location	Date
Farai	r111234z	Sadio	Economics	Kwekwe	2019-01-01
Farai	r191111a	Kelvin	Economics	Inyanga	2019-01-01
Godfreey	r101234z	Jordan	Information system	Harare	2019-04-12
Godfreey	r131234z	Roberto	Computer Science	Harare	2019-04-12
Godfreey	r151234z	Allison	Computer Science	Harare	2019-04-12
Godfreey	r161234z	Anold	Computer Science	Harare	2019-04-12
Godfreey	r155555z	Simbarashe	Information system	Harare	2019-04-12
Godfreey	r165555z	Khodza	Accounting	Harare	2019-04-12
Godfreey	r041234z	David	Human resources management	Harare	2019-04-12

Fig 5.4 objective 2

Objective 3

ID	Registration #	Firstname	Lastname	Department	Location	Company	Supervised	Tools
1	R157831g	Genius	Homwe	Information system	Mutare	Midlands State University	Supervised	Delete
3	R157059y	Godknows	Shumba	Information system	Rusape	CBZ	Allocated	Delete
4	R190000z	Vimbai	Homwe	Anatomy	Mutare	Microsoft Cooperation	Allocated	Delete
5	R191234z	Farai	Jere	Computer Science	Bulawayo	Chicken Inn	Allocated	Delete
6	R101234z	Jordan	Henderson	Information system	Harare	Air Zimbabwe	Allocated	Delete
7	R111234z	Sadio	Mane	Economics	Kwekwe	Golden Mile Hotel	Allocated	Delete
8	R131234z	Roberto	Firmino	Computer Science	Harare	Econet wireless	Allocated	Delete

Fig 5.5 objective 3

Objective 4

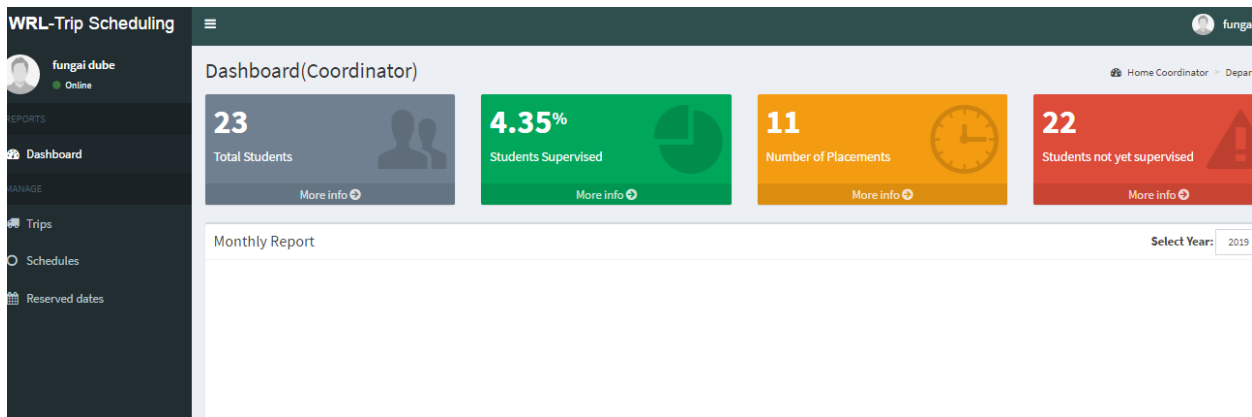


Fig 5.6 objective 4

5.3.3.2 VALIDATION

This is whereby the system built is checked to see if it is right, to see if it meets the user expectations. The system is checked to see if it was developed right. For example on confidentiality of user, the system must not accept some characters or user input as a way of maintaining the confidentiality of the system. Below are some screenshots that shows how validation was used in a number of ways.

Log in page

Welcome to MSU Trip scheduling System

MSU Logo

Login

patience

input Password

Login

Forget Password

Cannot find account with the username

Fig 5.7 validation of username

Adding user page

Department List

Error!
Invalid Characters

+ New

Show 10 entries

ID	Firstname	Role	Date Cre
2	Tendai	Male	2019-03-
3	Orward	Female	2019-03-
4	Munashe	Female	2019-03-
5	Justice	Male	2019-03-
6	Tafadzwa	Coordinator	2019-03-
7	Genius	Administrator	2019-03-

New User

Firstname: 123

Lastname: Dube

National ID: 12-175624z 12

Username: 123

Password:

Gender: - Select -

Role: - Select -

Close Save

Fig 5.8 validation of characters used

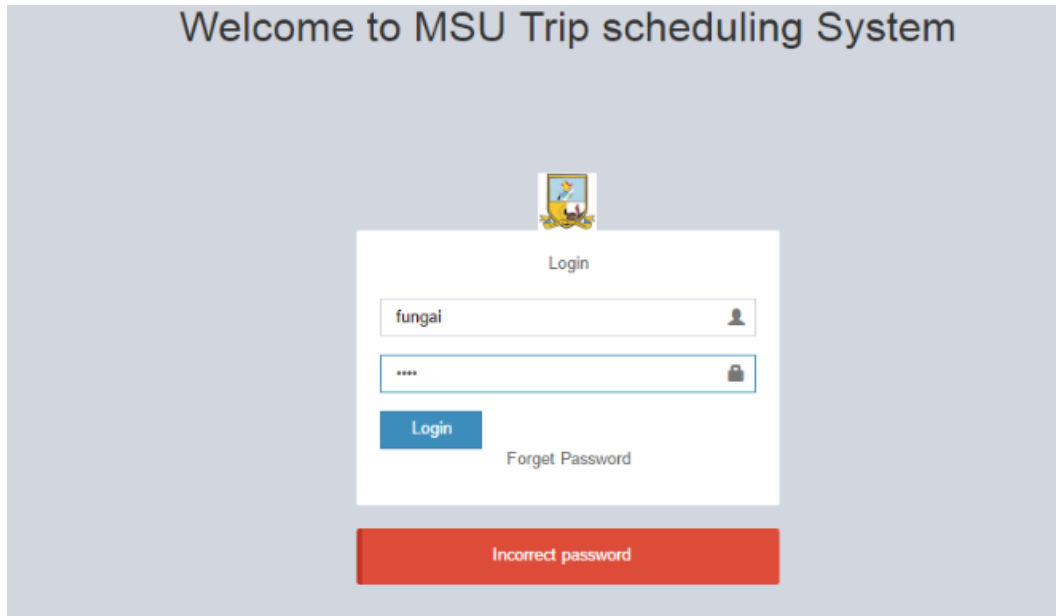


Fig 5.8 validation of password

5.3.4 ACCEPTANCE TESTING

Acceptance testing is done by users of the system or the management of the organisation to see if the system meets their requirements. This is done after system testing with the aim of ensuring that the system is performing in a way that satisfies end users. There are two types of acceptance testing that were used by the researcher namely alpha and beta testing, these are discussed below.

5.3.4.1 ALPHA TESTING

After users identify the problems with the system, alpha testing is done whereby the developers test for bugs or errors identified by users. Alpha testing is normally done at the developer's site. The developer will do the testing repeatedly until the user requirements are met and until system works as it should be.

5.3.4.2 BETA TESTING

Unlike alpha testing where testing is done at developer's site, beta testing is done at the site of end users thus some call it field testing as it is done in the working environment. Testing is done by users in this case in the working environment to see if it meets all the objectives in the real work environment.

5.4 INSTALLATION

This involves the successful data migration, user training and implementation of the new system in the organisation. The new system is introduced in the organisation and the training of users must take place as the system is considered functional and successfully installed if users can operate the new system and interact as expected, Homes (2013). Therefore training of users must take place.

5.4.1 USER TRAINING

The main objective of the new system is to come up with a system that is user friendly and efficient to users. It is essential for end users to have the proper knowledge and an understanding of how to use the system so that it become beneficial to their everyday work and so as to cut some unnecessary costs created by the old system, Homes (2013).

5.4.2 SYSTEM CHANGEOVER STRATEGIES

Changeover is a process of changing from something old to something new, in this case it is a process of switching from old system to a new system. Changeover takes place when the new system is to be implemented in the organisation due to the weaknesses of the old system. There are numerous changeover strategies which are discussed below.

1. DIRECT

This is when the organisation stops using the old system and immediately starts using the new system. The instant that the new system is approved to work then old system is

completely replaced by the new system. The method is quick and cut resources of using both systems.



ADVANTAGES:

1. It is less costly as it is a direct change over
- 2 .It is quick as once the old system has stopped being used the new system is immediately being set up
3. It minimizes workload as the system is directly changed over.

DISADVANTAGES:

1. If the system has not been implemented properly the new system may fail to work and this will affect the whole organization.
- 2 .It is very difficult to detect small errors in the new system
- 3 .If fails, it will be costly

2. PILOT

It is when the new system is introduced to a single location or department at a time while the rest of the organisation continues to use the old system. When the system proves to work as intended to in a certain department then it is implemented in that department then it is then piloted to other departments one at a time. This is done to compare the functioning of the new system in different environments and to avoid risks of failure.



ADVANTAGES:

1. Risk is reduced as it provides a greater degree of safety than direct changeover.

2. Allows the organization to see whether the new system will meet the organization's needs in one department/location before using it throughout the entire organization.
3. It is cheaper and easier to control than running the whole system in parallel.

DISADVANTAGES:

1. Too much time is involved in testing one location, there is also increased development and labour costs.
2. It is not as safe as complete parallel running.

3. PARALLEL

It is strategy whereby the organisation will be using both the old system and the new system simultaneously. When users are satisfied with using the new system then the old system will be ceased and new system will take over.



ADVANTAGES:

1. By using the parallel method, small minor errors can be easily seen
2. Companies are able to fix any problems with the new system before ending the previous system as it provides a way of verifying results of new system.

DISADVANTAGES:

1. It is very costly as two systems are being operated simultaneously, so there will be the costs for more power for example.

2. Operating two systems simultaneously are also time consuming and stressful as there is more work involved, such as creating more reports thus additional workload.

PHASED

This is when the new system is introduced in phases in different departments at a time. It is more appropriate when introducing a complex and large system into the organisation. The old system is discarded after users gain satisfaction in a particular department and the process is done until the new system completely takes over.



ADVANTAGES:

1. As the system is tested at every stage, there is very little chance of error
2. Less risky because if there is a problem it is in one area and will not affect other operations.

DISADVANTAGES:

1. It takes a lot of time to implement the whole new system to the entire organization.

5.4.3 RECOMMENDED CHANGEOVER STRATEGY

The researcher recommends that the organisation use the direct changeover strategy. Since the technology is ever changing it will be a great deal for the organisation to completely adopt the direct changeover strategy. The system is not complex that the organisation may fear to use the direct changeover and it will cut lots of resources.

5.4.4 DATA MIGRATION

Warmth et al (2015), define data migration as the transferring of data between storage type formats. This is done so that data can adapt to new technology when data is migrated from old system to new system. Data integrity should be maintained when moving data and data corruption may take place.

5.5 MAINTENANCE

This is an activity of making sure the system function as required through monitoring, updating and upgrading the system. It involves monitoring and upgrading of hardware ad well as the software, Burch (200). Maintenance is of great importance as it caters for any damage that may cause the system not to function as expected , this also includes the technical services to the system. There are numerous types of maintenance that are done and these are discussed below.

5.5.1 CORRECTIVE MAINTENANCE

The main purpose of this method is to identify the bugs or errors which were not identified during the system testing and try to resolve these errors. These may also be errors that take place during the runtime of the system. This includes the option of restoring certain activity, it does not affect the system in any way, it only correct the errors caused during use of the system, Burch (2000).

5.5.2 ADAPTIVE MAINTENANCE

This is mostly used when a new environment is created and the system has to be used in that environment. The maintenance is done to make sure that the system adjusts to the new environment. The objective is to be able to add and modify the features of the system so that it can adapt to the new environment, Burch (2000). The technological advancement is the main reason for undertaking adaptive maintenance. The method adds value to the system and the organisation.

5.5.3 PREVENTIVE MAINTENANCE

This type of maintenance is meant to carry out of the activities that prevent the system from failing to function and to increase its lifespan. The main aim is to cater for errors and bugs before they occur. Preventive maintenance includes updating and upgrading the hardware and the software of the system. It adds value to the system and organisation thus the researcher recommends the organisation to carry out this method, Homes (2013).

5.5.4 PERFECTIVE MAINTENANCE

These are activities that are done to ensure that the system's performance is improved so that it works efficiently and effectively. This includes improvements that may be needed in terms of

featured and functions that may be added after users identify some of the functions they may need on the system. The organisation must make use of this method as it cut costs of repairing the system when damage occurs, Homes (2013).

5.6 RECOMMENDATIONS FOR FURTHER DEVELOPMENT

1. The should be updated regularly if there are any changes to be made
2. System maintenance should take place regularly to ensure the effectiveness of the system
3. Confidentiality must be maintained and user's privacy must be kept
4. The software must be upgraded after certain period of time so as to keep track of the technological changes.

5.7 CONCLUSION

The chapter marks the end of the project and the researcher managed to do all the testing of the system which are required and then looked at the various ways which can be adopted in implementing the new system.

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APPENDIX A : USER MANUAL

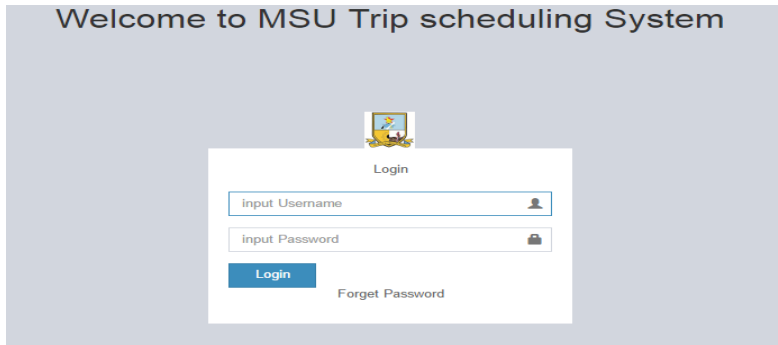


Fig A1. Login page

This is the page that gives the user access into the system. The user will have to enter the username and password in the sections provided on the diagram above. Failure to provide correct details the system will deny the user access into the system.

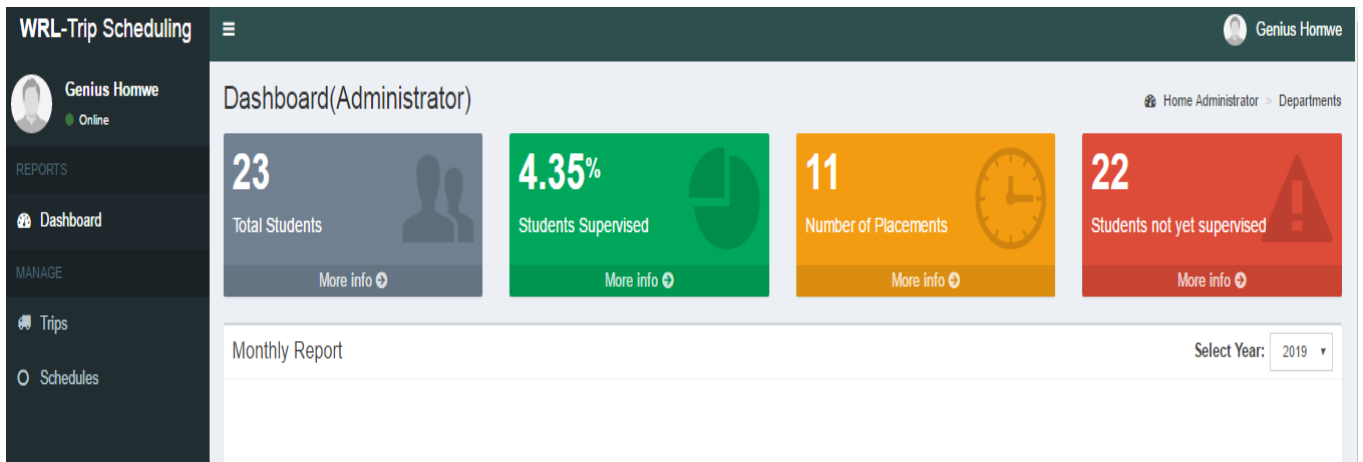


Fig A2. Reports page

This page gives feedback on the placement of students, it gives information on the reports of supervision of students. This is mainly managed by the administrator.

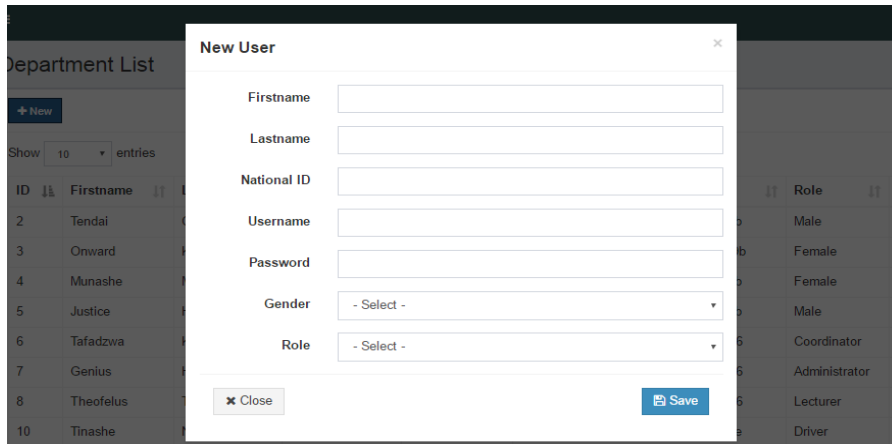


Fig A3. Adding user

Only the administrator has access or permission to this page so as to add users of the system. Adding and removing users is done by the administrator

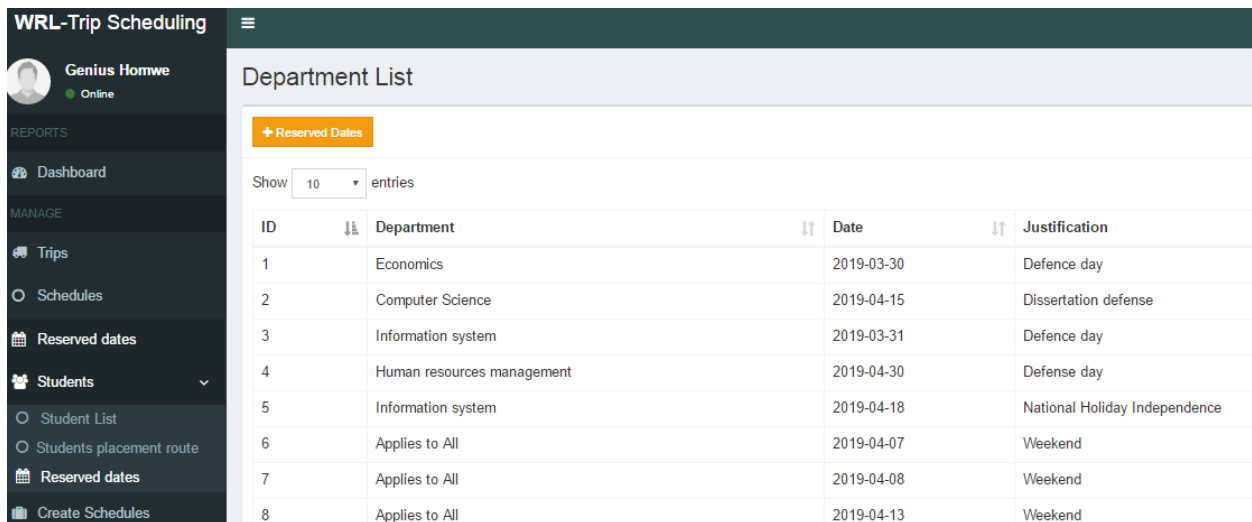


Fig A4. Reserved dates page

This page is available to the departmental coordinator and the system's administrator so that they can add the departmental reserved dates thus the dates they cannot go on work related trips.

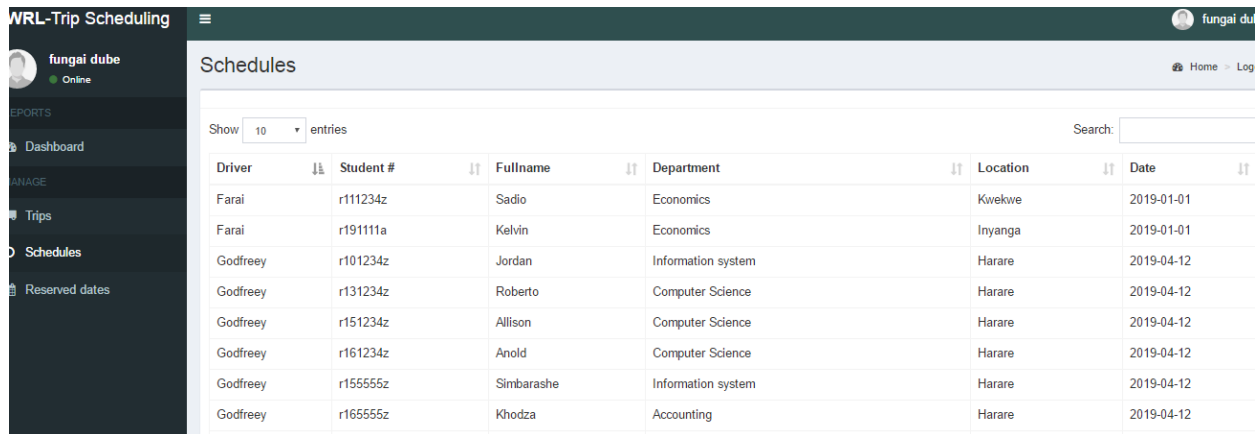
Placement per routes

Show 10 entries

ID	Location	Number
1	Mutare	5
2	Rusape	1
3	Bulawayo	1
4	Harare	9
5	Kwekwe	1
6	Chipinge	1
7	Gweru	1
8	Zvishavane	1
9	Victoria	1

Fig A5. Placement routes page

This is available for the administrator so as to create the trip schedule.



The screenshot shows the 'Schedules' page in the WRL-Trip Scheduling application. The page header includes the user name 'fungai dube' and 'Online' status. The left sidebar contains navigation options: Dashboard, Trips, Schedules (selected), and Reserved dates. The main content area displays a table of trip schedules with columns for Driver, Student #, Fullname, Department, Location, and Date. A search bar is located above the table.

Driver	Student #	Fullname	Department	Location	Date
Farai	r111234z	Sadio	Economics	Kwekwe	2019-01-01
Farai	r191111a	Kelvin	Economics	Inyanga	2019-01-01
Godfrey	r101234z	Jordan	Information system	Harare	2019-04-12
Godfrey	r131234z	Roberto	Computer Science	Harare	2019-04-12
Godfrey	r151234z	Allison	Computer Science	Harare	2019-04-12
Godfrey	r161234z	Anold	Computer Science	Harare	2019-04-12
Godfrey	r155555z	Simbarashe	Information system	Harare	2019-04-12
Godfrey	r165555z	Khodza	Accounting	Harare	2019-04-12

Fig A6. Trip schedule page

The trip schedule is created by the system's administrator and made available to the coordinator, lecturer and driver.

APPENDIX B : INTERVIEW CHECKLIST

INTERVIEW QUESTIONS

1. How do you view the performance of the current system at Work related Learning department?
2. What is your view and suggestion in implementing the online trip scheduling system?
3. Are there any controls that you would like to include in the event that an implementation of the trip scheduling system is done?
4. Who monitors the current system and direct linkage is to who?
5. Are there enough resources that will support in the running of the system in the event that we decide to implement it?
6. What are the major disadvantages that you are facing in the operation of the current system and do you have any possible solutions that you can think of to curb these problems?
7. Do you have any suggestions or additions that you would wish to include in order to improve proposed system performance?

APPENDIX C: QUESTIONNAIRE

QUESTIONS DIRECTED TO ICT DEPARTMENT

What do you expect from the implementation of the online trip scheduling system and do you see it as a means to increase business value in its operation?

Will the proposed system meet business objectives? Give supporting reasons if yes or no.

Are there any further ICT technologies you would wish to integrate into the operations of this trip scheduling system?

Due to the ever-changing technologies, a suggestion was given to change the system from the current to the online trip scheduling system. What are your views toward the proposed system?

ANSWER BY TICKING YES OR NO

QUESTION	YES	NO
1. Do you think the proposed system is better than the current system		
2. Do you think the proposed system will be beneficial in the future?		
3. Will the proposed system help increase sales?		
4. Are the company objectives being met by the current system?		
5. Will the proposed system pave way to development of new technologies?		

WORK RELATED LEARNING DEPARTMENT

1. How do you rate the current system?

Excellent Good Fair Poor

2. Would you opt for online system solutions if considered as a candidate from migrating from the current system?

Yes No

If **No**, what may be the reason _____

3. Do you often experience a system delay during busy days of operation?

Very often Sometimes All the time

4. Have some of employees complained about the current system's performance?

Yes No

If **YES** what were the complaints?

APPENDIX D: OBSERVATION FORM

OBSERVATION SCORE SHEET

Name of observer: _____ **FUNGAI DUBE** _____

Area under observation: _____

Date: _____ Time: _____

Focus of observation: _____

Brief description of session:-

Areas of strength:-

Comments:-

Signature: Manager _____ **Date:** _____

Signature: Observer _____ **Date:** _____

APPENDIX E: SAMPLE CODE

User login

```
public partial class login : Form
{
    connector con = new connector(); Boolean admin = false;
    public login()
    {
        InitializeComponent();
    }

    private void button1_Click(object sender, EventArgs e)
    {
        Boolean logged = false;
        con.connectiondb();
        string sql = "select * from usersadmin ";
        con.cmd = new SqlCommand(sql, con.cnn);
        con.reader = con.cmd.ExecuteReader();
        while (con.reader.Read())
        {
            if ((textBox1.Text == CryptorEngine.Decrypt(con.reader.GetString(0),true)) && (textBox2.Text ==
CryptorEngine.Decrypt(con.reader.GetString(1),true)))
            {
                logged = true;
                if(con.reader.GetString(2)=="Admin"){
                    admin = true;
                }
            }
        }
        if (logged)
        {
            this.Hide();
            MessageBox.Show("Login successfull.");
            Form1 fm = new Form1(admin);

            fm.ShowDialog();
            this.Close();
        }
        else { MessageBox.Show("Login failed."); }
    }
}
```


Adding new user

```
public partial class addUser : Form
{
    connector con = new connector();
    public addUser()
    {
        InitializeComponent();
    }

    private void button1_Click(object sender, EventArgs e)
    {
        if (!superValidator1.Validate()) { return; }

        if (textBox1.Text == "" || textBox2.Text == "" || textBox3.Text == "" || textBox4.Text == "" || comboBox1.Text == "") { MessageBox.Show("Please complete"); return; }
        if (!textBox2.Text.Equals(textBox4.Text)) { MessageBox.Show("Passwords do not match"); return; }
        try
        {
            con.sql = "insert into usersadmin values('" + CryptorEngine.Encrypt(textBox1.Text,true) + "','" + CryptorEngine.Encrypt(textBox2.Text,true) + "','" + comboBox1.SelectedItem.ToString() + "','" + textBox3.Text + "')";
            if (!con.ExecuteSQLQuery(con.sql)) { MessageBox.Show("User already exists");return;}
            MessageBox.Show("User Created Successfully.");
        }
        catch(Exception ex)
        {
            MessageBox.Show(ex.Message);
        }
    }

    private void button2_Click(object sender, EventArgs e)
    {
        superValidator1.Enabled = false;
        this.Close();
    }
}
```