

DWIT COLLEGE
DEERWALK INSTITUTE OF TECHNOLOGY
Tribhuvan University
Institute of Science and Technology



TROUBLE TICKET MANAGER

A PROJECT REPORT

Submitted to
Department of Computer Science and Information Technology
DWIT College

*In partial fulfillment of the requirements for the Bachelor's Degree in Computer Science
and Information Technology*

Submitted by
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August, 2016

DWIT College
DEERWALK INSTITUTE OF TECHNOLOGY
Tribhuvan University

SUPERVISOR'S RECOMENDATION

I hereby recommend that this project prepared under my supervision by SURYARAJ TIMSINA entitled **“TROUBLE TICKET MANAGER”** in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology be processed for the evaluation.

.....

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Tribhuvan University

LETTER OF APPROVAL

This is to certify that this project prepared by SURYARAJ TIMSINA entitled “**TROUBLE TICKET MANAGER**” in partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Information Technology has been well studied. In our opinion it is satisfactory in the scope and quality as a project for the required degree.

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Similarly I would like to express thanks to my friends for their valuable suggestions in the course of building this project.

Suryaraj Timsina

TU Exam Roll no: 1820/069

STUDENT'S DECLARATION

I hereby declare that I am the only author of this work and that no sources other than the listed here have been used in this work.

... ..
Suryaraj Timsina

Date: August, 2016

ABSTRACT

Different software tools have been developed and are in use in order to handle and manage the daily IT related issues in the IT industries like software industries, institutions, ISPs, repairing and support centers. but they are not the scalable according to the organizational need. Trouble Ticket Manager is the web based tool that is able to generate the trouble tickets and provide automated ticket routing to a respective technician or group of IT members. Trouble Ticket Manager provides the platform for the users to communicate with the IT Technician. The trouble ticket manager is able to generate the report based on the employee performance and the type of most re-curring issues in the organization.

Keywords: Internet Service Provider , Information Technology

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LIST OF ABBREVIATIONS

API – Application Program Interface

OS – Operating System

SDK – Software Development Kit

HTML – Hypertext Markup Language

CSS – Cascading Styles Sheet

XML – Extensible Markup Language

RAM – Random Access Memory

CHAPTER1: INTRODUCTION

1.1 Background

Trouble Ticket Manager is the web based software tool that is able to generate the IT Tickets and provide automatic ticket routing to a respective technician. It is the platform to create event, update, edit and make job easier. It makes the management simpler and organizational by providing the platform for communication between the users and the technicians. It helps to save time and manual effort by automating ticket management activities. including creation, assignment and escalation. The manager can generate a report based on the performance of the technicians.

The Trouble Ticket Manager consists of different project headings like request access, network issues, desktop issues, revoke access, software installation etc. The user choose the subject and based on the subject Trouble Ticket Manager's tracker will track the project heading for the subject. The TTM will automatically assign the trouble ticket to the respective technician in the IT Department. The technician will be notified via the email service. The web-based dashboard consists of different fields like Tracker, Status, Priority, Subject, Author and Assignee. The most recurring issues and the performance statistic of the staff are represented in the graphical form. The trouble ticket manager consists of a centralized database system that maintains the log of each trouble tickets.

1.2 Problem Statement

Organizational events are not managed and issues are difficult to handle. IT team is the pillar of the software industries and lots of issues are reported every minutes. Individuals of the IT team do have a specific expertise domain and they do care of their domain primarily. The

manager of the department is responsible to assign the team member with related issues reported to the department. However, it is quite complex job to work for a huge organization manually assigning updating, maintaining logs and generating the report.

1.3 Objectives

1.3.1 General objective

The main objective of this project is to automate the trouble tickets management and generate the statistical analysis reports that will help the daily IT work for efficiency.

1.3.2 Specific objectives

1. To track all the events, failures and issues and create IT Tickets to dynamically assign tickets to the respective technician or group of IT members based on ticket routing logic.
2. To manage users complaints and generate the statistical analysis report based on the employee's performance and the type of recurring issues.

1.4 Scope

Trouble ticket manager can be used by the IT Department of an organization. It can also be used by the ISPs, Schools, Software industries who will need to play with the IT stuffs to carry out their everyday work.

1.5 Limitation

This system is an intranet based web application and hence it can be used only inside the organization. Since this application filters trouble tickets and automate based on the contents in the subject, users should be careful while choosing the subject in the Trouble Ticket Manager's dashboard.

1.6 Outline of Document

Preliminary Section	<ul style="list-style-type: none">• Title Page• Abstract• Table of Contents• List of figures and Tables
;	
Introduction Section	<ul style="list-style-type: none">• Background of Project• Problem Statement• Objectives
Literature Review Section	<ul style="list-style-type: none">• Trouble Ticket Monitoring System• NOC Trouble Ticket System• Central Trouble Ticket Database• Help Desk Ticketing System
Methodology Section	<ul style="list-style-type: none">• System Design• Algorithms• Class Diagram• Sequence Diagram
Implementation and Testing Section	<ul style="list-style-type: none">• Work Flow• Tools used• User Interface

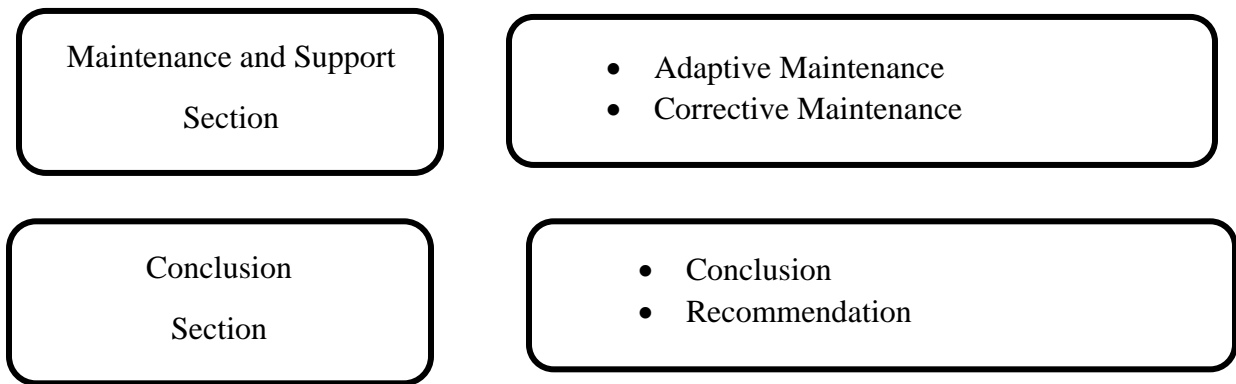


Figure 1- Project block diagram

CHAPTER 2: REQUIREMENT ANALYSIS AND FEASIBILITY ANALYSIS

2.1 Literature Review

2.1.1 Trouble Ticket Monitoring System.

A trouble ticket monitoring system includes an Internet enabled and Web-based graphical user interface (GUI) to trouble ticket Workload management systems such as legacy WFAC, WFADO, and WFADI systems. A dashboard application implements the GUI to essentially enable everything that can be done on WFA systems to be able to be done using the GUI. The dashboard application interacts With legacy WFA systems for both trouble ticket reporting and interactive trouble ticket functions While presenting a simple user interface.

Point and click functionality provided by the dashboard application for users allows for reporting or maintenance functions to be performed with a minimum of typing or knowledge of the WFA systems. The dashboard application is a server based rather than client based approach to trouble ticketing generation and monitoring. The dashboard application combines reports and queries from the WFA systems to present an overview of all maintenance operations in one location.

(Laperi, Trouble Ticket Monitoring System, 2006)

2.1.2 NOC Trouble Ticket System

Professional quality handling of network problems requires some kind of problem tracking system, herein referred to as a "trouble ticket" system. A basic trouble ticket system acts like

a hospital chart, coordinating the work of multiple people who may need to work on the problem. Once the basic trouble ticket system is in place, however, there are many extensions that can aid Network Operations efficiency. Information in the tickets can be used to produce statistical reports. Operator efficiency and accuracy may be increased by automating trouble ticket entry with information from the network Alert system. The Alert system may be used to monitor trouble ticket progress. Trouble tickets may be also used to communicate network health information between NOCs, to telecom vendors, and to other internal sales and engineering audiences.

(Johnson, NOC Trouble Ticket System, 1993)

2.1.3 Central Trouble Ticket Database

System and method for managing the collection, trending, and tracking of trouble ticket data within a data processing environment. The system and method include and involve a central data storage facility for storing trouble ticket data including archival type data corresponding to customer support requests and inquiries according to a common data storage scheme, and a plurality of data processing systems coupled to the central data storage facility via a network system, etc. Each data processing system of the plurality of data processing systems is configured to facilitate collection, trending, and tracking processes related to the trouble ticket data stored in the central data storage facility via a graphical user interface configured in accordance with the common data storage scheme.

(Turnbull, Central Trouble Ticket Database, 2003)

2.1.4 Help Desk Ticketing System.

A help desk ticketing system is a help desk tool that automates and centralizes ticketing management tasks, and allows you to convert email service requests into actual IT tickets. From ticket creation to resolution, ticketing software allows IT technicians to streamline ticketing management with task automation, customization, and intuitive dashboards. Solar

wind help desk ticketing system offers a built-in reporting engine to generate comprehensive reporting for various help desk needs.

At a supervisor/lead technician/help desk manager level, you can generate reports on technician performance and customer satisfaction indicators At a technician/help desk staff level, you can generate reports on ticket status, alerts, and issue resolutions All reports are customizable and you can easily create new reports according to your requirements. Additionally, Web Help Desk allows you to schedule automatic delivery reports via email.

(Scudder, 2008)

2.1.5 Trouble Ticket Express

Trouble ticket also called trouble report is a mechanism used in an organization to track the detection, reporting, and resolution of some type of problem. Trouble ticketing systems originated in manufacturing as a paper-based reporting system; now most are Web-based and associated with customer relationship management (CRM) environments, such as call centers or e-business Web sites, or with high-level technology environments such as network operations centers (NOCs). The Internet Engineering Task Force's Network Working Group specified requirements for a trouble ticketing system in RFC1297 (NOC Internal Integrated Trouble Ticket System Functional Specification Wish list). In the RFC document, the author compares the trouble ticket to a patient's hospital chart, because both define a problem and help to coordinate the work of several different people who will work on the problem at different times.

(Hiroya, 1994)

2.1.6 Network Management System

A system and method for network support that addresses the needs of a cellular phone system which handles large volumes of information. The invention comprises a complex computer network for performing various tasks including data collection and processing, equipment

inventory management, customer service, tactical surveillance, trend forecasting, modeling and other interrelated processes. The system incorporates state-of-the-art computer hardware and software into an engineering platform for providing a modular base to accommodate multiple applications as well as to ease integration of future applications .

(Sprecher, 1994)

2.1.7 Free Patients Online

Server information handling system deployment and maintenance is enhanced with automated trouble ticket generation at a mobile telephone through an NFC transaction with a management controller. NFC transactions coordinate authorization for replacement component installation and server information handling system replacement. In one embodiment, a bezel includes an NFC device that interfaces with a management controller and stores configuration information to aid installation of replacement server information handling systems in the event of a system failure. A backup battery provides power to an NFC support circuit that stores fault codes detected by the management controller so that fault codes are available during management controller failures.

(Terwilliger, 2015)

2.2 Requirement Analysis

The functional and non-functional requirements addressed by the application are listed below in the table:

Table 1- Functional and non-functional requirement

S.N	Functional Requirement	Non-functional Requirement
1.	User Registration	<ol style="list-style-type: none">1. The user can register from IT department with their valid official email address.2. Only a single account can be created per email address.3. The username should contain atleast 5 characters.4. The username can only contain alphabets and numbers5. The password length should be a minimum of 7 letters with atleast one digit.6. The user should be specified clearly according to their department.
2.	User login	<ol style="list-style-type: none">1. The user can login with an email, username and password.
3.	Manage Tickets	<ol style="list-style-type: none">1. Users can create tickets, update and close tickets.2. Tracker will be chosen dynamically based on the subject heading.3. Assignee will be chosen dynamically based on the Tracker.4. User can choose assignee and watchers manually also.
4.	Generate Statistical Reports	<p>Managers can generate reports based on.</p> <ol style="list-style-type: none">a. Most active employee in the team.b. Type of most recurring issues.

The basic functional requirement of Trouble Ticket Manager includes user registration. The user logs in the system and more importantly TTM manages and automates the tickets. And helps management and monitoring easy by generating the statistical reports. New user can be registered at the IT department. Each email address can have only one user while password should contain different characters with at least one digit. Tickets can be created, updated and closed. The tracker of the trouble ticket will be dynamically chosen based on the subject heading in the Trouble Ticket Manager's dashboard. The Trouble Ticket Manager dynamically assign the trouble ticket to the right technician at right time. Though, the user can manually choose the assignee from the list. Manager can generate the statistical report and analyze the most active employee and the most recurring issues.

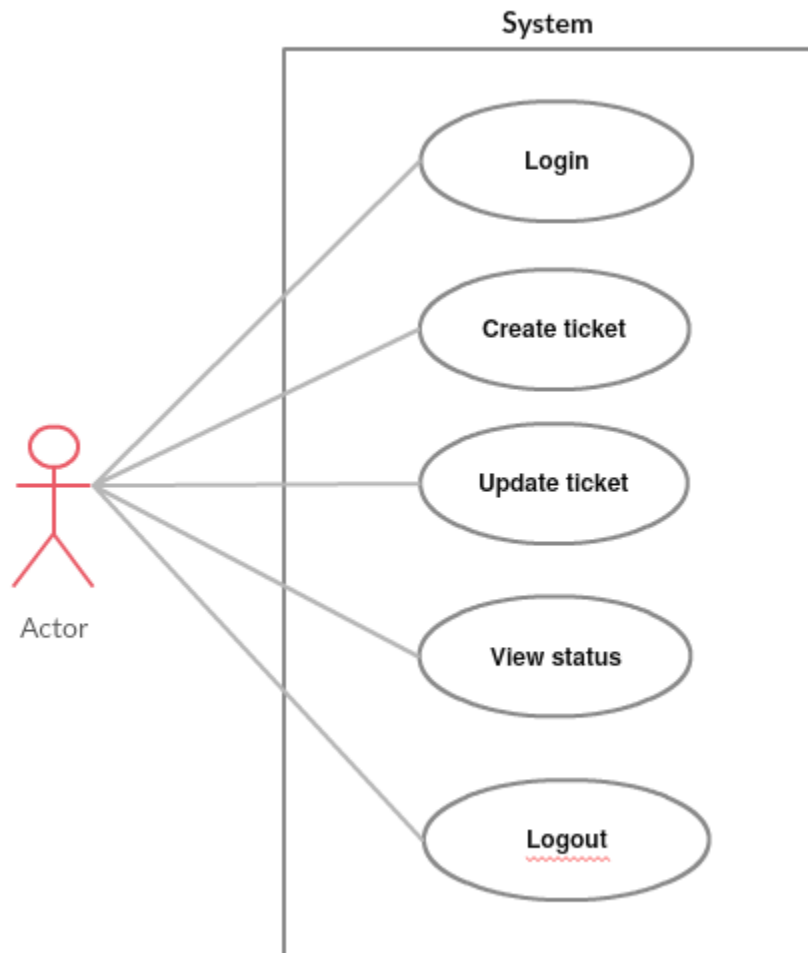


Figure 2- Use case diagram for user

The user of this application should have to login the system. As per their need they can create trouble ticket, update the ticket and also they can view the status of the tickets they have already created.

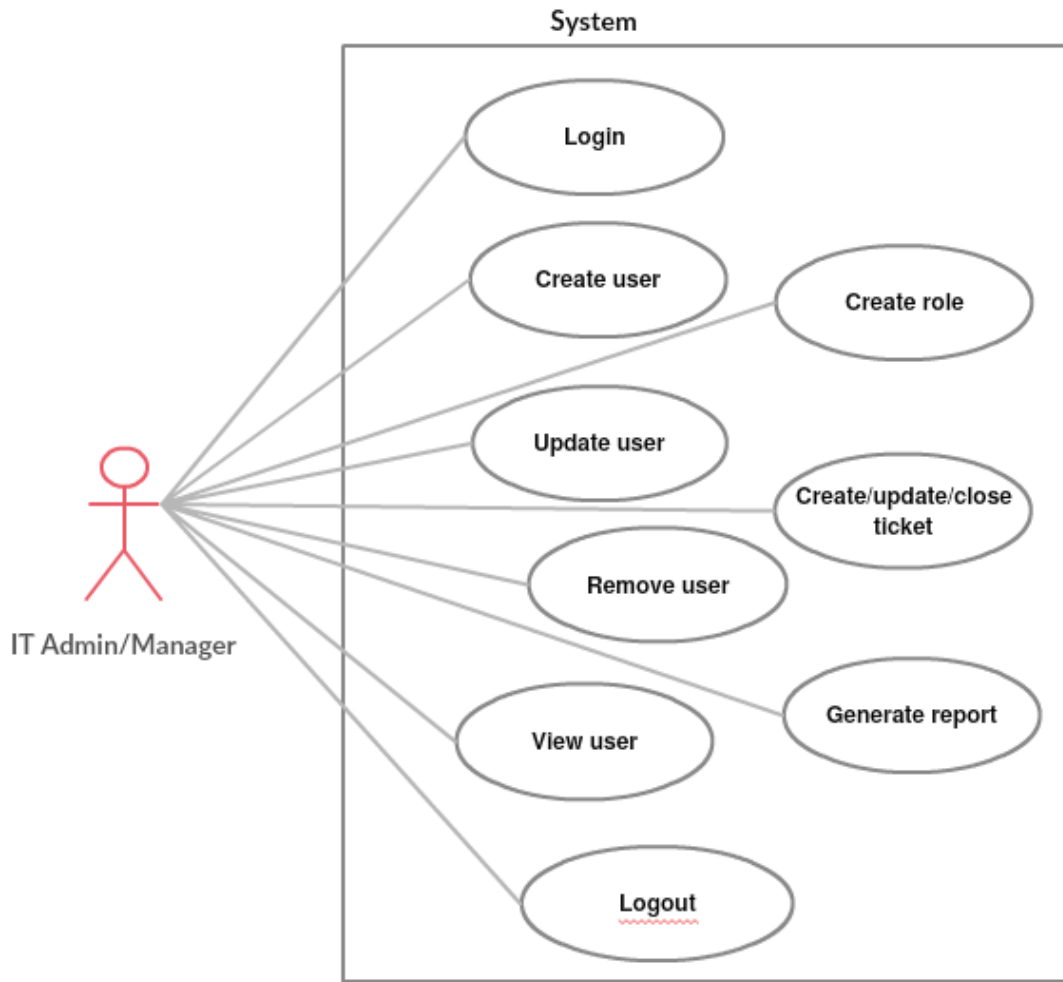


Figure 3 - Use case diagram for IT Admin/ Manager

The IT Admin or the manager of the IT Department should login the Trouble Ticket Manager. The IT Manager only can create new users, update the user details, remove the users and view the list of users . The IT manager also have access to create, update and close the tickets. They can also generate the statistical report of their employees work log.

2.3 Feasibility Analysis

The following result was obtained while performing a feasibility analysis:

2.3.1 Operational feasibility

TTM is a web based application tool. It uses HTML/CSS and JavaScript at the front end and Grails and MySQL at the back end. It is based on client server architecture and can work in an intranet environment. It supports both windows and Linux platform for its operation. All of the technology required by application are available and can accessed freely, hence it was operationally feasible.

Technical feasibility

This application used 2-tier architecture. The employee, IT admin or manager are the end users of the application. The server keeps and serves the ticket information updated by manager and users. The application can be accessed from anywhere at any time within an intranet connection of the organization. It is easy to use. Thus, it is technically feasible.

2.3.2 Economic feasibility

The cost associated while building the application can be:

1. Intranet connection setup cost
2. Development time

Trouble Ticket Manager

The application can be completed within 3-4 months with a single experienced developer. Hence, it is economically feasible.

2.3.3 Schedule feasibility

The total estimated time for the development of the application is 4 months.

Table 2- Gant chart

Trouble Ticket Manager			
tasks	start week	complet week	
plan	1	3	
front/back end work	3	3	
review	4	7	
implementation	11	4	
documentation	5	6	
testing	12	2	

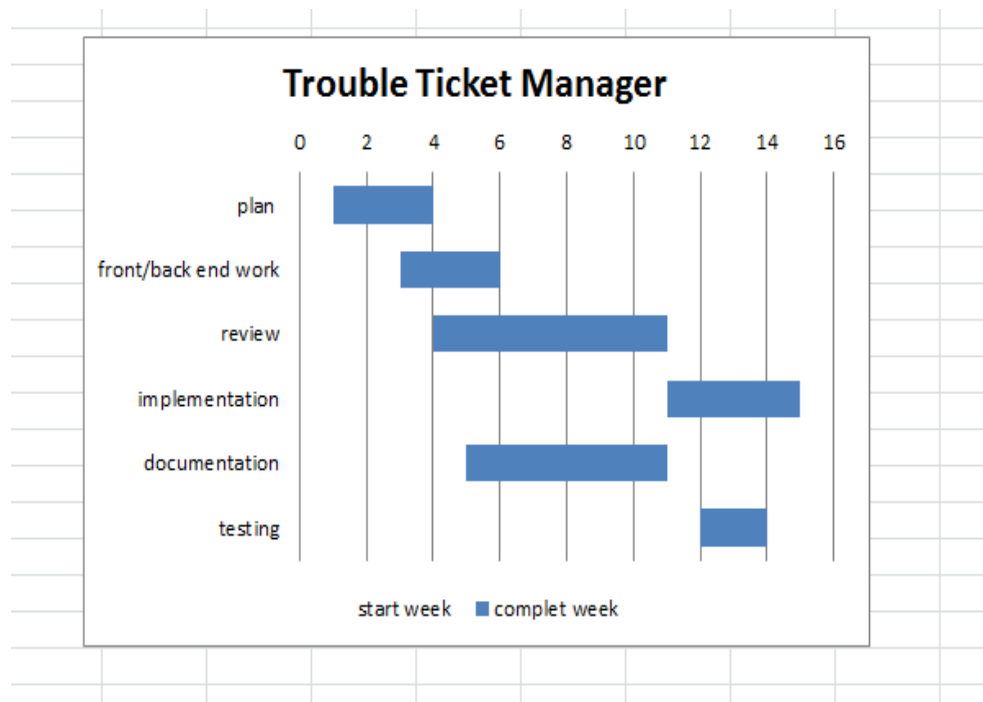


Figure 4 - Gant chart

CHAPTER 3: SYSTEM DESIGN

3.1 Methodology

This application is completed using the waterfall model. First the applications related to TTM were researched on the internet. Some applications similar to this idea were found. Some of them were Trouble Ticket Monitoring System, NOC Trouble Ticket System but none of them were exactly like this application. The working procedures of those applications was researched and found a relative methodology to build this application.

The algorithms used in this application is Naive Bayes Algorithm and high chart.

The Naive Bayes algorithm is used to automate route for the ticket and dynamically assign the trouble ticket to right technician while the high chart is used for demonstrating the statistically analyzed data in pie chart.

3.2 System Design

Class diagram

There are mainly five classes in the application of this system. Request access is for requesting the new access to the IT assets. Request access request can be made for system access, server access, email access, internet access and so on. Network issues is for network related issues. Network issues typically includes the issues like LAN not working, server machine not reachable, internet not working, switches and routers stop working etc. Desktop issues is for desktop related issues. Desktop issues can be anything related to hardware. Hardware components like Hard disk, RAM, CPU turn off after few minutes etc. Software

issues is for software related issues. Software are the application programs that use hardware to operate and similarly Revoke access is for revoking the current access to the IT assets. Revoke access is for removing the access to IT Assets like Servers, Routers, Computers, emails etc.

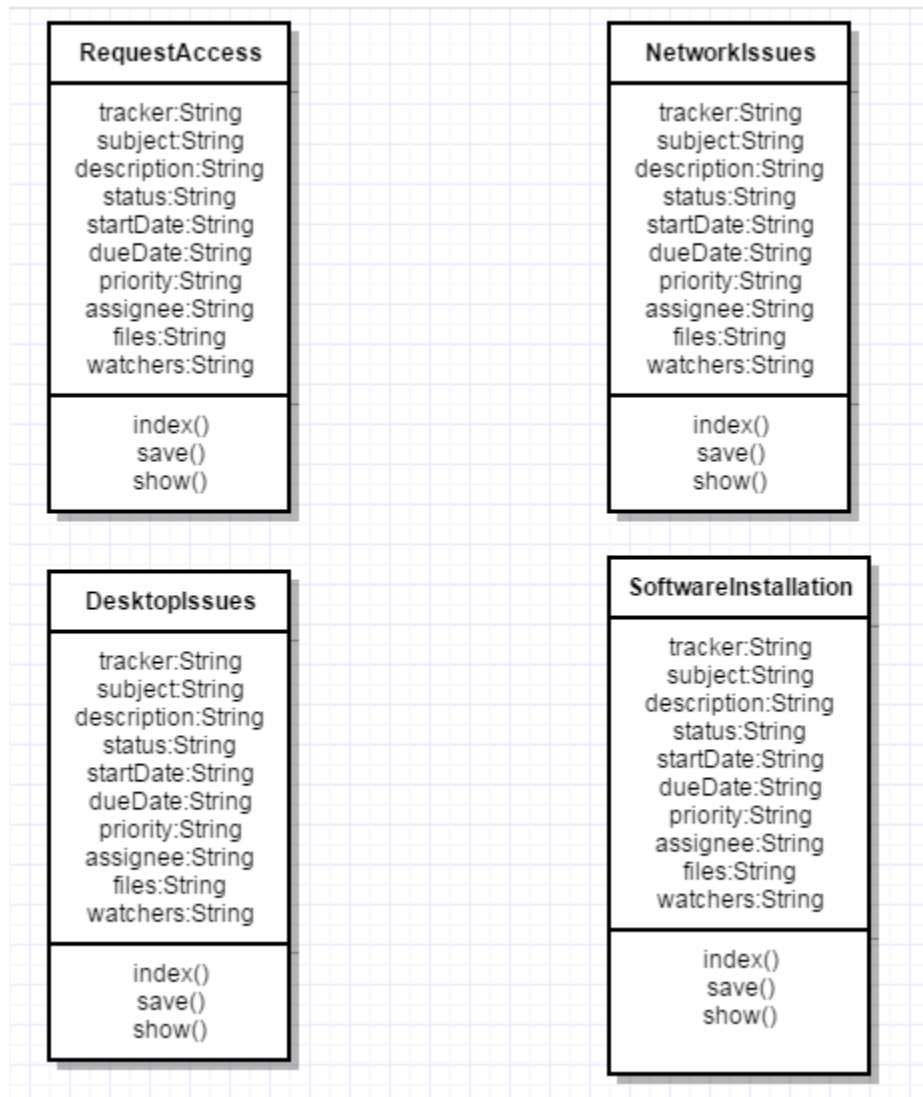
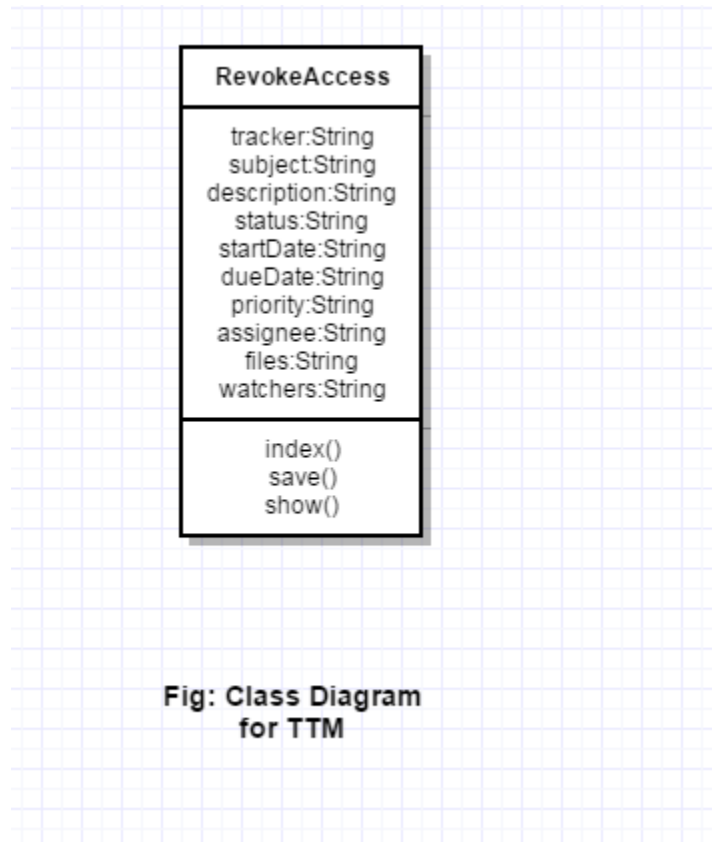


Figure 5 - Class diagram

Figure 5 explains the different classes in the Trouble Ticket Manager. The role of tracker is to select the tracker automatically based on the subject in the trouble ticket dashboard. The

description field is for adding the detailed information of the trouble ticket. Status field tracks the status of the trouble issues. It holds information about the progress of the ticket. Priority is set in the priority field in the dashboard. Files, screenshots can be uploaded at files field for the references



**Fig: Class Diagram
for TTM**

Figure 6 - Class diagram

Assignee are the technician who will be dynamically chosen while watchers are the managers or users who will be monitoring the ticket status. The `index()` view is for displaying the dashboard form. `Save()` is for saving the created ticket. The `show()` is for displaying the trouble tickets list.

Sequence diagram

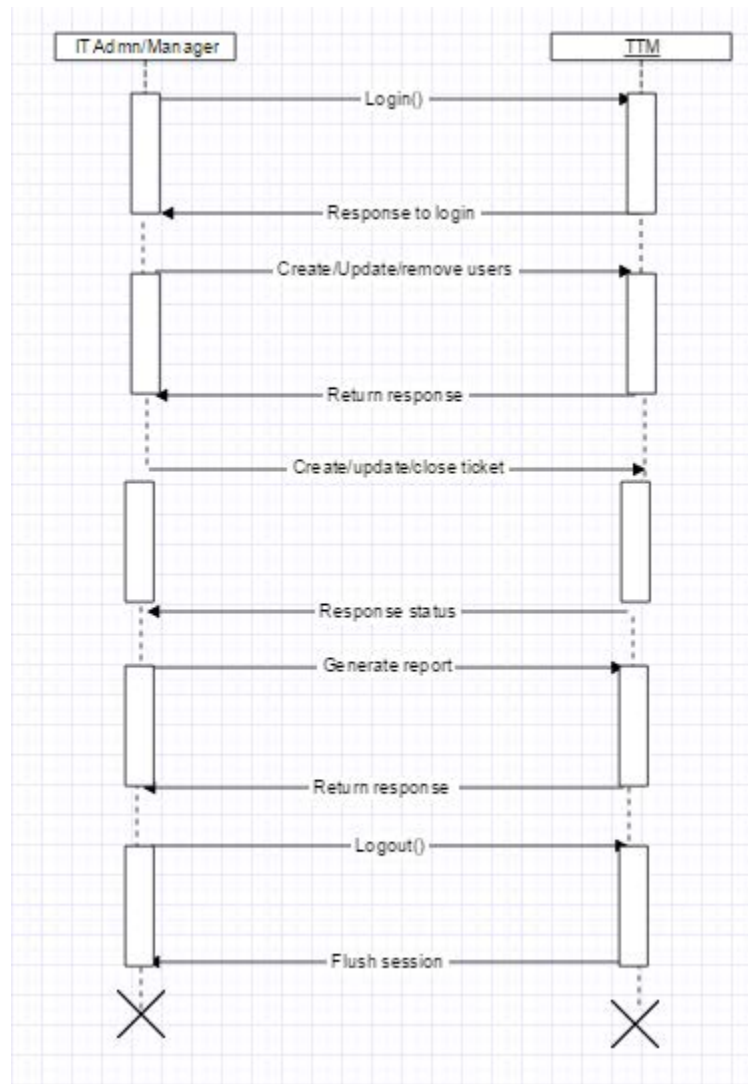


Figure 7 - Sequence diagram for Admin

Figure 7 explains the sequences of the Trouble Tickets Manager for the user with admin role. Initially the user login the TTM. The manager sends the response to the login request. Upon the successful login of the admin user, the admin or the IT manager can create new user, update the user details of old users and remove the old users. The IT manager can create new

ticket, update the old ticket and close the tickets. The report of the employees performance status can be generated by the manager and similarly the manager can generate the statistical report of most recurring IT issues. Finally the admin logout the application and all the sessions will be flushed.

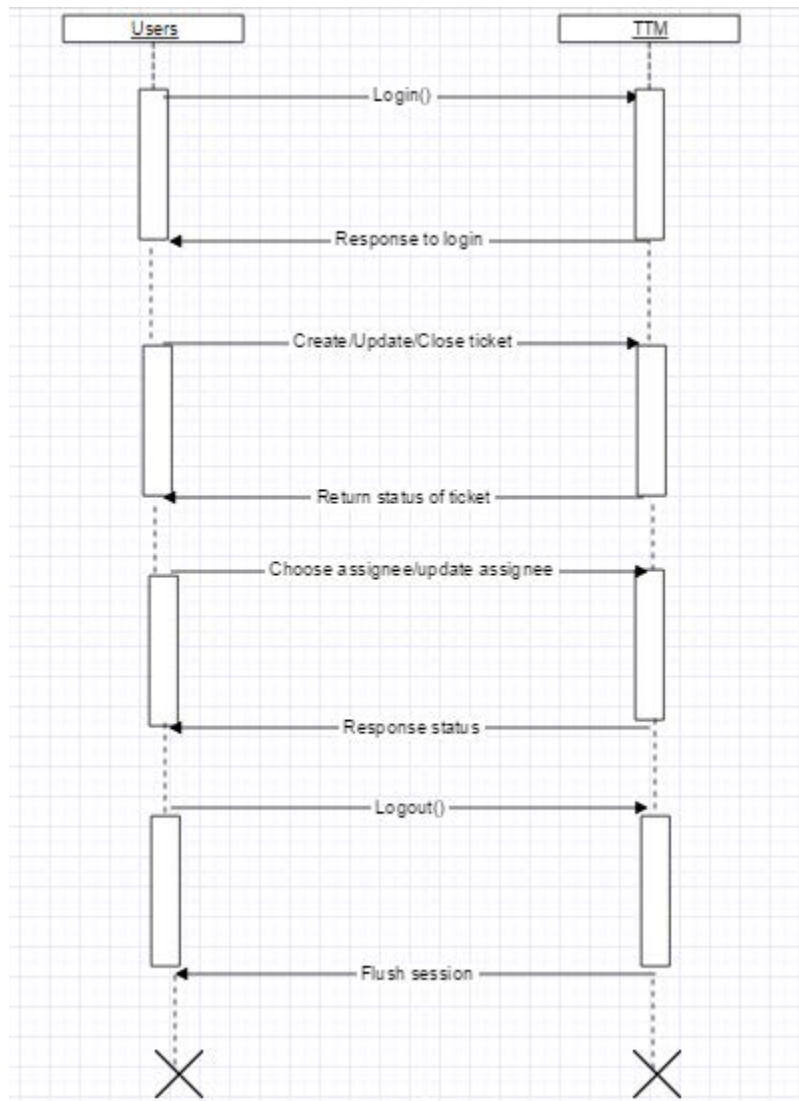


Figure 8 - Sequence diagram for user

Figure 8 explains the sequences of Trouble Ticket Manager for the user with user role only. Initially the user logs the system and receives the response to the login request. The user have to choose either create or view tickets. When the user choose the create tickets, the user

Trouble Ticket Manager

can create new tickets, update and close the trouble tickets. Similarly the user can view the trouble tickets after choosing the view in the dashboard.

The assignee of the trouble tickets will be chosen dynamically on the basis of the tracker heading in the dashboard. The user uploads the screenshots if needed and clicks the create button. The user gets logout with the logout and session will be flushed.

CHAPTER 4: IMPLEMENTATION AND TESTING

4.1 Implementation

Work Flow

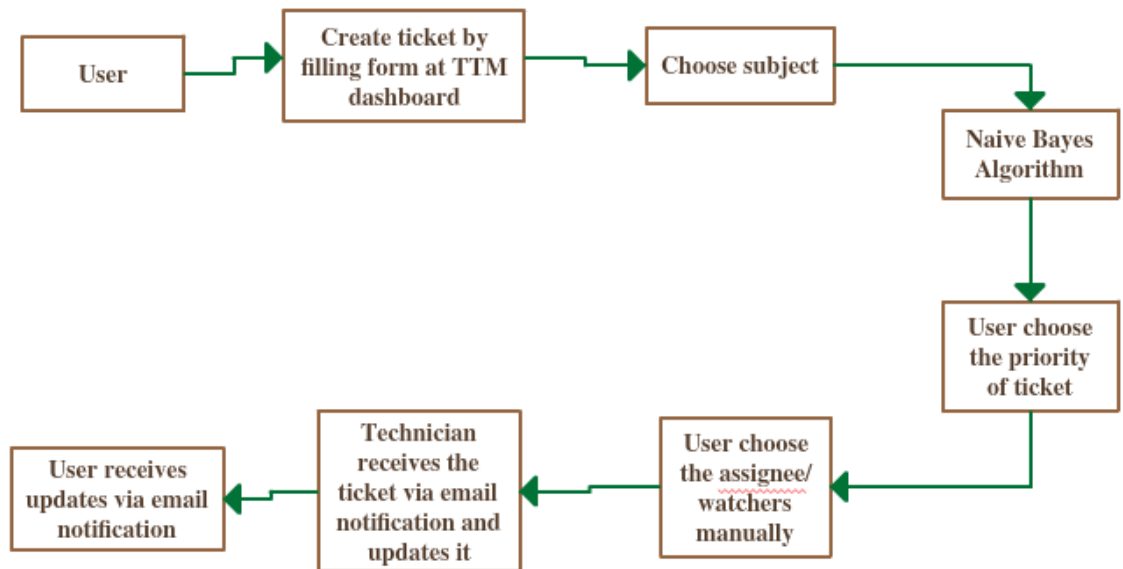


Figure 9 - Work flow diagram

Figure 8 explains the basic work flow of the Trouble Ticket Manager. Initially the user creates the trouble ticket by filing the trouble ticket form at the TTM dashboard(as shown in Appendix). When the user choose the subject in the subject field the tracker of the ticket will be selected dynamically. The user have to choose the priority of the ticket. Though the Trouble Ticket Manager dynamically assigns the ticket to the right technician, the user can also choose the assignee and watchers manually. Once the user click the create button, the page is redirected to the view page where list of trouble tickets can be seen(as shown in Appendix). The respective IT technician receives the ticket via the email notification and

updates the ticket. The user finally receives the updates on the ticket via the email notification

4.1.1 Tools used

Following tools are used in TTM.

a) Front End

Front End tools used

1. HTML/CSS

HTML/CSS were used for designing web pages. The web pages are used to display user's request.

2. JavaScript/jQuery

JavaScript/jQuery are used for client side validation. Ajax, combo of JavaScript and XML used for asynchronous communication with server and client.

3. Bootstrap

Designing web pages made easy with use of bootstrap. Bootstrap is powerful front-end framework. Bootstrap is used in this application to power design.

b) Back End

Back End tools used

1. Grails

Grails is used for server side programming.

2. MySQL

MySQL is an open source database. This is used in this application to stores application data.

4.1.2 Description

The classes in the TTM program are as below.

1. accessRequest
2. desktopIssues
3. internetIssues
4. softwareInstallation
5. accessRevoke

The accessRequest class is for making the new request for access to IT resources including server access, internet access, wifi access, email access computer access etc. Class desktopIssues is for creating the tickets related to desktop issues. This includes desktop computer startup failure, HDD, RAM, power problem etc. Class internetIssues is for internet related issues. Software related issues, software installation, software removal etc are included in the class softwareInstallation. Similarly the class accessRevoke is for creating the IT ticket for removing the access to IT resources.

These class includes CRUD operation methods. This methods get data collected from form via controller. Controller are intermediary function which acts as link between web pages and common class.

4.2 Testing

The following testing was done.

Table 3- Testing for user registration

Precondition	Should be in registration page
Input Test Data	1. Email 2. Username password 3. Full Name 4. Address 5. Contact 6. Department
Steps	1.Enter all required and appropriate information. 2.Click Register button
Expected output	User must receive the request has been sent for approval message.
Actual output	Your request has been sent for approval message is displayed
Result	Pass

Table 3 explains the testing performed for the user registration. User should supply the necessary details for the registration. Once the user fills the form and submit, the IT administrator receives the notification and as per the information, the user will be approved for user registration.

Table 4- Ticket creation

Precondition	Should be in TTM dashboard
Input Test Data	<ol style="list-style-type: none">1. Subject2. Description3. Status4. Start Date5. Priority6. Due Date7. Files
Steps	<ol style="list-style-type: none">1. Enter all required and appropriate information.2. Click Create button
Expected output	<ol style="list-style-type: none">1. Tracker must be dynamically tracked2. Assignee must be dynamically chosen3. Watcher must be dynamically chosen.4. Notification must be sent to Technician via email service.
Actual output	<ol style="list-style-type: none">1. Tracker was dynamically tracked.2. Assignee was dynamically chosen.3. Watcher was dynamically chosen.4. Notification email was sent successfully
Result	Pass

Table 4 explains the ticket creation process. The user will supply the necessary details by filling the form in the Trouble Ticket Manager's dashboard. Once the subject is chosen the tracker and the assignee were chosen dynamically by the Trouble Ticket Manager.

CHAPTER 5: MAINTENANCE AND SUPPORT

5.1 Adaptive Maintenance

The tickets should be verified before creating. Email address should be carefully registered by the admin.

5.2 Corrective Maintenance

As application could be sold or deployed for public use. May be there could be unresolved issues and if user complains about it, the maintenance have to done.

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.1. Conclusion

The project aims to automate the manual process of task division in the IT department of any organization. The application is able to create tickets, automate tickets generation process, ticket routing dynamically to assign to the right technician and generate report of the employees activities.

6.2. Recommendations

As for now project is only able to automate the IT works and issues but in the future release it can be expanded to other administrative issues. The application is currently useful within the intranet connection but it can be used upgraded to internet in the future releases.

APPENDIX I

Snapshots for login page as below



Please Login

Username:

Password:

☐ **Remember me**



Trouble Ticket Manager

Snapshot for ticket generating dashboard is as below.

View Desktop Issues

Tracker

Desktop Issues

Subject

Description

Status

New ▾

Start date

mm/dd/yyyy

Priority

Low (long term) ▾

Due date

mm/dd/yyyy

Assignee

Suryaraj Timsina ▾

Files

Choose File

No file chosen

Watchers

search for watchers to add

Create

Trouble Ticket Manager

Snapshot for email sent by TTM is as below.

Desktop #1013: OS Crashed

Inbox x



ttmproject16@gmail.com

to me, timsinasuryaraj ▾

Hello suryaraj.timsina@deerwalk.edu.np.

You have been assigned new task. Task details are as below.

Author :- Suryaraj Timsina

Description :- My OS has been crashed. Please re-install the new Win7 OS

Priority :-normal

Due Date :- 2016-09-09

Kind Regards

Trouble Ticket Manager

Snapshot for issues list is as below.

deerwalk
DWIT College

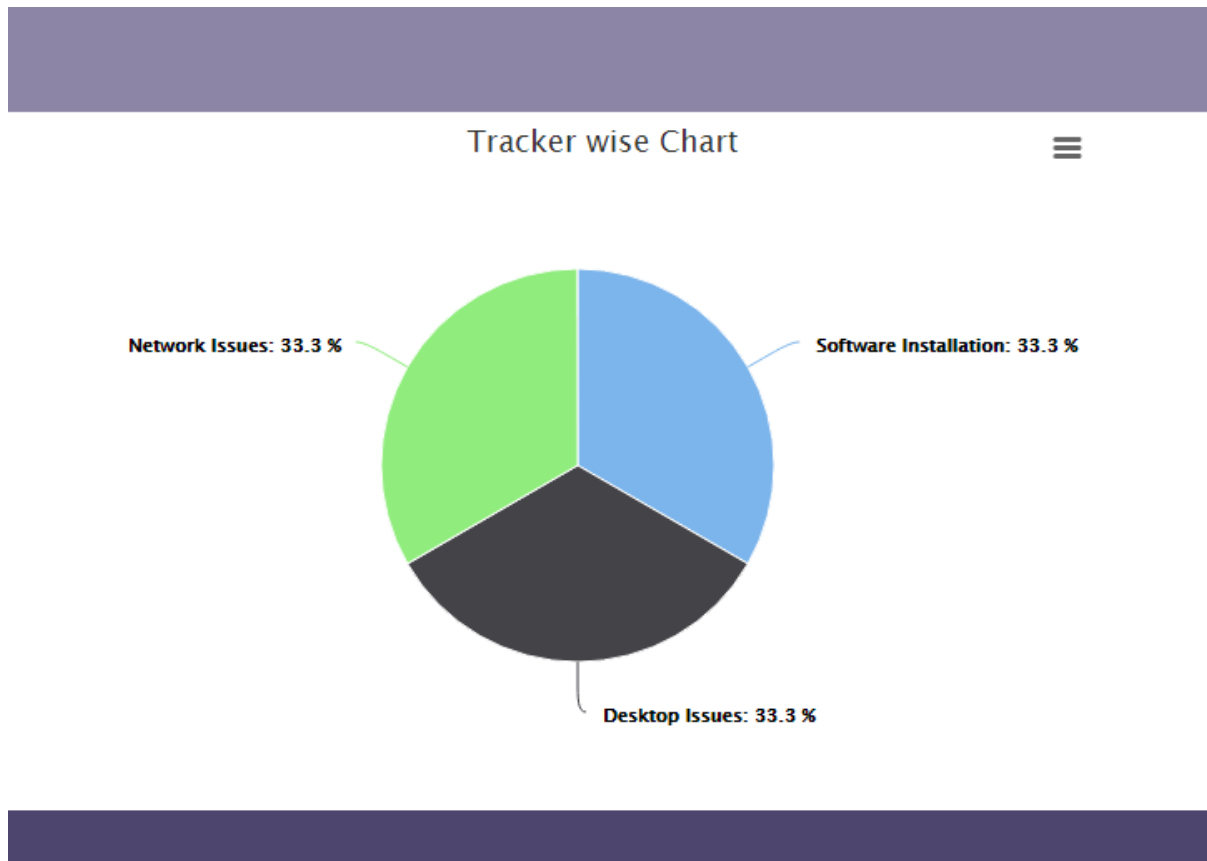
Surya

Logout

New Desktop Issues

Tracker	Subject	Description	Status	Assignee	Actions
Software Installation	SQL 2014 Installation	Please install sql 2014 in my desktop Computer.	new	krishna.chauhan@deerwalk.edu.np	EDIT DELETE
Desktop Issues	RAM	My computer is being slow. Please add extra 8 GB RAM.	new	suryaraj.timsina@deerwalk.edu.np	EDIT DELETE
Network Issues	WIFI	I am unable to connect my device to WIFI.	new	suryaraj.timsina@deerwalk.edu.np	EDIT DELETE

Snapshot for Tracker wise report is as below.

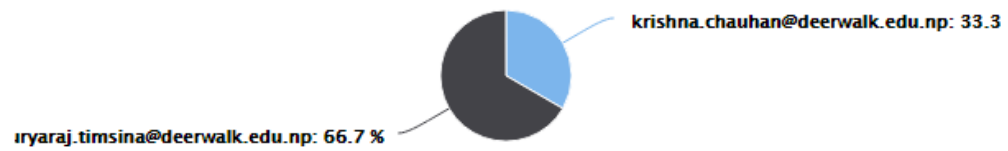


Trouble Ticket Manager

Snapshot for assignee wise report is as below.



Assignee wise Chart



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