AUTOMATION OF FYP MANAGEMENT AND EVALUATION

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Submitted for the partial fulfillment of BS Software Engineering degree to the Faculty of Engineering & Computer Sciences

NATIONAL UNIVERSITY OF MODERN LANGUAGES

ISLAMABAD

JULY, 2018

ABSTRACT

"Automation of Final Year Project Management and Evaluation" is a web-based application which provides the facility to manage final year projects efficiently. The application deals with five types of users i.e. head of department, dean, project coordinator, faculty members and students. The application has seven modules. These include evaluation, reporting, searching, communication, document management, group registration and supervisor selection. Application allocates the supervisor to the student group after the approval of proposal request. Application maintains all records of reports which are uploaded by the supervisors. Evaluation is done by the committee members and supervisors after granting access by the project coordinator. Application provides document searching with different access levels. Project evaluation committee is formed by the project coordinator and approved by the head of department. Users of the application may communicate via text messages.

Agile development methodology has been used for the development of the application. Visual studio 2013 has been used to develop the application and Microsoft SQL Server for database management. C# is used for backend development. Front-end of the application is developed using Bootstrap. jQuery, a cross-platform JavaScript library is used to simplify the client-side scripting of HTML.

The testing is performed for verification and validation of user requirements. Each functionality is tested separately using unit testing technique. The integration testing has been performed to test the functionality of the complete system. A number of test cases have been generated to verify the results of each feature. All the features of the application are working satisfactorily as per designed specification.

CERTIFICATE

Dated: _____

Final Approval

It is certified that project report titled '**Automation of FYP Management and Evaluation'** submitted by **Muhammad Usman, Ammad Idress, Umair Idress, Hafiz Muhammad Rizwan Aamir** for the partial fulfillment of the requirement of **"Bachelor's Degree in Software Engineering"** is approved.

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DECLARATION

We hereby declare that our dissertation is entirely our work and genuine / original. We understand that in case of discovery of any PLAGIARISM at any stage, our group will be assigned an F (FAIL) grade and it may result in withdrawal of our Bachelor's degree.

Group Members	**Signature**
Muhammad Usman	_____
Hafiz Muhammad Rizwan Aamir	_____
Umair Butt	_____
Ammad Butt	_____

PLAIGRISM CERTIFICATE

This is to certify that the project entitled "**Automation of FYP Management and Evaluation**", which is being submitted here with for the award of the "**Degree of Bachelors**" in "**Software Engineering**". This is the result of the original work by "**Muhammad Usman, Hafiz Muhammad Rizwan Aamir, Ammad Butt and Umair Butt"** under my supervision and guidance. The work embodied in this project has not been done earlier for the basis of award of any degree or compatible certificate or similar title of this for any other diploma/examining body or university to the best of my knowledge and belief.

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TABLE OF CONTENTS

LIST OF FIGURES

Figure **Caption** **Page**

LIST OF TABLES

Table **Caption** **Page**

CHAPTER 1
INTRODUCTION

1.0 Introduction

This chapter provide introduction to the report and the project. It provides overall view, problem statement, scope etc. The chapter provide the information about why the project is being developed. In this chapter the software and hardware requirement are also discussed. At the end of the chapter the tools and technologies used for the development of the project are discussed.

In every field nowadays, project management is a key feature in operations especially in the fields of engineering and information technology. In universities, it is difficult and time consuming to manage projects manually. The traditional process is very slow from proposal submission to final report submission in which the members including head of department, project coordinator, supervisors and student groups face many difficulties. Paperwork and document management is a crucial factor in the project management which causes a lot of problems in the traditional process. Communicational gap between all the stakeholders is a huge problem while dealing the projects manually.

To solve the project management complications in universities, an online application is developed which performs all the major activities related to project management. This application contains different roles which are head of department, project coordinator, project committee members, supervisors and student groups. Different access levels are provided to each role according to their need and admin role is managed by project coordinator. The application provides a mechanism through which all the previous data (reports and software's) are stored in the application and can be accessed by different roles. Head of department can see the progress of all the ongoing projects, approves the project committee in each session and communicate with project coordinator for projects related issues. Project coordinator plays a fundamental role in the application from start to end of each session. The major responsibilities of project coordinator include starting registration process, validating student group accounts, making project committee, sending request for project committee approval. Project coordinator can also see the progress of ongoing projects and communicate with supervisors and head of department for project related issues. Project coordinator also manages the notice board which is shown to all the roles of concerned program.

Students have to register their group for final year project. The main responsibility of student group is to send request to supervisor and after the approval of request form supervisor the system allocate supervisor to that student group and student group can

communicate with their supervisor. Student groups can view the new project ideas of supervisors and can also search the previous projects titles.

The role of committee member is managed by supervisors and supervisor performs committee member tasks through supervisor portal. In application, supervisor can see the progress of its student groups and communicates with its student groups for assigning tasks. Supervisor uploads the proposal and progress report after providing access by the project coordinator. Committee members provide the marks to each student group. All the communication between the roles is done in meeting track option which act as a messenger. The application generates different reports and forms for project coordinator and head of department which includes proposal, progress, final and supervisor reports and forms.

1.1 Problem Statement

Managing projects manually is a difficult and time-consuming task especially in the universities where people have to focus on other tasks simultaneously. Manual project management is a slow process and document management is the most tough part of this process. Hence, there is a need of web application which provides all the solutions to project management activities in universities.

1.2 Proposed System

In proposed system the final year students can register themselves after the registration process is started by project coordinator. Only one account is made for one student group but all the student group members can access the account through username and password. The account is activated after the approval of project coordinator. Student groups can send proposal request to supervisor, view tasks and can communicate through meeting track with supervisor. Student group can also search the existing project names which helps the them in selecting their project ideas.

The supervisors are already registered by project coordinator and their logins would be send to their email addresses by the system. The supervisors can update their account through theses logins. The supervisor can view all the requests sent by student groups. In proposal request, the student group has sent the proposal and after reading the proposal, it is up to supervisor whether to accept or reject the request. The supervisor communicates with its student groups through meeting track. In the evaluation section, supervisor give marks to its student groups. If the supervisor is a committee member then supervisor gives marks to all other student groups which are confidential until the submission of final report. The projects accepted by the supervisors are automatically updated in project coordinators

dashboard. The project coordinator can see all the approved student groups with their respective supervisor. Student group accounts are activated after the verification of students by project coordinator. The project committee is formed by project coordinator. The committee members receive notifications after the approval of committee by head of department. The project coordinator can search the existing project with full text search and some criteria-based search from the existing data of projects.

The head of department has full control on the system which includes all the access to existing project data and can see all the ongoing activities. The head of department can approve the committee which is formed by project coordinator. The head of department communicates with the project coordinator through meeting track. The application generates different reports and forms for project coordinator and head of department e.g. Proposal, progress, final, supervisor reports and Project evaluation report and Project evaluation by supervisor report and Group clearance report. The proposed system maintains all the previous data and import all data from the DVD's and save to our system. So, the concerned person can easily search previous records.

1.3 Aims and Objectives

The main objective of the project is to resolve the issues of the manual project management. The application provides document management, supervisor selection process, searching, evaluation of student groups, communication among different roles. These features help the students, project coordinator, supervisors and head of department to manage project activities and saves a lot of time.

1.4 Features of Proposed System

Features of the proposed system are group registration, proposal submission, meeting track, committee formation, document management, searching, evaluation, notification management, Role management, security management and reporting. Details are as follows.

1.4.1 Group Registration

After activating the registration process by project coordinator, the system allows the students to register their student group for current session. System authenticate the email of all the students in the groups. After registration, the details of student group send to project coordinator for further verification. The account should be activated after the approval of project coordinator. In both cases (approve or reject), the student group leader should receive a message through email.

1.4.2 Proposal Submission

In proposal submission, student group can send the proposal document to any supervisor. After reading the proposal document, supervisor can accept or reject the proposal request. Student group can see the status of request from their portal. Student group can send only one request at a time. After rejection, student group can send new request to another available supervisor. If the supervisor accepts the request of student group, then project coordinator and student group receive notification from the system.

1.4.3 Supervisor Selection

After the approval of proposal request by the supervisor, system allocates the supervisor to that student group. Student group can't send the proposal request to another supervisor after the supervisor allocation. Supervisor can view the progress of the student group after accepting the request.

1.4.4 Committee Formation

From the list of supervisors, project coordinator selects the committee members. After selecting the committee members, the list is sent to the head of department for approval. If the committee is approved, the project coordinator and all the committee members receive notifications. For the approved committee members, the system enables the option through which they can give marks to student groups. In case of rejection, the project coordinator receives the notification of creating the new project committee.

1.4.5 Searching

The search feature is given to every role but with different access levels of information. The project coordinator and head of department can have full control on the search feature. They can search and see the detail of every project and can download the documents e.g. proposal report and progress report etc. The supervisor can view and download the projects of its student groups only. The student groups can only search the names of all the previous projects which helps them in deciding their projects.

1.4.6 Evaluation

The supervisor has two roles in evaluation. First the supervisor can give marks to its student groups only and the second role is committee member. If the supervisor is a committee member then evaluation feature is enabled in supervisor portal after the approval of committee by head of department. The committee members and supervisors give marks to student groups only when they have access. Marks given by supervisors and committee members remain confidential until the completion of project.

1.4.7 Meeting Track

The communication between the different roles in the system is done through meeting track feature. Through this feature, the supervisor can assign task to its student groups. Student groups can communicate with their supervisor for any project related issue. Supervisor communicates only with their student groups and project coordinator. Project coordinator communicates with supervisors and head of department. Head of department can also communicate with project coordinator. All the communication record is maintained by the system.

1.4.8 Document Management

This system contains record of all the documents e.g. proposal, progress and final report and software. Only concerned roles can search and view these documents. The system provides mechanism to maintain all the previous data and import all the contents from the DVD's and save to our system.

1.4.9 Role Management

This feature describes that our proposed system is divided in different roles. All the roles in the system have different access level. This system has six main roles which are head of department, project coordinators, supervisors, committee members, student group and admin.

1.4.10 Notification Management

This feature of the proposed system allows the user to get notified whenever the notification is generated by someone e.g. the supervisors are notified when the head of department accepts the project committee. Student groups receive notifications only from project manager and supervisors.

1.4.11 Security Management

This feature of the proposed system allows the user to have secure communication. One user cannot interfere with another user's work. Different access levels are provided to each user to overcome the security issues. All other measures should be taken to secure the system e.g. to prevent SQL injection attack, stored procedures should be used which includes parametrized query.

1.4.12 Reporting

There are several reports should be generated according to the need.

1. Proposal, progress, final and supervisor reports.
2. Project evaluation report.

3. Project evaluation by supervisor report.
4. Group clearance report.

More reports can be generated according to the need of project coordinator and head of department.

1.5 Resource Requirements

Software and hardware resources is required in order to complete the project.

Following are the requirements that must be used.

1.5.1 Software Requirements

Following software tools must be required. Table 1.1 describes the software requirements.

Table 1.1 Software Requirements

Tools	**Description**
Visual Studio 2013	Visual Studio .NET is a Microsoft-integrated development environment (IDE) that can be used for developing consoles, graphical user interfaces (GUIs), Windows Forms, Web services and Web application [1].
Microsoft SQL Server	SQL Server is Microsoft's relational database management system (RDBMS) [2].
Windows 8.1	Microsoft Windows 8.1 is an operating system (OS) for personal computers and tablet computers [3].
Microsoft Visio 2013	Visio is a program that falls under the Microsoft Office Suite of products. It is used for many things that utilize layouts, diagrams, and charts [4].

1.5.2 Hardware Requirements

1.5.2.1 Laptop/PC

In order to develop our application successfully we need laptop or PC. Minimum requirements are described for the proper working of application in the table 1.2 given below.

Table 1.2 PC/Laptop Hardware Requirements

Resources	**Description**
Processor	Core i3 or above

RAM	4GB

1.6 Report Layout

The report includes six chapters. First chapter contains the description of project background, proposed system, features of project and the system's hardware and software requirements. Second chapter contains the description of existing systems, limitations of existing systems and their comparison with developed system. Third chapter is about system modeling. Fourth chapter describes the development methodologies. Testing is described in fifth chapter with test cases. Future work and system overview is described in last chapter.

CHAPTER 2
BACKGROUND & EXISTING WORK

2.0 Introduction

This chapter provides the description about the existing systems that are already developed. The features and limitations of existing systems are discussed and compared with proposed system. Functional and non-functional requirements are discussed at the end of chapter.

2.1 Developed System Overview

This system provides a way to manage the manual projects in the universities. The traditional process is very slow and time-consuming. The application provides six different roles which are student group, supervisor, project coordinator, committee members, head of department and admin. The application allows student group to perform group registration, view tasks and select supervisor.

Student group can view the status of their documents from their portals. The responsibilities of project coordinator are committee formation, manage evaluation process, monitor activities and authenticate student groups and manage profile. Final document, abstract and software/application are uploaded by the project coordinator into the system. Project coordinator and monitors all the evaluation activities during the project. The application allows the supervisors to manage their profile, view student group progress, assign tasks to student groups, communicate with student groups. Proposal and progress documents are uploaded by uploaded by supervisor into the system. The role of committee member is managed by supervisors. After providing access by the project coordinator, committee members give marks to each member of the student group. System sends the notification to every committee member after the head of department approves the project committee.

All the communication in the system is done through meeting track. Through meeting track feature, user can send files and messages. Head of department has full access on the application data and monitors all the ongoing activities. All the roles in the can search the previous projects but with different access levels of information. The application generates different reports and forms for project coordinator and head of department. System maintains all the previous data of reports and software/application and import all data from the DVD's and save to our system. So, the concerned person can easily search on previous records.

2.2 Existing Systems

In market, there are many existing systems that provide project management having many features and limitations. The features and limitations of these systems are discussed below. The chapter assess the existing systems in general.

2.2.1 Scoro

Scoro is a comprehensive solution that combines all the features you might need in project management and project tasks. Contact management, quotes, team collaboration, billing and reporting etc. it helps to streamline your entire work progress, so you do not need to use a lot of different tools for every task. It charges $22 user/month [5].

2.2.1.1 Limitations

This application lacks many important features like role management, group registration, proposal submission. There is no feature for team member's communication and task assigning. User have to pay some amount to use this application.

2.2.2 Proofhub

Proofhub offers a replacement for conventional emailing and a bunch of other tools, integrating multiple project management features under one roof. Proofhub has a simple and well-designed user interface that helps the team to collaborate more efficiently.
Proofhub charges $20/month [5].

2.2.2.1 Limitations

This application does not contain group registration, supervisor selection, proposal submission, notification management and committee formation features. Proofhub is a paid application. There is no security management feature. Proofhub does not generate any kind of report but in automation of FYP management and evaluation user generate the different kind reports.

2.2.3 Podio

Podio is a flexible and highly customizable online hub for work and team communication. Podio's workflow feature enables you to add if-this-then-that logic to podio apps. Instruct your app to create a task or comment when a particular update is made to an item. It charges $24 user/month [5].

2.2.3.1 Limitations

This application does not contain searching, student group evaluation, group registration. This application does not generate any reports but in automation of FYP management and evaluation generate different kinds of reports. This application doesn't have notification management feature. This application is not free of cost. There is no mechanism in the application to search previous record. Table 2.1 describes the comparison between existing and developed system features.

Table 2.1 Comparison Between Existing and Developed System Features

Features	**Automation of FYP Management and Evaluation**	**Scoro**	**Proofhub**	**Podio**
Group Registration	✓	×	×	×
Supervisor Selection	✓	×	×	×
Proposal Submission	✓	×	×	×
Committee Formation	✓	×	×	✓
Searching	✓	×	×	×
Evaluation	✓	×	×	×
Meeting Track	✓	×	✓	×
Document Management	✓	✓	×	✓
Role Management	✓	✓	✓	✓
Notification Management	✓	×	×	×
Security Management	✓	✓	✓	✓
Reporting	✓	✓	×	×

2.3 Functional Requirements

During the requirement gathering phase there are some requirements which are clearly stated, these requirements are of utmost importance, they are called functional requirements. These are those requirements which are must be fulfil. The functional requirements of the system are as follow:

2.3.1 Register Group

After activating the registration process by project coordinator, the system allows the students to register their student group. System authenticate the email of all the student by sending verification code to email. After registration, the details of student group should be send to project coordinator for further verification.

2.3.2 Authenticate Group

Project coordinator verifies the members of the student group. The accounts of student groups should be activated after the approval of project coordinator. In both cases (approve or reject), the student group leader receives a message through email.

2.3.3 View Supervisor Profile

This feature allows the student group to view the profile of supervisor. The system shows the list of supervisors in their respective categories e.g. development and research. After selecting the supervisor, student group can see the details of supervisors which are number of ongoing projects, list of previous projects done by supervisor etc.

2.3.4 Submit Proposal Request

Student group can send the proposal document to any supervisor. Through this document, the supervisor understands the details of the project. System shows the status of the proposal request to student groups. The student group can send only one request at a time.

2.3.5 Manage Proposal Request

The system shows the list of proposal requests to the supervisor. After reading the proposal document, supervisor can accept or reject the request. In case of rejection, the student group can send new request to another available supervisor. Project coordinator can view the list of all the approved projects with their respective supervisors after approval by supervisor.

2.3.6 Create Committee

From the list of supervisors, project coordinator selects the committee members and committee type. Two different committees are formed which are development and research. After selecting the committee members, the list is send to the head of department for each committee.

2.3.7 Manage Committee

If the committee is approved, the project coordinator and all the committee members receive notification. Only for the approved committee members, the system enables the option through which they can give marks to student groups. In case of disapproval, the project coordinator receives the notification of creating the new project committee.

2.3.8 Search Previous Projects

The search feature is given to every role but with different access levels of information. The project coordinator and head of department can have full control on the search feature. They can search and see the detail of every project and can download the documents e.g.

proposal report and progress report etc. The supervisor can view and download the projects of its student groups only. Student group can only search the names of all the previous projects which help them in deciding their projects.

2.3.9 Group Evaluation by Committee Members

This application allows the committee members to give marks to each student group. If the access is provided by project coordinator, then Committee members can give marks. System sends the notification after providing access by project coordinator. The marks given by the committee members remain confidential until the submission of final report by project coordinator.

2.3.10 Group Evaluation by Supervisors

Supervisors can give marks only to their respective student groups. After providing access by project coordinator, supervisors give marks to each member. System sends the notification after providing access by project coordinator. The marks given by the supervisors remain confidential until the submission of final report by project coordinator.

2.3.11 Meeting Track

The communication between the different roles in the system is done through meeting track feature. The supervisor can communicate with their student groups and project coordinator. The project coordinator can communicate with all supervisors and head of department. The head of department can communicate only with project coordinator. All the roles can send messages and files through this feature. System maintains all the history of files and messages.

2.3.12 Manage Documents

This system contains record of all the documents e.g. proposal, progress and final report and software. Supervisor can upload proposal and progress reports only when the project coordinator allows the supervisor. After giving access to supervisors by project coordinator, system sends the notification to all the supervisor to upload reports. The supervisor can upload the final report when the report is signed by the head of department. All the record can be accessed by different roles with different access level.

2.3.13 Upload Previous Record

The system provides mechanism to maintains all the previous data and import all the contents from the DVD's and save to our system. All the previous record is uploaded by admin. The previous record can be searched by the concerned role. Each role has different

access level of searching. Student can only search and view the previous project names. Project coordinator and head of department has full access to the previous record.

2.3.14 Create Reports

The system allows the project coordinator to create different reports.

1. Proposal, progress, final and supervisor reports.
2. Project evaluation report.
3. Project evaluation by supervisor report.
4. Finalize report.

2.3.15 Create Forms

The system allows the project coordinator to create different forms.

1. Proposal marks form.
2. Progress marks form.
3. Final marks form.
4. Supervisor marks form.

2.3.16 Manage Evaluation Process

The system allows project coordinator to manage the evaluation process. The project coordinator starts the proposal, progress, final and supervisor marks submission processes that allows the committee members and supervisors to give marks. After starting the processes, the system sends the notifications to committee members and supervisors. Project coordinator and head of department can monitor the evaluation process. These marks remain confidential until the project completion.

2.3.17 Manage Profile

The system allows all the roles to manage their profile. Supervisor can provide the details of previous projects using manage profile feature. Supervisor pervious projects details helps the students while selecting their supervisor. Supervisor can also upload the industry projects and new ideas that helps students to select their final year project idea. Project coordinator and head of department can also manage their profile. All the roles can also change their account password.

2.3.18 Monitor Activities

The system allows the project coordinator and head of department to monitor all the activities from registration process to final report submission. Charts are shown to the head of department to monitor the activities.

2.3.19 View Tasks

The system allows the student group to view tasks that are assigned by their supervisor. The student group can reply in response of the task assigned to them. All the task history is maintained by the system.

2.4 Non-Functional Requirements of the System

Non-functional requirements of the system are those which describes the attributes of the system. These requirements are also important and must to be implemented by the developer. By implementing these requirements, the quality of system is increased. The non-functional requirements according to this system are defined below.

2.4.1 Reliability

Reliability is an important requirement of the system. The system code is implemented with try catch block to prevent system from getting crash. System can handle all the exceptions which may occur during the usage which makes the system more reliable.

2.4.2 Maintainability

The system is flexible and maintainable because the system code is implemented in such a way that it can be upgraded later without having any issue. The commenting is done on all the code which helps the other developers to understand the code in the future.

2.4.3 Performance

Performance of system referred to the response time of the system. System should be designed and developed is such way that its can give expected result in short interval of time. The queries of the system are optimized which improves the performance of the system while generating reports.

2.4.4 Usability

The systems interface is designed in such a way that user can easily perform the required tasks. The user can easily learn about the system.

2.4.4 Availability

The system is available all the time for users perform their tasks.

CHAPTER 3
SYSTEM MODELING

3.0 Introduction

This chapter contains the description of use cases, sequence diagrams and system flow diagram. The interaction between the system and the user is shown through use cases. Input and output events are shown through sequence diagrams.

3.1 Flow Diagram of Automation of FYP Management and Evaluation

The application starts when project coordinator starts the registration process. After starting the registration process the student groups can perform registration. During the registration, the email of all the students in the student group is verified by sending verification code. After completing the registration, the student groups can't access their account unless their student group is verified by the project coordinator. In both cases (approve or reject), an email is sent to the student group by the system.

After successful activation of account, the student groups can login to the system. The system shows the list of supervisors to the student group. Student group can select any supervisor and sent the request. To send the request, the student group must have to attach the proposal document. After filling the form, the student group sends the request to supervisor. The student group can send only one request at a time. In case of rejection, the student group can send another request. The system shows the list of all pending student group requests to supervisor. The supervisor can download the proposal document and view the details of student groups.

In both cases (approve or reject), a notification is sent to the student group. In case of rejection, the student group can send request to another supervisor. The system shows the list of all the approved student groups with their supervisor to the project coordinator. After starting the registration process, project coordinator forms the project evaluation committee. The system shows the list of all the supervisors. After selecting the supervisors, the system sends the request to head of department.

Two different committees (development and research) are formed by the project coordinator. In both cases (approve or reject), a notification is sent to the project coordinator. In case of approval, the system sends the notification to all committee members. Project coordinator starts the proposal process after the demos of all the student groups. The system sends the notification to all the supervisor and committee members. In supervisor notification, the student groups are advised to upload their proposal report. In committee notification, the committee members are advised to upload the proposal marks.

The project coordinator and head of department monitors all these activities. The project coordinator can send message to student groups and committee members in case they are not completing their work on time. In case of progress and final process, all the roles perform the same tasks except the final report submission. The final report, abstract and software/application is uploaded by the supervisors to the system when final report is signed by the head of department.

After completing the final process, the project coordinator gives access to supervisors to upload marks. The supervisors give marks to each member of their student group. Now, all marks (proposal, progress, final and supervisor) are submitted by committee and supervisors. The system calculates the marks and assign the appropriate grade to each member of the student group. The communication between the different roles in the system is done through meeting track feature. The supervisor can communicate with their student groups and project coordinator. The project can communicate with all supervisors and head of department. The head of department can communicate only with project coordinator.

The search feature is given to every role but with different access levels of information. The project coordinator and head of department can have full control on the search feature. They can search and see the detail of every project and can download the documents e.g. proposal report and progress report etc. The supervisor can view and download the projects of its student groups only.

Student group can only search the names of all the previous projects which help them in deciding their projects. The system provides mechanism to maintains all the previous data and import all the contents from the DVD's and save to our system. The system shows the form to admin for uploading previous record. The admin fills the form and attach the required files and upload it to the system.

Different types of reports and forms are generated by the system. Only the project coordinator and head of department can have access to these reports and forms. The project coordinator can create proposal form, progress form, final form and supervisor form for the committee members to evaluate the student groups. The project coordinator can also create, proposal, progress, final report, all student groups evaluation report, all evaluation by supervisor, all evaluation by committee members, finalize report. The finalize report is generated only when all the documents are submitted by the supervisor. System shows the list of new project ideas to student groups which are provided by the supervisors. Figure 3.1 shows the flow of automation of FYP management and evaluation system.

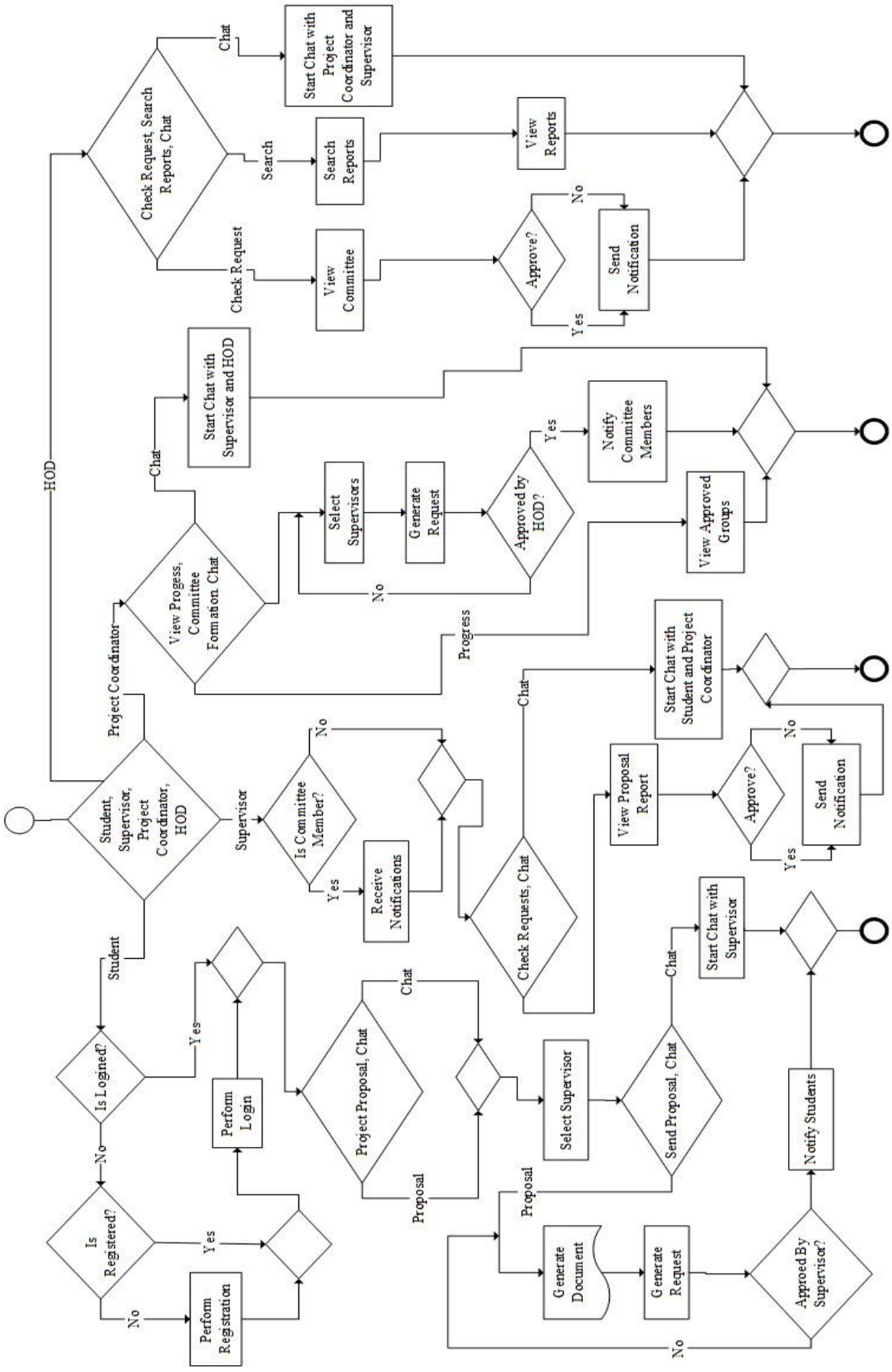

Figure 3.1 Flow Chart of Automation of FYP Management and Evaluation

3.2 Use Case Diagram of Automation of FYP Management and Evaluation

A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal [6]. In system use case, there are six actors which are head of department, project coordinator, project committee, supervisor, student group and admin. The head of department can see the progress of all the ongoing projects, approves the project committee in each session and communicate with project coordinator for project related issues. Head of department can manage their profile and search previous projects.

The major responsibilities of project coordinator include starting registration process, verification of student group accounts, create project committee, manage committee, create reports, create forms, manage profile and manage evaluation process. The project coordinator can also see the progress of ongoing projects and communicate with supervisors and head of department for project related issues. The application provides a mechanism through which all the previous data (reports and software's) are stored in the application and can be accessed by different roles. All the previous record is uploaded by project coordinator into the system.

Students have to register their student group to use the application. The responsibilities of student groups are sending request to supervisor, manage profile, and they can communicate with their supervisors. Student group can view the task assigned by their supervisor and can also search the previous project titles. Student groups can also view the new project ideas of supervisors.

The role of committee member is managed by supervisors. Supervisor performs committee member tasks through supervisor portal. In application, the supervisor can see the progress of its student groups, manage profile, manage proposal requests and communicates with its student groups for assigning tasks. Supervisor provide marks to each member of the student group. The committee members provide marks to each student group.

The application generates different reports according to the need of project coordinator and head of department. The project coordinator can also create, proposal, progress, final report, all student groups evaluation report, all evaluation by supervisor, all evaluation by committee members, finalize report. The finalize report is generated only when all the documents are submitted by the supervisor. System shows the list of new project ideas to

student groups which are provided by the supervisors. Student groups can also download the project related content which helps them in their reports. Figure 3.2 shows the use case diagram of Automation of FYP Management and Evaluation.

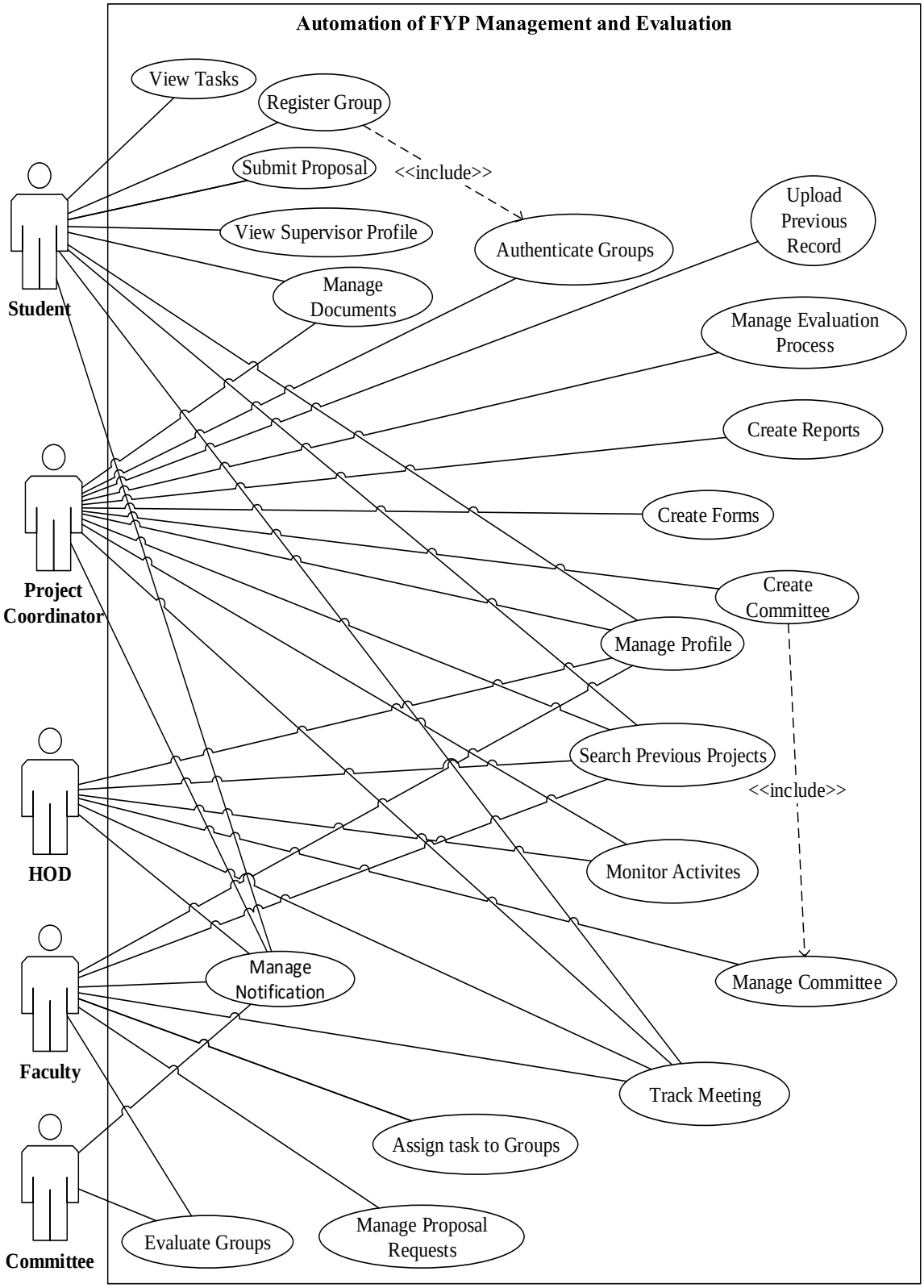

Figure 3.2 Use Case Diagram of Automation of FYP Management and Evaluation

3.2.1 Register Group Use Case

In register group use case, system allows the students to register their student group. System authenticate only the student group leader email. After authentication, the system sends the details of the student group to project coordinator for verification.

Table 3.1 Register Group Use Case

Use case Id	UC-1
Use case name	Register Group
References Requirement	Requirement no.1
Actors	Student group
Purpose	The students want to register their group for FYP.
Overview	The student group provides their information for registration. The system authenticates the student group leaders email and then send the information of members to project coordinator.
Type	Primary
Pre-condition	Student group must be in final year.
Post-condition	Request for student group registration is successfully send to the project coordinator.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the students want to register their group.	2. System shows the registration form to get the information of group members.
3. Student group provides personal information.	4. System authenticates the student group leader email.
5. Student group provides the information for account.	6. System successfully sends the request.

3.2.2 Authenticate Group Use Case

In this use case, project coordinator verifies the members of the student group. The accounts of student groups should be activated after the approval of project coordinator.

Table 3.2 Authenticate Group Use Case

Use case Id	UC-2
Use case name	Authenticate Group
References Requirement	Requirement no.2
Actors	Project coordinator, System
Purpose	To authenticate student groups for the final year project.
Overview	Project coordinator verifies the student group members. The system sends the notification in both cases (approve or reject).
Type	Primary
Pre-condition	Student group must be registered.
Post-condition	System successfully sends the notification to student group.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when the project coordinator receives the request for student group authentication.	2. System shows the detail of student group members.
3. Project coordinator verifies the student group members and approve the student group.	4. System activates the account and notifies the student group.
5. If the project coordinator rejects the group.	6. System notifies the group.

3.2.3 View Supervisor Profile Use Case

In view supervisor use case, system shows the list of supervisors in their respective categories e.g. development and research. After selecting the supervisor, student group can see the details of supervisors which are number of ongoing projects, list of previous projects done by supervisor etc.

Table 3.3 View Supervisor Use Case

Use case Id	UC-3
Use case name	Select Supervisor
References Requirement	Requirement no.3
Actors	Student group
Purpose	To view the supervisor profile.
Overview	Student group select the supervisor from the list of available supervisors and views the details of supervisors.
Type	Primary
Pre-condition	Student group must be registered.
Post-condition	Student group successfully views the supervisor profile.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when the student group wants to view the details of supervisor.	2. System shows the list of available supervisors.
3. Student group selects the supervisor from the list.	4. System shows the detail of selected supervisor.

3.2.4 Submit Proposal Use Case

In submit proposal use case, student group sends the proposal document to any supervisor. The student group can send only one proposal request at a time. After the rejection, the student group can send new request to any other supervisor.

Table 3.4 Submit Proposal Use Case

Use case Id	UC-4
Use case name	Submit Proposal
References Requirement	Requirement no.4
Actors	Student group, Supervisor
Purpose	To submit the proposal document to supervisor.
Overview	Student group sends the proposal document to supervisor.
Type	Primary
Pre-condition	1. Student group must have selected the supervisor. 2. Student group must be registered.
Post-condition	The system successfully sent the proposal to supervisor.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when the student group wants to submit proposal document.	2. System shows the form to upload the proposal document.
3. Student group sends the proposal document.	4. System shows the success message.

3.2.5 Manage Proposal Request Use Case

In manage proposal request use case, system shows the list of proposal requests to supervisor. After reading the proposal report, supervisor can accept or reject the student group request. In both cases (approve or reject) system notifies the group. In case of approval, system allocates the supervisor to that group. Group can send new request to another available supervisor after rejection.

Table 3.5 Manage Proposal Use Case

Use case Id	UC-5
Use case name	Manage Proposal Request
References Requirement	Requirement no.5

Actors	Supervisor
Purpose	Supervisor manages the proposal requests.
Overview	Supervisor views the proposal submitted by the group. In both cases (approve or reject) system notifies the group.
Type	Primary
Pre-condition	Group must have sent the proposal request.
Post-condition	The system successfully notifies the group.
Typical course of events	
Actors Actions	**System Response**
1. Use case starts when supervisor receive the proposal request.	2. System shows the option to download the proposal report and to view the details of group members.
3. Supervisor view the proposal report of the group and accept the request.	4. System allocates the supervisor to that group and notifies the group.
5. If supervisor rejects the request.	6. System notifies the student group and allow the student group to send new request.

3.2.6 Create Committee Use Case

In create committee use case, project coordinator selects the committee members and committee type from the list of supervisors. Two different committees are formed which are development and research. After selecting the committee members, the list is send to the head of department for each committee.

Table 3.6 Create Committee Use Case

Use case Id	UC-6
Use case name	Create Committee
References Requirement	Requirement no.6
Actors	Project coordinator

Purpose	To form the project committee for project evaluation.
Overview	Project coordinator select the committee members and send to the head of department for the approval.
Type	Primary
Pre-condition	List of supervisors must be available.
Post-condition	The list of supervisors is successfully sent.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when project coordinator wants to create committee for final year project evaluation.	2. System shows the list of supervisors.
3. Project coordinator send the list of supervisors after selection of supervisors and committee type.	4. System shows the success message.

3.2.7 Manage Committee Use Case

In manage committee use case, if the committee is approved, the project coordinator and all the committee members receive the notification. In case of rejection, only the project coordinator receives the notification of creating the new project committee. All the members again receive the notification in case of change in member of committee.

Table 3.7 Manage Committee Use Case

Use case Id	UC-7
Use case name	Manage committee
References Requirement	Requirement no.7
Actors	Head of department

Purpose	Approval or disapproval of project committee.
Overview	Head of department approve or disapprove the committee formed by the project coordinator.
Type	Primary
Pre-condition	Request must be sent to head of department for approval of committee.
Post-condition	System successfully sends the notification.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when head of department receives the request for committee approval.	2. System shows the option to view the details of committee members.
3. Head of department views the committee and approves the committee.	4. System sends the notification to project coordinator and all the committee members.
5. If head of department rejects the committee.	6. System sends the notification to project coordinator to reform the committee.

3.2.8 Search Previous Projects Use Case

In search previous projects use case, system allows the user to search the previous projects. search feature is given to every role but with different levels of information. The project coordinator and head of department can have full control on the search feature. They can search and see the detail of every project and can download the documents e.g. proposal report and progress report etc. The supervisor can view and download the projects of its student groups only. The student group can only search the names of all the previous projects which help them in deciding their projects.

Table 3.8 Search Previous Projects Use Case

Use case Id	UC-8
Use case name	Search previous projects
References Requirement	Requirement no.8
Actors	Student group, supervisor, project coordinator, head of department
Purpose	Different roles want to search the previous projects records.
Overview	Every role of the system can search and download the previous project documents with different access levels.
Type	Primary
Pre-condition	Each role must be registered.
Post-condition	The system shows the data to the user after searching.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when any role wants to search the previous record.	2. System shows the data according to role.

3.2.9 Evaluate Group by Committee Use Case

In evaluate student group by committee use case, committee members give marks to all the approved student groups. Committee members receives notification after providing access by the project coordinator.

Table 3.9 Evaluate Group by Committee Use Case

Use case Id	UC-9
Use case name	Evaluate Group by Committee
References Requirement	Requirement no.9
Actors	Committee members

Purpose	Give marks to the student groups
Overview	Committee members give marks to the student groups.
Type	Primary
Pre-condition	Must be a committee member to give marks.
Post-condition	The marks are successfully submitted.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when project coordinator provide access to committee members.	2. System notifies the committee members.
3. Committee members enters the marls for each member of the student group.	4. System shows the success message.

3.2.10 Evaluate Group by Supervisor Use Case

In evaluate student group by supervisor use case, supervisors give marks only to their respective student groups. Supervisor receives notification after providing access by the project coordinator.

Table 3.10 Evaluate Group by Supervisor

Use case Id	UC-10
Use case name	Evaluate Groups by Supervisor
References Requirement	Requirement no.10
Actors	Supervisors
Purpose	Give marks to the student groups
Overview	Supervisor give marks to student group after providing access by the project coordinator.
Type	Primary

Pre-condition	Must be a supervisor to give marks.
Post-condition	Marks are successfully submitted.
Typical course of events	
Actors Actions	**System Response**
1. Use case begins when project coordinator provide access to supervisors.	2. System notifies the supervisors.
3. Supervisors enters the marks for each member of the student group.	4. The system shows the success message.

3.2.11 Track Meeting Use Case

In track meeting use case, system allows all the roles to communicate with each other. The supervisor can communicate with their student groups and project coordinator. The project can communicate with all supervisors and head of department. The head of department can communicate only with project coordinator. Student group can only communicate with their supervisor.

Table 3.11 Track Meeting Use Case

Use case Id	UC-11
Use case name	Track Meeting
References Requirement	Requirement no.11
Actors	Student group, Committee Members, Project Coordinator, Head of department
Purpose	Different roles of the system communicate with each other.
Overview	System shows the list of users to the communicate. The user can send file and message to another user.
Type	Primary
Pre-condition	All roles must be registered.
Post-condition	System shows the success message.

Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the different roles of the system want to communicate with each other.	2. System allow user send messages or files to others user.
3. User send messages or files to others user.	4. System send notification to receiver.

3.2.12 Manage Documents Use Case

In manage document use case, system allows the supervisor to upload different documents into the system. Supervisor can upload proposal and progress final documents, abstract and software/application.

Table 3.12 Manage Documents Use Case

Use case Id	UC-12
Use case name	Manage Documents
References Requirement	Requirement no.12
Actors	Supervisor
Purpose	To upload documents in the system.
Overview	Supervisor uploads the proposal, progress final documents, abstract and software/application to the system.
Type	Primary
Pre-condition	Supervisor should have access to upload documents.
Post-condition	Document is successfully uploaded.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when supervisor want to upload the documents.	2. System shows the form to upload the documents.

3. Supervisor uploads the documents.	4. System show the success message.
5. If the supervisor doesn't have access.	6. System shows the error message.

3.2.13 Upload Previous Record Use Case

In upload previous record use case, system provides a way to import all the previous record into the system. All the previous record is uploaded by admin of the system.

Table 3.13 Upload Previous Record Use Case

Use case Id	UC-13
Use case name	Uploads Previous Records
References Requirement	Requirement no.13
Actors	Admin
Purpose	To upload previous records into the system.
Overview	Admin uploads the previous record into the system.
Type	Primary
Pre-condition	Admin must be registered.
Post-condition	Documents are successfully uploaded.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when admin wants to uploads previous records to the system.	2. System shows form to the admin that allow to upload previous record.
3. Admin fills the form and attaches all files and upload into the system.	4. System show the success message.

3.2.14 Create Reports Use Case

In create reports use case, project coordinator creates different reports.

Table 3.14 Create Reports Use Case

Use case Id	UC-14

Use case name	Create Reports
References Requirement	Requirement no.14
Actors	System, project coordinator
Purpose	To create reports.
Overview	Project coordinator creates different reports.
Type	Primary
Pre-condition	The system must have data.
Post-condition	Project coordinator successfully create the reports.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the project coordinator wants to create reports.	2. System allow project coordinator to create reports.
3. The project coordinator creates reports.	4. System successfully create the report.

3.2.15 Create Forms Use Case

In create forms use case, project coordinator creates different reports.

Table 3.15 Create Forms Use Case

Use case Id	UC-15
Use case name	Create Forms
References Requirement	Requirement no.15
Actors	System, project coordinator
Purpose	To create Forms.
Overview	Project coordinator creates different forms.
Type	Primary
Pre-condition	The system must have data.
Post-condition	Project coordinator successfully creates forms.

Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the project coordinator wants to create forms.	2. System allows project coordinator to create forms.
3. The project coordinator creates forms.	4. System successfully create the forms.

3.2.16 View Tasks Use Case

In view tasks use case, system shows tasks to student groups which are assigned by their supervisors.

Table 3.16 View Tasks Use Case

Use case Id	UC-16
Use case name	View Task
References Requirement	Requirement no.17
Actors	Student group
Purpose	To view tasks assigned by supervisor.
Overview	System allow student group to view tasks, assigned by their supervisor.
Type	Primary
Pre-condition	Student group must be registered
Post-condition	System shows the success message.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the student group wants to view tasks, assigned by their supervisor.	2. System show the tasks to the student group.

3.2.17 Manage Evaluation Process Use Case

In manage evaluation process use case, the project coordinator starts the proposal, progress and final processes that allows the committee members and supervisors to give marks.

Table 3.17 Manage Evaluation Process Use Case

Use case Id	UC-17
Use case name	Manage Evaluation Process
References Requirement	Requirement no.17
Actors	Project Coordinator
Purpose	To manage evaluation process.
Overview	Project coordinator manage evaluation process by starting processes that allow supervisor and committee members to evaluate student groups.
Type	Primary
Pre-condition	Project coordinator must be registered.
Post-condition	Project coordinator successfully start processes and system shows the success message.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when the project coordinator wants to start the evaluation process.	2. System successfully starts the selected process.

3.2.18 Manage Profile Use Case

In manage profile use case, system allows all the roles to manage their profile.

Table 3.18 Manage Profile Use Case

Use case Id	UC-18
Use case name	Manage Profile
References Requirement	Requirement no.18

Actors	Project Coordinator, Supervisor, Student group, head of department
Purpose	To manage profile.
Overview	Different roles of the system manage their profile.
Type	Primary
Pre-condition	Project coordinator must be registered.
Post-condition	All the roles have successfully updated their profile.
Typical course of events	
Actors Actions	**System Response**
1. This use case starts when users want to manage their profile.	2. System allows all the user to manage their profile.

3.2.19 Monitor Activities Use Case

In monitor activities use case, system shows all the activities to project coordinator and head of department.

Table 3.19 Monitor Activities Use Case

Use case Id	UC-19
Use case name	Monitor Activities
References Requirement	Requirement no.19
Actors	Project Coordinator, Head of department
Purpose	To monitor activities.
Overview	Users wants to monitor activities.
Type	Primary
Pre-condition	Project coordinator and head of department must be registered.
Post-condition	Project coordinator successfully monitor activities
Typical course of events	
Actors Actions	**System Response**
1. Use case starts when users want to monitor activities.	2. System shows all the activities.

3.3 Sequence Diagram

Sequence diagrams describe interactions among classes in terms of an exchange of messages over time. A sequence diagram is a good way to visualize and validate various runtime scenarios [7]. Figure 3.3 shows the system sequence diagram.

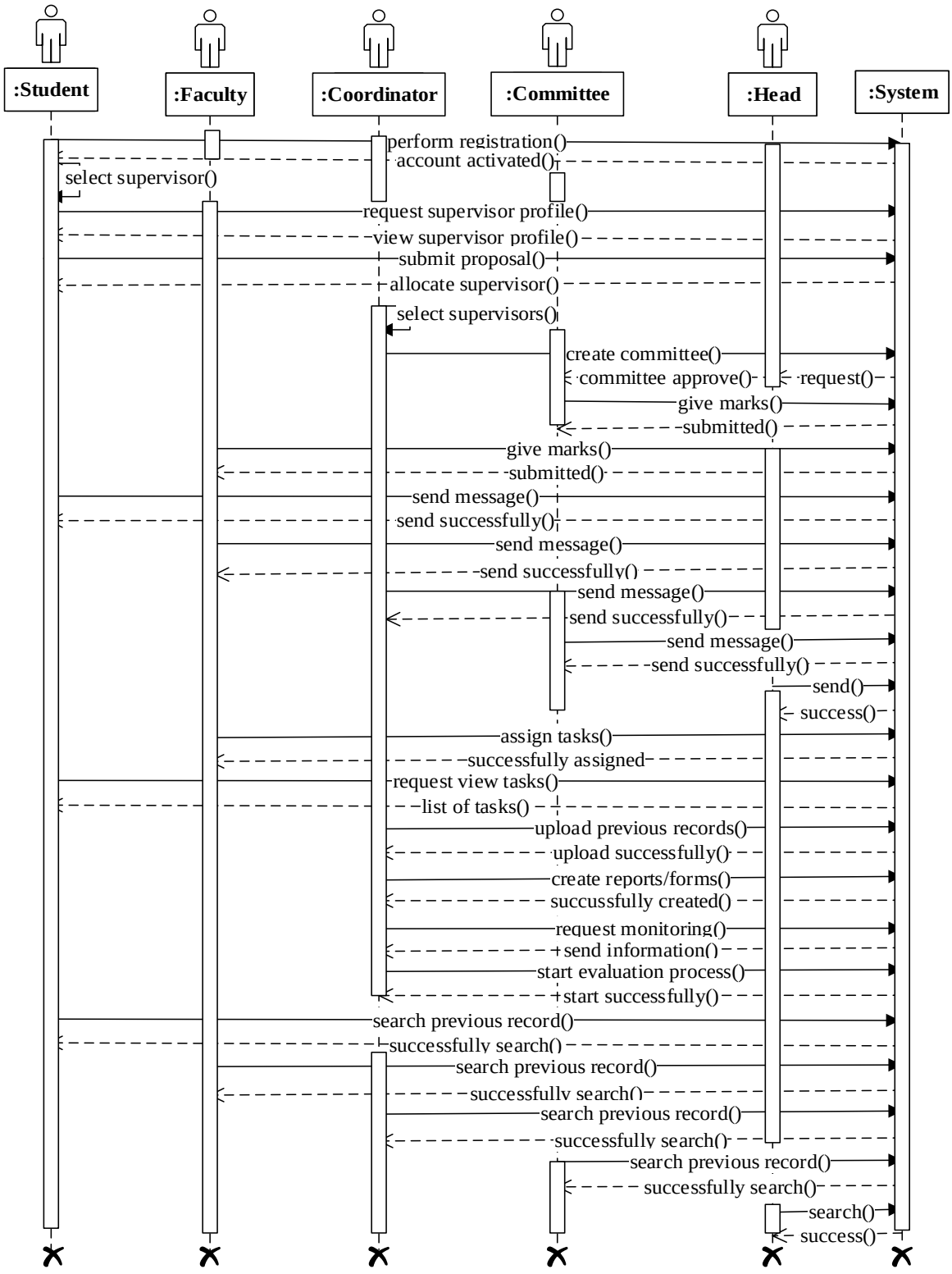

Figure 3.3 System Sequence Diagram

3.3.1 Register Group Sequence Diagram

In this sequence diagram, system allows the students to register their group. Figure 3.4 shows the register group sequence diagram.

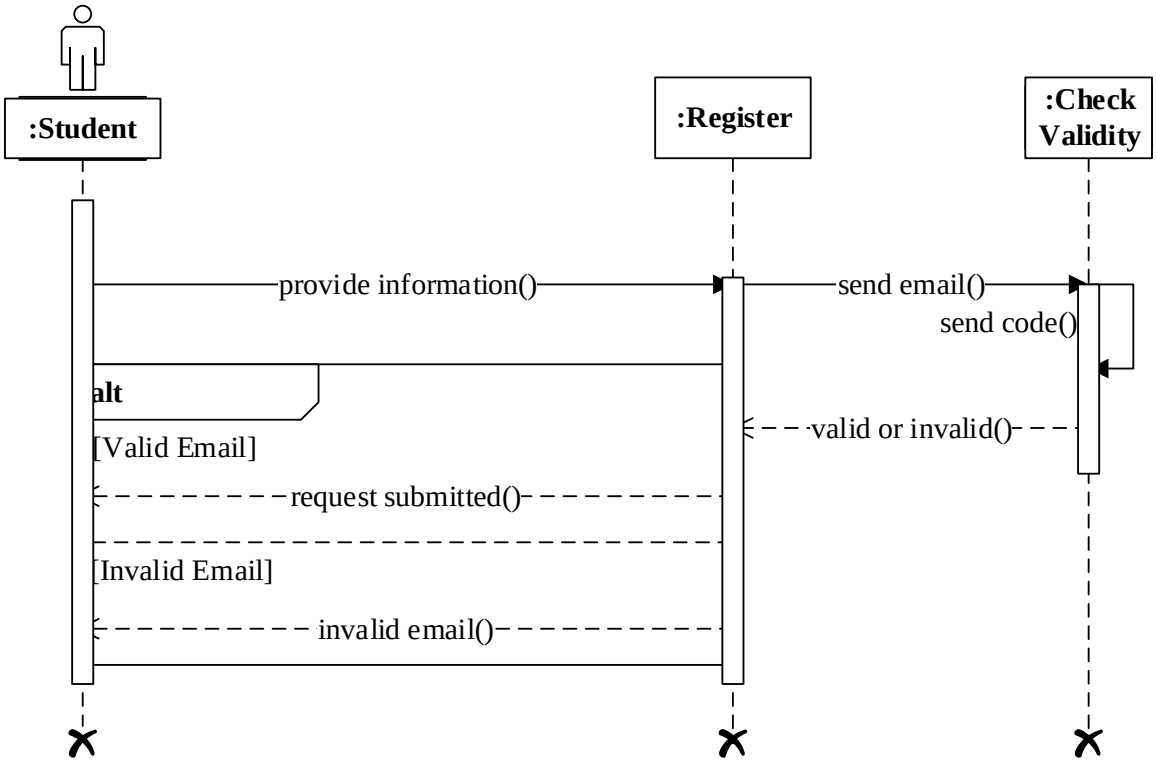

Figure 3. 4 Register Group Sequence Diagram

3.3.2 Submit Proposal Sequence Diagram

In this sequence diagram, student group sends the proposal document to any faculty member. Figure 3.5 shows the submit proposal sequence diagram.

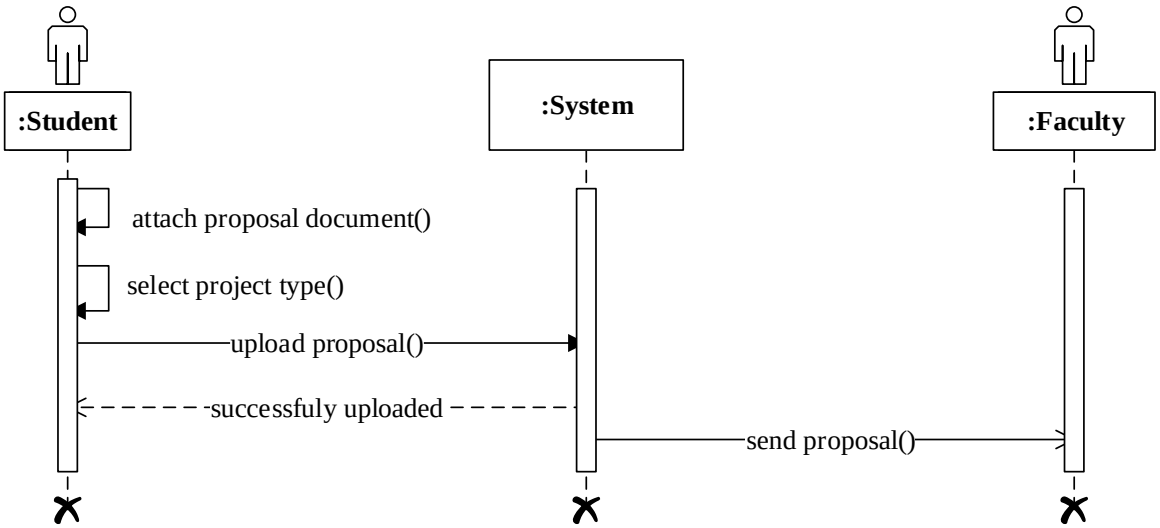

Figure 3.5 Submit Proposal Sequence Diagram

3.3.3 Authenticate Group Sequence Diagram

In this sequence diagram, project coordinator verifies the members of the student group. The accounts of student groups should be activated after the approval of project coordinator. Figure 3.6 shows the authenticate group sequence diagram.

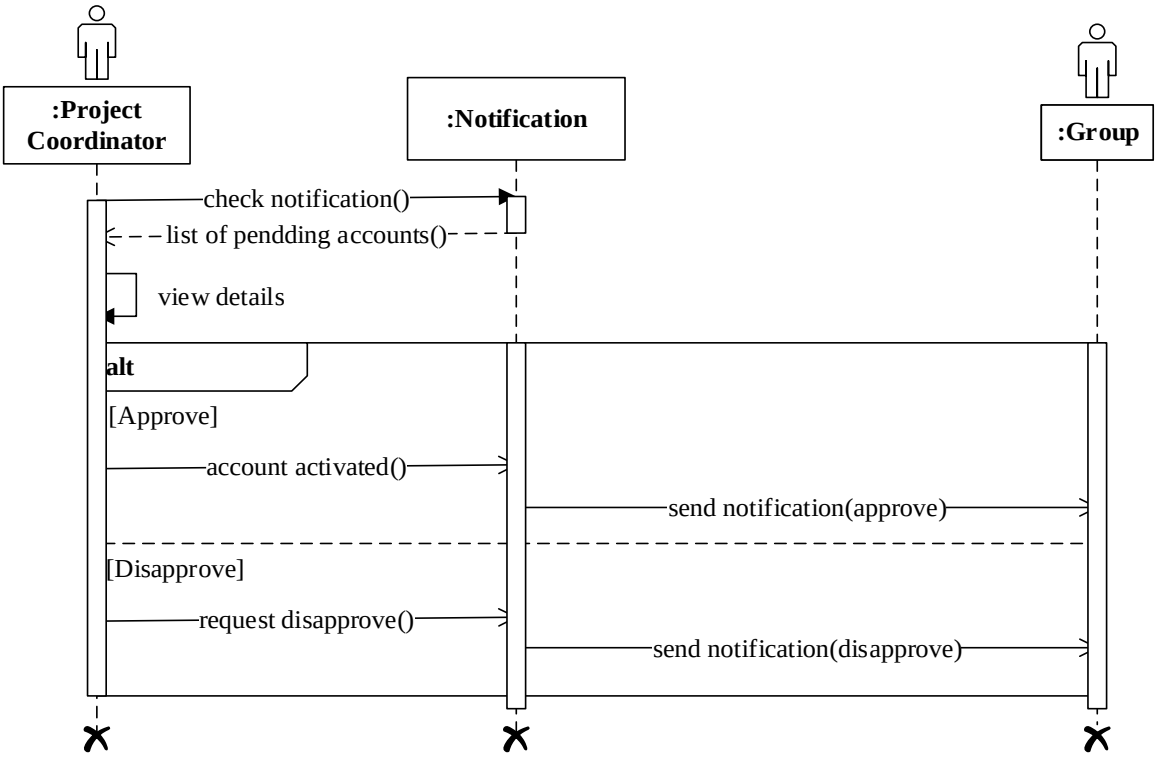

Figure 3.6 Authenticate Group Sequence Diagram

3.3.4 View Supervisor Profile Sequence Diagram

In this sequence diagram, system shows the supervisor profile. Figure 3.7 shows the view supervisor profile sequence diagram.

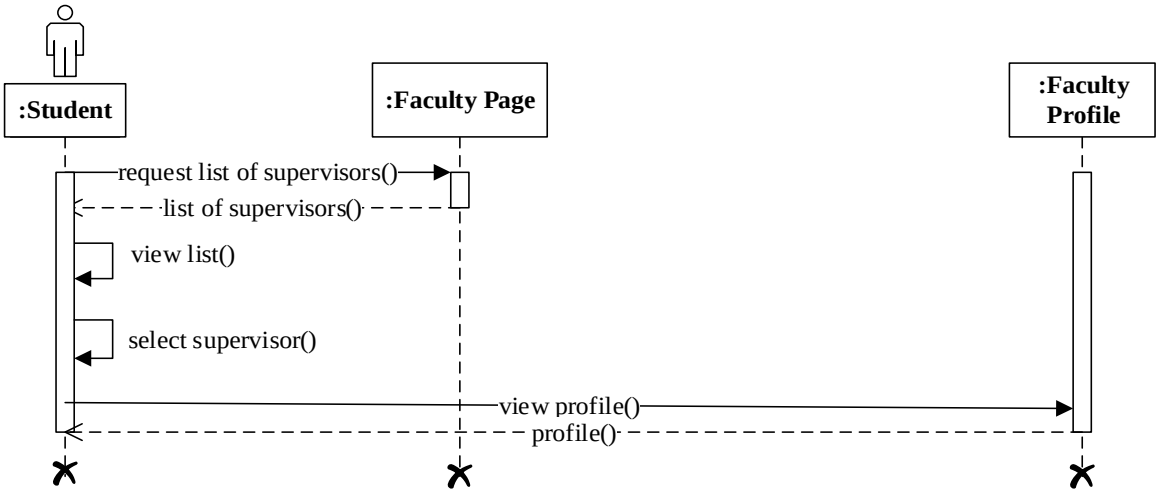

Figure 3.7 View Supervisor Profile Sequence Diagram

3.3.5 Manage Proposal Request Sequence Diagram

In this sequence diagram, supervisor manages the proposal requests. Figure 3.8 shows the manage proposal request sequence diagram.

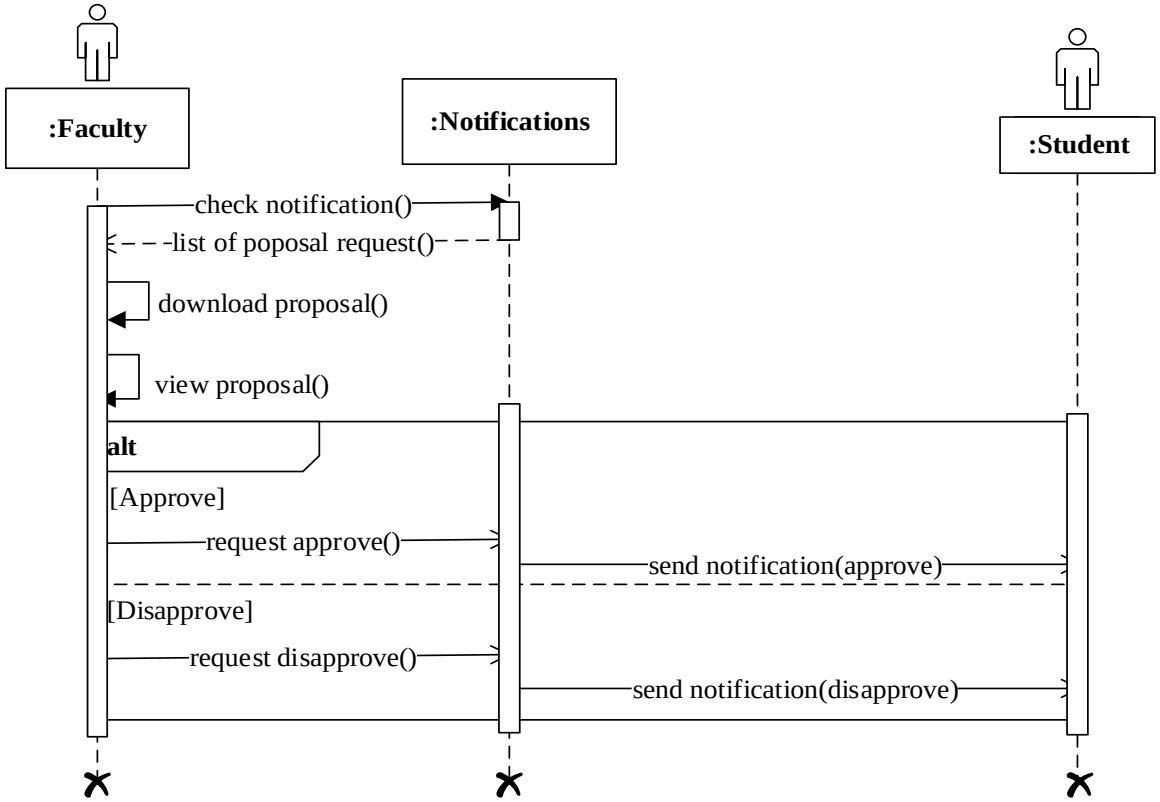

Figure 3.8 Manage Proposal Request Sequence Diagram

3.3.6 Create Forms Sequence Diagram

In this sequence diagram, project coordinator creates different forms. Figure 3.9 shows the Process to create forms.

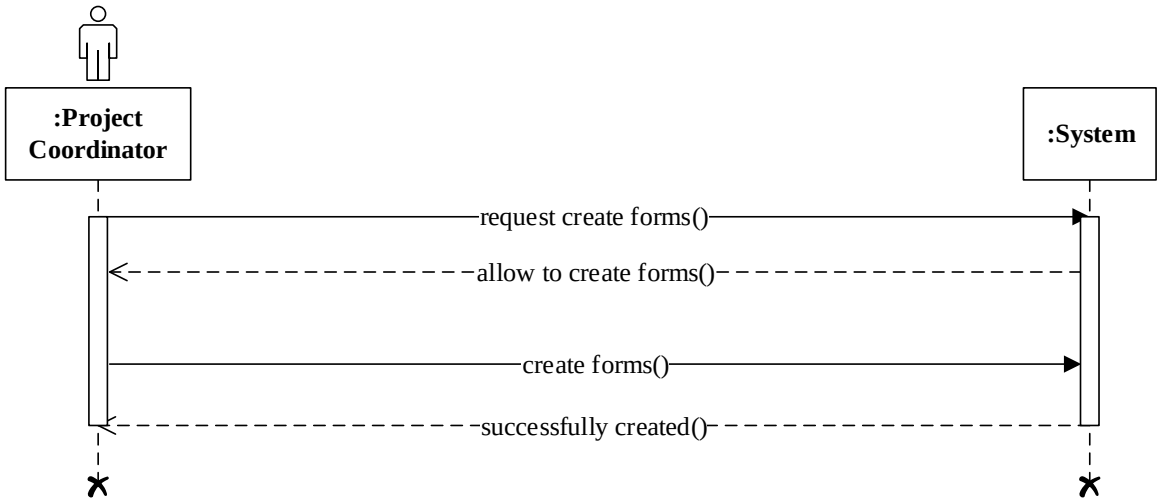

Figure 3.9 Manage Proposal Request Sequence Diagram

3.3.7 Create Committee Sequence Diagram

In this sequence diagram, project coordinator creates the committee. Figure 3.10 shows the process to create committee.

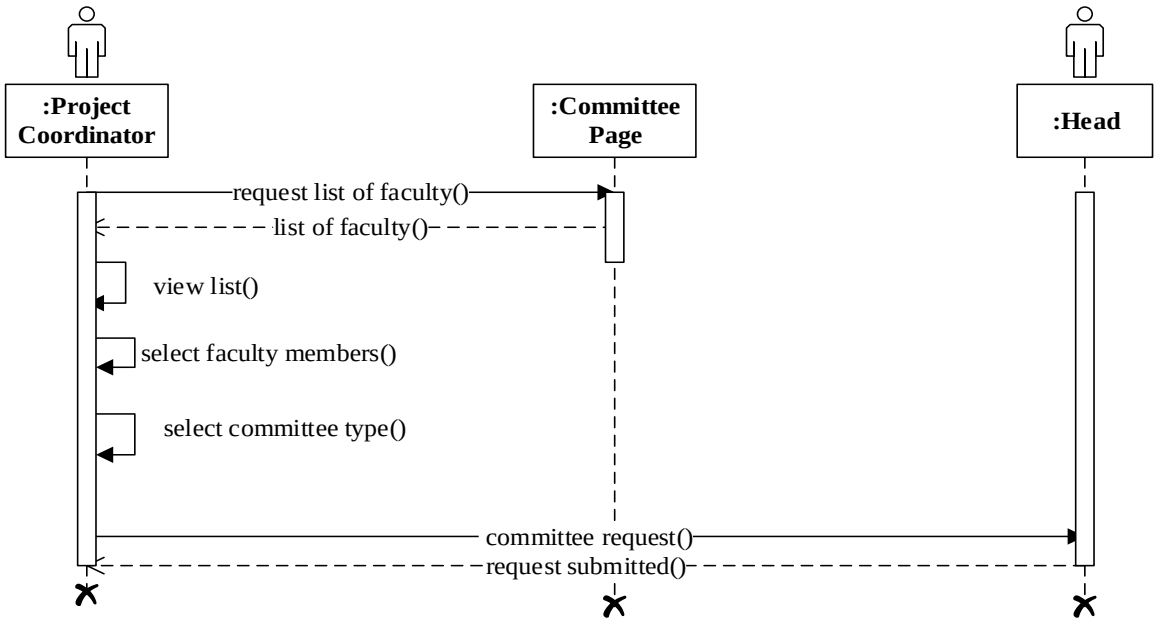

Figure 3.10 Create Committee Sequence Diagram

3.3.8 Manage Committee Sequence Diagram

In this sequence diagram, project coordinator manages the committee. Figure 3.11 shows the process to manage the committee.

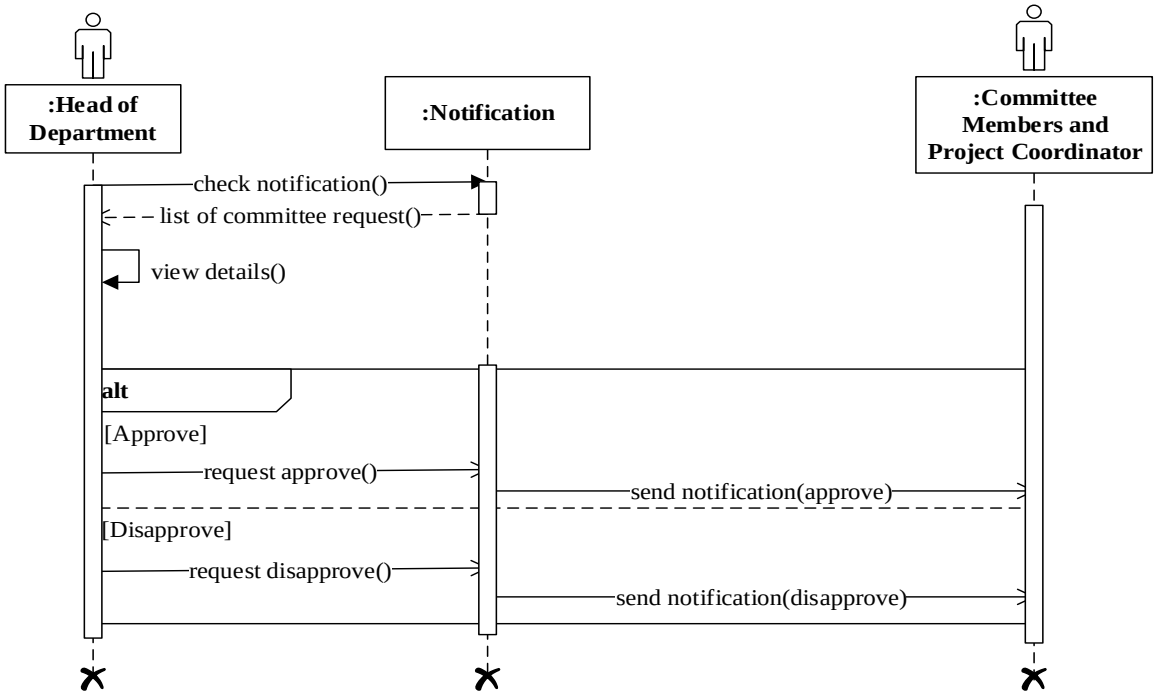

Figure 3.11 Manage Committee Sequence Diagram

3.3.9 Search Previous Projects Sequence Diagram

In this sequence diagram, all roles can search the previous record. Figure 3.12 shows the search previous projects sequence diagram.

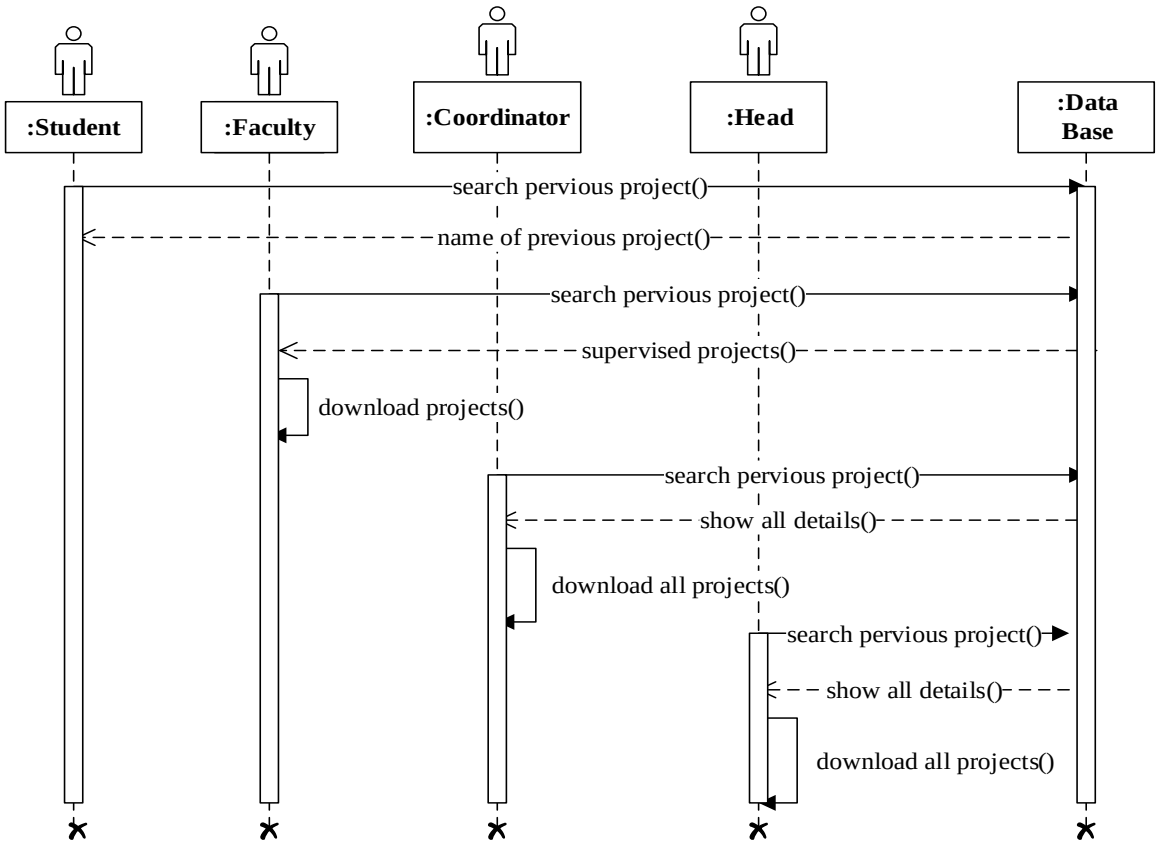

Figure 3.12 Search Previous Projects Sequence Diagram

3.3.10 Manage Evaluation Process Sequence Diagram

In this sequence diagram, project coordinator manages the evaluation process. Figure 3.13 shows the manage evaluation process sequence diagram.

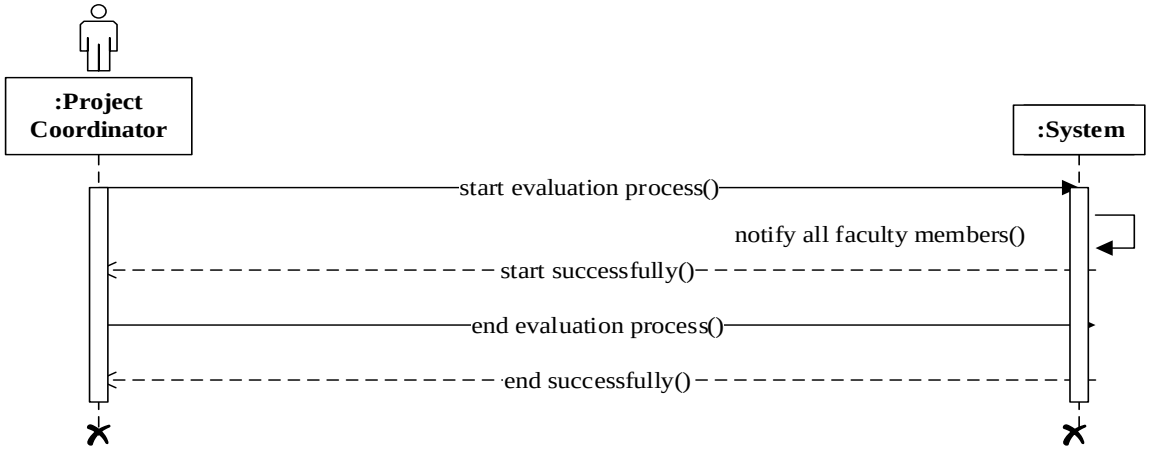

Figure 3.13 Manage Evaluation Process Sequence Diagram

3.3.11 View Tasks Sequence Diagram

In this sequence diagram, system shows tasks to student groups. Figure 3.14 shows the view tasks sequence diagram.

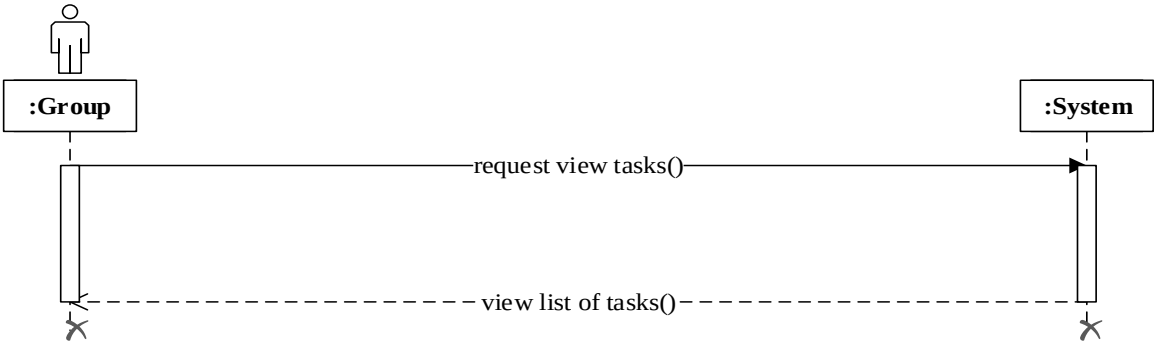

Figure 3.14 View Tasks Sequence Diagram

3.3.12 Evaluate Group by Supervisor Sequence Diagram

In this sequence diagram, supervisors give marks only to their respective student groups. Figure 3.15 shows the process to evaluate group by supervisor.

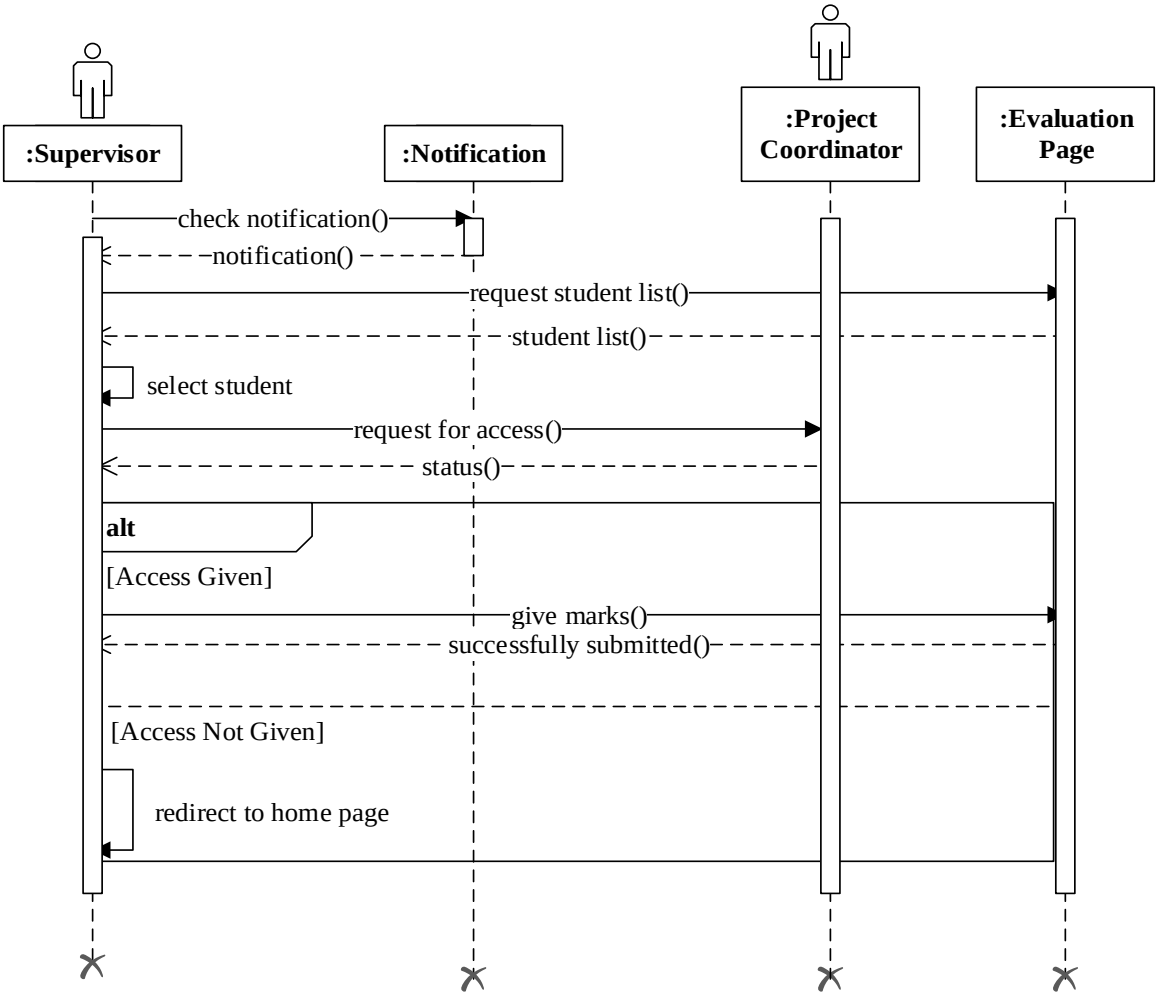

Figure 3.15 Evaluate Group by Supervisor Sequence Diagram

3.3.13 Track Meeting Sequence Diagram

In this sequence diagram system allows all the roles to communicate with each other. Figure 3.16 shows the track meeting sequence diagram.

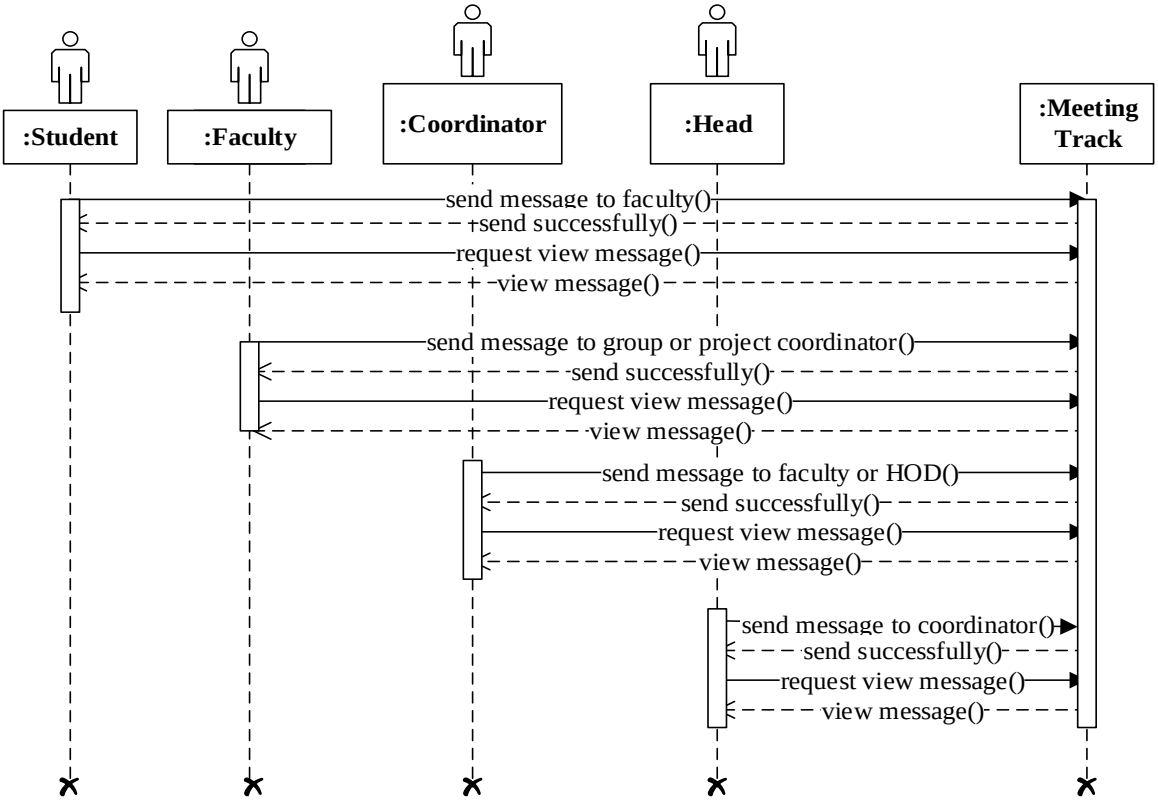

Figure 3.16 Track Meeting Sequence Diagram

3.3.14 Create Reports Sequence Diagram

In this sequence diagram, project coordinator creates different reports. Figure 3.17 shows the process to create repots.

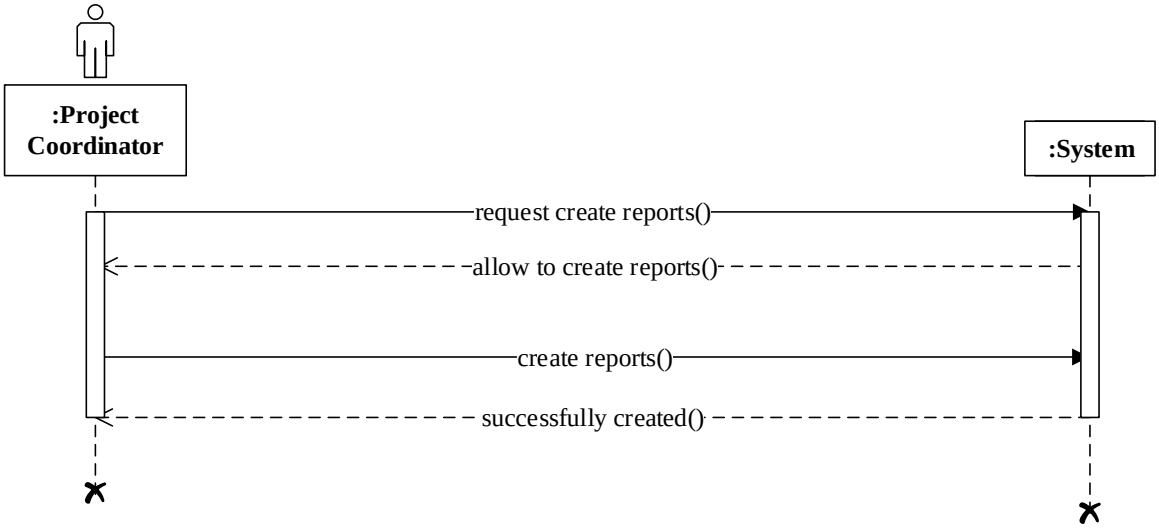

Figure 3.17 Create Reports Sequence Diagram

3.3.15 Manage Documents Sequence Diagram

In this sequence diagram, system allows the supervisor to upload different documents into the system. Figure 3.18 shows the process to manage documents.

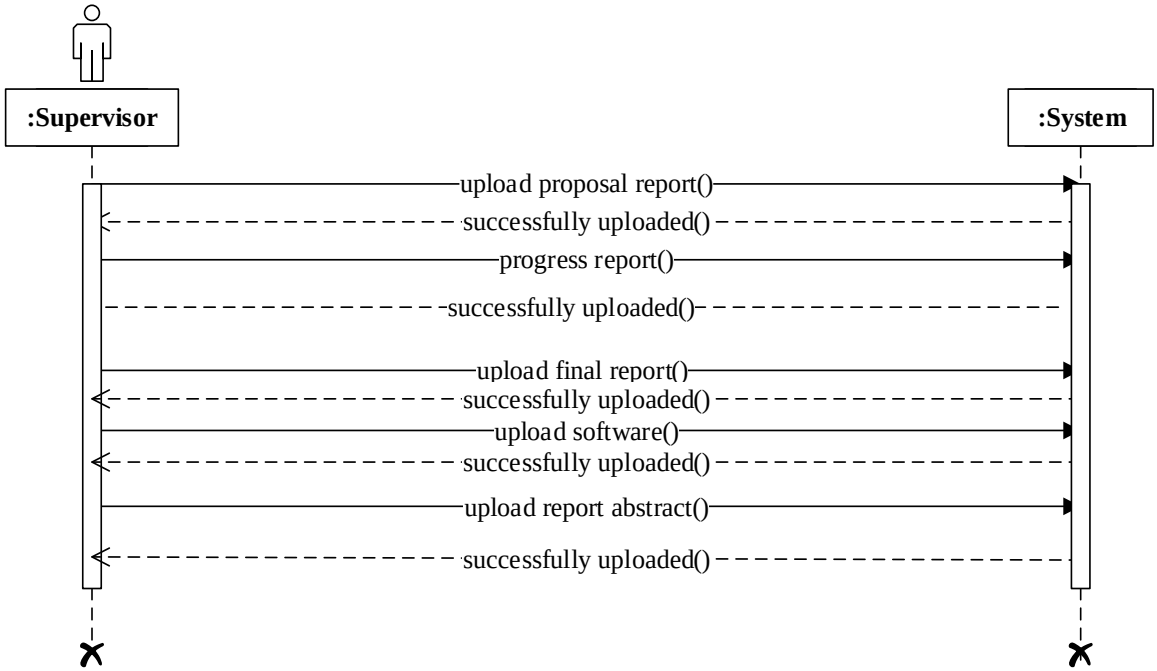

Figure 3.18 Manage Documents Sequence Diagram

3.3.16 Manage Profile Sequence Diagram

In this sequence diagram, system allows all the roles to manage their profile. Figure 3.19 shows the manage profile sequence diagram.

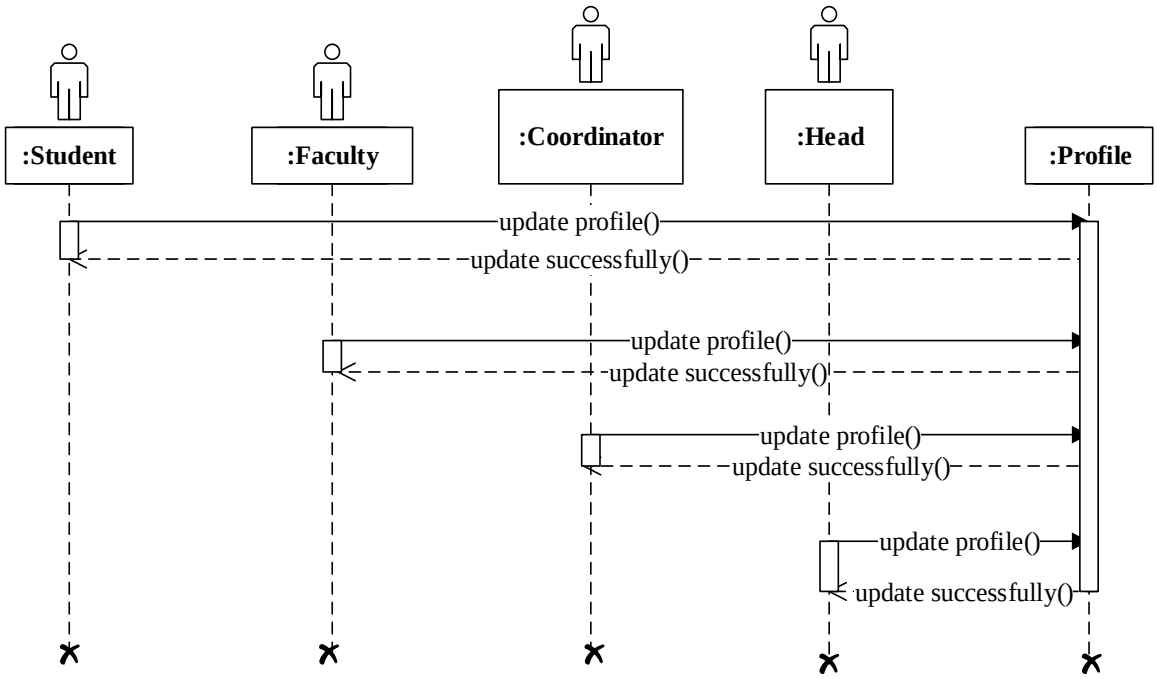

Figure 3.19 Manage Profile Sequence Diagram

3.3.17 Monitor Activities Sequence Diagram

In this sequence diagram, system shows all the activities to project coordinator. Figure 3.20 shows the monitor activities sequence diagram.

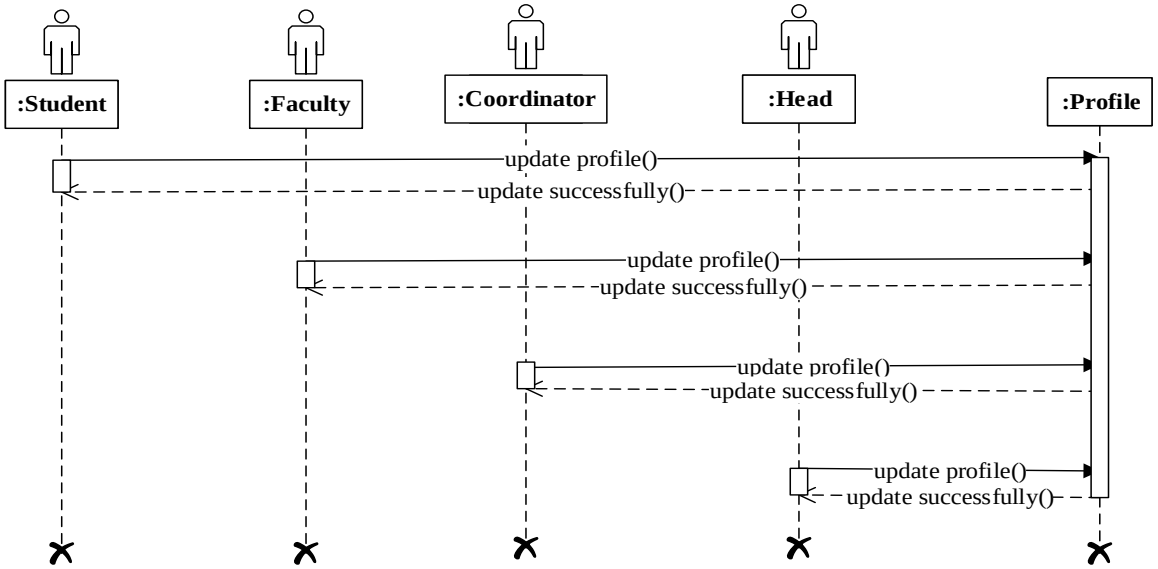

Figure 3.20 Monitor Activities Sequence Diagram

3.3.18 Evaluate Group by Committee Sequence Diagram

In this sequence diagram, committee members give marks to all the student groups. Figure 3.21 shows the evaluate group by committee sequence diagram.

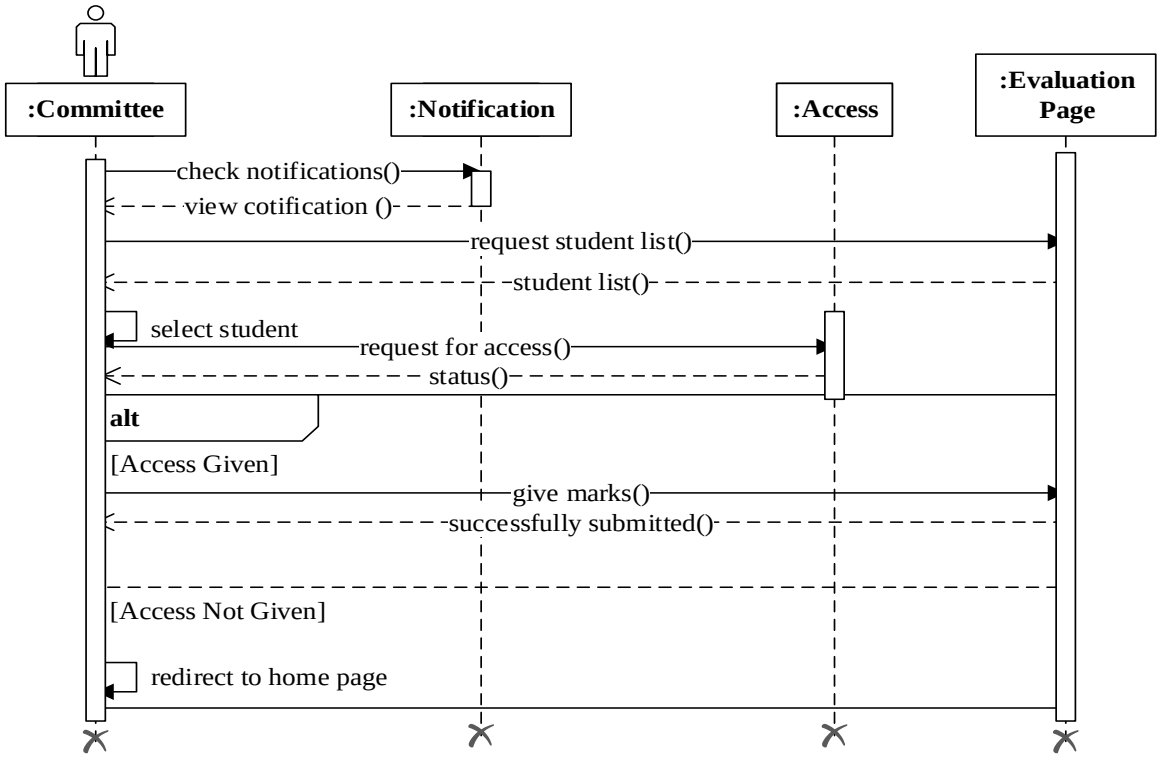

Figure 3.21 Evaluate Group by Committee Sequence Diagram

3.4 Class Diagram of FYP Management and Evaluation

Figure 3.22 shows the class diagram of FYP management and evaluation.

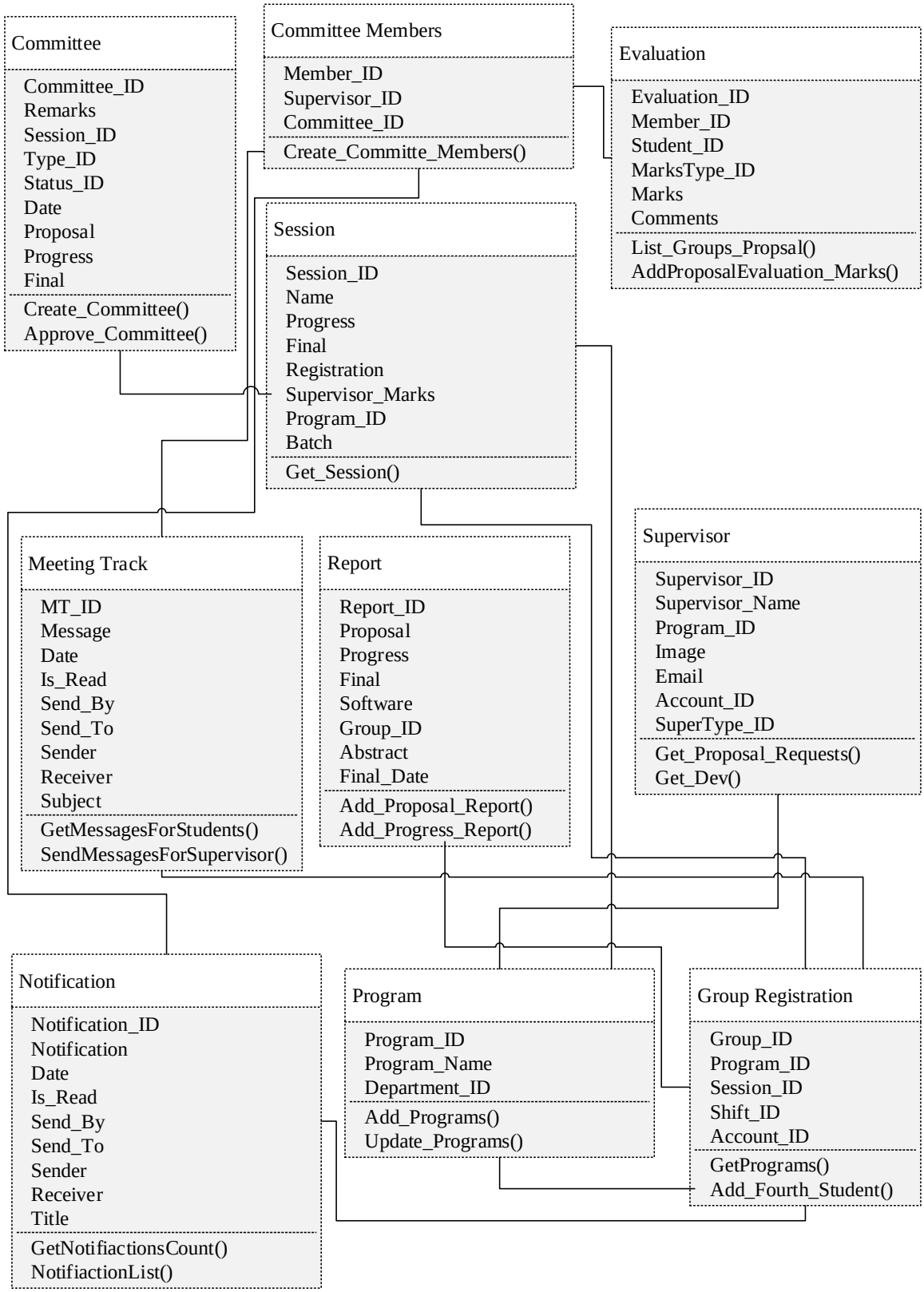

Figure 3.22 Class diagram of FYP Management and Evaluation

CHAPTER 4
DEVELOPMENT METHODOLOGY

4.0 Introduction

This chapter consist the details about development and implementation of web-based application for Automation of FYP and Evaluation Management. This chapter explains the whole working process of the web-based application. Also, briefly describes that how the processes of Automation of FYP and Evaluation Management are achieved.

4.1 Development Track

Project Development is done efficiently and smoothly when all the modules of the application are integrated. At first, requirements of the project area are briefly analyzed. On the basis of gathered requirements, every module is designed with need of the user interaction with the system. For the development of these modules, Visual studio and C# programming language is used. When designing is done, the integration of all the developed modules including the student group registration, supervisor selection, proposal submission, committee formation, searching, evaluation, role management, document management, meeting track, security management and reporting was performed.

For the development of the web application, C# programming language was used. The C# language is used to implement programming instruction for the application. The ASP.NET framework is used to create the interface and layouts of the application. The development of this application is achieved through different tools. These tools are MS SQL server, visual studio and many other tools are available in market. Visual studio is very fast, highly configurable and massively extensible tool. Visual studio has amazing integration with build systems and with source control systems and is developed hand in hand with the underlying runtime and compilers, and so offers exceptional debugging and compilation integration, with all these features of visual studio it is best choice for any .NET application.

At first, all the modules of the application are developed individually in the Visual Studio. These modules are tested individually. After that, all the modules are integrated. Secondly, all other modules were developed in Visual Studio and at the end all the components were integrated and tested for final phase.

4.2 Application Design

Design of this web application is developed by focusing on the basic engineering frameworks. Application design is developed according to nature of application and needs of different roles. As this application is based on ASP.NET framework to provide the different access level to different roles. This application allows students to register their

student group for final year project in signup process. Similarly, project coordinator is responsible to create the logins for faculty members which can be supervisors or committee members. But the interface is designed similar to the typical web-based application, that if a user wants to interact with the application then it is very easy to read the instructions.

The architecture used for the development of Automation of FYP Management and Evaluation is 3-tier architecture. As described above the architecture of the system used is 3-tier architecture. The three-tier architecture pattern is a pattern which provides a manner for structuring and separating the application into three tiers or layers, in which each tier provides different levels of responsibility. The first tier deals with the presentation part of the system. The second tier deals with the business logic, which is the core of the system and the third tier, represent the database.

4.2.1 DAL

The Data Access Layer named as "DAL" library class which is responsible for storing data into database and maintaining connection with the database. This layer supports the database connection and also handles all the exceptions. In this system architecture, "DAL" layer facilitates to insert the various built in functions for alerts, exceptions and secure connections. The DAL contains entities and operations classes of each database table [8].

4.2.2 Entities

Entities folder contains all the entities of the application by using get and set accessors of C#. After the successful completion of get and set accessors, these entities are used by the operation classes to perform different operations.

4.2.3 Operations

Operations folder contains all the functions related to each table of the application. These functions are used by the business logic layer to pass data from presentation to data access layer.

4.2.4 SignalR

SignalR is an ASP.NET library that makes developing the real-time web functionality easy. SignalR allows bi-directional communication between server and client. Servers can now push content to connected clients instantly as it becomes available. By using the SignalR library, user don't have to refresh the page to check the notifications. The application also provides alert feature to notify the project coordinator. Application maintains all the record of notifications. Most of the notifications of the system are

predefined. SignalR library is used to generate the real-time notifications. All the users of the system receive the real-time notification [9].

4.2.5 Benefits of using three-tier architecture

The main reason to use 3-tier architecture is its advantage over other architectures is its independent tiers. In this regard if any one of the tiers is failed, others remain unaffected as a result no data lose occurs. The complexity of processing is hidden from the user with the help of 3-tiers. So this architecture is more secure as the client does not have a direct access to physical and database logic. Web server and database is represented with a true separate approach.

Application demands high quality attributes and the 3-tier helped to achieve this level of non-functional specification. By using this architecture an effective client and server connection is provided. Hence performance, flexibility, maintainability and reusability of the system are increased.

4.3 Application Implementation

Implementation of application was starts right after the designing the user case for all the functionalities. All the modules of the applications are developed separately. These modules are student group registration, supervisor selection, proposal submission, committee formation, searching, role management, document management, security management, evaluation, notification management and reporting. System is being integrated on the basis of different modules and interact within different activities.

4.3.1 Searching

Searching allows the head of department, project coordinator and supervisors to search and view any previous documents and project reports with the help of keywords and some criteria-based searching. After searching any project, head of department and project coordinator can see the details of that project e.g. proposal report, progress report and final thesis report.

The supervisors can check whether the project is already done by another student group or not while dealing proposal requests. Students can also search the titles of previously done projects so they can have the idea if certain project is already in the list or not.

System also allows the student to search previous record, student don’t have full access to the searching feature. Student only search the previous project names that helps student to select their idea. Students can also search the new project ideas which are provided by the supervisors.

4.3.2 Evaluation

Evaluation also can be done through this web application. Supervisors and committee members can evaluate the student groups when project coordinator allows them and give control to them. There are two types of evaluation criteria. First is supervisor's evaluation where supervisor can evaluate the student groups which are under his/her supervision. Second is committee member's evaluation where all the committee members can evaluate each student group individually. Evaluation is takes place throughout the project. Supervisors and committee members evaluate the student groups in proposal submission presentation, progress demonstration and final plus code demonstration. Evaluation process is remained confidential until the final report submission.

4.3.3 Committee Formation

When project coordinator forms the committee for final year project evaluation. If project coordinator wants to create the committee for development projects, project coordinator selects the names of development supervisors and send approval request to the head of department. While creating the research committee, project coordinator selects the research related supervisors and send for approval of committee to the head of department.

Now it is up to head of department whether to approve or disapprove the committee. If head of department approved the committee then project coordinator receives notification. In case of changing any committee member, head of department request project coordinator to replace that specific committee member. Project coordinator create the committee through change control and send to head of department for approval again.

4.3.4 Meeting Track

Any of role of this application can communicate with each other on different access levels. Student groups can communicate related to projects queries with their respective supervisors only. Supervisors can assign tasks and give deadlines of those tasks to their student groups through meeting track.

Supervisors can communicate with project coordinator through meeting track. Project coordinator have to notify supervisors related to any activity or deadlines through meeting track. Similarly, head of department can communicate with project coordinator. Head of department can discuss committee formation related issues and progress of ongoing activities. All the history of the communication between different roles is maintained by the system. The system generates the real-time notifications whenever the message is received by the users.

4.3.5 Group Registration

When student group is going through the registration process, students of the student group must be the final year students. First of all, any of student group member or student group leader can perform the registration process by providing the information regarding its student group. Email verification of all the students in the student group is done by the system. After verification process, a mail is sent to the provided email address which includes the login information e.g. username and password etc.

Through the given username and password any of student group member can access the student group account. After logging in to the account, student group can see the profile of different available supervisors. Student group can see the profiles of development related supervisors, research related supervisors and both research and development related supervisors. Student group can also view new project ideas posted by supervisors in their profiles.

4.3.6 Supervisor Selection

Student group can select the available supervisor according to their final year project idea. If idea is related to research project, then they have to select the supervisor among the list of research related supervisors. Similarly, if idea is related to development project then student group have to send request to the development related supervisor.

Student group can send only one request at a time and copy of proposal report also sent to the selected supervisor. After reading the proposal report it is up to the supervisor whether accept or reject the student group request. In case of rejected by the supervisor, now student group can send request to any other available supervisor.

4.3.7 Role Management

This web application divided into different roles and each role has its own access level. Every role has different dashboards and controls from where they can perform different activities. First role is student group, different student groups can perform registration and been assigned a unique username and password through which they can access their accounts. Single username and password for whole student group members.

Faculty members also have the logins which are provided by the project coordinator. Through given logins, faculty members can update their profiles according to their role. In case if faculty member is also a committee member, profile is being updated accordingly.

Project coordinator is performing key role throughout the project lifecycle. Whenever any student group is performed registration, project coordinator has to authenticate the student

group. Project coordinator also responsible for creating the logins for faculty members and stay in touch with faculty members and head of department throughout the project.
Head of department can monitor all the ongoing activities regarding the projects. Progress of each phase of project can be shown through the different flow charts and graphs.

4.3.8 Document Management

This application contains all the record of proposal reports, progress reports and final thesis reports. Previous documents are also available in this application for different roles with different access levels. Student groups can only search previous project titles for selecting the final year project idea.
Head of department and Project coordinator can search, view and download previous project documents. Project coordinator is responsible for uploading the final thesis report on the system. All the previous record is being uploaded to the system from different sources e.g. DVDs etc.

4.3.9 Notification Management

This web application generates different kind of notification according to different activities. When any student group is being registered into this system, student group leader is get notified through an email. Similarly, project coordinator set some events as reminder. Such events generate a notification before set time of event get started.
When committee formation request is sent to the head of department, a notification send to the head of department's dashboard. If committee is approved, then a notification has sent to the committee members and project coordinator as well. In case of disapproval of committee, system send notification to the project coordinator only.
All the communication between different roles is also takes place through the notification management. Whenever any of role receive a message, system sends notification to the receiver.

4.3.10 Security Management

This web application provides secure mechanism of communication to different roles with different access levels. There is no interference between the tasks of each role. All security related issues are overcome by providing different access levels to each role.
All other security measures are taken to secure the system e.g. to prevent SQL injection attack, stored procedures are used which includes parameterized query. That is why this system is managed securely between different roles and each activity which is being performed.

4.3.11 Reporting

Different kind of reports and forms are being generated through this web application. Some of reports are being generated by project coordinator for different tasks. Head of department also can generate different forms and reports regarding to the progress of projects.

CHAPTER 5
TESTING, ANALYSIS AND RESULTS

5.0 Introduction

Testing is the process of finding bugs and errors form the system. Finding errors by running the system in real environment. Different types of testing integration, system, unit, white and black box testing. Unit testing is testing of modules of the system. Integration testing is testing of modules after integration of modules that module is working correctly after integration. In system testing integrated software is tested. In white box testing where system is tested internally or code of system is tested. In black box testing where tester don't know the internal functionality of the system. Tester check the behavior of the system by giving different inputs into the system.

In automation of FYP management and evaluation all type of testing is perform. All modules of system are tested separately and modules are also tested after integration that integration of new modules effect the existing system. System code is testing at every stage and system is also tested by giving all the possible input and check the behavior or output of the system. Some test cases are designed and testing result is discussed in this chapter.

5.1 Test Bed

In order to test an application certain hardware and software are required. Test bed consists of specific software, hardware, Operating system, Network configuration, the product under test, other system software and application software. It is the combination of hardware and software environment in which the tests are executed. For this automation of FYP management and evaluation, the test bed which is required is a web browser such as Chrome, Firefox and Internet Explorer and operating system Windows 7 or above with stable internet connection. All the modules and functional requirements are tested. All the possible inputs given to test every possible response of the system.

5.2 Register Group Test Case

In register student group test case, the system allow user to register their student group. The user provides information and perform registration. The student group registration request is send to project coordinator for authentication.

Table 5.1 Register Group Test Case

ID: TC-1	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	1	**Developer**	Muhammad Usman

Test Date	07 March 2018	**Use Case Reference**	UC-1
Objective	To perform student registration successfully.		
Environment	System in running condition.		
Considerations	System must have stable internet.		
Pre-requisites	User want to register their student group.		
Step #	**Execution Description**		**Procedure Result**
1.	Students provides information to register their group for final year project.		Student group registration request successfully send to project coordinator for approval.
Comments: Students successfully register their student group for final year project.			
Status	☑Pass☐Fail☐ Not Executed		

5.2.1 Conclusions

Students provides information to register their student group for final year project and information is save in database and request is send to project coordinator for authentication.

5.3 Authenticate Group Test Case

In this test case of authenticate student group, System shows project coordinator list of pending accounts. The project coordinator views the requests details and approve or disapprove the registration request. System send notification to student group in both case of approval or disapproval.

Table 5.2 Authenticate Group Test Case

ID: TC-2	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	2	**Developer**	Muhammad Usman

Test Date	07 March 2018	**Use Case Reference**	UC-2
Objective	To authenticate student groups for the final year project.		
Environment	System in running condition.		
Considerations	System must have stable internet.		
Pre-requisites	Project coordinator wants to authenticate registered student groups.		
Step #	**Execution Description**		**Procedure Result**
1.	Project coordinator receives the request for student group authentication. Project coordinator approve or disapprove the student group.		System send notification in both cases accept or rejects.
Comments: The project coordinator authenticates the student groups requests. The system notifies the students in both cases of accepts or rejects.			
Status	☑Pass☐Fail☐ Not Executed		

5.3.1 Conclusions

The system shows list of pending to project coordinator. The project coordinator approves or disapprove the registration request and system notify student group in both case of approval or disapproval.

5.4 View Supervisor Profile Test Case

In this test case, the system allow student to selects supervisor and view profile of selected supervisor. In supervisor profile student view the details of supervisor project, ideas of new projects, industry projects etc.

Table 5.3 View Supervisor Profile Test Case

ID: TC-3	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	3	**Developer**	Ammad Idrees

Test Date	07 March 2018	**Use Case Reference**	UC-3
Objective	To view the supervisors profile.		
Environment	System in running condition.		
Considerations	Student group must be registered.		
Pre-requisites	Student wants to view the supervisor profile.		
Step #	**Execution Description**		**Procedure Result**
1.	Student selects the supervisor from the list to view profile.		System shows profile of the selected supervisor.
Comments: Student selects supervisor to view the profile and system show the profile of selected supervisor.			
Status	☑Pass☐Fail☐ Not Executed		

5.4.1 Conclusions

The student select supervisor to view the profile. The system shows profile of the selected supervisor.

5.5 Submit Proposal Test Case

In this test case student select the supervisor to submit proposal. The student attaches the proposal document file and submitted to the selected supervisor.

Table 5.4 Submit Proposal Test Case

ID: TC-4	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	4	**Developer**	Ammad Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-4
Objective	To submit the proposal document to supervisor.		
Environment	System in running condition.		

Considerations	Student group must be registered. Student group must select supervisor.	
Pre-requisites	Student wants to submit proposal to selected supervisor.	
Step #	**Execution Description**	**Procedure Result**
1.	Student upload proposal document and send it to the selected supervisor.	System shows the success message that proposal is submitted successfully.
Comments: Student send proposal to the selected supervisor and system shows the success message.		
Status	☑Pass☐Fail☐ Not Executed	

5.5.1 Conclusions

The student select supervisor, attaches file of proposal document and submitted to the selected supervisor.

5.6 Manage Proposal Request Test Case

In this test case, the system shows the list of pending proposal requests to the supervisor. The supervisor view, download proposal document and view student group details. After reading proposal document the supervisor approves or disapprove the proposal request. If supervisor approves proposal request the system allocates the supervisor to student group.

Table 5.5 Capture Image Test Case

ID: TC-5	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	5	**Developer**	Ammad Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-5
Objective	To manage proposal request by supervisor.		
Environment	System in running condition.		

Considerations	Student group must be registered. Student send proposal request to the supervisor.	
Pre-requisites	Supervisor wants to view the proposal request.	
Step #	**Execution Description**	**Procedure Result**
1.	Supervisor view the proposal report of the student and accept the request. If supervisor accept the proposal request system allocates the supervisor to that student group and notifies the student group.	System send notification in both cases (approve or reject).
Comments: Supervisor view the proposal report and accept or reject the request and system send notification to the student.		
Status	☑Pass☐Fail☐ Not Executed	

5.6.1 Conclusions

The system allocates supervisor to student group if the supervisor approves proposal request. If supervisor disapprove the request the system allow student to send proposal request to others supervisors. System notify supervisor in both case of approval or disapproval.

5.7 Create Committee Test Case

In this test case, system shows the list of supervisors to project coordinator. The project coordinator selects the supervisors, session and select committee type and generate committee request. The system sends committee request to head of department for approval or disapproval of committee.

Table 5.6 Create Committee Test Case

ID: TC-6	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	6	**Developer**	Ammad Idrees

Test Date	07 March 2018	**Use Case Reference**	UC-6
Objective	To create the project committee for project evaluation.		
Environment	System in running condition.		
Considerations	Supervisors must be registered.		
Pre-requisites	Project coordinator wants to create committee for final year project evaluation.		
Step #	**Execution Description**		**Procedure Result**
1.	Project coordinator send the list of supervisors after selection of supervisors and committee type.		System shows the success message.
Comments: System send list of supervisor and committee type to head of department for review.			
Status	☑Pass☐Fail☐ Not Executed		

5.7.1 Conclusions

The system shows list of supervisors to project coordinator to create committee. Project coordinator selects supervisor and generate committee request.

5.8 Manage Committee Test Case

This test case, system shows the pending committee requests to head of department. Head of department view detail of committee request and approve or disapprove the committee request. System send notification in both case of approval or disapproval. If committee request is disapproved by head of department system only notify project coordinator to reform committee. If committee request is approved by head of department system notify project coordinator and committee members.

Table 5.7 Manage Committee Test Case

ID: TC-7	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	7	**Developer**	Ammad Idrees

Test Date	07 March 2018	**Use Case Reference**	UC-7
Objective	Approval or disapproval of project committee.		
Environment	System in running condition.		
Considerations	Request must be sent to head of department for approval of committee by project coordinator.		
Pre-requisites	Head of department wants to view the committee request.		
Step #	**Execution Description**		**Procedure Result**
1.	Head of department view the committee and approve or disapprove the committee request.		System send notification in both cases of approval or disapproval.
Comments: If committee approve system sends the notification to project coordinator and all the committee members and if committee rejects than system sends the notification to project coordinator to reform the committee.			
Status	☑Pass☐Fail☐ Not Executed		

5.8.1 Conclusions

The head of department view list of pending committee request and approve or disapprove the committee request. System send notification in both cases of approval or disapproval.

5.9 Search Previous Projects Test Case

In this test case, System allow all the roles of the system to search previous record but different access level. Student only search or view the previous projects name and supervisor search and download own supervised projects. Project coordinator and head of department search and download all the pervious projects.

Table 5.8 Search Previous Projects Test Case

ID: TC-8	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	8	**Developer**	Ammad Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-8
Objective	Different roles want to search the previous projects records.		
Environment	System in running condition.		
Considerations	Each role must be registered.		
Pre-requisites	when any role wants to search the previous record.		
Step #	**Execution Description**		**Procedure Result**
1.	Any role searches the previous record. Every role has different access level.		System shows the data according to role.
Comments: Any role of the system search previous record and system shows the data according to role.			
Status	☑Pass☐Fail☐ Not Executed		

5.9.1 Conclusions

The system allows all the roles of the system to search and download previous projects but different access levels.

5.10 Group Evaluation by Committee Test Case

This test case, committee members gives marks to each student in the student groups when access is given by project coordinator.

Table 5.9 Group Evaluation by Committee Test Case

ID: TC-9	**Requirement #**	**QA Test Engineer**	**Name of Personnel**

Test Case Version 1.0	9	**Developer**	Ammad Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-9
Objective	Give marks to the student groups.		
Environment	System in running condition.		
Considerations	Must be a committee member to give marks.		
Pre-requisites	when project coordinator provide access to committee members.		
Step #	**Execution Description**		**Procedure Result**
1.	Committee members enters the marks for each member of the student group.		System shows the success message.
Comments: Committee members give marks to student group members.			
Status	☑Pass☐Fail☐ Not Executed		

5.10.1 Conclusions

The system allows committee members to give marks when access is given by project coordinator.

5.11 Group Evaluation by Supervisor Test Case

This test case, supervisor give marks to each student of supervised student group when access is given by project coordinator.

Table 5.10 Group Evaluation by Supervisor Test Case

ID: TC-10	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	10	**Developer**	Ammad Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-10
Objective	Give marks to the student groups.		

Environment	System in running condition.	
Considerations	Supervisor must be registered to give marks.	
Pre-requisites	when project coordinator provide access to supervisors.	
Step #	**Execution Description**	**Procedure Result**
1.	Supervisor enters the marks for each member of the student group.	System shows the success message.
Comments: Supervisor give marks to student group members.		
Status	☑Pass☐Fail☐ Not Executed	

5.11.1 Conclusions

The system allows committee members to give marks when access is given by project coordinator.

5.12 Track Meeting Test Case

In this test case, System allow all the role of the system to communicate with each other but different access levels. Student send message or file to supervisor. Supervisor send message or file to student and project coordinator. Project coordinator send message or file to head of department and supervisor. Head of department send message or file to project coordinator. System send notification to the receiver.

Table 5.11 Assign Tasks Test Case

ID: TC-12	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	11	**Developer**	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-11
Objective	Different roles of the system communicate with each other.		
Environment	System in running condition.		

Considerations	All role must be registered.	
Pre-requisites	When any role wants to communicate with other role.	
Step #	**Execution Description**	**Procedure Result**
1.	System allow user to send message or send file to others user. User send message or file to others user.	System shows the success message and notify receiver.
Comments: User send message or file to others user successfully and system notify receiver.		
Status	☑Pass☐Fail☐ Not Executed	

5.12.1 Conclusions

The system allows all the roles of the system to communicate with each other. System send notification to the receiver.

5.13 Manage Documents Test Case

In this test case, System allows supervisor to upload different documents. Supervisor upload proposal, progress and final reports, abstract and software only when access is provided by project coordination. Final report is submitted when signed by head of department.

Table 5.12 Manage Documents Test Case

ID: TC-13	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	12	**Developer**	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-12
Objective	To upload documents in the system.		
Environment	System in running condition.		
Considerations	Supervisor should have access to upload documents.		

Pre-requisites	When supervisor want to upload the documents.	
Step #	**Execution Description**	**Procedure Result**
1.	System allows supervisors to upload document.	System shows the success message.
Comments: Supervisor successfully upload documents and system shows the success message to the supervisor.		
Status	☑Pass☐Fail☐ Not Executed	

5.13.1 Conclusions

The system allows supervisor to upload different documents and supervisor successfully upload documents and system shows the success message.

5.14 Upload Previous Record Test Case

In this test case, system allow project coordinator to upload previous record to the system. Project coordinator upload previous record and system shows the success message.

Table 5.13 Upload Previous Record Test Case

ID: TC-14	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	13	**Developer**	Hafiz M. Rizwan Aamir
Test Date	07 March 2018	**Use Case Reference**	UC-13
Objective	To upload previous records into the system.		
Environment	System in running condition.		
Considerations	Project coordinator must be registered.		
Pre-requisites	When project coordinator wants to upload previous record.		
Step #	**Execution Description**		**Procedure Result**

1.	System allow project coordinator to upload previous record. Project coordinator attaches all the files and upload into the system.	System shows the success message.
Comments: Project coordinator upload previous record successfully and system shows the success message.		
Status	☑Pass☐Fail☐ Not Executed	

5.14.1 Conclusions

Project coordinator upload previous document to the system and system shows the success message.

5.15 Create Reports Test Case

In this test case, system allow project coordinator to create reports. Project coordinator create reports and system successfully create reports.

Table 5.14 Create Reports Test Case

ID: TC-15	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	14	**Developer**	Hafiz M. Rizwan Aamir
Test Date	07 March 2018	**Use Case Reference**	UC-14
Objective	To create, reports.		
Environment	System in running condition.		
Considerations	Project coordinator must be registered. The system must have data.		
Pre-requisites	When project coordinator wants to create reports.		
Step #	**Execution Description**		**Procedure Result**

1.	System allow project coordinator to create report. Project coordinator create reports.	System successfully create reports.
Comments: Project coordinator create reports and system successfully create reports.		
Status	☑Pass☐Fail☐ Not Executed	

5.15.1 Conclusions

Project coordinator create reports and system successfully create reports.

5.16 Create Forms Test Case

In this test case, system allow project coordinator to create forms. Project coordinator create forms and system successfully create forms e.g. proposal, progress, final and supervisor forms.

Table 5.15 Create Forms Test Case

ID: TC-16	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	15	Developer	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-15
Objective	To create forms.		
Environment	System in running condition.		
Considerations	Project coordinator must be registered. The system must have data.		
Pre-requisites	When project coordinator wants to create forms.		
Step #	**Execution Description**		**Procedure Result**
1.	System allow project coordinator to create forms. Project coordinator create forms.		System successfully create forms.

Comments: Project coordinator create forms and system successfully create forms.	
Status	☑Pass☐Fail☐ Not Executed

5.16.1 Conclusions

Project coordinator create forms and system successfully create forms.

5.17 View Tasks Test Case

In this test case, system allow student to view the tasks assigned by respective supervisor. System shows the list of tasks assigned by supervisor to the student.

Table 5.16 View Tasks Test Case

ID: TC-17	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	16	**Developer**	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-16
Objective	To view tasks assigned by supervisor.		
Environment	System in running condition.		
Considerations	Students must be registered.		
Pre-requisites	When student wants to view tasks assigned by supervisor.		
Step #	**Execution Description**		**Procedure Result**
1.	Student view tasks assigned by supervisor.		System shows the tasks to the student.
Comments: Student view the tasks assigned by supervisor and system shows the tasks.			

Status	☑Pass☐Fail☐ Not Executed

5.17.1 Conclusions

The system shows the list of tasks assign by supervisor to the student.

5.18 Manage Evaluation Process Test Case

In this test case, Project coordinator manage evaluation process. Project coordinator starts the evaluation process that allow committee members and supervisor to evaluate students.

Table 5.17 Manage Evaluation Process Test Case

ID: TC-18	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	17	**Developer**	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-17
Objective	To manage evaluation process.		
Environment	System in running condition.		
Considerations	Project coordinator must be registered.		
Pre-requisites	When wants to starts evaluation process.		
Step #	**Execution Description**		**Procedure Result**
1.	Project coordinator starts the evaluation process that allow supervisor and committee to evaluate student.		System shows the success message and start evaluation process.
Comments: Project coordinator starts the evaluation process successfully.			
Status	☑Pass☐Fail☐ Not Executed		

5.18.1 Conclusions

Project coordinator starts the evaluation process that allows committee members and supervisors to evaluate students.

5.19 Manage Profile Test Case

In this test case, system allows all the role to manage their profile. User update their information and manage their profile.

Table 5.18 Manage Profile Test Case

ID: TC-11	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	18	**Developer**	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-18
Objective	To manage profile.		
Environment	System in running condition.		
Considerations	All role must be registered.		
Pre-requisites	When user wants to manage their profile.		
Step #	**Execution Description**		**Procedure Result**
1.	User wants to update their information and manage their profile.		System allow user to manage their profile.
Comments:			
User update and manage their profile successfully.			
Status	☑Pass☐Fail☐ Not Executed		

5.19.1 Conclusions

The system allows all roles to manage their profile.

5.20 Monitor Activities Test Case

In this test case, system allows project coordinator and head of department to monitor all the ongoing activities.

Table 5.19 Monitor Activities Test Case

ID: TC-20	**Requirement #**	**QA Test Engineer**	**Name of Personnel**
Test Case Version 1.0	19	Developer	Umair Idrees
Test Date	07 March 2018	**Use Case Reference**	UC-19
Objective	To monitor activities.		
Environment	System in running condition.		
Considerations	Project coordinator and head of department must be registered.		
Pre-requisites	When user wants to monitor activities.		
Step #	**Execution Description**		**Procedure Result**
1.	Project coordinator and Head of department monitor ongoing activities.		System shows all the activities.
Comments:			
System shows all the ongoing activities to project coordinator and head of department.			
Status	☑Pass☐Fail☐ Not Executed		

5.20.1 Conclusions

The system successfully shows all the ongoing activities to the project coordinator and head of department.

5.22 Testing Result

Testing is process of finding error and bugs form software by using different procedure. Testing is performed on every module in real environment. All the modules are working properly.

CHAPTER 6
CONCLUSION AND FUTURE WORK

6.0 Introduction

In this chapter the system overview and methodologies used to develop the system are discussed. Every system has some benefits and few limitations. The limitations of the system are also discussed in detailed. The challenges faced in implementation of the system are also included and what are the future work to be done in the system also summarized.

6.1 System Overview and methodologies

Agile methodology is used for the development of automation of FYP evaluation and management system. Agile methodology is iterative in nature, the system developed iteratively and provided to the customer and continues feedback is recorded. Due to continuous feedback from customer the automation of FYP evaluation and management system is developed error free. Agile methodology focusses on customer satisfaction and continues feedback from the customer by providing system to the customer in iterative manner. Agile methodology prefers people experience over follow specific process and working software over comprehensive documentation.

Automation of FYP management and evaluation allow all the role of the system to perform different activities and each role have different access levels.

Student perform registration process and registration request is send to project coordinator for the approval. After approval from the project coordinator the student account is active and student group is registered for final year project. Student also select supervisor for the final year project and send proposal request to selected supervisor. After approval of proposal request from the supervisor system allocated to the student group. Student also chats with approved supervisor through meeting track. Student view the tasks assigned by the supervisor. Student also search the name of pervious projects to finalize their idea for the final year project. Student also manage their profile and update their information.

Supervisor manage the proposal requests send by the students and approve and disapprove the proposal requests. Supervisors also upload documents of their approved student groups, supervisor upload proposal, progress, final report when access is given by the project coordinator. Supervisor chats with the student and assign tasks to the students. Supervisor can also manage their profile and update their information and also provide the recommended ideas that helps students to select their idea for final year project. Supervisor also gives marks to their student groups only.

Project coordinator manage registration request and approve or disapprove the registration request. Project coordinator selects supervisors and create committee the system sends the

committee request to the head of department for approval or disapproval. Project coordinator also starts the evaluation process that allow committee members and supervisors to evaluate students and notify supervisors to upload proposal, progress, or final document. Project coordinator also view the progress from student group registration to final report submission. Project coordinator can also manage their profile and update their information. Project coordinator also chats with supervisors and head of department. Head of department view the progress all the time in the form of charts and graphs. Head of department also manage committee requests and approve or disapprove the request. Head of department also manage their profile and also chats with project coordinator.

6.2 Limitations

One of the limitation of the system is that it is a web application. Android or IOS user couldn't use it properly because it is web application not mobile application. Another limitation of the system is that stable internet must be available all the time while using web application. In feature student group registration, the mobile phone verification of students is not done due to some issues.

6.3 Challenges Involved with the Implementation

The implementation of web application, Automation of FYP evaluation and management involved many challenges with the implementation.

6.3.1 Unclear Requirements

In start there were not clear requirements for automation of FYP management and evaluation. The functional requirements were clear but with the passage of time more requirements are added to the system.

6.3.2 Implementing SignalR Technology

In meeting track and notification management feature live notification is implemented through signalR. In start of implementation, knowledge about the signalR technology is very limited. In the implementation of signalR in project face many challenges.

6.4 Future Work

Automation of FYP evaluation and management is web application to automate the final year project process. Automation of FYP evaluation and management is developed by using effective methodologies and all the functional requirements are fulfill. In future more, features are added to the web application according to the demands of the customers or end users. Android application and IOS application could also be develop in future.

APPENDICES

Appendix I–Deploying Website

Developing a website is one task and deployment of website is another task which have following steps.

Install IIS

First the user has to install the IIS. Figure A-1.1 shows the process to install IIS.

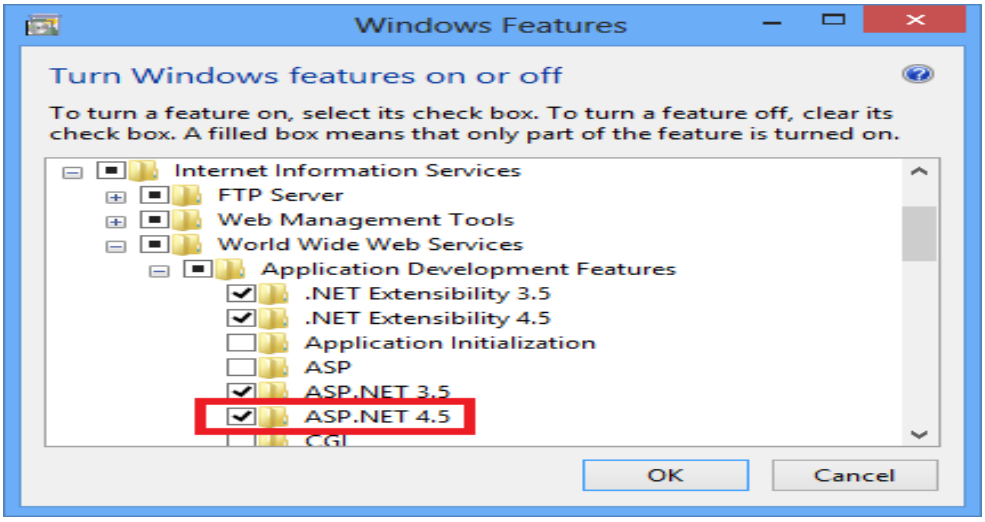

Figure A-1.1 Install IIS.

Publish the Project

Then user have to publish the project. Figure A-1.2 show the process to publish the project.

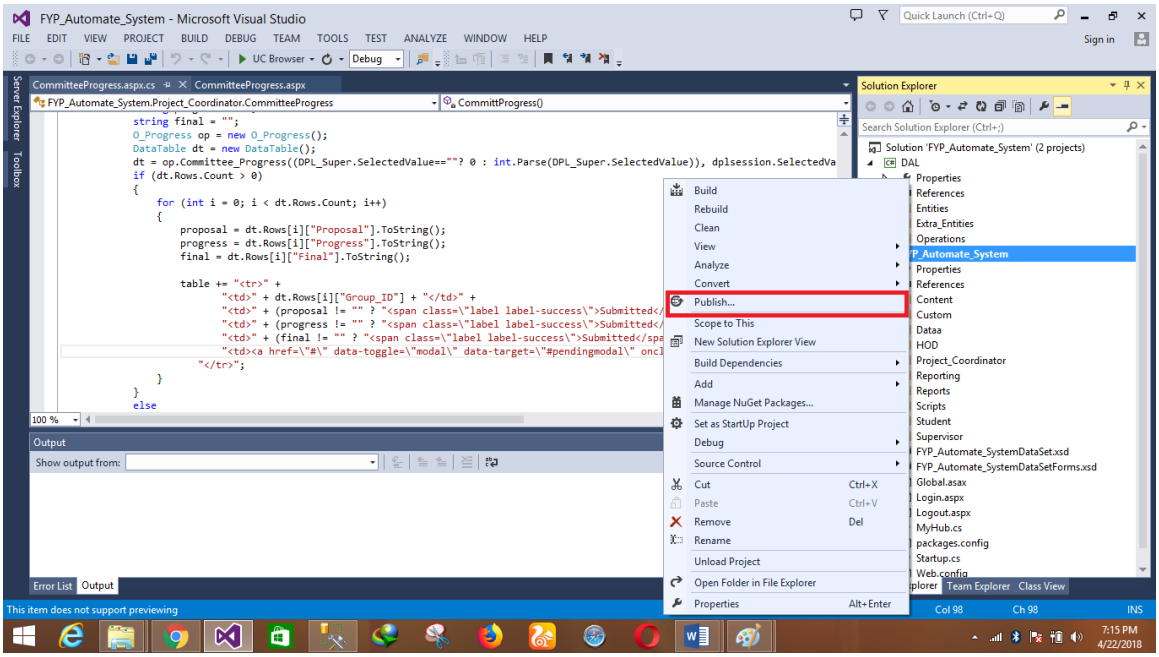

Figure A-1.2 Publish the project.

Set Destination URL

Then user have to set the destination URL where the published file is going to save. Figure A-1.3 shows the set destination URL.

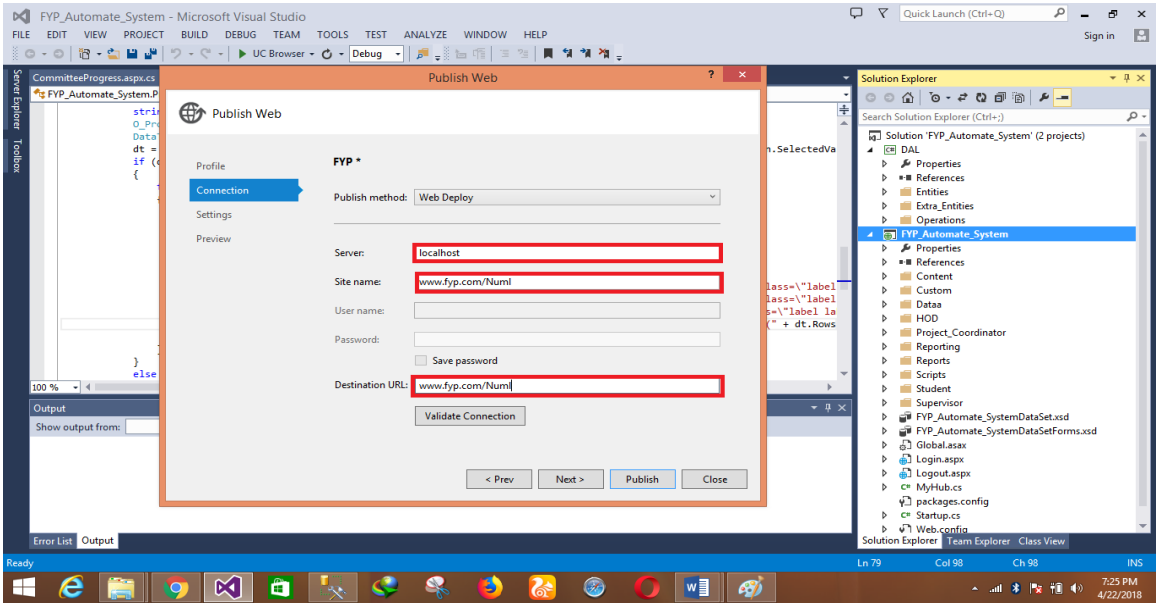

Figure A-1.3 Set destination URL.

Start Publishing

After all the settings, the user has to click on publish button to publish the file. Figure A-1.4 shows the set publishing

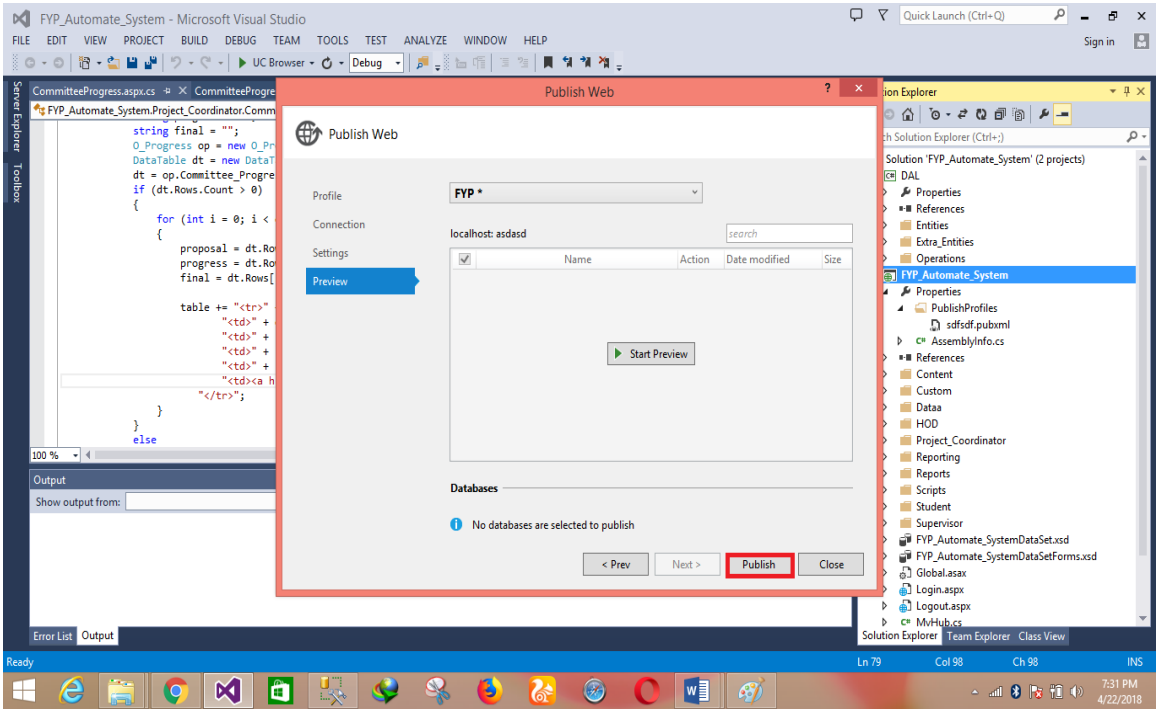

Figure A-1.4 Start publishing.

Paste Publish File

After setting destination URL, now user have to paste the published file into “wwwroot” folder. Figure A-1.5 shows the screenshot to paste publish file.

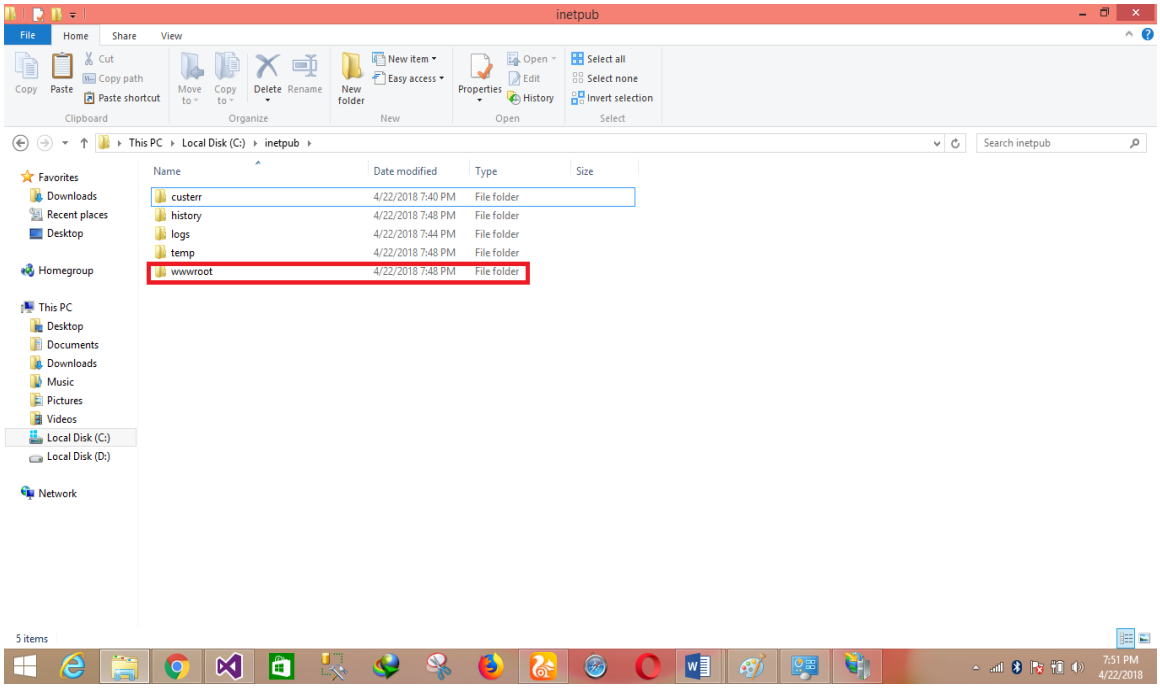

Figure A-1.5 Paste publish file.

Set Default Page

Now add the default page of your application. Figure A-1.6 shows the set default page.

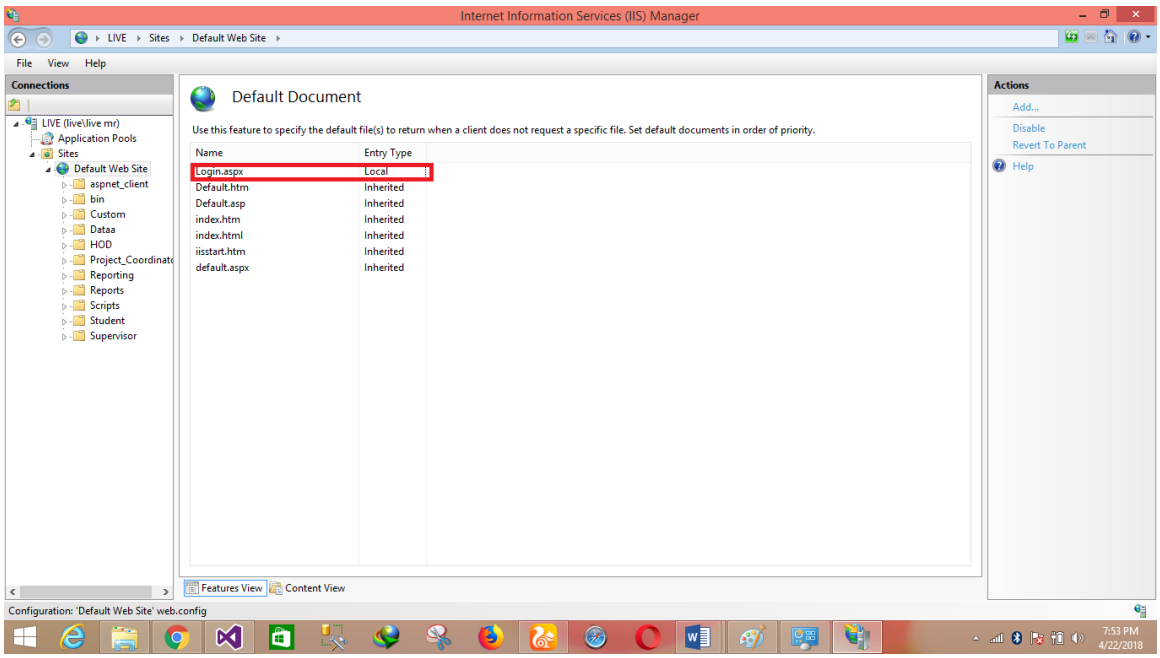

Figure A-1.6 Set default page.

Start Browsing

Open the browser and write localhost in the URL to access the default page. Figure A-1.7 shows the start browsing screenshot.

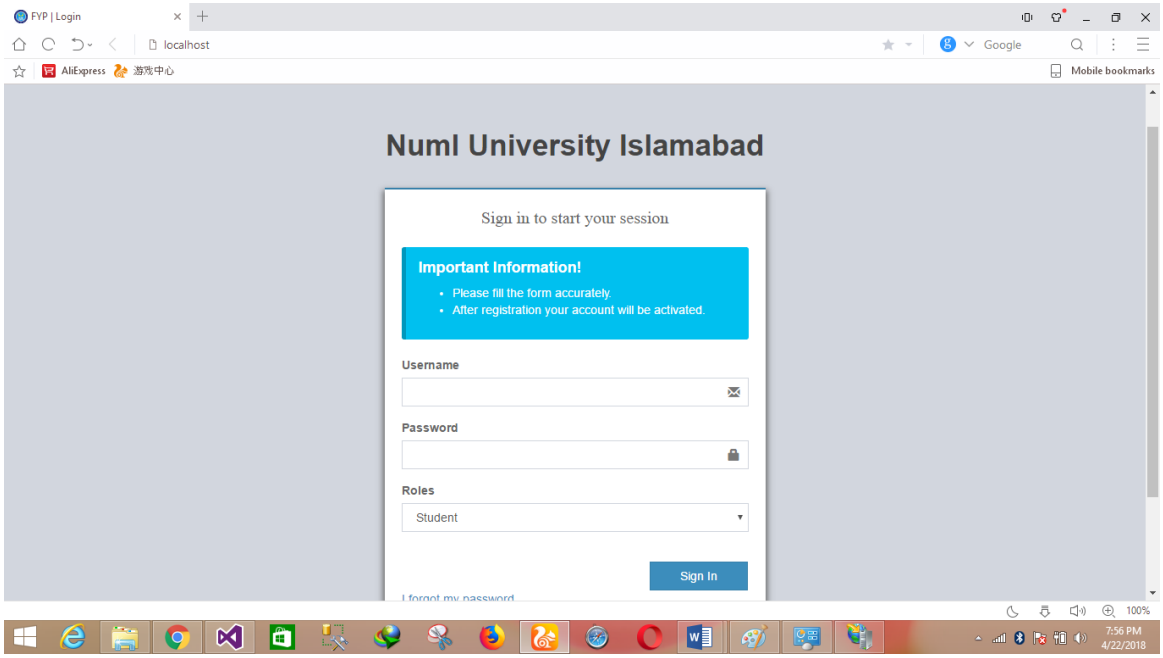

Figure A-1.7 Start browsing.

Appendix II– Glossary

Head of department: Is a person who is head of department and monitor all the progress throughout the project.

Project Coordinator: Is a person who coordinate the projects.

Supervisor: Is a person who supervise the student groups.

Committee members: Is the student group of supervisors who evaluate the student groups of final year projects.

Student: Is a person who is registered for final year project.

Student group: Is a student group of students who registered for final year projects.

Admin: Is a person in the system to upload the previous record.

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