ONLINE LIVE MEETING SYSTEM FOR DEBRE BIRHAN UNIVERSITY

A Senior Project Documentation Submitted In Partial Fulfillment of the Requirement for the Degree of Bachelor of Science in Computer Science

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Approval letter

The Project is our own and original work which has not been presented for a degree in any other university. Thus, our signature has duly acknowledged every piece of work that has carried throughout the whole project.

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College: College of Computing

Program: Computer science

Project Title: Online Live Meeting System for Debre Birhan University

I certify that this project satisfies all the requirements as a project for the degree of Bachelor of Science.

Name of program coordinator Signature

....

This is to certify that I have read this project and that in my opinion it is fully adequate, in scope and quality, as a thesis for the degree of Bachelor of Science.

....

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Examining committee members	**signature**	**Date**
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2. Examiner 1 _____	_____	_____
3. Examiner 2 _____	_____	_____
4. Examiner 3 _____	_____	_____

It approved that this project has been write in compliance with the formatting rules laid down by the college of the university

Acknowledgment

First, we would like to thank Almighty (omnipotent) GOD, for giving strength; he has given us throughout our life and the project. Secondly, we would like to express our deepest gratitude to our advisor **Ins. Redaei G/Wahid** for his excellent guidance, caring, patience, and providing us with an excellent atmosphere for doing this documentation.

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Abbreviations

CDRW	Re-Writable Compact Disk
DBU	Debre Birhan university
CD	Compact Disk
DVD	Digital Versatile Disc
PC	Personal Computer
REQ	Requirement
UC	Use Case
OLMS	Online Live Meeting system
SQL	Structure Query Language
TCP	Transport Control Protocol
UML	Unified Modeling Language
IP	Internet protocol
IIS	Internet Information Service
DFD	Data Flow Diagram
OOSAD	Object Oriented System Analysis and Design
HTTP	Hyper Text Transfer Protocol
ASP.NET	Active Server Page
ADO.NET	ActiveX Data Objects

CHAPTER ONE

1. Background and Introduction about the Project

1.1 Introduction

This chapter will introduces about mission, vision and background of the study, and overview of the system that developed which is the project aims and objectives, summary modules description, project scope, project schedule, project team composition ,the outline of methodology, Fact Finding, development environment, operational environment used, significant of the study, and testing procedure.

1.2 Background information of the organization

Debre Birhan University, which is 11-year young university, which established in the 600 years old historical town- Debre Birhan – a town situated in Amara Region, North Showa zone, 130 km away from Addis Ababa in the north. The most powerful explanation of the establishment of the University is the government`s commitment towards the expansion of quality higher education as well as ensuring a reasonable distribution of higher education in the country.

Based on these organizing explanations the foundation stone was laid down on 9th May, 2005 G.C by her Excellency w/ro Genet Zewdie, the then Ministry of Minister of Education of the Federal Democratic Republic of Ethiopia.

Thereafter, the construction of the university started on a total land area of 102 hectares, which given by the City Administration of Debre Birhan Town.

The initial intake capacity of the university (in Jan. 2007 G.C.) was 725 students who joined in to five departments with 68 instructors and 7 administrative staffs. Now, the enrolment has significantly increased to around 14,000 regular, extension and summer students who joined in to 35 departments/ programs under ten colleges, two institutes and eight post graduate programs.

Miraculously to its being young, the management fervently and zealously envisions to become one of the best universities in Ethiopia by 2020 G.C.

Hence, it is adamantly and unrelentingly working and undertaking massive organizational activities in terms of human resource development and construction with an over view to further enhancing its institutional capacity on areas of producing competent graduates, conducting a problem solving research & offering community services.

1.2.1 Vision of the organization

- Aspires to be the best university in Ethiopia by 2020.
  - Shared vision.
  - Quality service.
  - Attention to crosscutting issues.
  - Diversity.
  - Professionalism.
  - Equality.
  - Effectiveness.

1.2.2 Mission of the organization

- Producing efficient graduates by offering research assisted quality education.
- Undertaking a problem solving research based on national need and benefiting the community with the outcome.
- Offering government and community centered training, consultancy service, transferring technology and undertaking innovation.

1.3 Background of the project

Meeting is not an exception of the university in which complex tasks processed such as take attendance, make a report and manage the overall activities of the meeting. To manage those complexities, gaining the benefit of computer technology is must. This proposed project is about to develop an efficient & effective online live meeting system which is used to make functional meeting system for Debre Birhan University.

To provide a good service for Debre Birhan University of Employees based on wastage of time and workload. The project entitled “LIVE MEETING” set of platform for the Meeting leader and plenary to send message to keep constant interaction of time.

In the proposed system, Meeting manager can communicate with the plenaries and can maintain the login time and logout time. He/she can chat in online message about the meeting with each other.

1.4 Problem Statement

In the existing system, there are a lot of disadvantage related to time, cost and other related factors. In addition to that, the data can be stored and transferred using different type of removable storage media (CD/DVD, flash disk, memory stick, or hard disk) or paper.

The following are the most common problems related to current manual meeting system: -

- There is no coherent database.
- Redundancy of data.
- Data not easily maintain.
- Loss of data.
- Data affected by external environment such as fire, rain, and any other natural dangers.
- Meeting is place bounded (restricted).
- The vertical communication between meeting manager and meeting leader is always manual or paper based.
- It does not accommodate people with special needs.
- Schedule uses notice board that is not accessible for all users.
- Conducted meeting detail are restricted or accessed only by the manager hence it can be compromised.

1.5 Team composition

The project team is composed from five members as follows

	No	Name	ID	Responsibility
Prepared By	1	Yabibal Zelalem	DBU07001975UR	Coding part
	2	Mesert Dechasa	COMPRT011/07	System Designer
	3	Mulate Fetene	DBU07001990UR	System Analyzer
	4	Yonatan Gebremeskel	DBU07002135UR	Testing
	5	Aster Derese	DBU07002100UR	Data Collection
Supervised by	1	Instructor Redaei G/Wahid.		Supervisor

Table 1 Team Composition

1.6 Objective of the project

1.6.1 General objective

Design and implement online live meeting system for Debre Birhan University.

1.6.2 Specific objective

In order to achieve the general objectives of the project we have the following specific objectives.

- Thoroughly study the existing system so as to identify:
  - ✓ The working principle
  - ✓ Business rules that need to be enforced
  - ✓ Players of the existing system and their role
- To propose a new and automated solution
- To study the proposed solution so as to identify the:
  - ✓ Functional requirement
  - ✓ Non-functional requirement
  - ✓ Suitable technology
  - ✓ Hardware requirements
  - ✓ Software requirements
- To design the proposed system in such a way that it will:
  - ✓ Eliminate data redundancy
  - ✓ Be more secure
  - ✓ Be user friend
  - ✓ Have better and easy reporting technique
  - ✓ Be anywhere meeting attending technology
- To develop user friendly and interactive system
- To implement and test
- To prepare manual
- To forward recommendation

1.7 Scope and Limitation of the project

The live meeting can be appropriate to develop in the following ways in different functionalities: such as speech recognition for preparing the minutes (reports), image-

processing technology for make better security, speech synthesis for blind persons reading of messages or documents. However according to educational level, cost, and time constraints we can develop video live meeting, text live meeting, record a live video, Prepare the minutes, generate attendance, give comment, assign the meeting leader and plenary for each meeting group, view assign meeting group, create turn , inform turn, confirm completion and prepare a meeting schedule for Debre Berhan University.

1.8 Significance of the project

After completion/implementation of the system, the system has the following advantages like.

- To save time ,money and materials by using computer,
- Minimize wastage of resources,
- It can use coherent database.
- It can remove loss of data.
- It can remove the redundancy of data.
- It can keep data from natural and environmental risks.
- It can create any user accessible schedules.
- Any authorized users can access data.
- Minimize the workload of Users.
- Users participate in the meeting located in anywhere if there is internet connection.
- The meeting manager manages all meeting groups easily
- The meeting data is better secure when you compare with the manual system.

1.9 Target beneficiaries of the system

The main beneficiary of the system is:

- **Debre Birhan University:**
  - ✓ Our University gets better user-friendly access.
- **Project Developer/Group Members:**
  - ✓ The project has initiated our team to get knowledge of how to develop the required system and solve the problems of the university.
  - ✓ While struggling with some difficulties, the team got huge experiences of solving problems.
- **User:**
  - ✓ Can get online live meeting service easily.

1.10 Methodology for the project

Methodology of a project is in which and how the information is gathering from the required placed to analysis the current problem of the system. As a project, a systematical and a methodological travel through problems to eliminate them or as much as possible to reduce them and to get a better thing by investigating or inventing new innovations, which will be employed in the real world to solve that specific problem

1.10.1 Data collection method

Observation: - The project team members has conduct observation in our university to know the overall meeting performed.

Interview: - The team has prepared interview to gather information for the overall functionality, activity and process in the meeting.

Browsing the internet: -we also have and will gate some of information from the internet. We will find out or browse to fulfill our information need.

1.10.2 System analysis and design methodology

For this project, we will be using the Advance Analysis & Design Methods, like object oriented system analysis and design (OOSAD) because of the following reasons.

- Used to Model the functions of the system (use case modelling).
- Find and identify the business objects.
- Organize the objects and identify the relationship between them and finally model the behavior of the objects and specifically it provides:
    - **Improved quality** by providing the application on time, on budget and meet user expectations
    - **Real-World Modelling:** traditional methods. Objects organized into classes of objects, and objects are associated with behaviors. The model based on objects, rather than on data Object-oriented system tend to model the real world in a more complete fashion than do and processing.
    - **High Code Reusability:** When a new object created, it will automatically inherit the data attributes and characteristics of the class from which it spawn. The new object will also inherit the data and behaviors from all super classes in which it participates.

1.10.3 Case Tool

- Microsoft Visual Studio 2015 for implementation and design Unified Modeling Language Diagram.
- Enterprise architecture for Unified Modeling Language Diagram.
- Window 10 operating system.
- Microsoft SQL Server 2014 for database.
- Microsoft office word 2016 for preparing documentation.

1.10.4 System Development Environment

We use development tools for the purpose of perform the implementation part of the project and there are two development tools categories those are hardware tools and software tools.

1.10.4.1 Software requirement

- **Enterprise Architect: -** To designs the system analysis part of the project.
- **Visual Studio 2015:** We will be using this software to develop server side and client side interface.
- **SQL:** To create and design the database, which is used to store the information, More storage engines, Better performance, advanced run time, Reliability, Easy to adopt, Fast execution.
- **Microsoft Word 2016:** It is very useful because it takes less time to write and format the text, communicate effectively smart diagram and chart tools, quickly assemble document. By looking its useful properties, we use Microsoft word to type our project work to get all the above benefits of it.
- **Microsoft PowerPoint**: Use to present the document in abstract forms. We use it to present our presentation in short and brief way.

1.10.4.2 Hardware Requirement

- We have used and are using different hardware tools to develop our project.
- **Desktop and Laptop Computer**: Computer is a machine capable of doing many things. We use it to type on it and install all software and programming language.
- **Flash Disk and CD Hardware**: - used for the movement of data from one machine to another. We use both of the devices when we move our data from one machine to another.
- **Stationery**: Stationery like paper, pen and so on that were need. All these are necessary things that we need to do and use.
- **Disks (CD, DVD)**: necessary for the movement of relevant data and for backup and recovery mechanism.

For this project system development, we will be using c sharp or ASP.Net for the front end as means of communication between application and the user. This enables the application to be friendly interactive and us we use SQL as a back-end tool to define the structure of the system for storing all the records because of the following reasons. More storage engines, Better performance, advanced run time, Reliability, Easy to adopt, Fast execution.

1.11 Testing Procedure

Testing Procedures are the testing practices, processes and techniques used to ensure that the software application is tested and validating before release or deployment.

We set two approaches to test the proposed system. These approaches are functionality testing of the proposed system and implementation testing of the system. Each testing approaches use different techniques. The examiners will test the functionality of the system. In order to test the functionality of the system, testers will use Black-Box testing technique. The developers using White-Box testing technique will test implementation of the proposed system.

Black-Box Testing: used by testers who do not know the design and structure of the code. The tester in this case has a set of input values and respective desired outputs from the system. On providing input, if the output matched to the desired output the system tested "OK". Otherwise problematic.

White-Box Testing: We use this testing technique to test the program and its implementation in order to improve code efficiency and structure of our system.

Testing Levels:

There are different testing levels for a system. However, we will use the following testing levels. These are:

- **Unit Testing**

While coding, the project team performs some tests on that unit of program to know if it is error free. This testing level helps us to decide that individual units of the program are working as per requirement and are error free. We use white-box testing approach for this level of testing.

- **Integration Testing**

Even if the units of the system are working fine individually, there is a need to find out if the units were integrate together would also work without errors.

- **System Testing**

The software compiled as product and then it tested as a whole. This can accomplish using one or more of the following tests:

- **Functionality testing -** Tests all functionalities of the software against the requirement.
- **Performance testing -** This test proves how efficient the software is. It tests the effectiveness and average time taken by the software to do desired task. Performance testing done by means of load testing and stress testing where the software put under high user and data load under various environment conditions.

1.12 Risks and Contingencies

During the development of the project, there may be different problems that we may face. These are:

➢**Unfortunate failure of system:** To handle this problem the teams have some method to resist not completely but partially by using back up mechanisms using flash disks, CD/DVD and by storing the data on our Email account.

➢**Power problem:** we tried to use laptops to cover the gap happened to our project during power failure.

➢**Virus attack:** It is difficult to control data from virus but try to scan the data, installing and updating antivirus software and we use CDRW instead of flash.

➢**Time management problem**: we solve this problem by working cooperatively, divide our time by schedule for each phase of the project and we try to use this schedule effectively.

➢**System Failure**: to solve this problem the organization workers must take backup file by using external hard drive daily.

➢**Power Failure:** When power failure occurs, the organization must use generator.

1.13 Feasibility of the project

1.13.1 Operational Feasibility

Operational feasibility aspects of the project taken as an important part of the project implementation. Proposed system is providing end users with timely, accurately and useful information related to meeting. Moreover, providing cost effective information.

Some of the important issues raised are to test the operational feasibility of a project includes the following: -

- Is there sufficient support for the meeting from the users?
- Will the system used and work properly if it is being developed and implemented?
- Is there any resistance from the user that will undermine the possible application benefits?

The target of this system in accordance with the above-mentioned issues. Beforehand, the meeting issues and user requirements have taken into consideration.

The well-planned design would ensure that the optimal utilization of the computer resources and would help in the improvement of performance status of the system.

1.13.2 Technical feasibility

The technical issue usually raised during the feasibility stage of the investigation. The proposed system does not require new professional person to process any activity. The system does not need many employees, which need special computer skill. Online live meeting is technically feasible in terms of the development team have the capability to analyze, design, implement, test, deployment and maintain the overall system development process. As much as possible, every user in the university can access without any confusion. Since it has clear communication with the users, anyone who can use computer can also operate and use the full functionality of the system.

1.13.3 Political Feasibility

After development of the project, the system does not contradict with government policies. Additionally, the proposed system support the country and university rule and regulations. It is on legal activities.

1.13.4 Economic feasibility

The project that we are going to develop is economically feasible than the manual system. Manuals have high wastage of resource, this means regarding to time and cost. Regard to money and time wasted until the plenaries are arrive and all the leader are arrive there is time wastage, for refreshment, and transportation (if meeting place and plenary are in different place or far away). However, after the system automated, it does not require too much cost beyond the capacity of the University.

1.13.5 Schedule Feasibility

No	Tasks	Oct 1-15,2010	Oct 28-Nov 1,2010	Nov 15-Dec 10,2010	Dec 15-Jan 23, 2010	Mar 1- Apr 30,2010	May 1- June 10,2010
1	Title selection and Submission						
2	Proposal preparation and Submission						
3	Requirement gathering						
4	System requirement specification and design						
5	System implication						
6	Operating Testing						

Table 2: time frame for implementation of the project

CHAPTER TWO

2. Description of the Existing System

2.1 Introduction of Existing System

In Debre Birhan University, there are around ten colleges, which prepares different types of meeting. The existing system mainly focused on the taking attendance of the plenary, make a report about the meeting, and prepare the agenda of the meeting and preparing temporary schedule of the meeting with a manual way.

This activity in the existing system make administrator more expenditure for the University resource including the time and cost. The existing system make the employees tiredness for preparing a report, prepare a schedule and collecting attendance manually. Now we do this project for changing this current system to an automated way.

2.2 Players in the Existing System

An existing system compromises different players to carry out its responsibilities. Among those different players (actors), the most common are:

- **Administrator:** a person who response for managing user account.
- **Meeting Leader:** a person who responsible for leading the meeting.
- **Meeting Manager:** a person who response for manage the meeting.
- **Plenary:** is an individuals used to participate the meeting directly entered in to the meeting group.

2.3 Major Functionality of the Existing System

As we describe earlier, the existing system is manual. Because of this, all of its operations performs manually. Even if it is manual, the system provides the following major functionalities. These functionalities related to make a meeting.

- **Manually taking of the attendance: -** Plenaries assign the attendance in manual paper and Meeting Leader's or attendance takers can collect the attendance and report to the meeting manager.
- **Preparing the manual report: -** The Meeting Leaders can prepare the report about the meeting and transfer into the meeting manager.
- **Leading the meeting: -** Meeting Leaders can present or lead the meeting in the meeting group.

- **Prepare a manual schedule: -** The meeting manager can prepare the current meeting schedule and post into the advertise board manually before one or two days remain to the meeting.
- **Prepare manual minutes: -** The meeting leader can prepare the summarized meeting minutes and transfers to the meeting manager.

2.4 Business Rules

A business rules is effectively an operating principle or polices that must be fulfill and obligate in order the system will function properly and effectively.

To perform its activities, the existing system following the business rules.

BR1: prepare the meeting schedule.
BR2: assign the Meeting Leader to each meeting groups.
BR3: participants get into the meeting group.
BR4: plenaries sign the attendance.
BR5: participants are the member of the organization.
BR6: prepare an agenda
BR7: report all meeting with 24 hours.
BR8: take meeting notes in all meetings.
BR9: assign the meeting groups.

2.5 Report Generating in the Existing System

Reports are necessary information to tell the information what happen the past and used to get the current system available data. In the existing system, different reports are prepared to submit the needed position. Those reports are deal with-

- ✓ Report the numbers of plenaries participate in the meeting
- ✓ Report the questions raised from the plenaries
- ✓ Report the overall activities that happened in the meeting

2.6 Bottlenecks of the Existing System

There are many different problems that the existing system faces because of the manual system is not reliable and participate in the meeting who located in different locations so due to this it has the following problems.

Performance Problems

In the existing system did not have quick response for the request. For example, it needs several times to prepare plenary attendance and view the past meeting reports.

- ✓ **Throughput**: The manual system cannot accomplish high amount of output within specified time.
- ✓ **Response time:** The user requests take much time to get response.

Information and data problem

- ✓ **Outputs**
  - Lack of necessary information or data.
  - Information that is not in use full format.
- ✓ **Inputs**
  - Data not captured accurately.
  - Too much data capture and takes time to identify.
  - Data captured redundantly same data captured more than once.
- ✓ **Stored data**
  - Data is not well organized.
  - Data is not flexible-not easy to meet new information needs from stored data.
  - Data is not accessible.
  - Data is not stored into the database rather it sets to the shelf.
- ✓ **Control (and Security)**
  - Data is access by unauthorized users because data set in the shelf.
  - Data not guaranteed from natural and personal damages.
  - Information is not set to secured place.

2.7 Practice to be preserved

The main activities that performed in the existing system will be transfer by designing the corresponding simulation of those activities.

- ✓ Most of current system practice will be preserved by applying their business rule for our
  Privileges of users.

2.8 Proposed solution for the new system

We are going to develop the proposed system based on the current system. Since the current system has its own structure of the player, the proposed system also have the user who can login to the system and manipulate their authorized task. Therefore, the proposed system design and implement by considering the current system business rule and privileges of players.

The proposed system mainly focused on changing the current manual system to automated system. It gives the solution to the problem of the existing system we described in the above.

The solution listed below as what will do the proposed system.

- ❖ Store data about the meeting on the database server and backup server, so it removes the loose of data, redundancy of data, data easily maintain and information.
- ❖ Prepare a meeting schedule that is accessible by any user.
- ❖ Assign the meeting leader and plenaries for each meeting groups.
- ❖ Generate the plenaries attendance.
- ❖ Record the meeting video.
- ❖ Conduct meeting and communicate with text and video.
- ❖ Create turn to forward comments or reply answers for raised questions.
- ❖ Inform turn to start the user to speak.
- ❖ Confirm completion to know the speaker is finished.
- ❖ Give comment used to forward the comment.
- ❖ Reply used to answer the questions raised from the user.

2.9 Requirement of the proposed system

2.9.1 Functional Requirement

REQ-1. Login: Users log in to the system by using own user name and password.

REQ-2. Conduct meeting: Meeting leader, meeting manger and plenary conduct the meeting under this join video meeting, join text meeting, comment, reply, and record videos.

REQ-3. Manage Account: Administrator create an account, Assign Role, and Update account.

REQ-4. Create turn: Meeting manager and plenary crate turn to take chance in meeting.

REQ-5. Prepare Schedule: Meeting Manager prepare the meeting schedule.

REQ-6. Manage report: Meeting Manager View minutes, view attendance, summarize minutes.

REQ-7. View Schedule: Meeting Leaders and plenary view the meeting schedule.

REQ-8. Manage meeting group: Meeting manager assign, update, delete meeting group.

REQ-9. Prepare Minutes: Meeting leaders prepare a report or minutes.

REQ-10. Logout: User logout from the system.

REQ-11. Confirm completion: The plenary confirm the turn to completion.

REQ-12. View Group: The meeting leader and plenary views the assign meeting group.

REQ-13. Manage Meeting File: the user to store the meeting file or data.

2.9.2 Non Functional Requirement

Non-functional requirements or system qualities capture required properties of the system, such as performance, security, maintainability, etc. In other words, how well some behavioral or structural aspect of the system should be accomplish. The non-functional requirements of the system described as follows.

Performance: -the part of the system to use for the programming language should have a fast response time (real time) with maximum throughput. Furthermore, the system should not be taking up too much space in memory. The user gets fast response time over throughput and hence the system should try to be more interactive. The system should be more reliable in order to satisfy the constraints than fast response time.

Criteria's for performance are the response-time, throughput and space for file storage.

- ✓ **Response time**: Response request to the user at most Three seconds.
- ✓ **Throughput:** system can accomplish high amount of outputs within a specified amount time.

- ✓ **Availability**: The core system will be available during working days and hours. However, the public webpage will be available 24 hours in 7 days.
- ✓ **Accuracy:** The new system shall be 95% accurate.

Usability: - The new system shall have a good looking and a user-friendly interface.

Reliability: - The system is effective and consistent in that integrity of information maintain and supply to the system. The new system shall be 95% reliable.

Efficiency: -Searching record should not take more time updating and Recording information done in simple and unambiguous way.

Security: - Information concerning individuals has value. Information is a vital asset to any company, and needs appropriately protected. In order to decrease information exposure, companies must protect the place sensitive information resides because that is the entry point for cybercriminals. Lose the data and you lose the business. This may result in potential damage to reputation of company and loss of customer confidence. Today, protecting network is no longer simply and sufficient for information protection. In today's business environment, information is constantly moving among employees and consumers.

With the needs for reliable systems that provide security and privacy to their consumers, the matter of information security is becoming more and more important. In order to be able to make sensible decisions about security, there is a need for measuring the security of information system.

We need for information system security successful in the following aspects:

- ✓ **Confidentiality:** The main objective of information system security is to preserve the confidentiality of information. Authentication and encryption can ensure authorized access to media and that the data itself has not tampered or corrupted. User authentication is a foundation procedure to ensure the right persons with granted permission to access the required confidential information. Unauthorized to access or disclosure of any part of the information to unauthorized person, this caused loss of confidentiality and privacy. If someone gets access to user's username and password, he or she has the keys to the kingdom. Password amended over certain period and never share with others.

However, password security is not enough. Encryption is the mean to best diminish the access exposure of privacy information. It helps in ensuring the confidentiality of information transferring across networks. User access the confidential information over network protected by encryption or cryptographic security techniques. For example, using of virtual private network and through secure socket layer protocol will protect the information during transferring in the networks, especially the Internet. Outsiders are not easily to read the encrypted information.

- ✓ **Availability:** In order to have dependable internet connection, the data storage devices in data centers. In this situation, data may better protected in the data centers rather than your own facilities. The service provider should have auditable controls governing physical access to your equipment, reducing the risk of someone accessing data locally.
- ✓ **Integrity:** Integrity is a process that builds that data has not modified, and the accuracy of the data can preserved. Security manger should make sure the data has not tampered with or altered intentionally or unintentionally. Once data modified, and then it results in loss of integrity. Weaknesses on servers, at the application or the operating system level, can used to cause server data modification. In situations are difficult to secure information due to its nature, detection of the loss of integrity should exist.

CHAPTER THREE

3. System Analysis

3.1. System Models

In this section, the functionalities of the system are describe and model using UML models and describe the interaction between the user and the system. This section also used to identify the actor of the system and who is use on what function.

3.1.1 Scenarios

In this section we are describe our systems in a short history. In our system the administrator has his/her own role such as manage user account (create, update, and assign user role) and change their own and any other user passwords. Meeting manager also has his/her own role such as record live video, view attendance, view minutes, manage meeting files, take minutes from the meeting leader and prepare summarized minutes. Also, change their own password, prepare schedule, join meeting (Video and text meeting), create turn, give comment, and reply, assign the meeting leaders, plenaries in each meeting groups, update meeting rooms and delete meeting rooms. Meeting leader also has their own role, such role include join meeting, view schedule, prepare minutes, view assigned meeting group, manage meeting files, inform turn, reply, record meeting video, confirm completion and change their own password. Plenary also participant of the meeting, and who has their own roles or activities in our system among this role: view schedule, view assigned meeting group, manage meeting files, give comment, reply, create turn, and record meeting video.

3.1.2 Use case Model

Use case diagrams graphically describe system behavior (Use case). These diagrams represent a high-level view of how the system used as viewed from an outsider's (actors) perspective.

From the identified use cases and actors, the use case diagram of the system shown below.

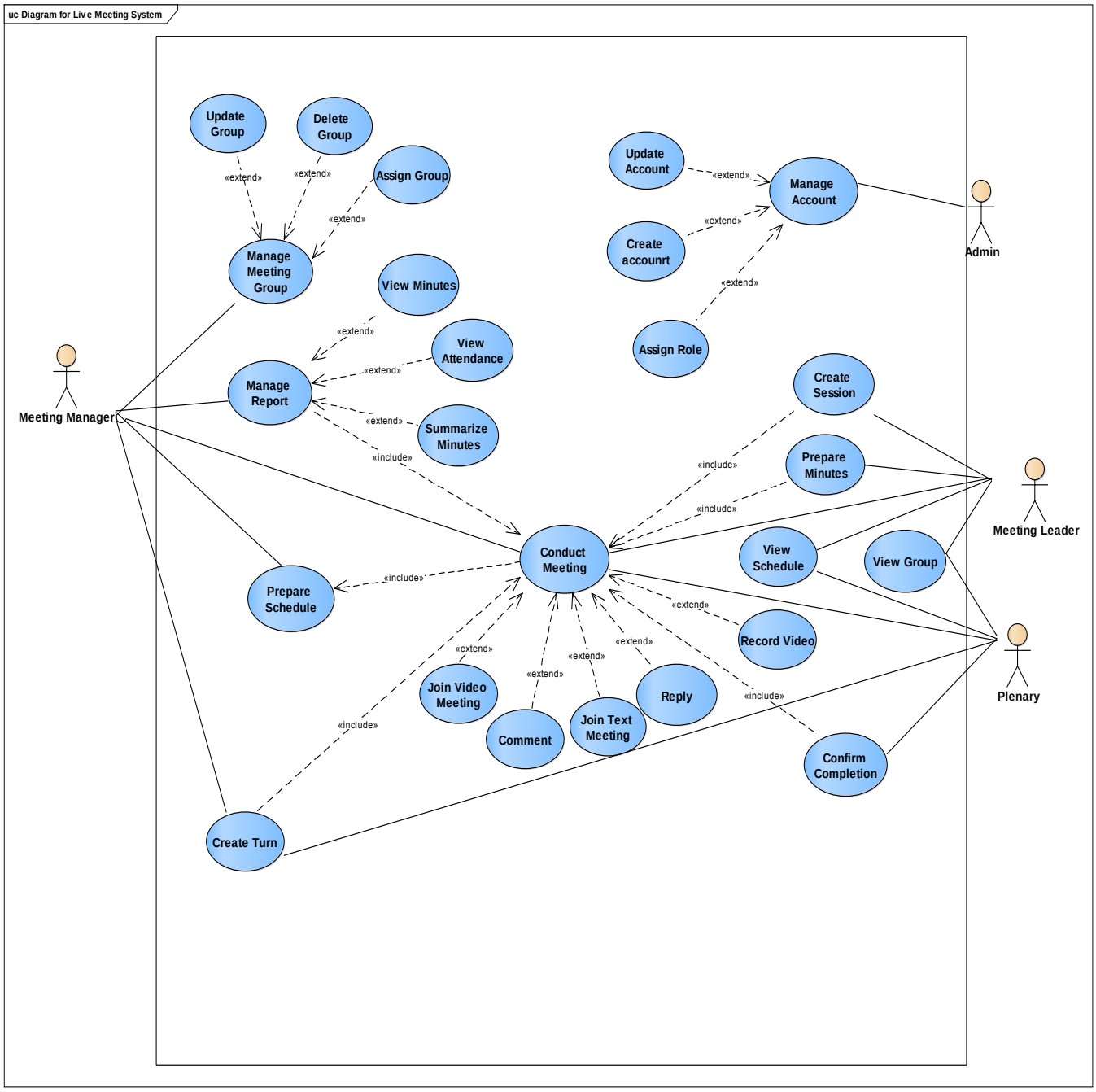

Figure 1 Use Case Diagram

3.1.3 Use case Description

<table>
<tr><td>Use-Case ID:</td><td colspan="2">UC-001</td></tr>
<tr><td>Use-Case Name:</td><td colspan="2">Login</td></tr>
<tr><td>Priority</td><td colspan="2">High</td></tr>
<tr><td>Actor</td><td colspan="2">Users</td></tr>
<tr><td>Description</td><td colspan="2">This use case used to login to the system</td></tr>
<tr><td>Trigger</td><td colspan="2">When user want to start their work</td></tr>
<tr><td>Pre-Condition</td><td colspan="2">User must have Username and password</td></tr>
<tr><td>Post-Condition</td><td colspan="2">Users successfully logged into the system and appropriate page for each actor can be display.</td></tr>
<tr><td>Basic Course of action</td><td>User Action</td><td>System Response</td></tr>
<tr><td></td><td>1. User Launch the system
3. Users Click Login Link
5. Users Enter Username and password and click on login button</td><td>2.The System display “Home Page”
4. The system display the “login Form”
6. If username and password is valid, the corresponding page for each user can be display. (A6: if username and password is incorrect).
7. The use case ends.</td></tr>
<tr><td>Alternative Course of action</td><td colspan="2">A6: if the username and password is not valid:
1. System display error message.
2. The use case resumes step 5.</td></tr>
</table>

Table 3 Use case Description for Login

<table>
<tr><td>Use-Case ID:</td><td>UC-002</td></tr>
<tr><td>Use-Case Name:</td><td>Create Account</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Actor</td><td>Administrator</td></tr>
<tr><td>Description</td><td>This use case used to create account for the user.</td></tr>
<tr><td>Trigger</td><td>The Administrator must login to the system</td></tr>
<tr><td>Pre-Condition</td><td>The user must be register.</td></tr>
<tr><td>Post-Condition</td><td>The user Account successfully created</td></tr>
<tr><td>Basic Course of action</td><td><table>
<tr><td>User Action</td><td>System Response</td></tr>
<tr><td>1. The Administrator select create account from account menu.
3. Administrator enter user id
4. Click search button
6. Administrator Fill user name, password and confirm password and Click create button.
9. The Administrator confirm the message.
10. Use case end.</td><td>2. System display create account form.
5. The system display full name of the user (A5: If the Administrator search not registered user Id).
7. The system validate the input (A7: If the Administrator input not match confirm password).
8. The system display successful message.</td></tr>
</table></td></tr>
<tr><td>Alternative Course of action</td><td>A5: If the Administrator input not registered user Id
1. System Display error message to the Administrator.
2. Use case resumes step 3.
A7: If the Administrator input not match confirm password
1. System display error message to the Administrator.
2. Use case resumes step 6.</td></tr>
</table>

Table 4 Use Case Description for Create Account

Use-Case ID:	UC-003	
Use-Case Name:	Prepare minutes	
Priority	High	
Actor	Meeting Leader	
Description	This use case used to prepare meeting minutes.	
Trigger	The Meeting leader must be login to the system	
Pre-Condition	There must be a meeting	
Post-Condition	The minutes prepare and send successfully.	
Basic Course of action	User Action	System Response
	1. The meeting leader write the minutes to the specified text area and click submit button. 3. The meeting leader confirm the message. 4. Use case end	2. The system display successful message.
Alternative Course of action	No	

Table 5 Use Case Description for Prepare Minutes

Use-Case ID:	UC-004	
Use-Case Name:	Update user Account	
Priority	High	
Actor	Administrator	
Description	This use case used to update the user account	
Trigger	The Administrator must be login to the system	
Pre-Condition	There must be a user account	
Post-Condition	The user account successfully updated	
Basic Course of action	User Action	System Response
	1. The Administrator click manage user account link. 3. The Administrator select user account to update from the table. 4.Click edit button 6. Fill the new data in to the specified text field and click update button	2.The system display the mange account page 5.Display the user account information to the specified text field

	9. The Administrator confirm the message 10. Use case end	7. The system validate the input data (A7: if the Administrator input invalid data) 8. The system display the successful update message.
Alternative Course of action	A7: if the Administrator fills or input invalid data 1. System Display error message to the Administrator 2. The use case resumes to step 6	

Table 6 Use Case Description for Update User Account

Use-Case ID:	UC-005	
Use-Case Name:	Assign Group	
Priority	High	
Actor	Meeting Manager	
Description	This use case used to assign group to meeting participant.	
Trigger	The meeting manager must be login to the system	
Pre-Condition	There must be a meeting participant, a meeting and meeting leader.	
Post-Condition	Successfully group assigned.	
Basic Course of action	User Action	System Response
	1. The meeting manager click assign group link. 3. The meeting manager fill the required field click submit button. 5. The meeting manager confirm the "success message". 6. Use case end.	2. The system display assign group form. 4. The system display "successful message".
Alternative Course of action		

Table 7 Use Case Description for Assign Group

Use-Case ID:	UC-006	
Use-Case Name:	View Attendance	
Priority	High	
Actor	Meeting Manager	
Description	This use case used to view the user attendance	
Trigger	Meeting manager must login to the system	
Pre-Condition	There is a meeting.	
Post-Condition	The system display the attendance data	
Basic Course of action	User Action	System Response
	1. The User click view attendance menu items. 3. The user view the data. 4. Use case end.	2. The system display the data to the specified form.
Alternative Course of action	No	

Table 8 Use Case Description for View Attendance

Use-Case ID:	UC-007	
Use-Case Name:	Mange report	
Priority	High	
Actor	Meeting Manager	
Description	This use case used to manage the report	
Trigger	The User must be login to the system	
Pre-Condition	There must be a meeting	
Post-Condition	The report successfully managed	
Basic Course of action	User Action	System Response
	1.The user select Manage report menu strip 3. The User select the required operation. 6. The user confirm the message. 7. Use case end	2. The system display Manage report page. 4. The system done the selected operation. 5. The system return confirmation message.
Alternative Course of action	No	

Table 9 Use Case Description for Manage Report

<table>
<tr><td>Use-Case ID:</td><td>UC-008</td></tr>
<tr><td>Use-Case Name:</td><td>Prepare Schedule</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Actor</td><td>Meeting Manager</td></tr>
<tr><td>Description</td><td>This use case is used to set the schedule for live meeting system</td></tr>
<tr><td>Trigger</td><td>The meeting manager must be login to the system</td></tr>
<tr><td>Pre-Condition</td><td>There is a meeting to prepare a schedule</td></tr>
<tr><td>Post-Condition</td><td>Prepare a meeting schedule successfully</td></tr>
<tr><td>Basic Course of action</td><td>
<table>
<tr><td>Use Action</td><td>System Response</td></tr>
<tr><td>1.Meeting manager select make schedule menu strip
3. Meeting manager set or fill the schedule form and click submit button.
6. The meeting manager confirm the message
7. Use case end.</td><td>2.The system display schedule form
4. The system validate the input data (A4: If the Meeting manager inputs invalid data)
5. The system display successful message.</td></tr>
</table>
</td></tr>
<tr><td>Alternative Course of action</td><td>A4: If the Meeting manager inputs invalid data
1. The system displays error message to the meeting manager
2. The use case resumes step 3.</td></tr>
</table>

Table 10: Use Case Description for Prepare Schedule

<table>
<tr><td>Use-Case ID:</td><td>UC-009</td></tr>
<tr><td>Use-Case Name:</td><td>Conduct meeting</td></tr>
<tr><td>Priority</td><td>High</td></tr>
<tr><td>Actor</td><td>Meeting manager, meeting leader and Plenary</td></tr>
<tr><td>Description</td><td>This use case used to conduct meeting the text, video meeting, Comment, Reply and Record Video</td></tr>
<tr><td>Trigger</td><td>There must be meeting schedule to conduct meeting</td></tr>
<tr><td>Pre-Condition</td><td>The user must be known meeting schedule prepared</td></tr>
<tr><td>Post-Condition</td><td>The user successfully conducted to the meeting</td></tr>
<tr><td>Basic Course of action</td><td><table><tr><td>User Action</td><td>System Response</td></tr><tr><td>1. The user select conduct meeting menu.
3. Choose appropriate operation
5. The user confirm the operation
6. Use case end.</td><td>2. The system display the conduct-meeting page.
4. The system perform the operation.</td></tr></table></td></tr>
<tr><td>Alternative Course of action</td><td>No</td></tr>
</table>

Table 11 Use Case Description for Conduct Meeting

3.1.4 Object Model

3.1.4.1 Data Dictionary

Field Name	Data Type	Description
First name	string	Hold first name of the user
Last Name	string	Hold Last Name of the user
Email	string	Hold Email of the user
Phone	string	Hold phone of the user
Sex	string	Hold sex of the user
User ID	integer	Holds Id of the user

Table 12 Data Dictionary for User Table

Field name	Data type	Description
User ID	Integer	Hold the user id
User Name	string	Hold User name of the user
Login Date	Date time	Hold the login date and time of the user
Logout Date	Date time	Hold logout date of the user

Table 13 Data Dictionary for Attendance Table

Field Name	Data type	Description
User id	Integer	Hold the user id
User name	string	Holds user name of user
Password	string	Holds the password of user
Question	string	Holds the user question
Answer	string	Holds the user Answer
Role	String	Holds the user role
Status	Small integer	Holds status of user
Date	Date time	Holds account created date

Table 14 Data Dictionary for User Account Table

Field name	Data type	Description
Minutes Id	integer	Hold the user id
User Id	string	Hold the user name
Minutes	string	Hold the appointment of user
Date of Minutes	Date time	Hold the date of appointment

Table 15 Data Dictionary for Minutes Table

Field name	Data type	Description
User ID	string	Holds the user id
Date Time	Date time	Hold the date of mailing
Status	string	Hold the current status of the user activity

Table 16 Data Dictionary for Turn Table

Field name	Data type	Description
Schedule id	Integer	Hold the schedule id
Month	string	Hold month
Start Date	Date time	Hold the Start date of meeting
End Date	Date time	Hold the end date of meeting
Task	string	Hold Task perform
User ID	integer	Holds id of the user

Table 17 Data Dictionary for Schedule Table

Field Name	Data type	Description
Group ID	string	Holds the unique group id of the meeting
Schedule ID	integer	Holds the unique number of the schedule
User Role ID	integer	Holds the unique number of the user role
User ID	string	Holds the unique string of user identification code

Table 18 Data Dictionary for Assign Group

Field Name	Data type	Description
ID	integer	Holds the unique file id of the meeting
File Name	string	Holds the file name
File Type	string	Holds the file types
User ID	string	Holds the unique string of user identification code

Table 19 Data Dictionary for Meeting File Table

3.1.4.2 Analysis Level Class Diagram (Conceptual Modeling)

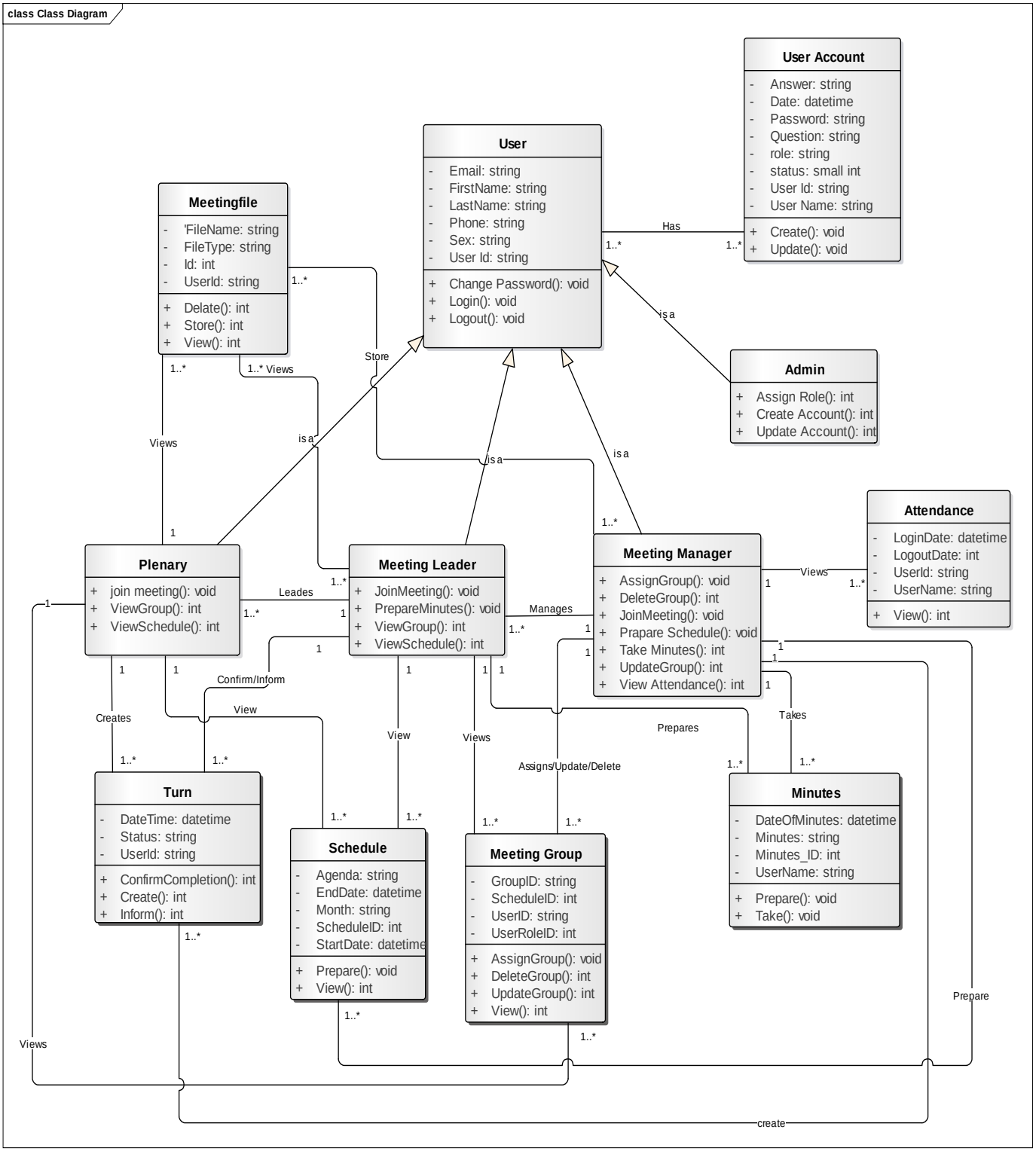

Figure 2 Class Diagram

3.2.Dynamic Model

A dynamic model represents the behavior of an object over time. It used where the object's behavior best describe as a set of states that occur in a defined sequence.

3.2.1. Sequence Diagram

In this section, we are going to show interaction between objects over a specific period time and describe the flow of messages, events, and actions between objects .We show concurrent processes, activations and time sequences not easily depicted in other diagrams.

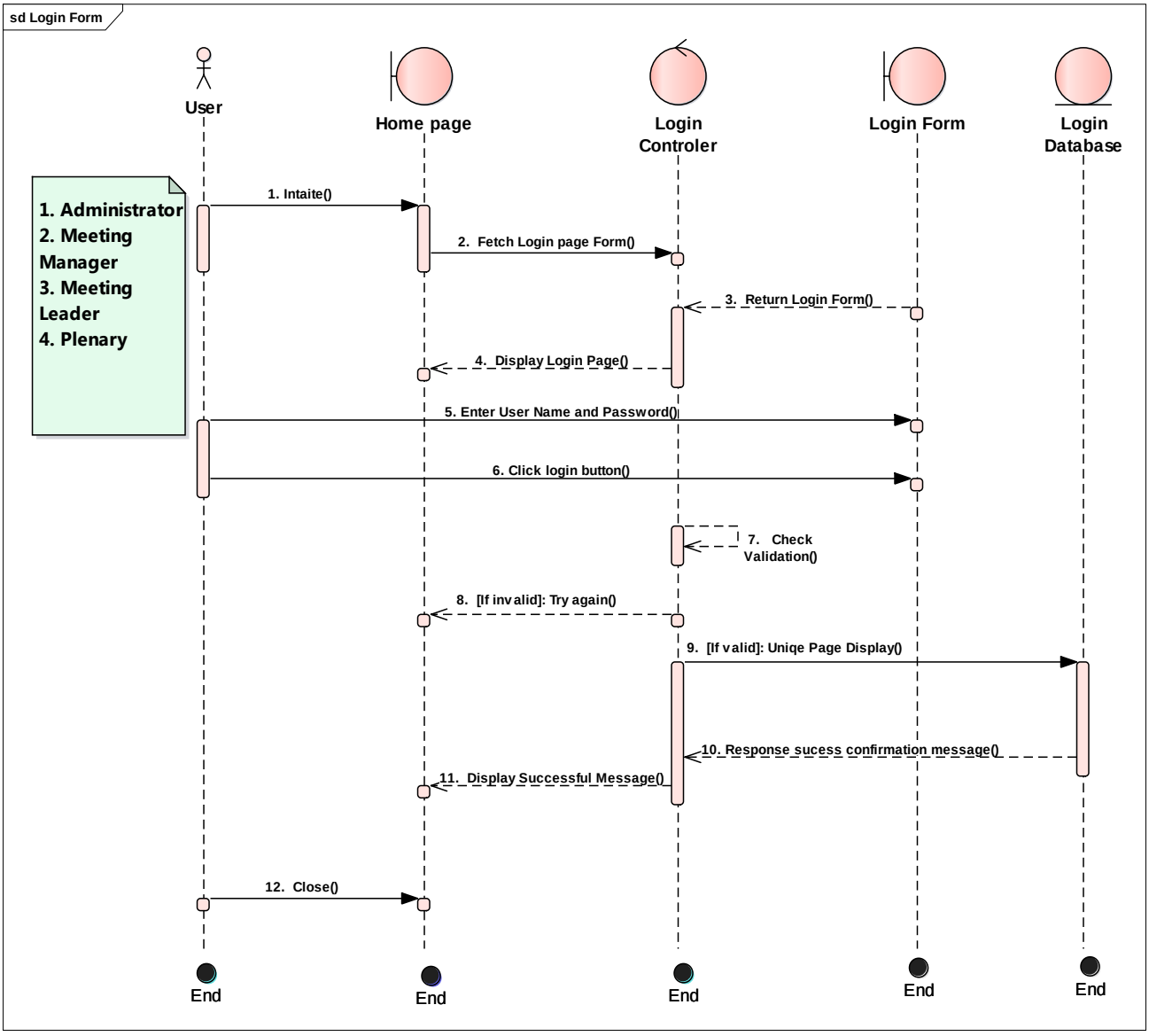

Figure 3 Sequence Diagram for login

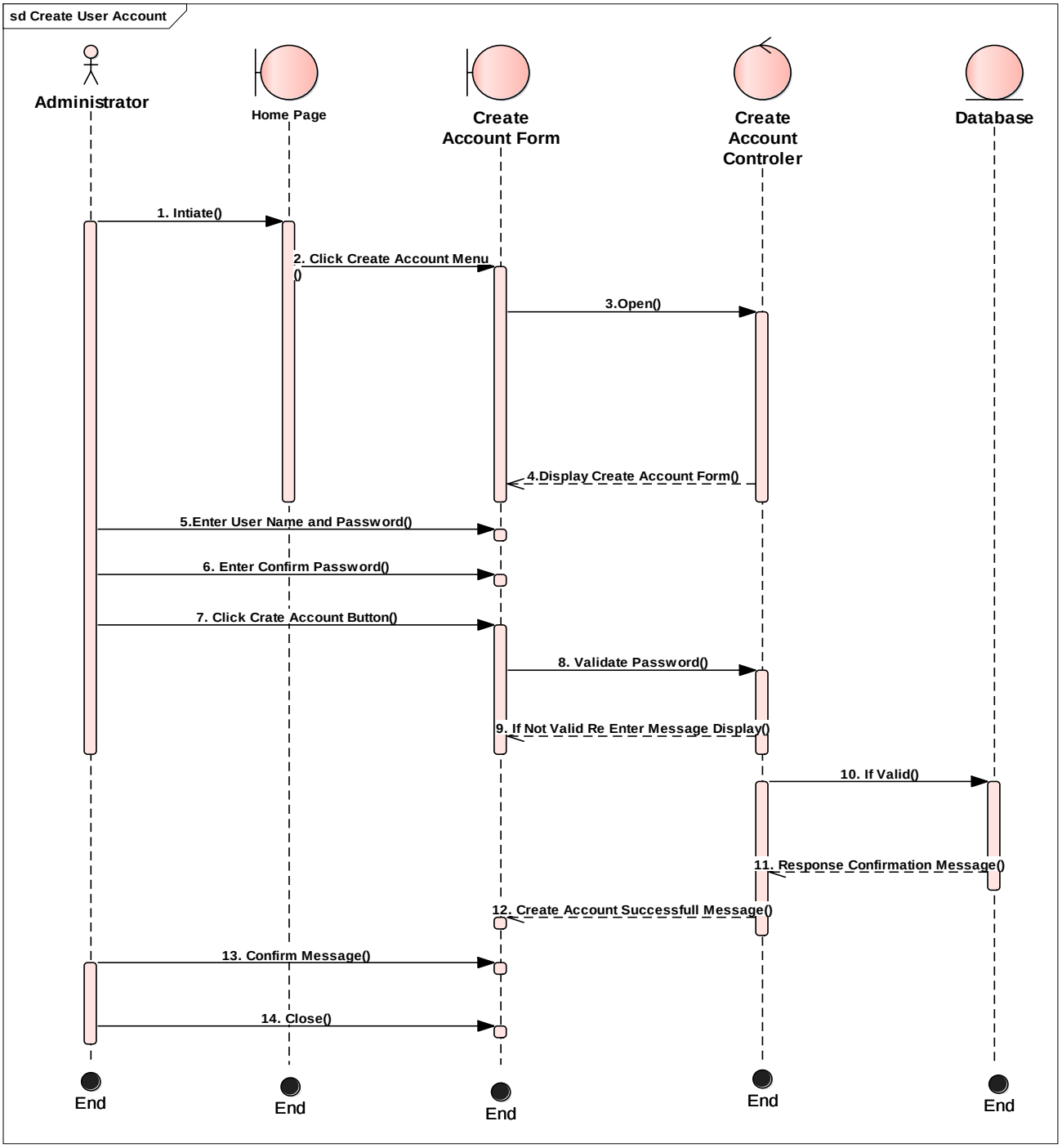

Figure 4 Sequence Diagram for Create Account

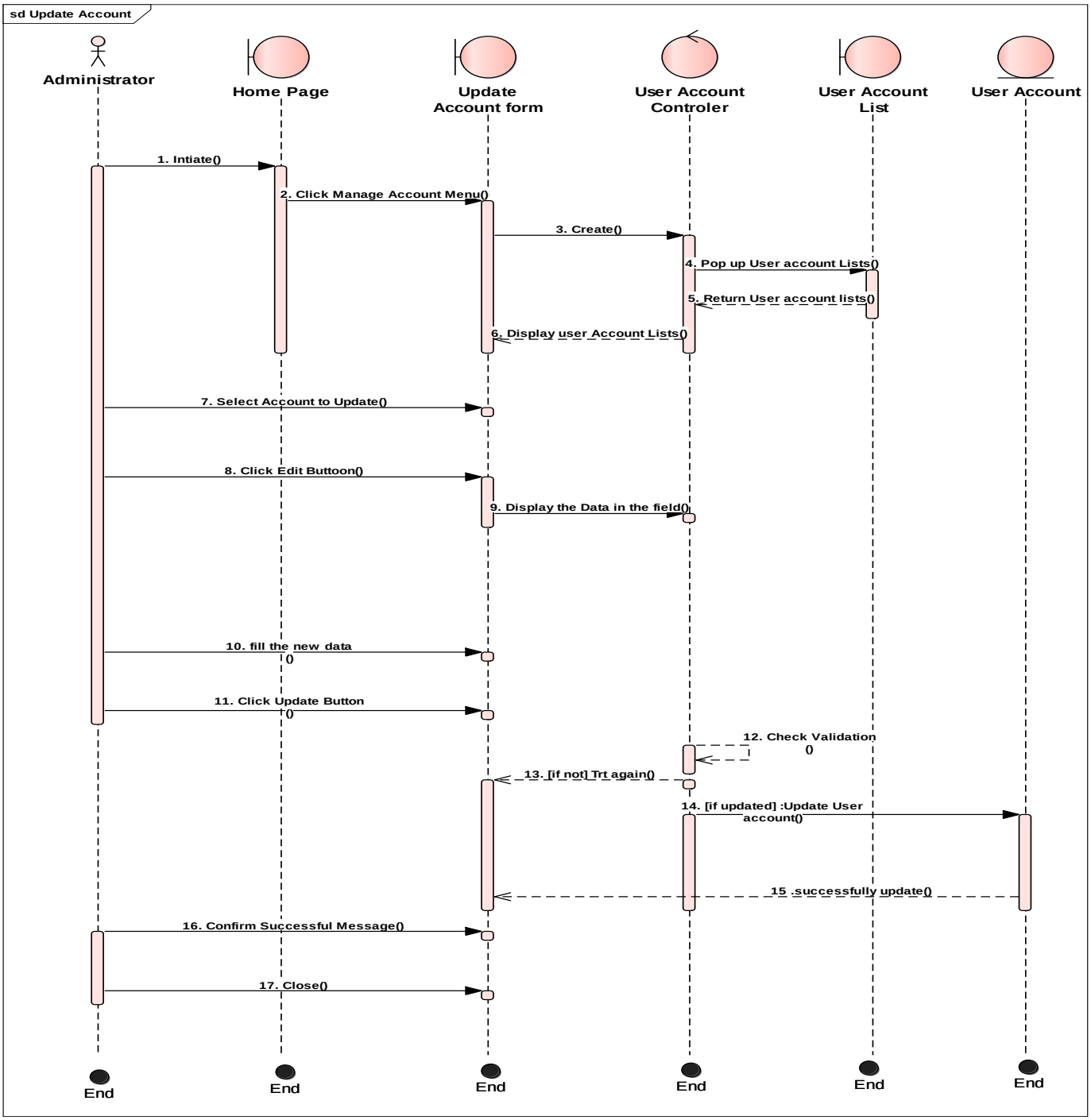

Figure 5 Sequence Diagram for Update Account

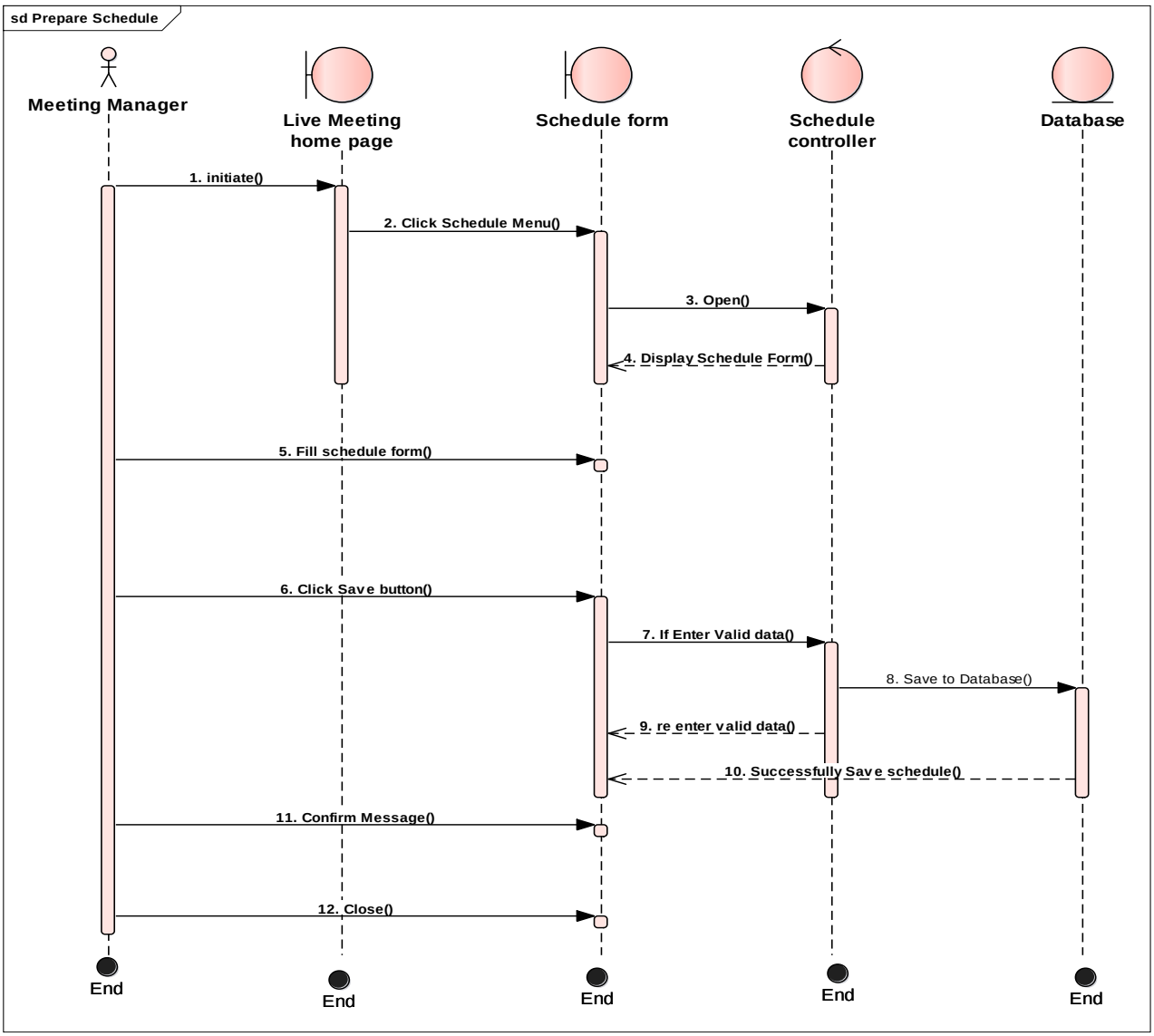

Figure 6 Sequence Diagram for Prepare Schedule

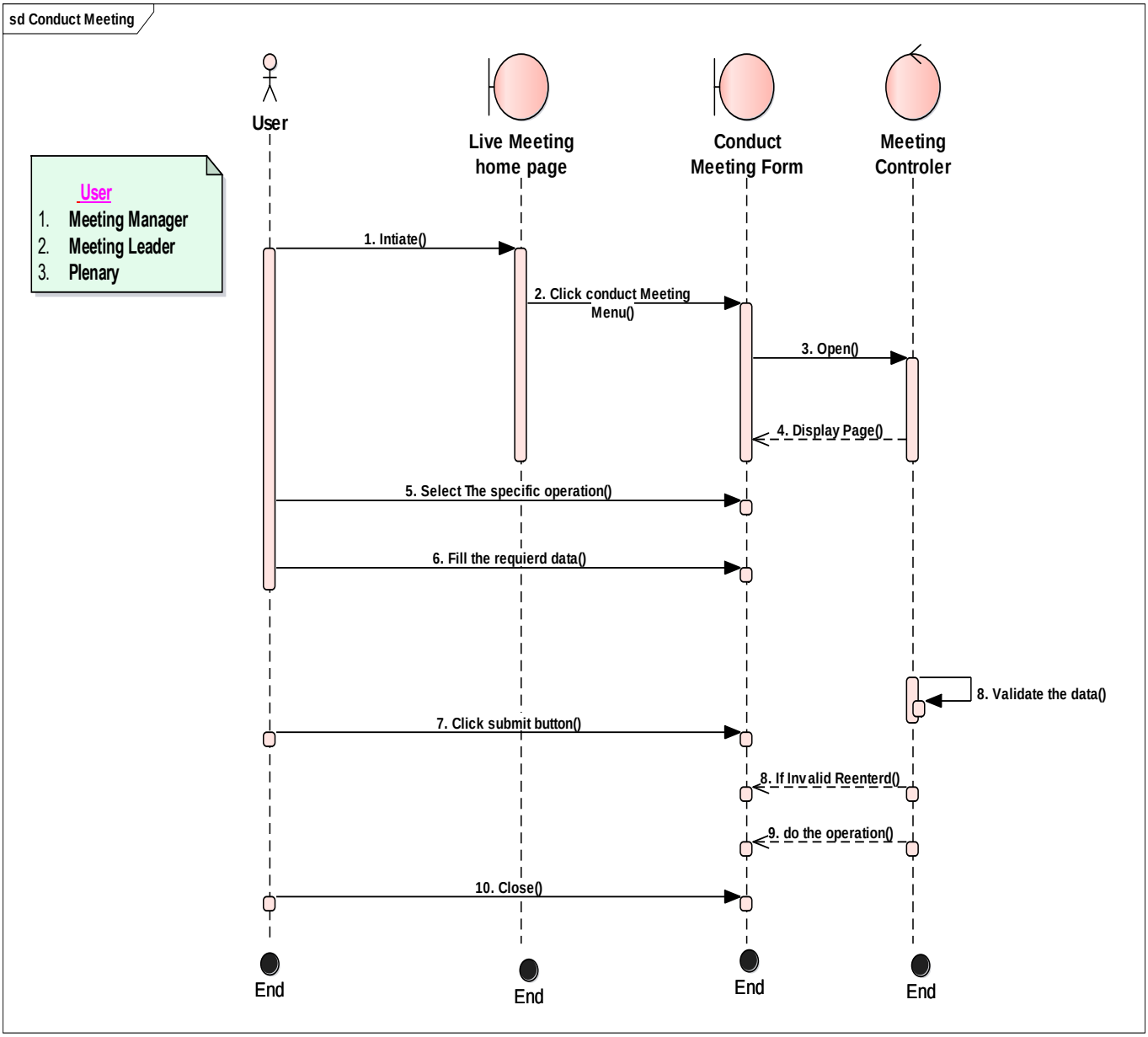

Figure 7 Sequence Diagram for Conduct Meeting

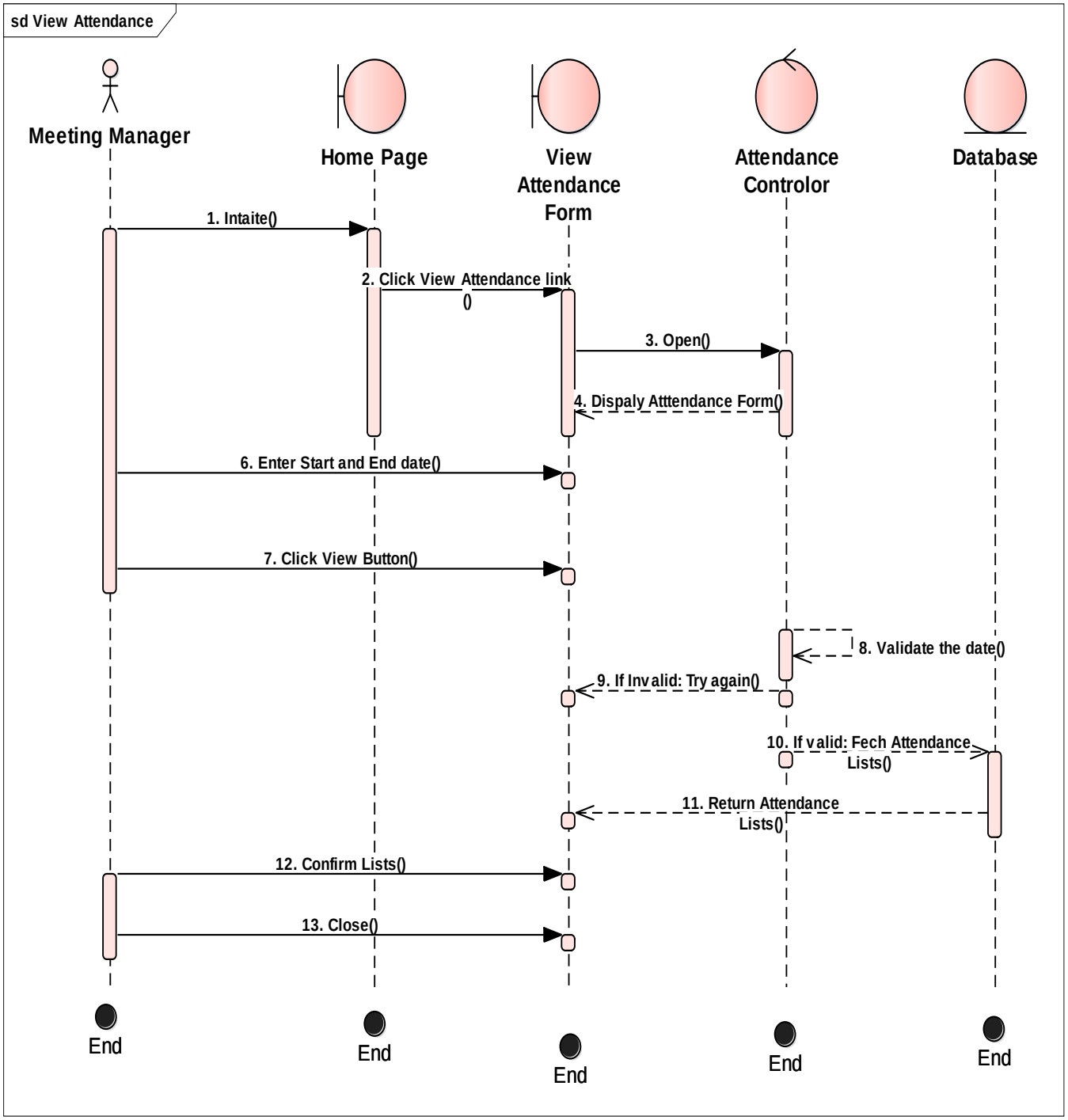

Figure 8 Sequence Diagram for View Attendance

3.2.2. Activity Diagram

Activity diagram used to document the logic of a single operation/method, a single use case, or flow of logic of business operation. In many ways activity diagram are the object-oriented equivalent of flow charts and data flow diagrams (DFD) from structured development to represent the flow from one activity to another activity.

The processing with in an activity goes to completion and then an automatic transition to the next activity occurs an arrow represents the transition from one activity to the next. The starting point of an activity diagram represented by a filled-in circle.

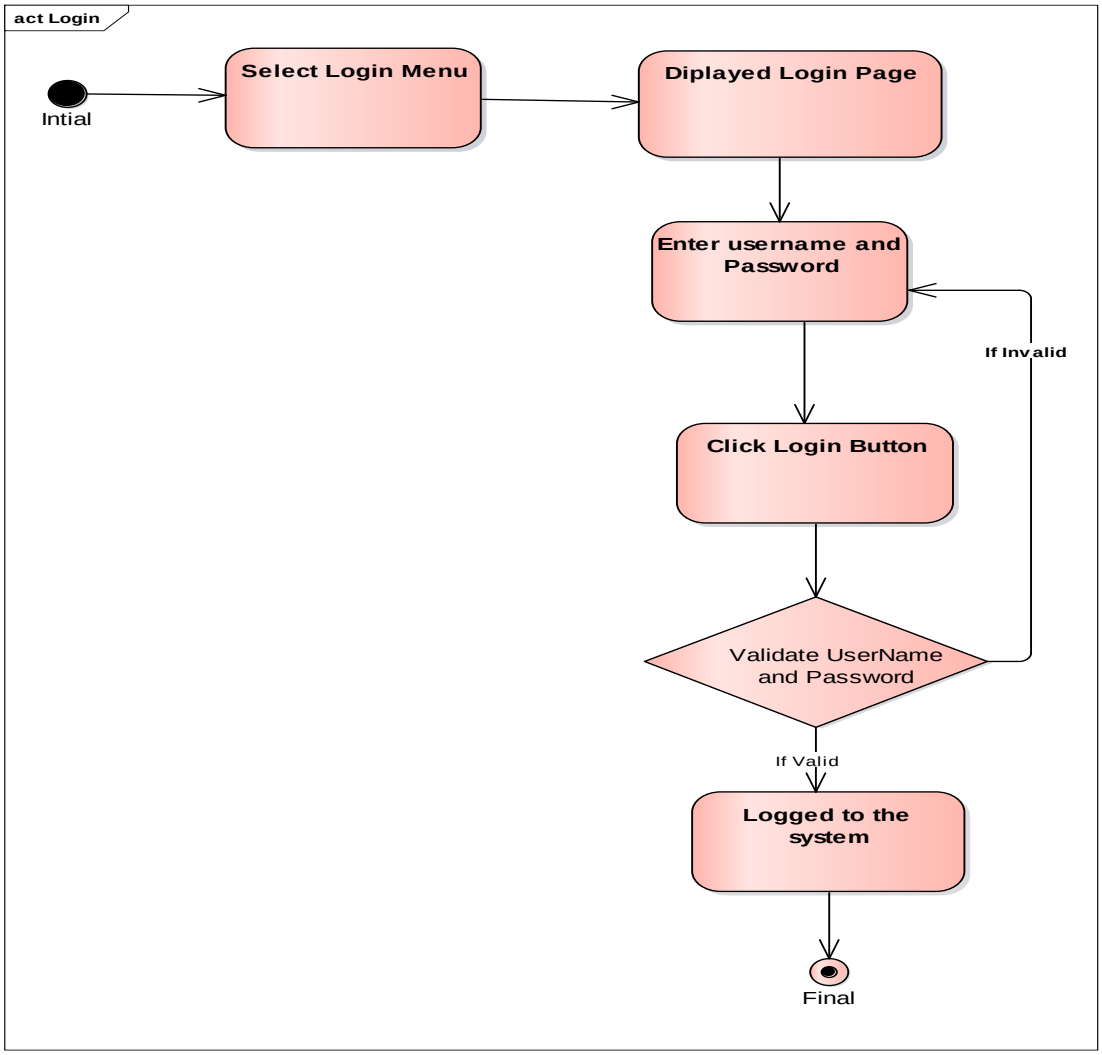

Figure 9 Activity Diagram for Login

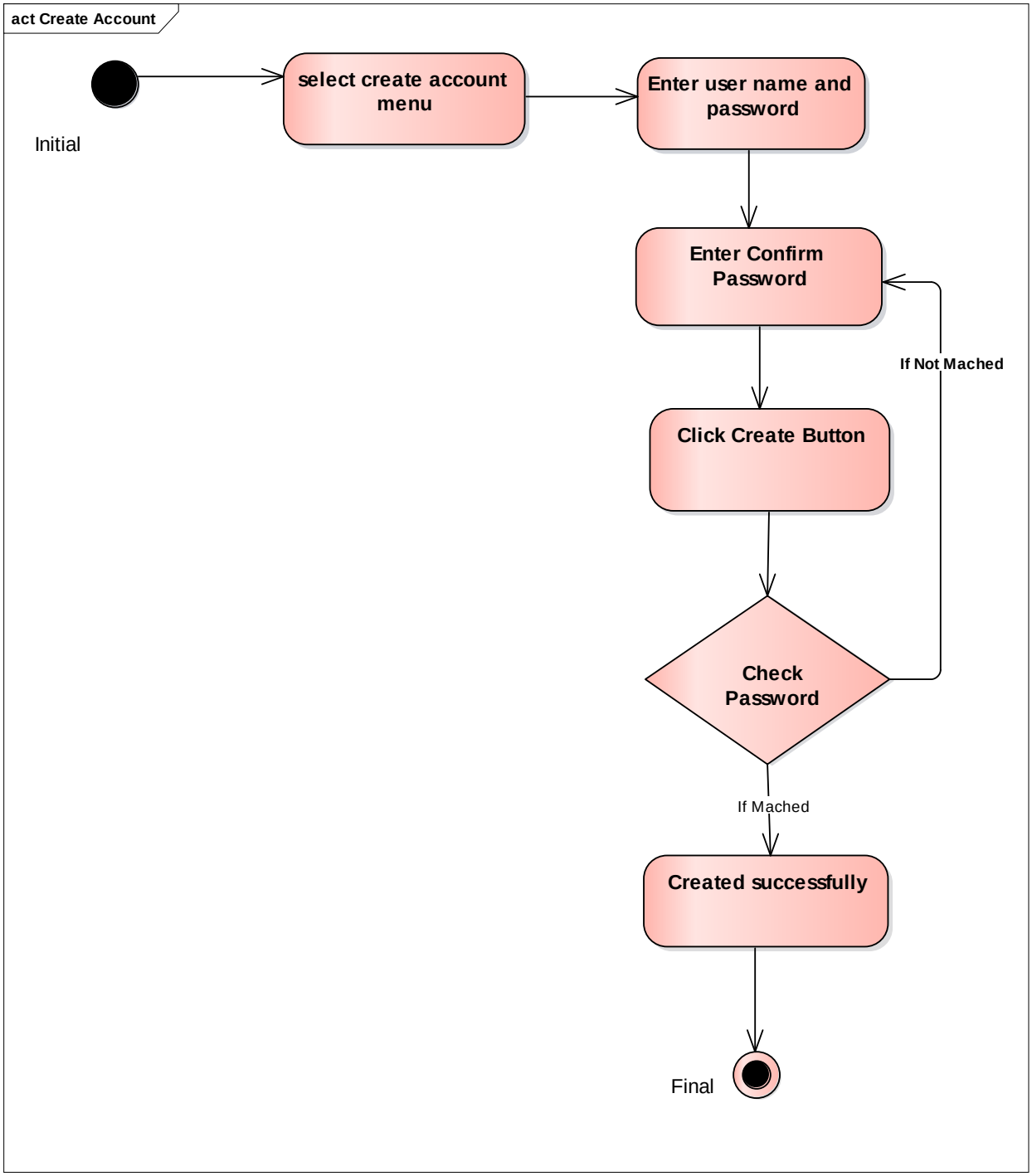

Figure 10 Activity Diagram for Create Account

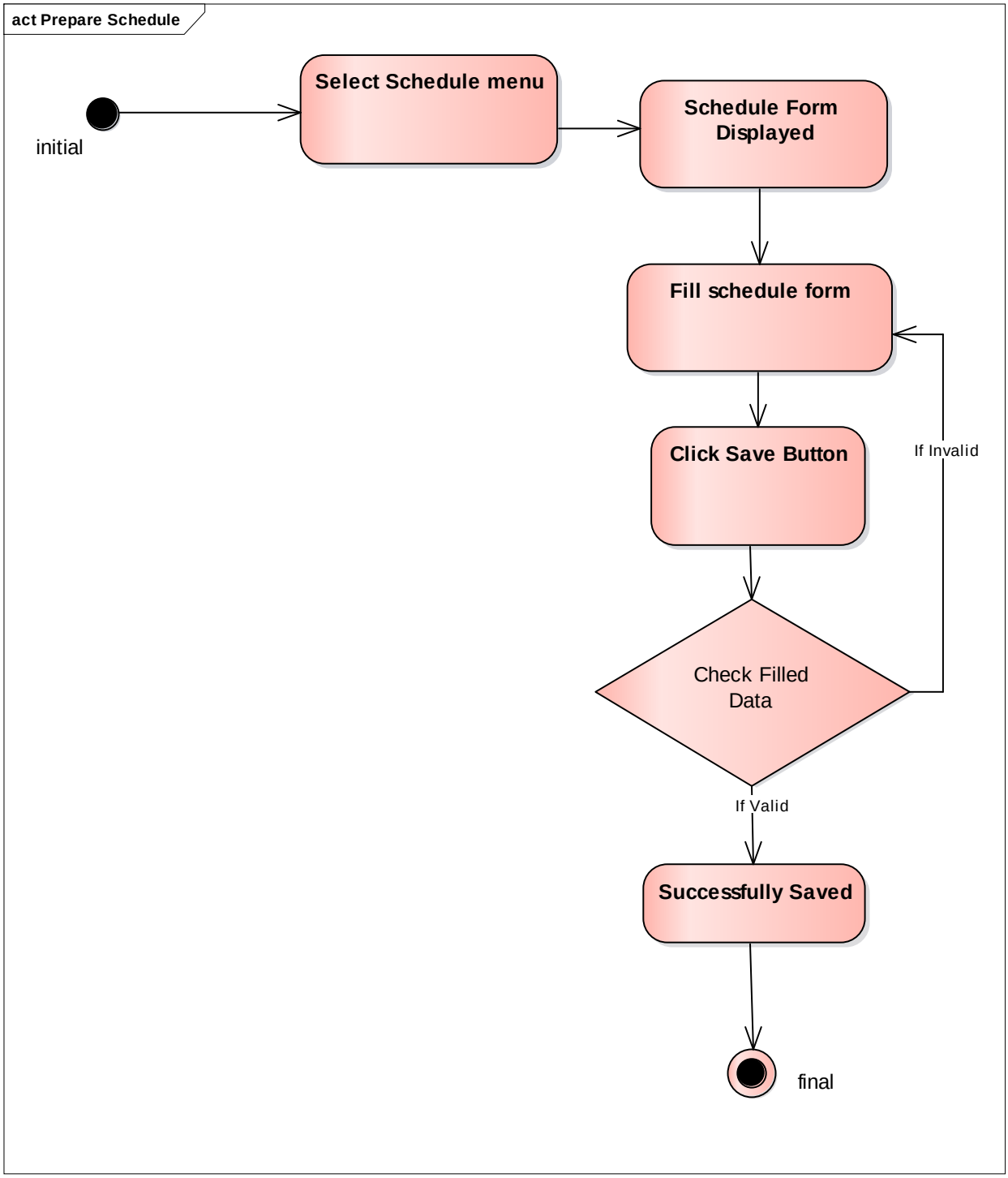

Figure 11 Activity Diagram for Prepare Schedule

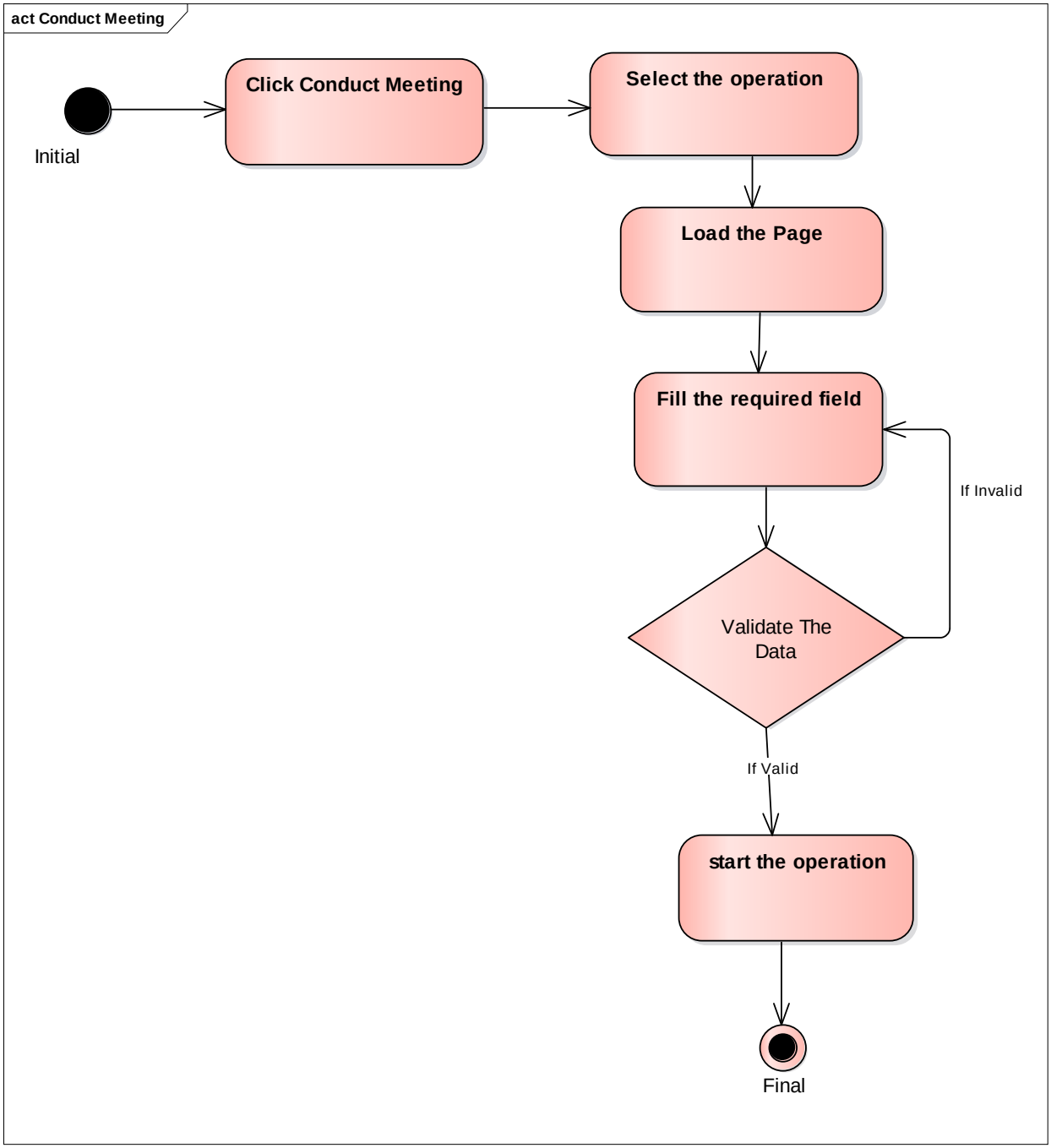

Figure 12 Activity Diagram for Conduct Meeting

3.2.3. State Diagram

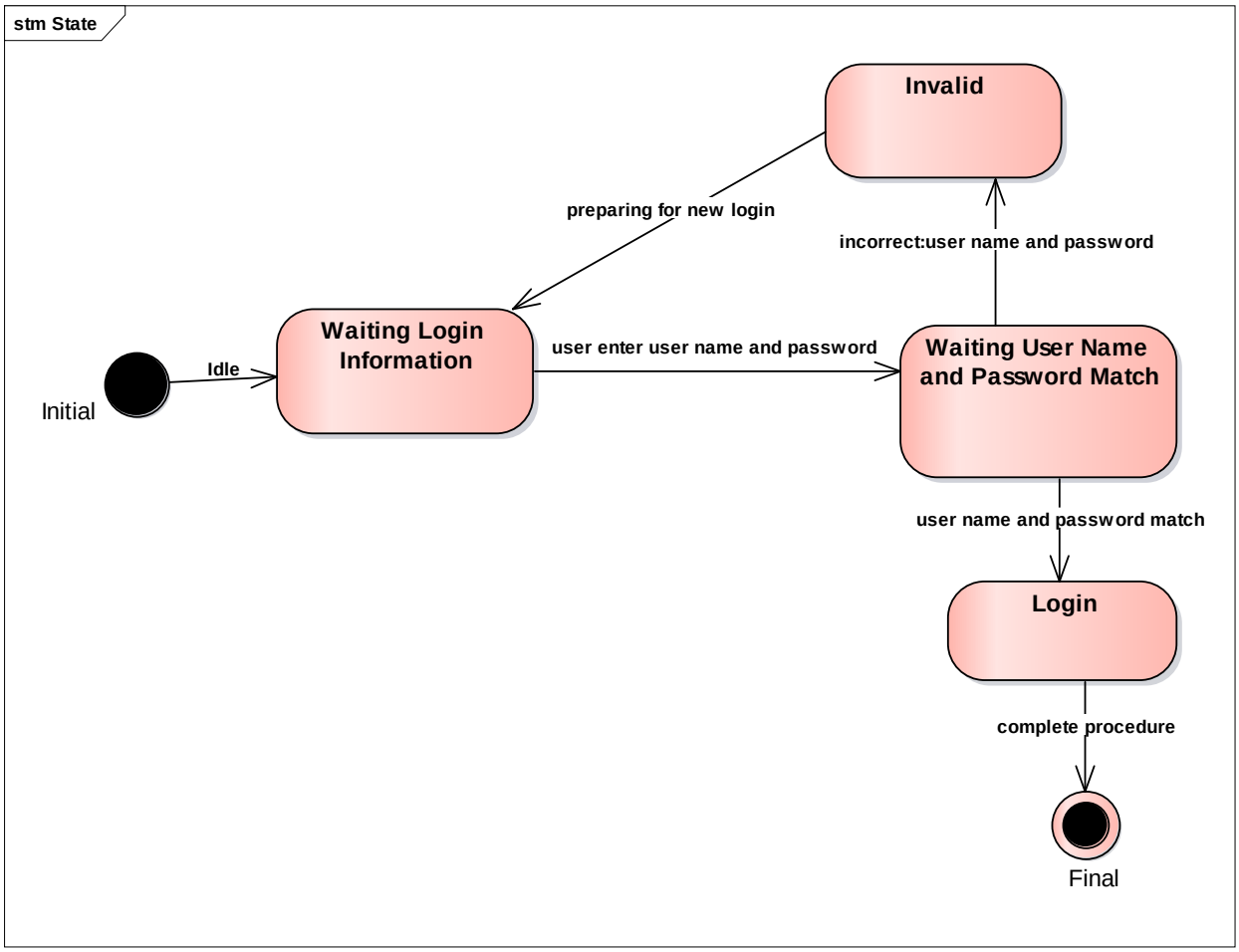

Figure 13 State Diagram for Login

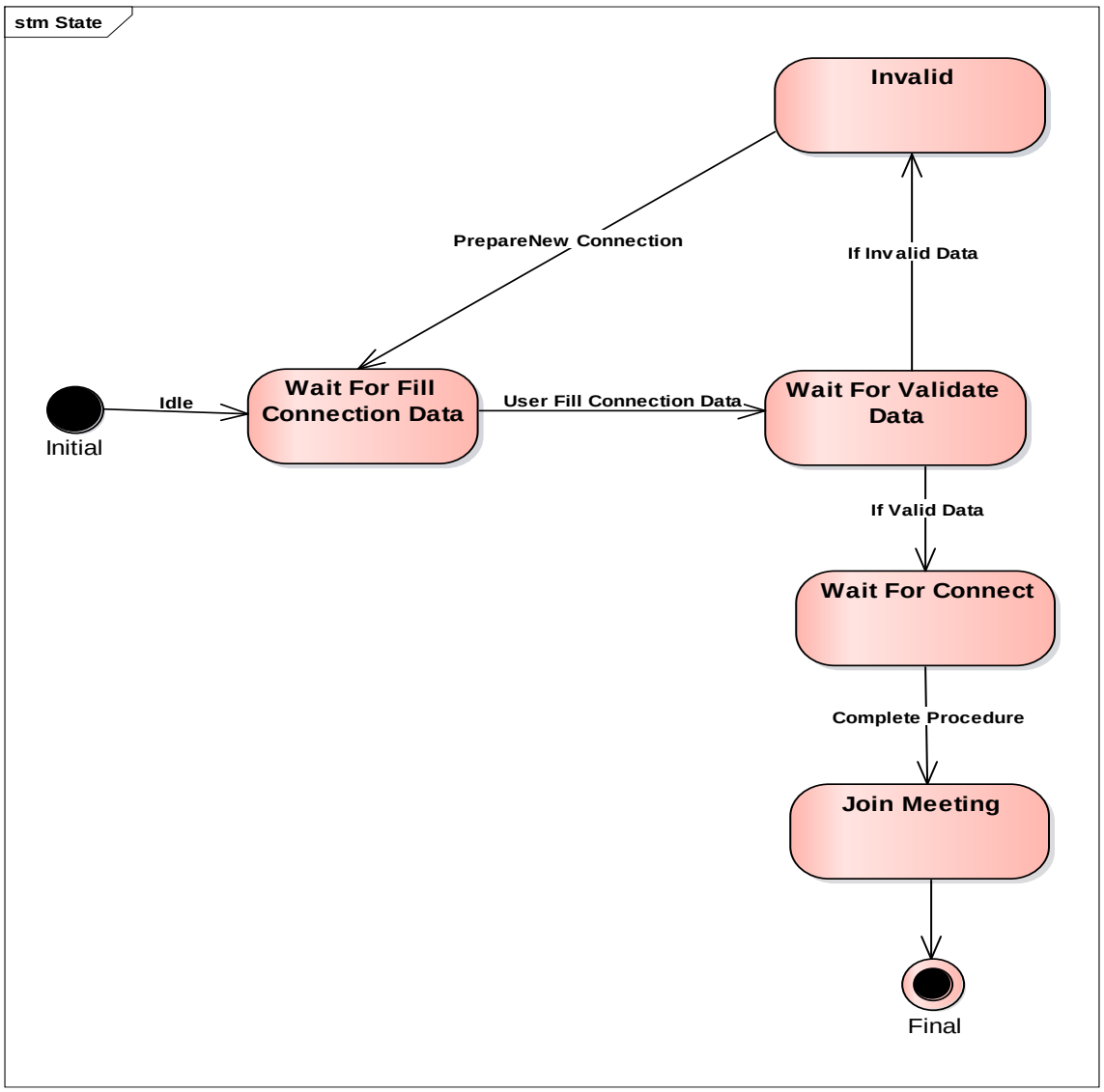

Figure 14 State Diagram for Conduct Meeting

3.2.4. User Interface Prototype

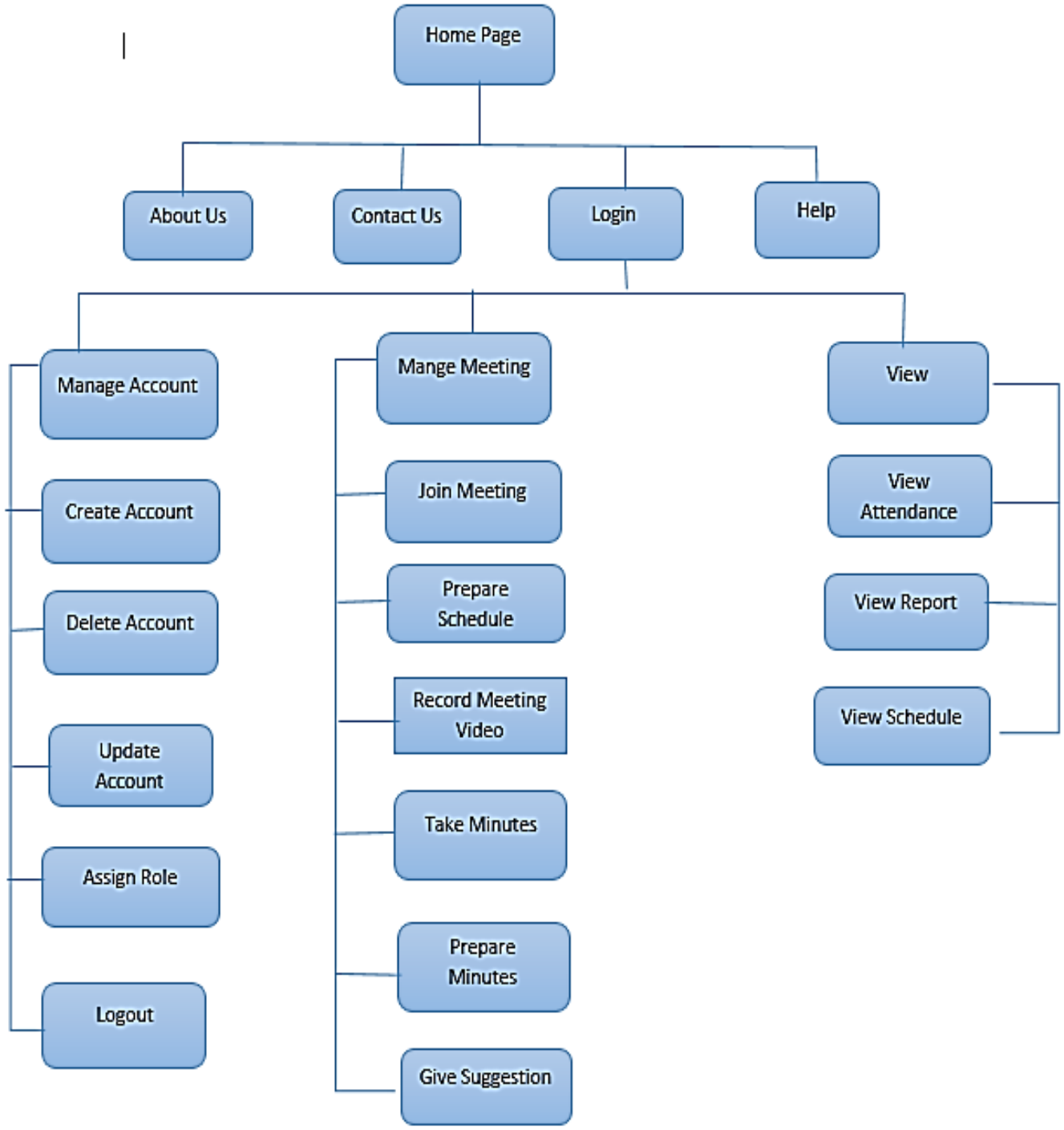

Figure 15 User Interface Prototype

CHAPTER FOUR

4. System Design

4.1. Introduction

System design is the transformation of the analysis model into a system design model. In this chapter, the project team discusses about the higher-level description of the DBU Live meeting system. In this chapter, we included the following concepts such as the purpose of the system, design goals, current and proposed software architectures, subsystem decomposition, hardware/software mapping, persistent data management, access control and security, component and deployment diagrams.

4.1.1. Purpose of the system

System designing in terms of software engineering has its own value and importance in the system development process as a whole.

The purpose of the System Design is to supplement the system architecture providing information and data useful and necessary for implementation of the system elements. To provide sufficient detailed data and information about the system and its system elements to enable the implementation consistent with architectural entities as defined in models and views of the system architecture. Design definition is the process of developing, expressing, documenting, and communicating the realization of the architecture of the system through a complete set of design characteristics described in a form suitable for implementation.

4.1.2. Design Goals

Design goals derived from the nonfunctional requirement of the system, which are the description of the feature characteristics and attribute of the system as well as any constraints that may limit the boundary of the proposed solution. Design goals describe the qualities of the system that the developers should consider. The following are the design goals of the proposed system.

- **Security**

  The system should provide a better level of security and integrity of the data held by the system as compared to the current manual system, only authorized person of the system can gain access to the university secured page on the system; and only users with valid password and username can login to view user's page. Database security, to

prohibit the database from an unauthorized access, shall be implemented using ASP.NET Authorization and Authentication feature.

- **Performance and Response time**

  The system should have high performance rate when executing user input and should be able to provide feedback or response within a short time span.

  To meet system performance:-

  - Minimize the page navigation, no more than two navigation path for any activities of the system.
  - Using pup up and tabs to minimize page reload which is take much time when reload the page many times for the specific functionality.
  - Avoiding redundancy of codes increase the time of operation and memory space of the system.

- **Usability**:

  The system allow users to access and operate on it, because the user interfaces are easily understandable and user guide line will prepared to help users to access the system.

  To meet usability we will design the system like:

  - To remove any ambiguity regarding the consequences of an action e.g. clicking on Add/delete/remove.
  - Help –the system have help disk how to use the system.

- **Availability**

  This system should always be available for access at 24 hours, 7 days a week unless in the occurrence of any major system malfunctioning, the system should be available in all working days

4.2. Current Software Architecture

The existing system of DBU live meeting system is manual. Hence, there is no software architecture for it.

4.3. Proposed Software architecture

4.3.1. Overview

In this project, the team uses a three-tier architecture, which has three layers. These three layers are the Application or Presentation layer, the business layer and the data access layer. Application or presentation layer is the form that provides the user interface to either programmer or end user.

The business layer is the class that the team uses to write the function that works as a mediator to transfer data from application layer or presentation layer to data layer. This layer also has a property layer which is a class where variables are declared corresponding to the fields of the database which can be required for the application and make the properties so that the team can get or set the data using these properties into the variables. The third tire is the data access layer, which is also a class to get or set data to the database queries back and forth. This layer only interacts with the database. The database queries or stored procedures will write here to access the data from the database or to perform any operation to the database.

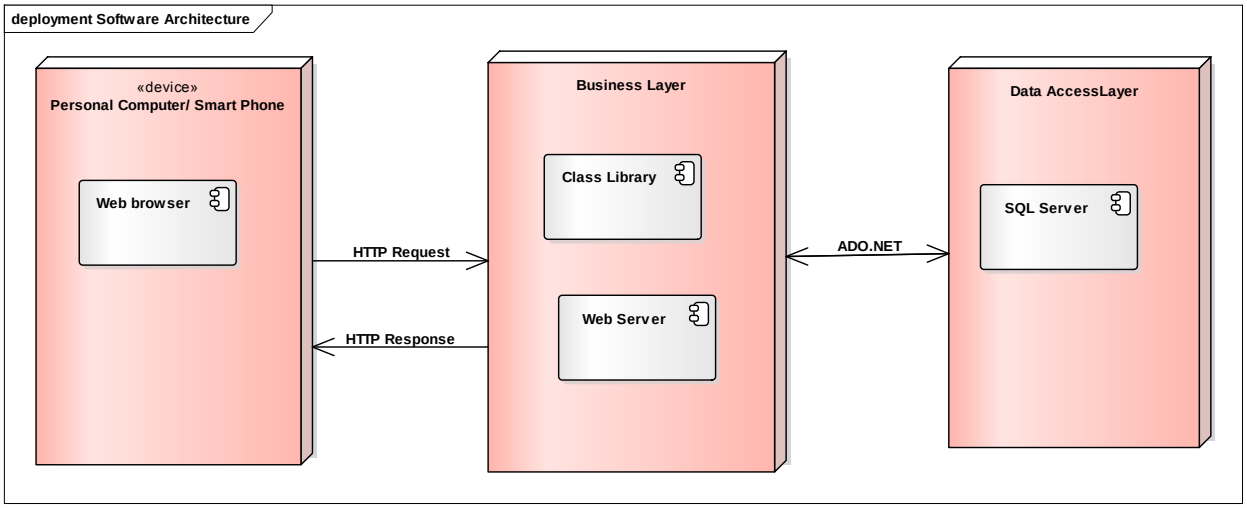

Figure 16 Proposed Software Architecture

4.3.2. Subsystem Decomposition

The process of "subsystem decomposition" can increase the levels of abstraction in a software architecture. The goal of subsystem decomposition is to obtain weak coupling between subsystems.

Our system decomposed into the following subsystems.

1. **Manage User Account subsystem:** This subsystem has the following functional requirements.

   REQ 1: Create user account. **REQ 3:** Assign Role

   REQ 2: Update User account

2. **Manage Meeting Group Subsystem:** This subsystem has the following functional requirements.

   REQ 1: Assign group **REQ3:** View group

   REQ 2: Update group **REQ4:** Delete group

3. **Schedule Subsystem:** This subsystem has the following functional requirements.

   REQ 1: Prepare Schedule

   REQ 2: View Schedule

4. **Manage Report Subsystem:** This subsystem has the following functional requirements.

   REQ 1: Prepare Minutes **REQ3:** View minutes

   REQ 2: Summarize Minutes **REQ4:** View attendance

5. **Conduct meeting Subsystem:** This subsystem has the following functional requirements.

   REQ1: Video meeting **REQ4:** Reply

   REQ2: Record video **REQ5:** Text meeting

   REQ3: Comment

6. **Manage turn subsystem:** This subsystem has the following functional requirements.

   REQ1: Create turn **REQ3:** Confirm completion

   REQ2: Inform turn

7. **Manage Meeting File sub system**: This subsystem has the following services.

   REQ1: Store file **REQ3:** View file

   REQ2: Delete file

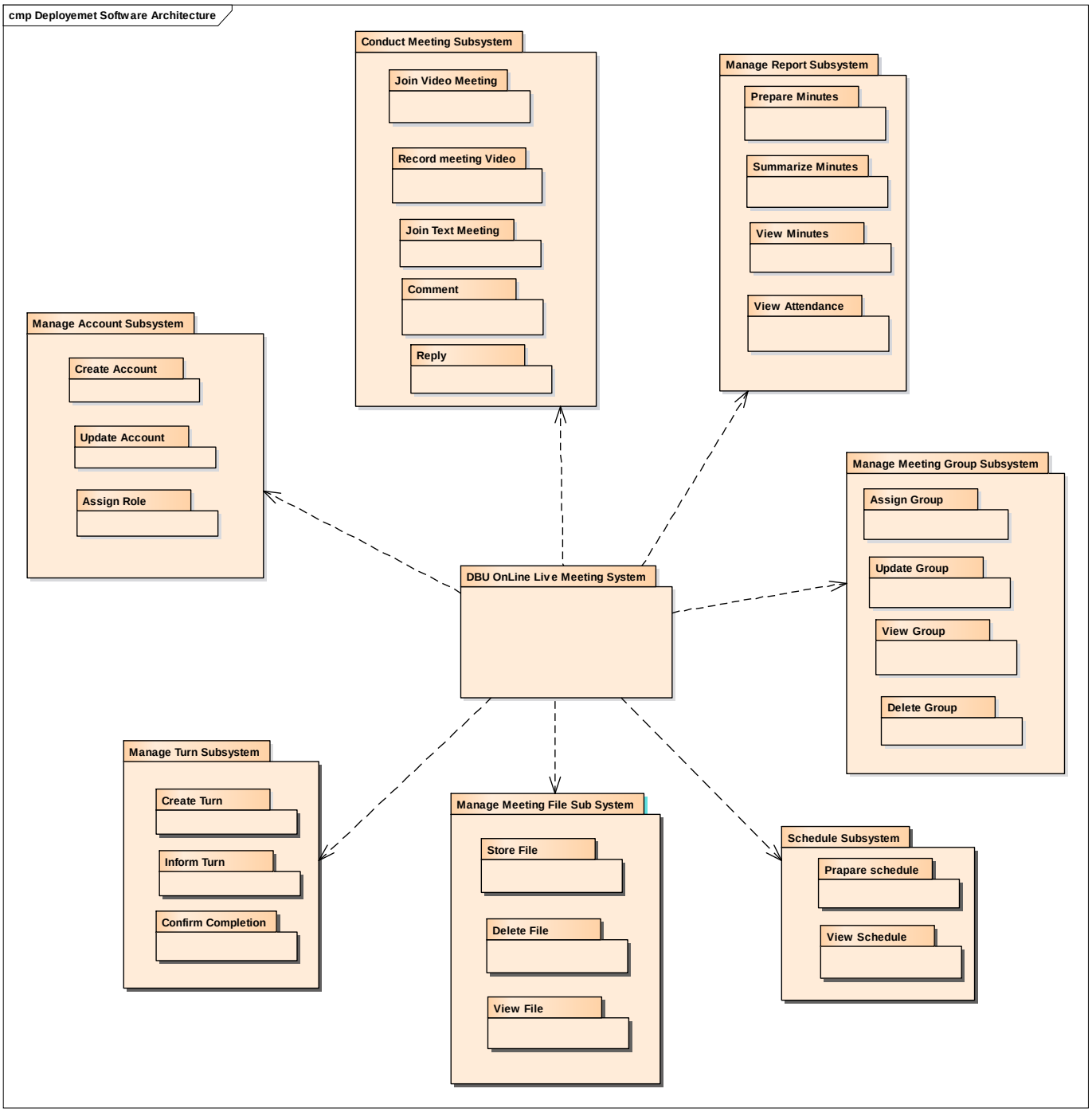

Figure 17 Sub System Decomposition

4.3.3. Hardware/Software Mapping

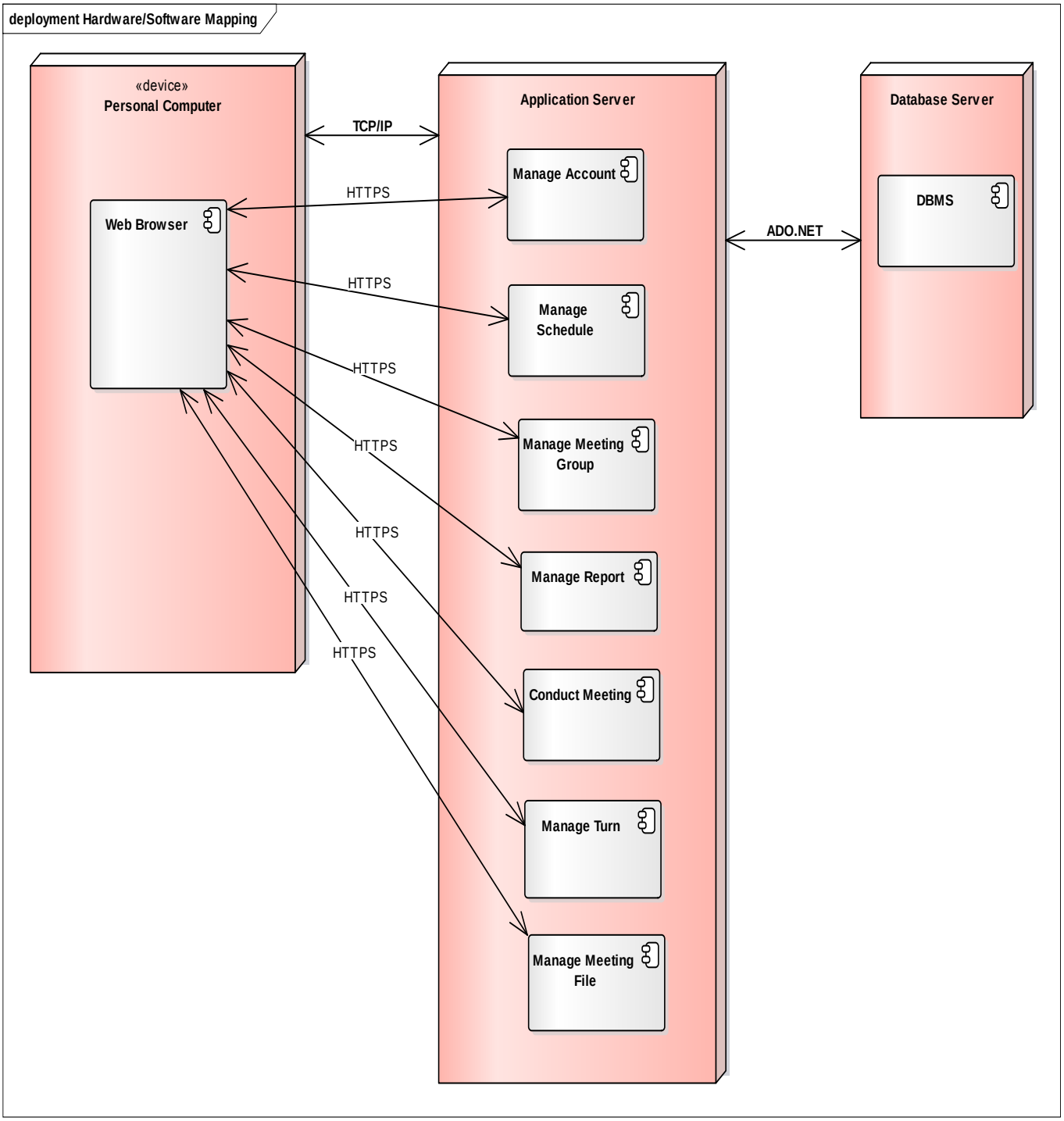

Figure 18 Hardware / Software Mapping

4.3.4. Persistence Data Management

4.3.4.1. Mapping

In order to store information persistently we map objects into tables and the attributes into fields to the specific table based on the objects found on the system. Therefore, we identified five major tables that will implement on the system. For this reason, the mapping of objects to tables are display as follows:-

Figure 19 Mapping

4.3.4.2. Database Design

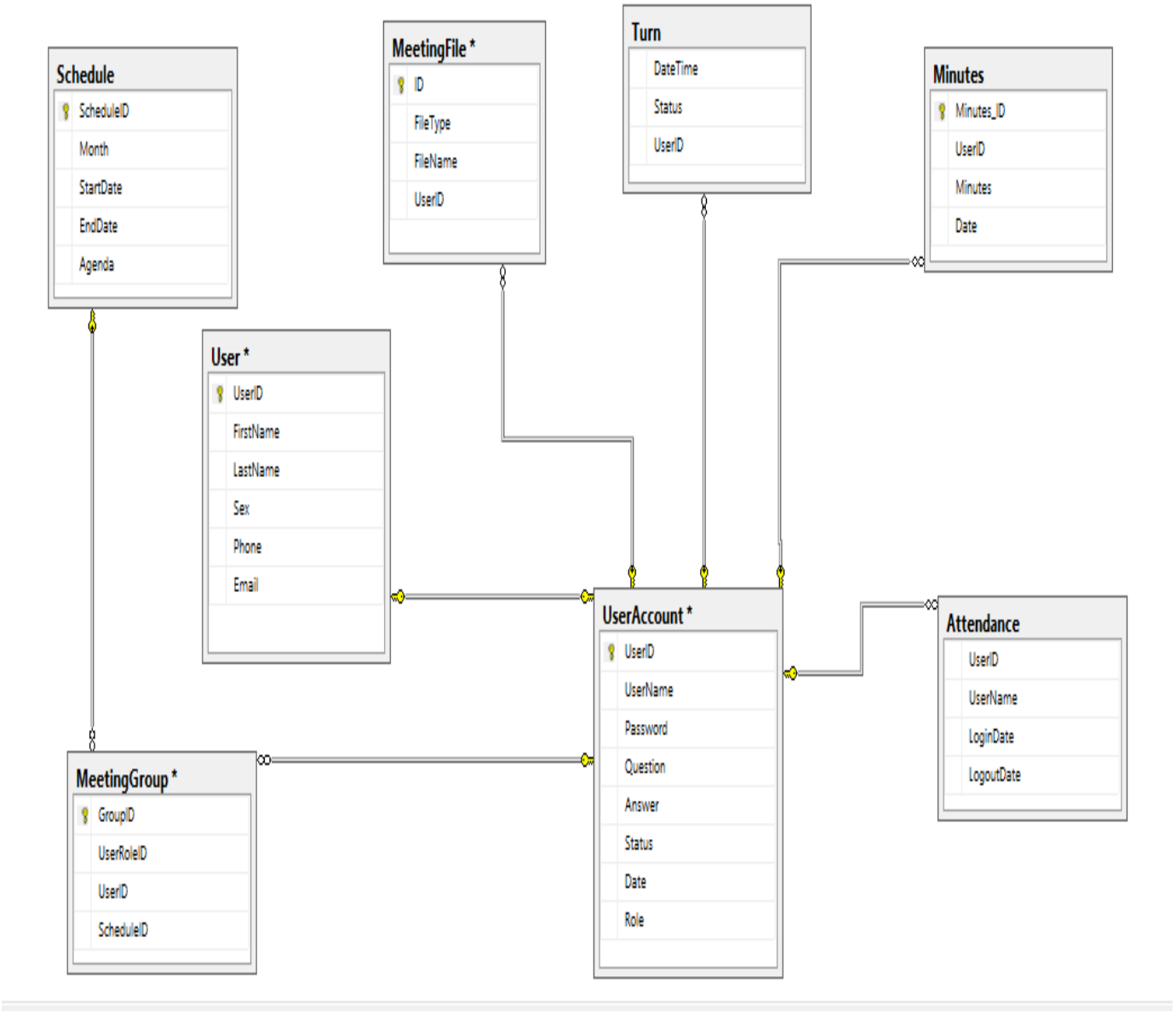

Figure 20 Database Design

4.3.5. Access Control and Security

Here clearly describe the way we will use to secure our system and the issues associated with access control within our system; we should also specify which actions is given to which user under what condition. Access to the system must controlled by creating different authentication levels and using password for login purposes. Any people who have the authentication to use the system have to provide a username and password in order to perform what it supposed to do. Multiple levels of security protect sensitive documents and files from unauthorized users. Each user has a security access level and each document has a sensitivity level

Operation	Administrator	Meeting Manager	Meeting Leader	Plenary
login	✓	✓	✓	✓
Update Account	✓	×	×	×
Assign Meeting group	×	✓	×	×
Create Account	✓	×	×	×
Assign Role	✓	×	×	×
View meeting group	×	×	✓	✓
Summarize Minute	×	✓	×	×
Conduct meeting	×	✓	✓	✓
Prepare Schedule	×	✓	×	×
View Schedule	×	×	✓	✓
Comment	×	✓	×	✓
Prepare Minutes	×	×	✓	×
View Minutes	×	✓	×	×
Record Meeting Video	×	✓	✓	✓
View Attendance	×	✓	×	×
Reply	×	✓	✓	✓
Text Meeting	×	✓	✓	✓
Video Meeting	×	✓	✓	✓
Logout	✓	✓	✓	✓
Create turn	×	✓	×	✓
Confirm completion	×	×	×	✓
Manage Meeting File	×	✓	✓	✓
Inform turn	×	×	✓	×

Table 20 Access Control and Security

4.4. Subsystem Service

- **Manage User Account subsystem**: This subsystem has the following Service
  - **Create user account**: This subsystem service used to create personal user account that used to access the system.
  - **Update User account**: This subsystem service used to update the personal user account that used to active or inactive the account temporarily and any other updating is required.
  - **Assign Role**: This subsystem service used to give the user grant that used to access the system in what and when you use and used to identify who use for this and that.
- **Manage Meeting Group Subsystem:** This subsystem has the following Service.
  - **Update group**: This subsystem service used to update meeting group.
  - **Delete group**: This subsystem service used to delete the meeting group.
  - **View Assign Group:** This subsystem service used to view the assign meeting group and meeting leaders.
  - **Assign Meeting Group:** This subsystem service used to assign the meeting group, meeting leader and plenary.
- **Conduct meeting subsystem:** This subsystem has the following Service.
  - **Record Video:** This subsystem service used to record the meeting video.
  - **Video Meeting:** this subsystem service used to make or conduct video meeting.
  - **Text Meeting:** this subsystem service used to make a text message meeting.
  - **Comment:** this subsystem service used to give the comment for plenaries, meeting leaders and all over the meeting.
  - **Reply:** this subsystem service used to give response to comments and questions to the questioner.
- **Schedule Subsystem:** This subsystem has the following Service.
  - **Prepare Schedule**: this subsystem service used to prepare the meeting schedule.
  - **View Schedule**: this subsystem service used to view the schedule of the meeting that is prepared by the meeting manager.
- **Manage Report Subsystem:** This subsystem has the following Service.
  - **Prepare Minutes**: this subsystem service used to prepare minutes (reports) about the meeting.
  - **View Minute:** This subsystem service used to view the minutes or report prepared by meeting leaders.

- **View Attendance**: This subsystem service used to view the participated plenaries in the meeting by using of the start and end date.
- **Summarize minute**: This subsystem service used to view or accept minutes or reports from the meeting leader and summarize it.

❖ **Manage Turn Subsystem:** This subsystem has the following services.

- **Create Turn:** This subsystem service used to create a turn for raising comments, replies and questions.
- **Inform Turn:** This subsystem service used to inform the created turn to start the comment, questions and replies
- **Confirm Completion:** This subsystem service used to confirm the informed user is complete their work or comment, questions and replies.

❖ **Manage Meeting File sub system**: This subsystem has the following services.

- **Store file:** This sub system service used to store meeting files.
- **Delete file:** This sub system service used to delete meeting files.
- **View file:** This sub system service used to view meeting files.

4.5. Component Diagram

In the unified modeling language, a component diagram depicts how components are wired together to form large components or software systems. They used to illustrate the structure of arbitrarily complex systems. Show how the physical components of a system are organized, and shows which component or objects will be accessed by whom and what type of security infrastructures it is using. The diagram simulated as follows.

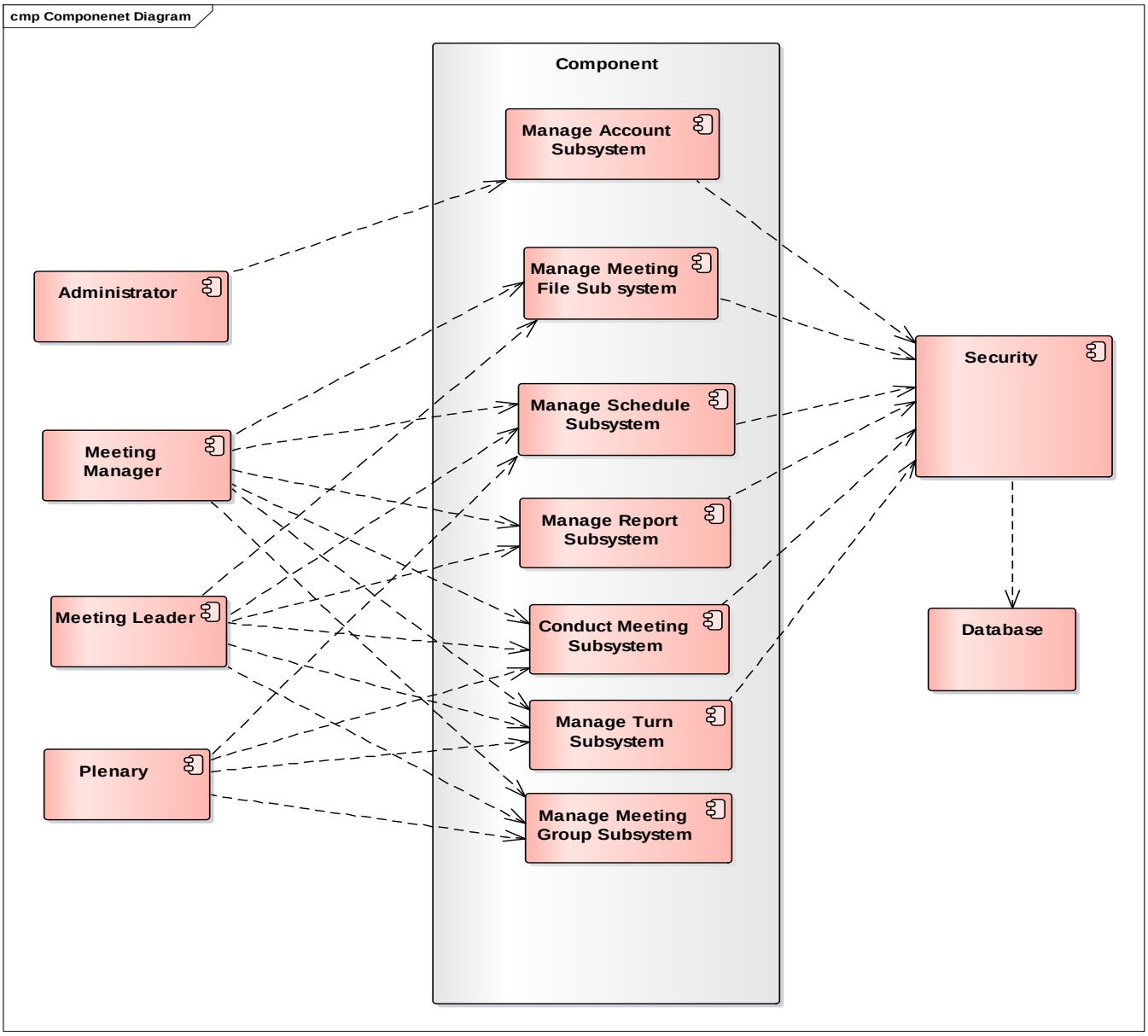

Figure 21 Component Diagram

4.6. Deployment Diagram

Our system will deployed on the application server that is Internet Information Service (IIS), and clients can access the system with HTTPS request to this application server. The application server access the database with ADO.NET.

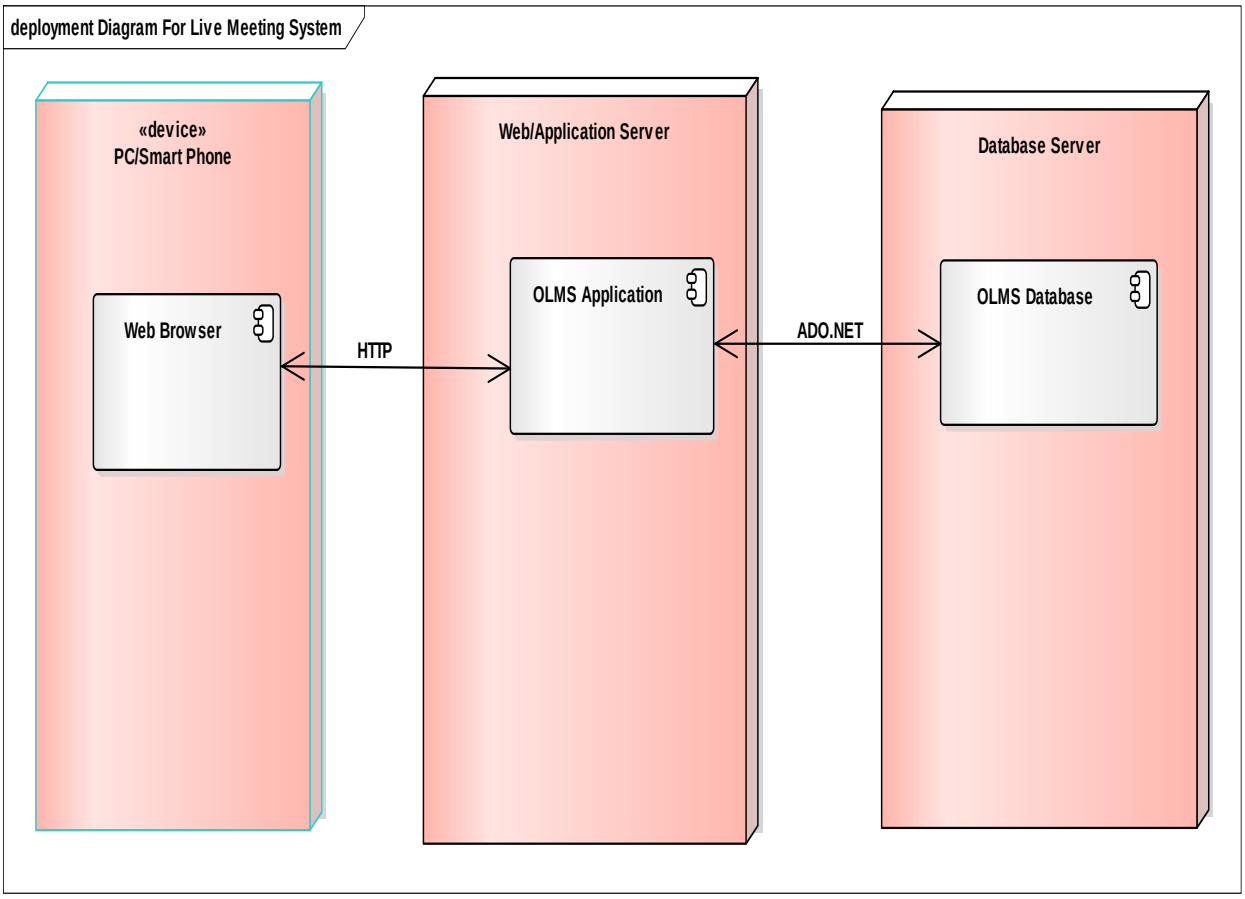

Figure 22 Deployment Diagram

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