

# **SRS on SPL Management System**

## **Submitted as**

SRS document of SPL-2

Course: SE 503

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## **Chapter - 1: Introduction**

### **1.1 Introduction**

**SPL (Software Project Lab) Management System** is a web based application which aims to help the students and SPL board of IIT, DU. This application will help the students to find appropriate supervisors for SPL-1, SPL-2 and SPL-3. Supervisors will be assigned automatically through this system according to their interested topic. It will help the SPL board to manage SPL's through posting any notice, evaluate continuous marks, and check the progress of students.

### **1.2 Purpose**

In the Institution Of Information Technology, there are three courses in 3rd, 5th and 8th semester named respectively SPL-1, SPL-2 and SPL-3. SPL committee members sometimes face some troubles in supervisor allocating. Each of the groups/students is required to present their progress weekly to the coordinator. Coordinator has to maintain the progress as the form of attendance and he/she has to evaluate the progress of students. There is one project proposal presentation, one/two mid

presentation carries and one final presentation carrying a certain mark which has to be stored in hard copy. Then the coordinator has to count these marks separately. Sometimes students can't get the idea what to do or not in their SPL.

This application will digitalize those things to ease both teachers and students' activity.

### **1.3 Intended Audience**

In order to create a versatile, efficient and convenient system, developers must fully comprehend its future functions, users, and supposed benefits. Only after this step, they will be able to plan and coordinate their efforts, choose the most appropriate technologies, anticipate potential problems and come up with solutions. The supposed users of SPL Management System may be generally divided into three categories:

1. SPL Board
2. Teachers
3. Students.

Each category should have a separate set of rules for clearance and restrictions within the system. This set depends on a user's role and varies from unrestricted access granted to the highest administration members, to limited access to a certain portion of information for students. For example, a teacher should have access to his student's data. Every user should have a unique identifier, which associates the person with that person's rank in the system. Users with higher ranks and more permissions within the system may need additional means of authorization.

### **1.4 Conclusion**

This software requirement specification is more than helpful to identify the owner and stakeholder of the project. As it is working as the baseline of the project which reflects both the demand of the SPL Board as well as the students so that the system is up to the function it needs to be. As this document is addressed as the bible of the project, the document content may evolve with the passage of modification and enhancement of the software whenever it is necessary.

# Chapter - 2: Inception

## 2.1 Inception

SPL Management System is a web based application which will help an institution named IIT to manage its Software Project lab (SPL). This application will help the SPL committee to assign supervisors in SPL-1, SPL-2, SPL-3. It will help the course evaluators in evaluation of both continuous and final marks.

## 2.2 Inception procedure

At the beginning of our project, we entered the inception stage. This stage includes how the project will be started and its scope and limitations. The main goal of this phase is to identify the requirements, demand and establish some sort of mutual understanding between the software team and the stakeholders of SPL Management System. In order to make this phase effective we took the following steps:

- Identifying the client of our project
- Icebreaking
- Identifying the stakeholders of TestCube
- Identifying the multiple viewpoints of stakeholders

## 2.3 Identify The Client of Project

Any programmer wanting to test their code with ease is our potential client. An inexperienced programmer who does not know much about generating test cases and testing in general can be identified as a client of this project.

## **2.4 Icebreaking**

Icebreaking refers to the fact that to diminish the communication barrier between two people. It is a crucial part since it denotes the acceptance of our proposal. We started this phase by talking with the stakeholders with context free languages. Their behavior, responding to our question, impacted the whole system.

## **2.5 Identify The Stakeholders of Project**

Stakeholder refers to any person or group who will be affected directly or indirectly by the system. Stakeholders include end-users who interact with the system and everyone else in an organization who may be affected by its Installation. SPL Management System has a limited number of stakeholders. They are:

- Teachers of IIT
- Students of IIT

## **2.6 Viewpoints of Stakeholders**

### **Teachers of IIT:**

1. Teachers will have their accounts.
2. Availability to use everywhere.
3. Teachers Accounts will be created by admin and then admin will notify the users to change the password by logging in.
4. Anyone with the permission of authority can be the admin of the system.
5. SPL Manager will be able to post any notice.
6. Committee head will randomize the SPL-1 supervisor.
7. The system will suggest a supervisor to the committee for the students who won't be able to convince any supervisor for SPL-2/3 according to students' ideas. Then the committee head will request the teachers to be supervisors by maintaining hierarchy or suggestion.

8. After assigning a supervisor, the supervisor can post any notice which is visible to his/her students. Supervisor can also post the same notice for SPL-1/2/3 students by customizing the visibility.
9. Every student will get three different supervisors in their three SPL.
10. Supervisor and SPL Manager will be able to track the students' activity progress through github repository or weekly reporting or progress check box.
11. Course faculty will maintain the students' progress through attendance and a certain mark will be added by Course faculty in students' continuous evaluation.
12. Supervisor will be able to upload marks of the students with admin's permission which aren't editable.
13. Committee members will be able to mark students in presentations individually. The Committee Head will be able to add an extra evaluator for presentations.
14. Continuous evaluation will be visible to students after publishing the marks and final marks will be visible to only committee members.
15. Final mark sheet will be ready by adding all other marks which are visible to committee members.
16. Finally, the application should be easy to use.

### **Students Of IIT:**

1. Students will have their accounts
2. Teachers will be able to share his/her interested field in which he/she is willing to work as well as students can share their interest.
3. Students of SPL-2, SPL-3 will be able to request any teacher to be their supervisor by sharing their ideas. Teachers can accept or skip the request.
4. SPL manager notice and supervisor notice should be differentiable.

## 2.7 Conclusion

The primary goal of this project is to model and design software for the programmers including beginners to generate unit test cases for their given code and make it easy to use. For this reason, the software needs to be simple. The software will be designed in such a way as it takes very little time to get started.

And also clearing out facts about what users want, how the software will work, how it can be more convenient, how it will save time and energy.

## Chapter - 3: Elicitation

### 3.1 Quality function deployment:

**Quality Function Deployment (QFD)** is a technique that translates the needs of the customers into technical requirements for software. Ultimately the goal of QFD is to translate subjective quality criteria into objective ones that can be quantified and measured, and can then be used to design and manufacture the product. It is a methodology that concentrates on maximizing customer satisfaction from the software engineering process. So, we have followed this methodology to identify the requirements for the project. The requirements which are given below, are identified successfully by the QFD.

#### Normal Requirements:

1. Admin, Teachers and Students will have their accounts.
2. Anyone with the permission of authority can be the admin of the system.
3. Teachers Accounts will be created by admin and then admin will notify the users to change the password by logging in.
4. Students will create their account.
5. Committee head and SPL Manager will be able to post any notice.
6. Committee head will randomize the SPL-1 supervisor.
7. Teachers will be able to share his/her interested field in which he/she is willing to work as well as students can share their interest.
8. Students of SPL-2/3 will be able to request any teacher to be their supervisor by sharing their ideas. Teachers can accept or skip the request.
9. The system will suggest a supervisor to the committee for the students who won't be able to convince any supervisor for SPL-3 according to students'

ideas. Then the committee head will request the teachers to be supervisors by maintaining hierarchy or suggestion.

10. After assigning a supervisor, the supervisor can post any notice which is visible to his/her students. Supervisor can also post the same notice for SPL-1/2/3 students by customizing the visibility.
11. Every student will get three different supervisors in their three SPL.
12. Supervisor and SPL Manager will be able to track the students' activity progress through the progress check box.
13. Course faculty will maintain the students' progress through attendance continuous development and a certain mark will be added by Course faculty in students' continuous evaluation.
14. Supervisor will be able to upload marks of the students with admin's permission which aren't editable.
15. Committee members will be able to mark students in presentations individually. The Committee Head will be able to add an extra evaluator for presentations.
16. Continuous evaluation will be visible to students after publishing the marks and final marks will be visible to only committee members.
17. Final mark sheet will be ready by adding all other marks which are visible to committee members.

### **Expected Requirements:**

1. Any notice's visibility from coordinator or admin, can be customized.
2. Information regarding faculty members to be available for students.
3. Admin will be able to assign any supervisor manually.
4. Admin will be able to modify any marks manually (will notify committee head).
5. Data archive for previous year students.

### **Exciting Requirements:**

1. The system will suggest supervisors to students according to their interest.

## **3.2 Usage Scenario**

### **3.2.1 Account Management**

There will be 3 types of accounts: **Admin account, Teachers account, and Students account.**

The admin account is responsible for **creating teachers accounts**. After creating a teacher's account an email will be sent with a password (generated by the system) and **users will be able to change the password** by logging in. Students will create their account by using **IIT mail**. Users can **edit their information** and **recover the account** if they forget the password. In signing, every user will use email and password. After checking authentication, they'll be logged in.

### **3.2.2 SPL Committee Formation**

There will be three separate committees for SPL-1, SPL-2 and SPL-3. Every committee will be formed with **certain members** and **a committee head**. The admin can select/remove/update the committee head and members for these three committees.

- **SPL Committee Head :** Committee Head can also add any teachers as a committee member if needed. Committee head can select/remove/update a teacher as SPL manager.
- **SPL committee member:** They are involved in some evaluation process. Committee members can post any notice which visibility can be customized.
- **SPL manager:** He/she will monitor and evaluate the regular progress of students in the form of attendance and continuous development of the project.

And He/she will publish continuous marks. SPL managers will be able to post any notice for students.

### 3.2.3 Supervisor Allocation

Every teacher can supervise some students or some groups in these three SPL. Every student will get three different supervisors in their three SPL.

1. **SPL-1:** In SPL-1 supervisor will be assigned randomly which can be initiated by the admin/the SPL committee head.
2. **SPL-2:** In SPL-2 students will **form a group** of a certain number of members through a **form fill up**. These groups can be viewed by the committee and SPL manager. Then the groups can send requests to teachers to be their supervisor by sharing their ideas. A teacher can accept or reject the request. Then the SPL-2 committee head can initiate supervisor-allocation for remaining groups by maintaining teachers' hierarchy. Teachers will be notified to respond whether he/she is willing to take that group or not. Teachers have to respond within a given time.

The SPL-2 committee head can assign any teacher as a supervisor manually and he/she can **assign students in a group manually**.

3. **SPL-3:** In SPL-3 students will send requests to teachers to be their supervisor by sharing their ideas. A teacher will be able to accept or reject the request. The system will suggest supervisors to SPL-3 committee head for those students who can't manage the supervisor. System will use students' shared ideas to match with teachers' interests. Then the SPL-3 committee head can initiate supervisor-allocation for remaining students. Teachers will be notified to respond whether he/she is willing to take that group or not. Teachers have to respond within a given time. This process can be continued.

The SPL-3 committee head can assign any teacher as a supervisor manually.

### 3.2.4 Project Room

After allocating supervisor, students and the supervisor will be in a project room where the supervisor can post any notice and maintain a progress bar on the basis of some specific tasks. Supervisor will mark those tasks as done when students can

finish those. Students and SPL managers will see that progress bar as a form of progress. Students and SPL Managers will view this progress bar only.

### 3.2.5 Marking System

In SPL-1, SPL-2 and SPL-3 there are some evaluation criteria to evaluate the students. The full evaluation will be in certain marks. Committee head can set the individual percentage for every evaluation process. These are-

- SPL managers can add a percentage in the form of attendance and continuous progress of the project.
- There will be 2/3 presentations where the committee head will create a presentation event. Teachers who have an event link can act as evaluator in presentation. Finally the average of those marks will be added for a particular student and will be sent to committee members.
- Supervisor can add a percentage when the committee head gives permission. This mark will be visible only to this supervisor and committee members.
- Final presentation or code evaluation has a certain percentage. This mark will be visible only to this supervisor and committee member.

Committee members can see all other marks but supervisor and SPL manager will see their marks only. Committee can publish some portion of these marks as a continuous evaluation for students.

The system will collect these marks and add these for every student and a final grade sheet will be generated. Admin will promote a student to the next SPL. **Any marks can be updated manually by committee member/head.**

# Chapter - 4: Scenario Based Modeling

## 4.1 Introduction

Although the success of a computer-based system or product is measured in many ways, user satisfaction resides at the top of the list. If we understand how end users (and other actors) want to interact with a system, our software team will be better able to properly characterize requirements and build meaningful analysis and design models. Hence, requirements modeling begins with the creation of scenarios in the form of Use Cases, activity diagrams and swim lane diagrams.

## 4.2 Definition of Use case diagram

A Use Case Diagram captures a contract that describes the system behavior under various conditions as the system responds to a request from one of its stakeholders. In essence, a Use Case tells a stylized story about how an end user interacts with the system under a specific set of circumstances. A Use Case diagram simply describes a story using corresponding actors who perform important roles in the story and make the story understandable for the users. The first step in writing a Use Case is to define that set of “actors” that will be involved in the story. Actors are the different people that use the system or product within the context of the function and behavior that is to be described. Actors represent the roles that people play as the system operators. Every user has one or more goals when using the system.

### Primary Actor

Primary actors interact directly to achieve required system function and derive the intended benefit from the system. They work directly and frequently with the software.

## **Secondary Actor**

Secondary actors support the system so that primary actors can do their work. They either produce or consume information.

## **4.3 Use Case Diagrams**

Use Case diagrams give the non-technical view of the overall system.

**Level : 0**

**Name:** SPL Management System

**Primary Actor:** Admin, Teacher( Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

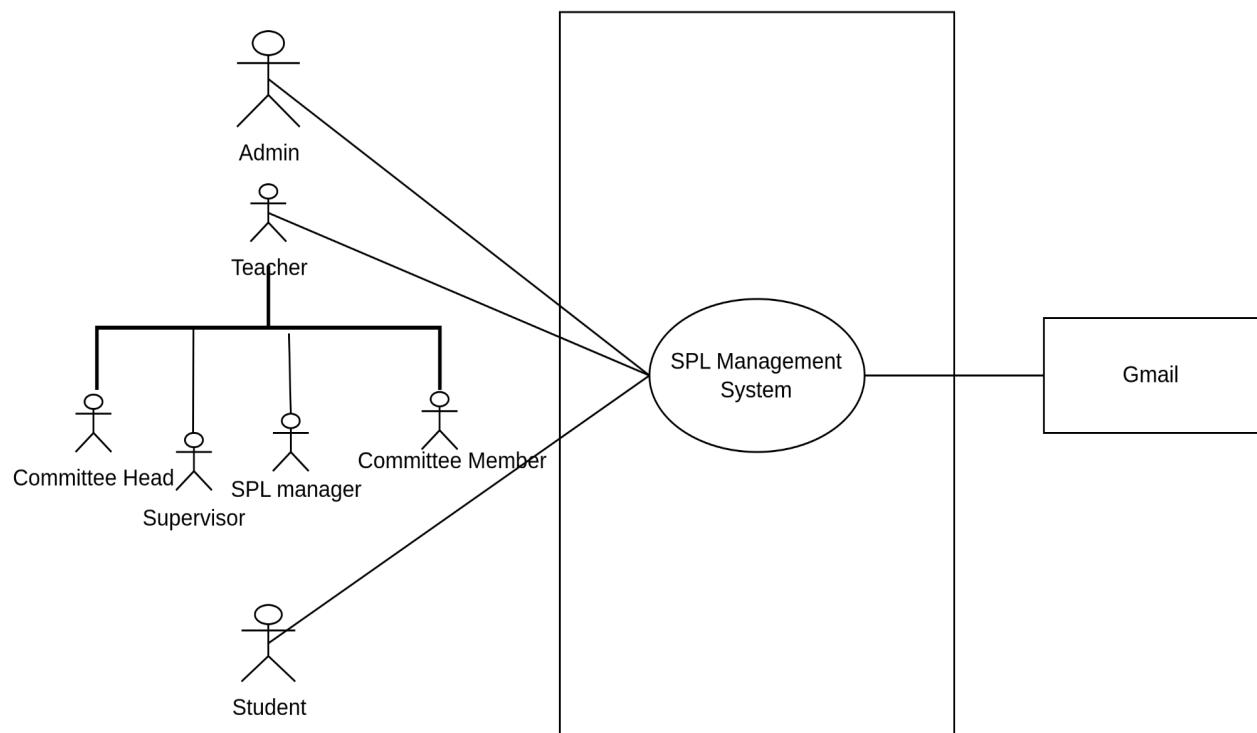


Fig: 4.3.1 (UCD of Level-0 : SPL Management System)

## Level : 1

**Name:** SPL Management System (Project Overview)

**Primary Actor:** Admin, Teacher( Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

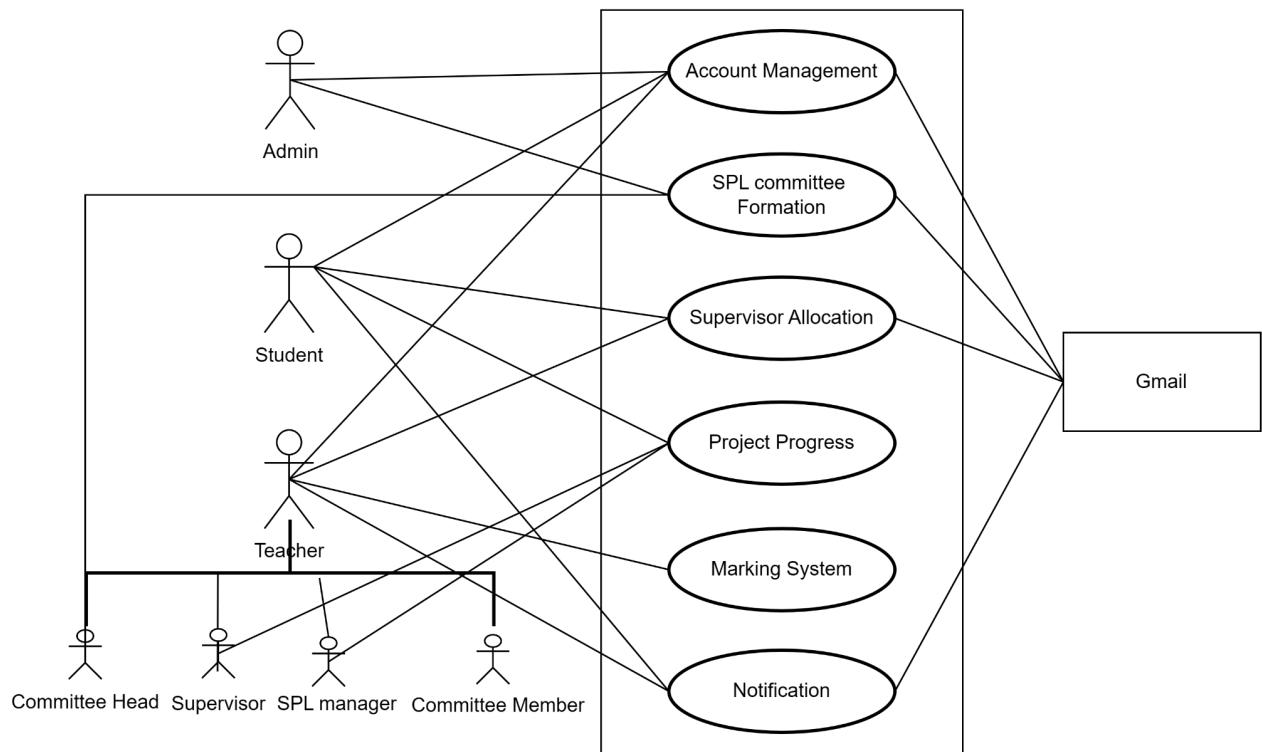


Fig: 4.3.2 (UCD of Level-1: SPL Management System)

### Description:

**1. Account Management:** Admin will create account for all teachers and a mail will be sent to every teacher with credentials(password). Then teachers will be able to change their password and edit account information after login. Every student has to create their own account(sign up). After creating account they will be able to login and edit their account information.

**2. SPL Committee Formation:** The admin will create three separate committees for SPL-1, SPL-2 and SPL-3. Every committee will be formed with certain Members, a Committee Head and a SPL Manager.

**3. Supervisor Allocation:** Every teacher can supervise some students or some groups in these three SPL. There will be three different processes for supervisor allocation of every SPL. Each student will be allocated to 3 separate supervisors across their 3 SPLs.

**4. Project Progress:** It's basically a task bar. If a student finishes his/her tasks, the supervisor will check those tasks. And on the basis of complete tasks, there will be a progress bar showing the percentage of projects completion.

**5. Marking System:** There will be some evaluation criteria to evaluate the marks for every SPL. The full evaluation will be in certain marks. The Committee Head will set the individual percentage for every evaluation process.

**6. Notification:** Supervisor and SPL manager can post any notice. Supervisor's post will be visible to his/her students only. SPL managers can post any notice which visibility will be customized.

## Action & Response:

### 1. Account Management:

**A1:** Admin will create accounts for all teachers.

**R1:** A mail with credentials will be sent to all teachers. And then they will be able to login to the system.

**A2:** Students will create their own account by providing necessary information.

**R2:** A mail with credentials will be sent to them. And then they will be able to login to the system.

### 2. SPL Committee Formation:

**A1:** The admin will create three separate committees for SPL-1, SPL-2 and SPL-3.

**R1:** Every committee member will be notified through mail.

### 3. Supervisor Allocation:

**A1:** The Committee Head will randomly assign supervisors for SPL-1 students.

**R1:** Students will be notified with mail.

**A2:** Students will form groups for SPL2.

**R2:** Other group members will be notified through mail.

**A3:** Groups will request teachers to be their SPL-2 supervisor.

**R3:** Teachers can accept or reject group requests.

**A4:** Students of SPL-3 will request teachers to be their supervisor.

**R4:** Teachers can accept or reject group requests.

**A5:** Committee Members will initiate supervisor-allocation for SPL-2 and SPL-3 for the groups/students who didn't find any supervisor.

**R5:** Teachers can accept or reject Committee Members' requests.

**A6:** The Committee Member will manually allocate supervisors for remaining groups/students of SPL-2 and SPL-3.

**R6:** Teachers and Students will be notified with corresponding messages.

#### **4. Project Progress:**

**A1:** Check Proposal submission as done.

**R1:** Done. Show a percentage of total project completion.

**A2:** Check SRS report as done.

**R2:** Done. Show a percentage of total project completion.

#### **5. Marking System**

**A1:** Set 15% marks for Mid1 Presentation

**R1:** Mid1 will carry 15 marks

**A2:** Permit supervisor to give marks

**R2:** Supervisor can submit marks

**A3:** Add another Teacher in Presentation

**R3:** Added teacher in presentation

**A4:** Add SPL manager Marks

**R4:** SPL manager's Marks Added

**A5:** Generate Final grade sheet

**R5:** Generated

#### **6. Notification:**

**A1:** post Notification for all

**R1:** Posted

## Level : 1.1

**Name:** Account Management

**Primary Actor:** Admin, Teacher( Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

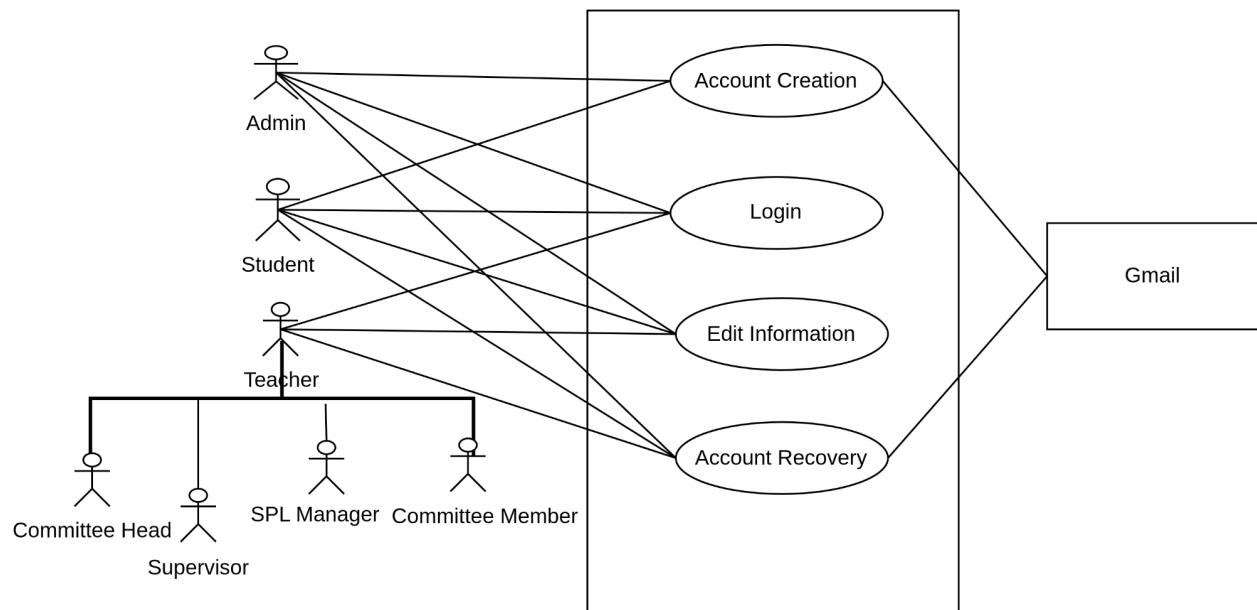


Fig: 4.3.3 (UCD of Level-1.1 : Account Management)

### Description:

- 1. Account Creation:** Admin will create account for all teachers and a mail will be sent to every teacher with credentials(password). Every student has to create their own account with necessary credentials(name, email, password).
- 2. Login:** All users need to be logged into the system. All users can login by providing required information.
- 3. Edit Information:** After logged in every user will be able to edit their account information.

**4. Account Recovery:** Every user will be able to recover the account if they forget the password.

## **Action & Response:**

### **1. Account Creation:**

**A1:** Admin will create accounts for all teachers.

**R1:** A mail with credentials will be sent to all teachers. And then they will be able to login to the system.

**A2:** Students will create their own account by providing necessary information.

**R2:** A mail with credentials will be sent to them. And then they will be able to login to the system.

### **2. Login:**

**A1:** Each user can login with necessary credentials.

**R1:** System will verify the information and send response to corresponding user.

### **3. Edit Information:**

**A1:** Each user can edit their account information.

**R1:** System will respond with a successful or unsuccessful message.

### **4. Account Recovery:**

**A1:** User will send a request to the server to recover the account with email information.

**R1:** System will respond with a link for account recovery.

## Level : 1.3

**Name:** Supervisor Allocation

**Primary Actor:** Teacher( Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

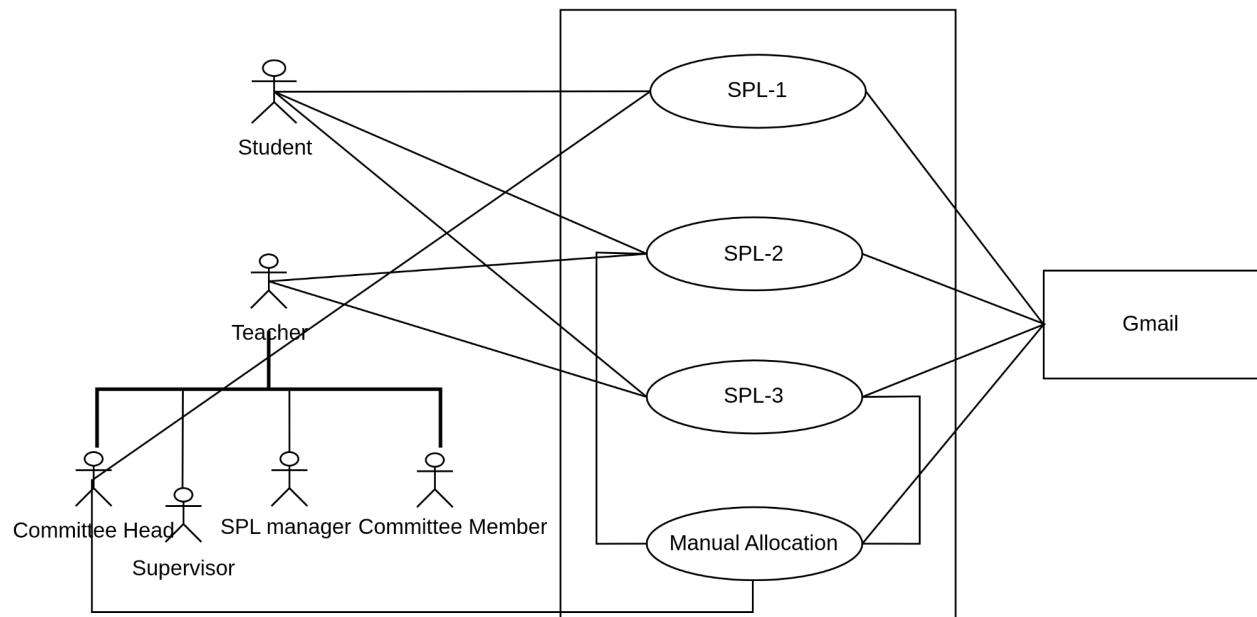


Fig: 4.3.4 (UCD of Level-1.3 : Supervisor Allocation)

### Description:

- 1. SPL-1:** The Committee Head will randomly assign a supervisor for every student.
- 2. SPL-2:** The students will form groups with a specified number of members. Then each group will send requests to teachers to be their supervisor. A teacher can accept or reject the request. For remaining groups, who didn't find any supervisor, the Committee Head will initiate the supervisor-allocation according to teachers' hierarchy.

**3. SPL-3:** SPL-3 is individual. Each student will be able to share their interested field/ideas in account details. The system will suggest appropriate supervisor for students by matching their field/ideas with teachers interested field/area. Then each student will send requests to teachers to be their supervisor. A teacher can accept or reject the request.

For the remaining students, who didn't find any supervisor, the Committee Head will initiate the supervisor-allocation according to teachers' field/area.

**4. Manual Allocation:** The Committee Head will be able to manually allocate supervisor for remaining students of SPL-2 and SPL-3.

### **Action & Response:**

#### **1. SPL-1:**

**A1:** The Committee Head will randomly assign a supervisor for every student.

**R1:** Teachers and Students will be notified with corresponding messages.

#### **2. SPL-2:**

**A1:** Students will form groups for SPL2.

**R1:** Other group members will be notified through mail.

**A2:** Groups will request teachers to be their SPL-2 supervisor.

**R2:** Teachers can accept or reject group requests.

**A3:** Committee Members will initiate supervisor-allocation for SPL-2 and SPL-3 for the groups/students who didn't find any supervisor.

**R3:** Teachers can accept or reject Committee Members' requests.

#### **3. SPL-3:**

**A1:** Students of SPL-3 will request teachers to be their supervisor.

**R1:** Teachers can accept or reject group requests.

**A2:** Committee Members will initiate supervisor-allocation for SPL-2 and SPL-3 for the groups/students who didn't find any supervisor.

**R2:** Teachers can accept or reject Committee Members' requests.

#### **4. Manual Allocation:**

**A1:** The Committee Member will manually allocate supervisors for remaining groups/students of SPL-2 and SPL-3.

**R1:** Teachers and Students will be notified with corresponding messages.

**Level : 1.3.2**

**Name:** SPL-2

**Primary Actor:** Teacher( Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

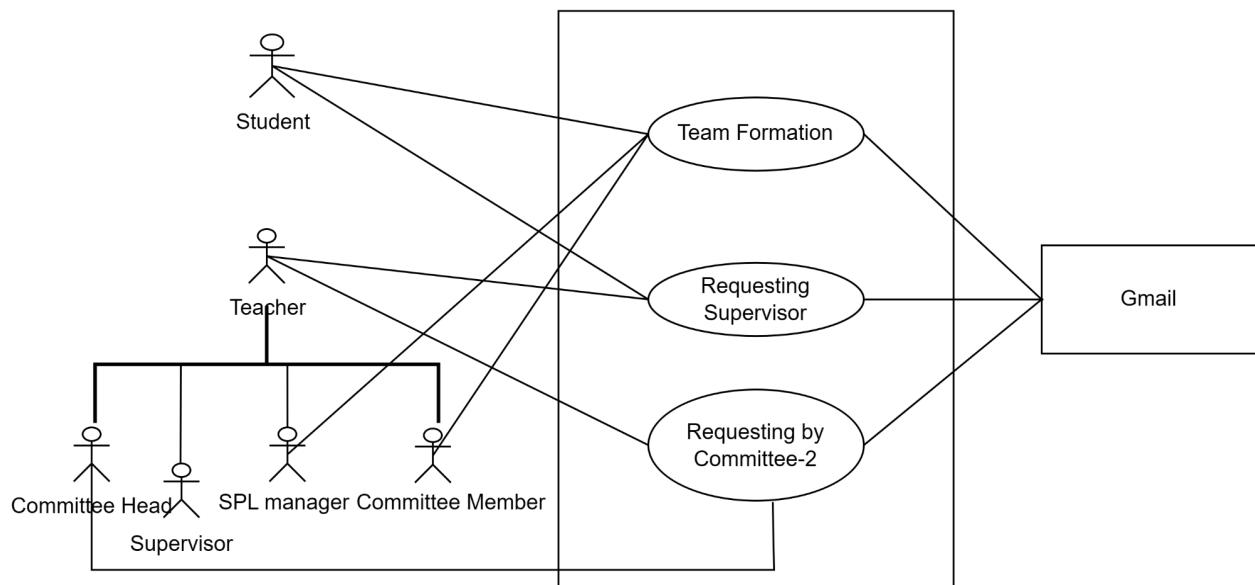


Fig: 4.3.5 (UCD of Level-1.3.1 : SPL-2)

**Description:**

- 1. Team Formation:** The students will form groups with a specified number of members.
- 2. Requesting Supervisor:** Then each group will send requests to teachers to be their supervisor. A teacher can accept or reject the request.

**3. Requesting by Committee-2:** For remaining groups, who didn't find any supervisor, the Committee Head will initiate the supervisor-allocation according to teachers' hierarchy. Teachers will be notified to respond whether he/she is willing to take that group or not. This process can be continued.

### **Action & Response:**

#### **1. Team Formation:**

**A1:** Students will form groups for SPL2.

**R1:** Other group members will be notified through mail.

#### **2.Requesting Supervisor:**

**A1:** Groups will request teachers to be their SPL-2 supervisor.

**R1:** Teachers can accept or reject group requests.

#### **3.Requesting by Committee-2:**

**A1:** Committee Members will initiate supervisor-allocation for SPL-2 and SPL-3 for the groups/students who didn't find any supervisor.

**R1:** Teachers can accept or reject Committee Members' requests.

**Level :** 1.3.3

**Name:** SPL-3

**Primary Actor:** Teacher(Supervisor, SPL Manager, SPL committee member, Committee head), Student

**Secondary Actor:** Gmail

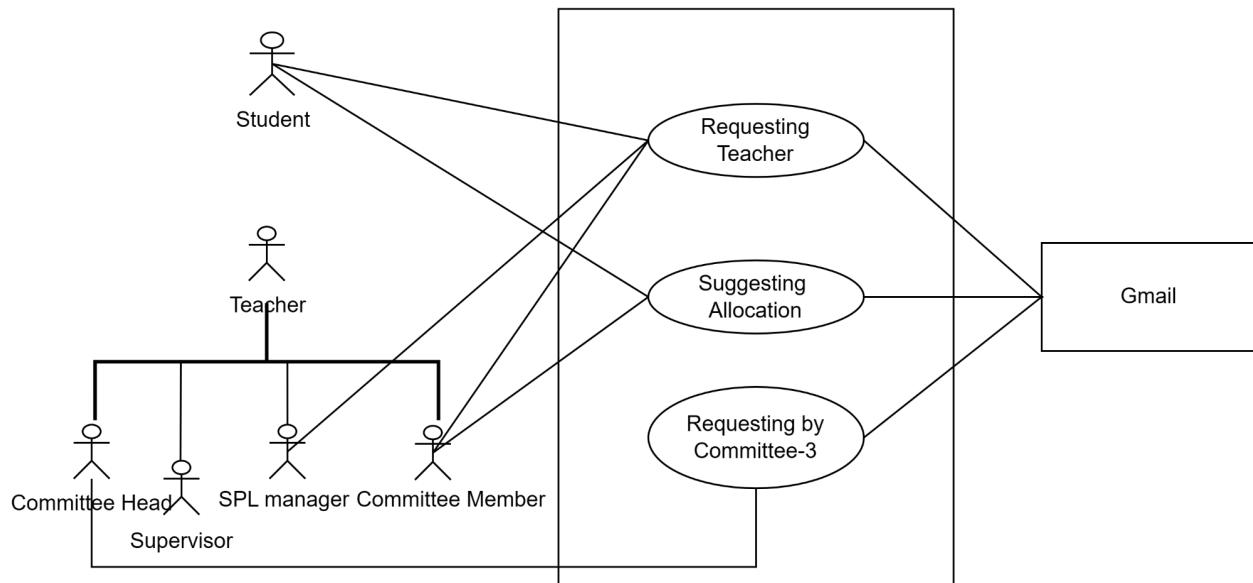


Fig: 4.3.6 (UCD of Level-1.3.2 : SPL-3)

### Description:

- Requesting Teacher:** Then each group will send requests to teachers to be their supervisor. A teacher can accept or reject the request.
- Suggesting Allocation:** The system will suggest appropriate supervisor for students by matching their field/ideas with teachers of the interested field/area.
- Requesting by committee-3:** For remaining students, who didn't find any supervisor, the Committee Head will initiate the supervisor-allocation according to the ideas matched with the teachers idea. Teachers will be notified to respond whether he/she is willing to take that group or not. Teachers have to respond within a given time. This process can be continued.

### Action & Response:

#### 1. Students Request:

- A1:** Students of SPL-3 will request teachers to be their supervisor.  
**R1:** Teachers can accept or reject group requests.

## **2. Suggesting Allocation:**

**A1:** Committee Members and Students will login to the system.

**R1:** System will suggest appropriate supervisors for students by matching their ideas with teachers' interested fields or ideas.

## **2. Requesting by committee-3:**

**A1:** Committee Members will initiate supervisor-allocation for SPL-2 and SPL-3 for the groups/students who didn't find any supervisor.

**R1:** Teachers can accept or reject Committee Members' requests.

### **Level : 1.5**

**Name:** Marking System

**Primary Actor:** Teacher(Supervisor, SPL Manager, SPL committee member, Committee head)

**Secondary Actor:** Student

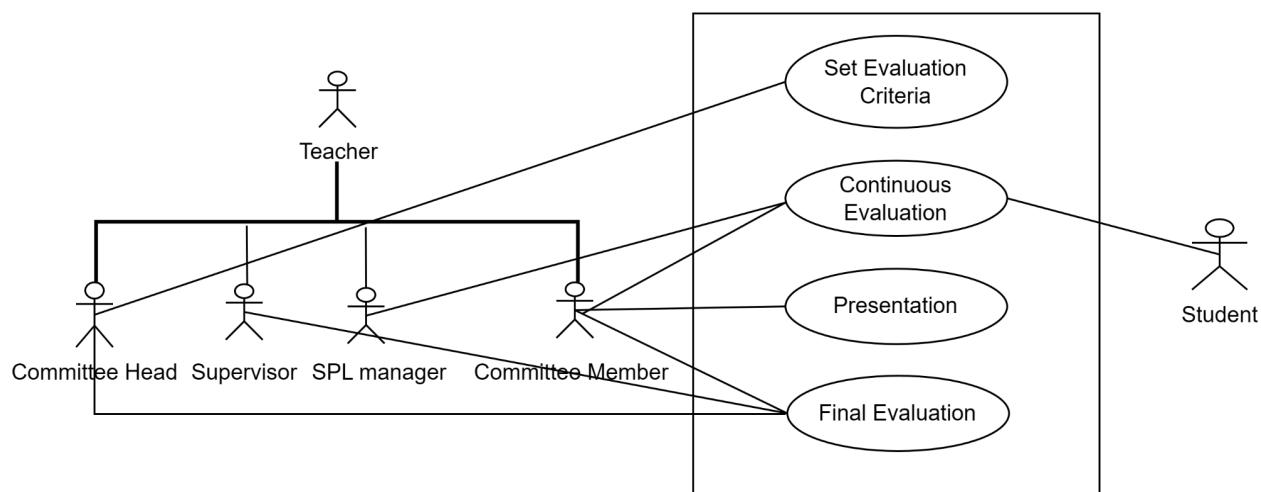


Fig: 4.3.7 (UCD of Level-1.4 : Marking System)

## **Description:**

- 1. Set Evaluation Criteria:** There will be some evaluation criteria to evaluate the marks for every SPL. The full evaluation will be in certain marks. The Committee Head will set the individual percentage for every evaluation process.
- 2. Continuous Evaluation:** SPL Manager will add the marks of continuous evaluation such as attendance, checking progress.
- 3. Presentation:** There will be several presentations in each SPL. Committee Members will mark individual groups or students.
- 4. Final Evaluation:** After the final presentation all marks will be gathered. According to the authority rule a final grade sheet will be generated.

### **Action & Response:**

#### **1. Set Evaluation Criteria:**

A1: Set 30% marks for supervisor  
R1: Supervisor will evaluate in between 30 marks

#### **2. Continuous Evaluation:**

A1: Get SPL manager marks  
R1: Got it  
A2: Add Mid1 Presentation as continuous evaluation  
R2: Added

#### **3. Presentation:**

A1: Add presentation evaluator  
R1: added  
A2: Add Mid1 marks as evaluator1  
R2: Added  
A3: Add mid2 marks as evaluator3  
R3: Added

#### **4. Final Evaluation:**

A1: Get presentation marks  
R1: Got it  
A2: Average presentation marks  
R2: Average done  
A3: Add all percentage  
R3: Added  
A4: Generate Final grade sheet  
R4: Generated

#### **4.4 Activity Diagram**

Activity diagram is an important behavioral diagram in UML diagram to describe the system. Activity diagram is essentially an advanced version of flowchart that models the flow from one activity to another activity.

#### **Level-1: Activity Diagram of Use Case Diagram Level-1:**

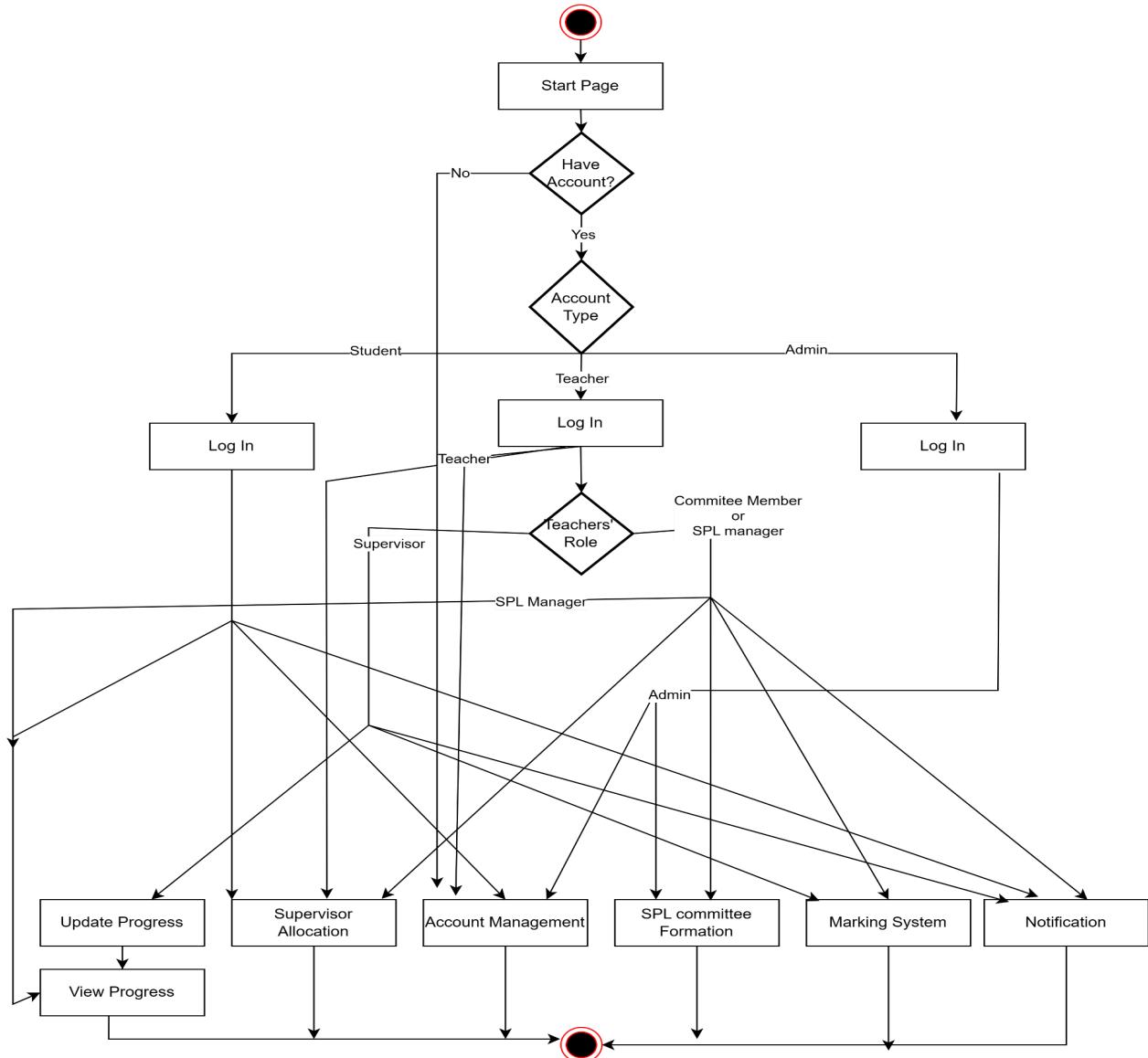


Fig: 4.4.1 Activity Diagram of Level 1 : SPL Management System

### Level-1.1: Activity Diagram of Use Case Diagram Level-1.1:

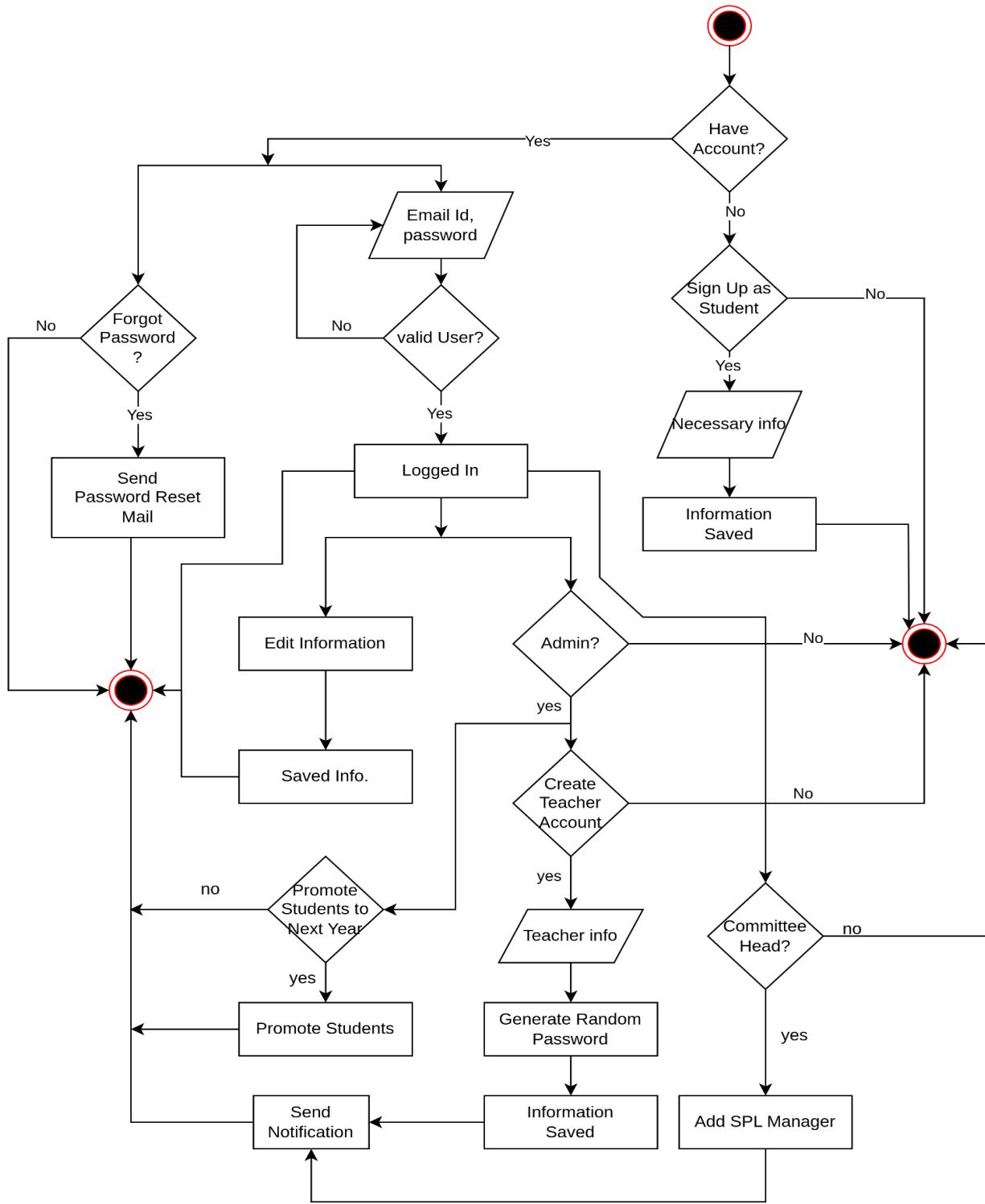


Fig: 4.4.2 (Activity Diagram of Level 1.1 : Account Management)

### Level-1.3: Activity Diagram of Use Case Diagram Level-1.3:

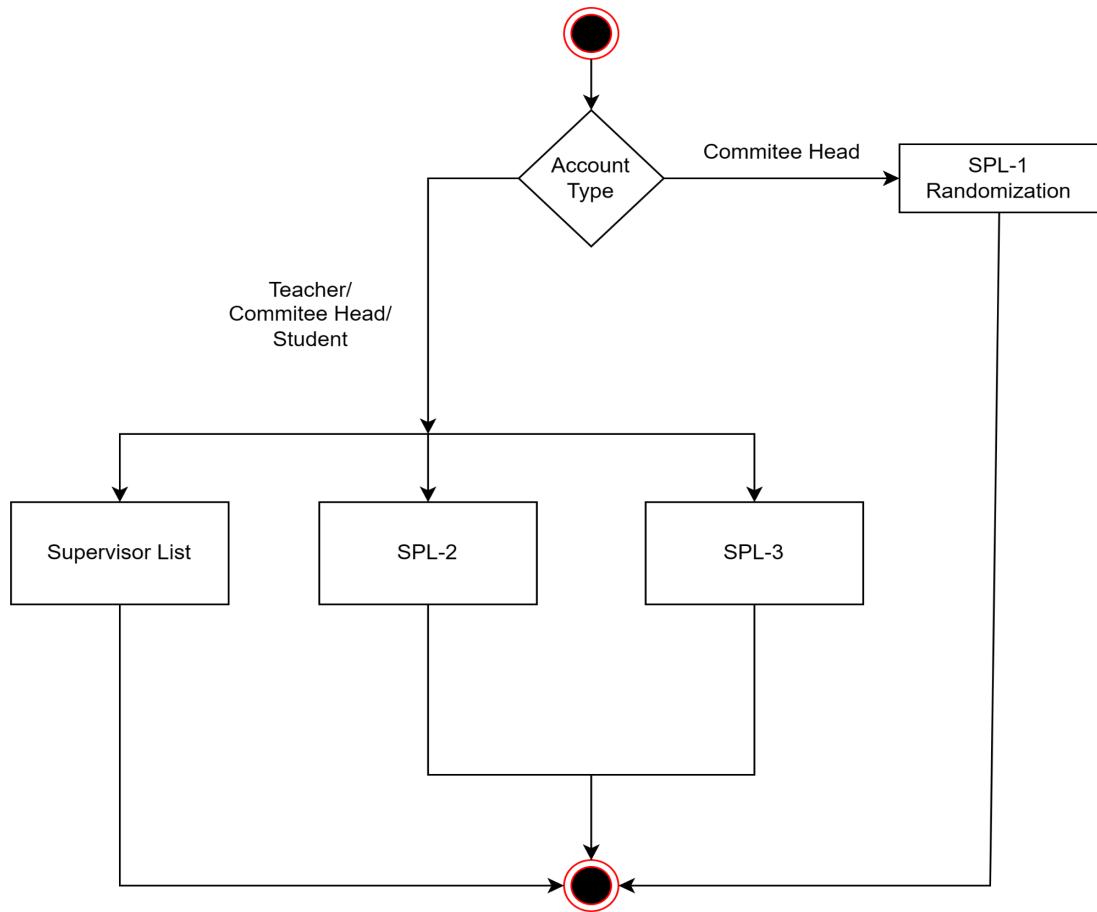


Fig: 4.4.3 (Activity Diagram of Level 1.3 Supervisor Allocation)

### Level-1.3.2 Activity Diagram of Use Case Diagram Level-1.3.2:

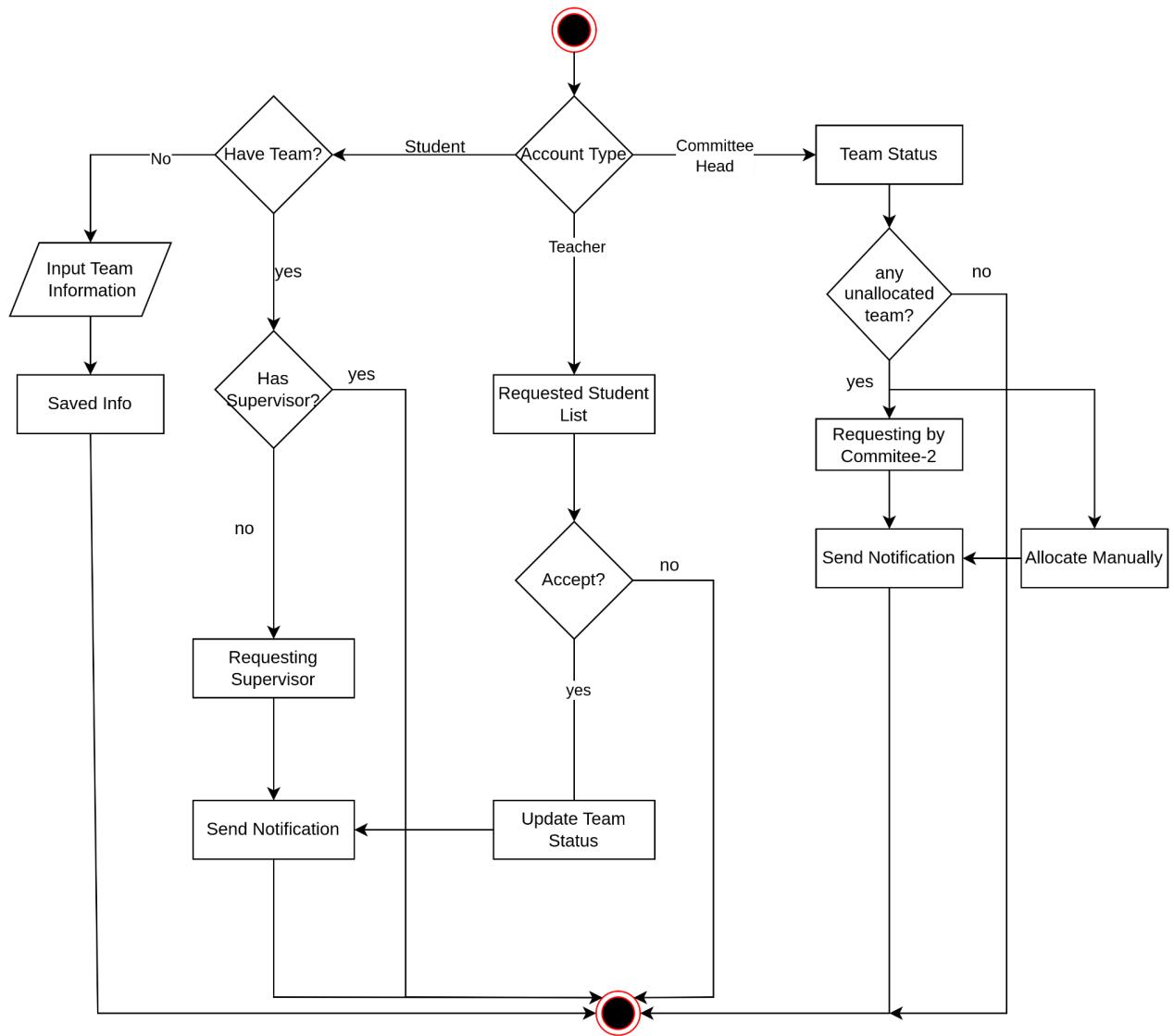


Fig: 4.4.4 (Activity Diagram of Level 1.3.2 : SPL-2)

### Level-1.3.3 Activity Diagram of Use Case Diagram Level-1.3.3:

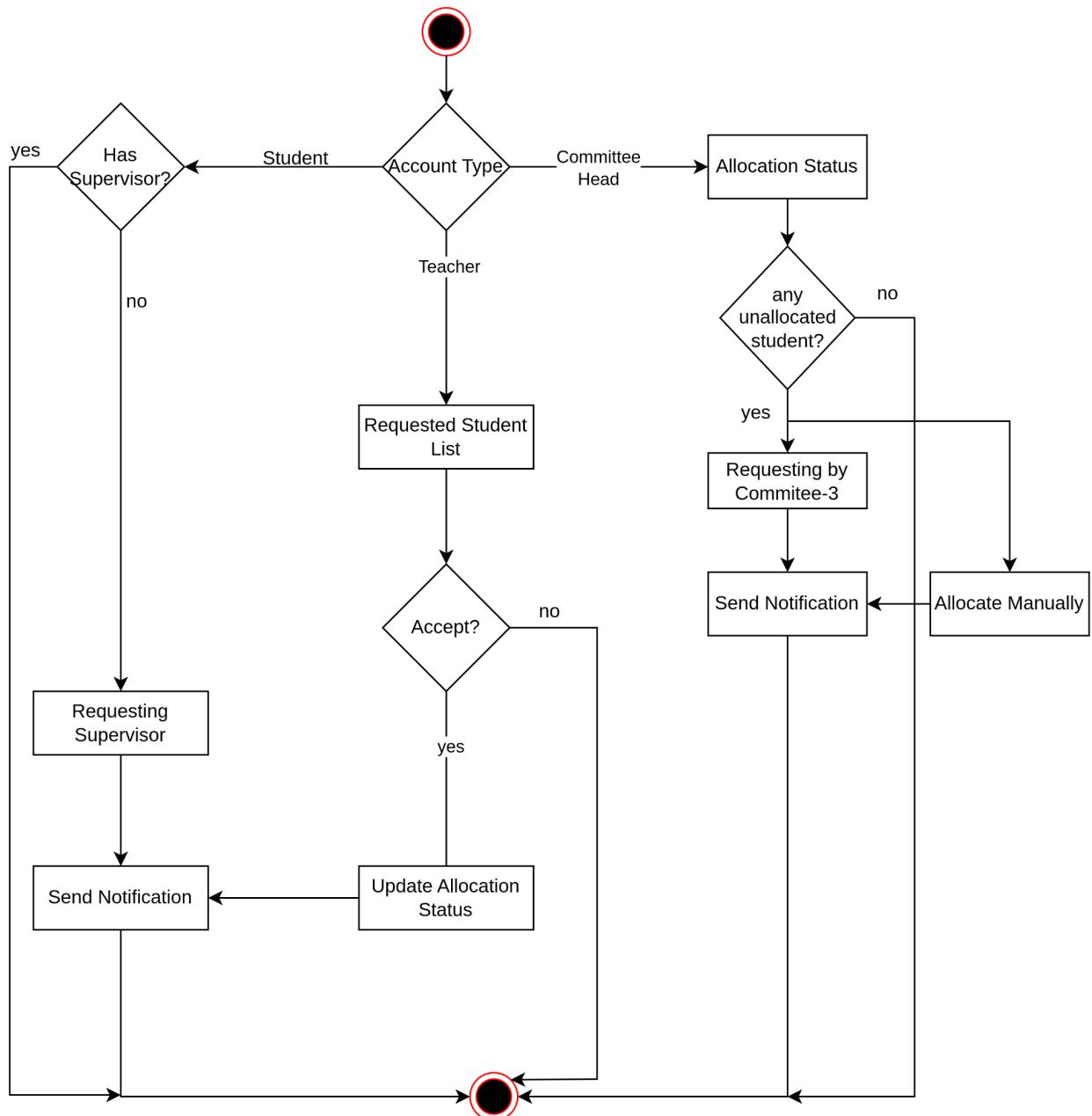


Fig: 4.4.5 (Activity Diagram of Level 1.3.3 : SPL-3)

## Level-1.5 Activity Diagram of Use Case Diagram Level-1.5:

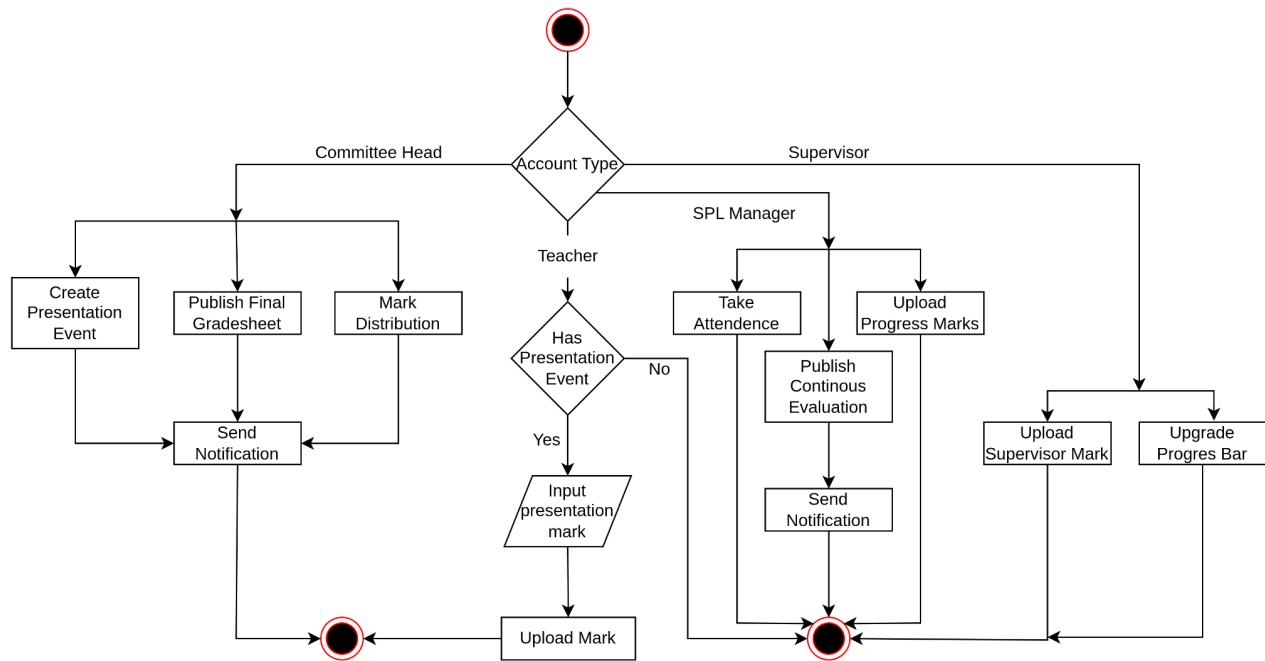


Fig: 4.4.6 (Activity Diagram of Level 1.5 : Marking System)

## 4.5 Swimlane Diagram

**Swimlane Diagram:** The Swimlane diagram, also known as the Rummler-Brache diagram or across-functional diagram, is a more detailed form of an activity diagram. Swimlanes are sometimes called functional bands. It simply describes who is responsible for the activities being performed in the activity diagram and how they are responsible. The activity diagram only represents the activities being performed, but Swimlane describes who does what in a process or activity performed.

### The purpose of a Swimlane diagram:

A swimlane diagram provides various facilities to a software engineer, such as

- The separate lanes of the diagram make it easy to delineate responsibilities belonging to certain actors. This helps to clarify complex processes within the software.
- Visualizing processes in this way provides a more thorough overview of an actor's roles within an organization and helps to reduce bottlenecks, redundancies, and extraneous steps.
- Ensures that everyone knows their specific role and avoids collisions.
- Helps to standardize work processes and record them in highly shareable formats that people within the organization can quickly refer to if needed.

# Swimlane Diagram : SPL Management System

## Id-1 (Swimlane of Activity Level 1.1)

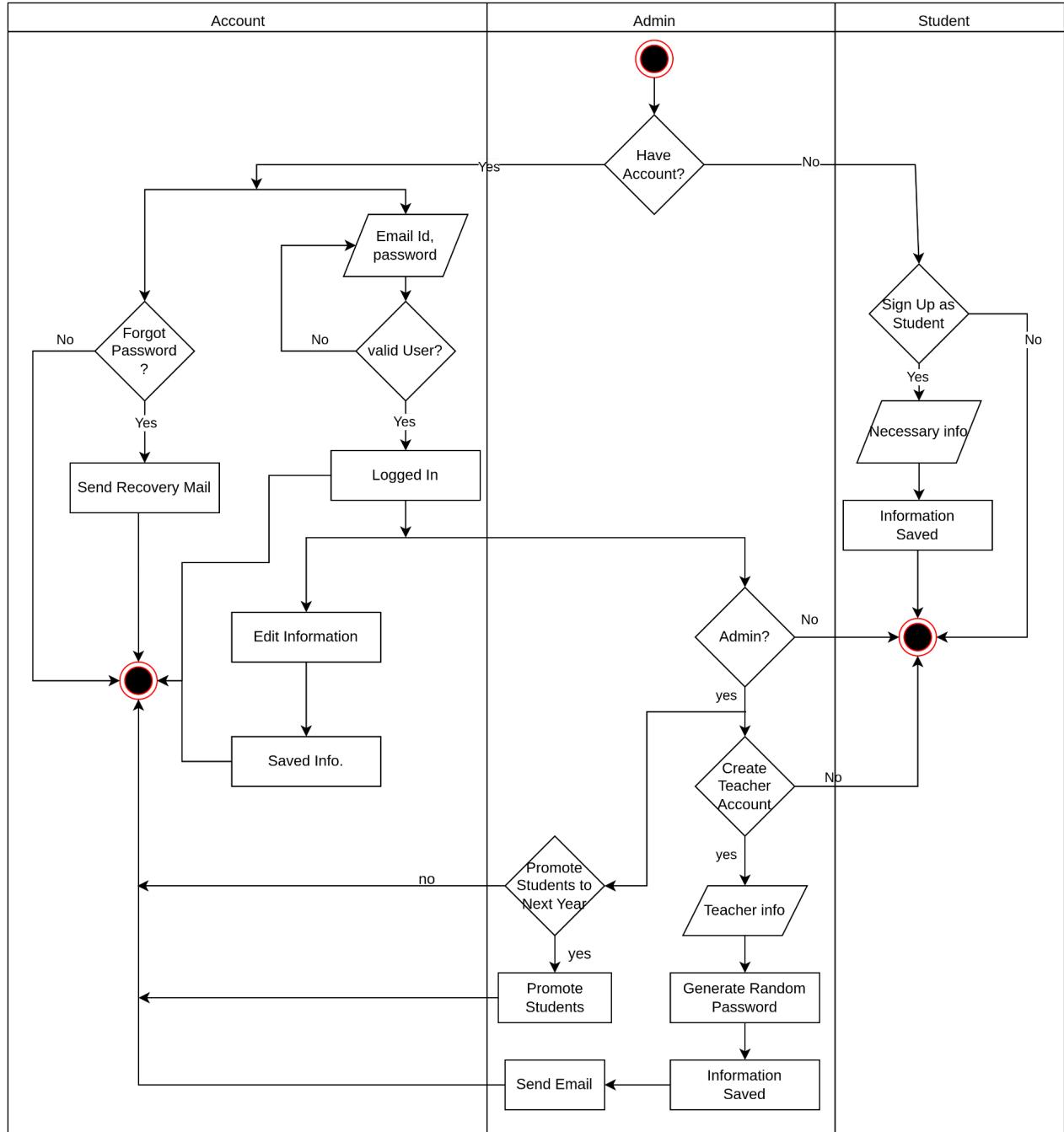


Fig: 4.5.1 (Swimlane of Activity Level 1.1)

## Id-2 (Swimlane of Activity Level 1.3)

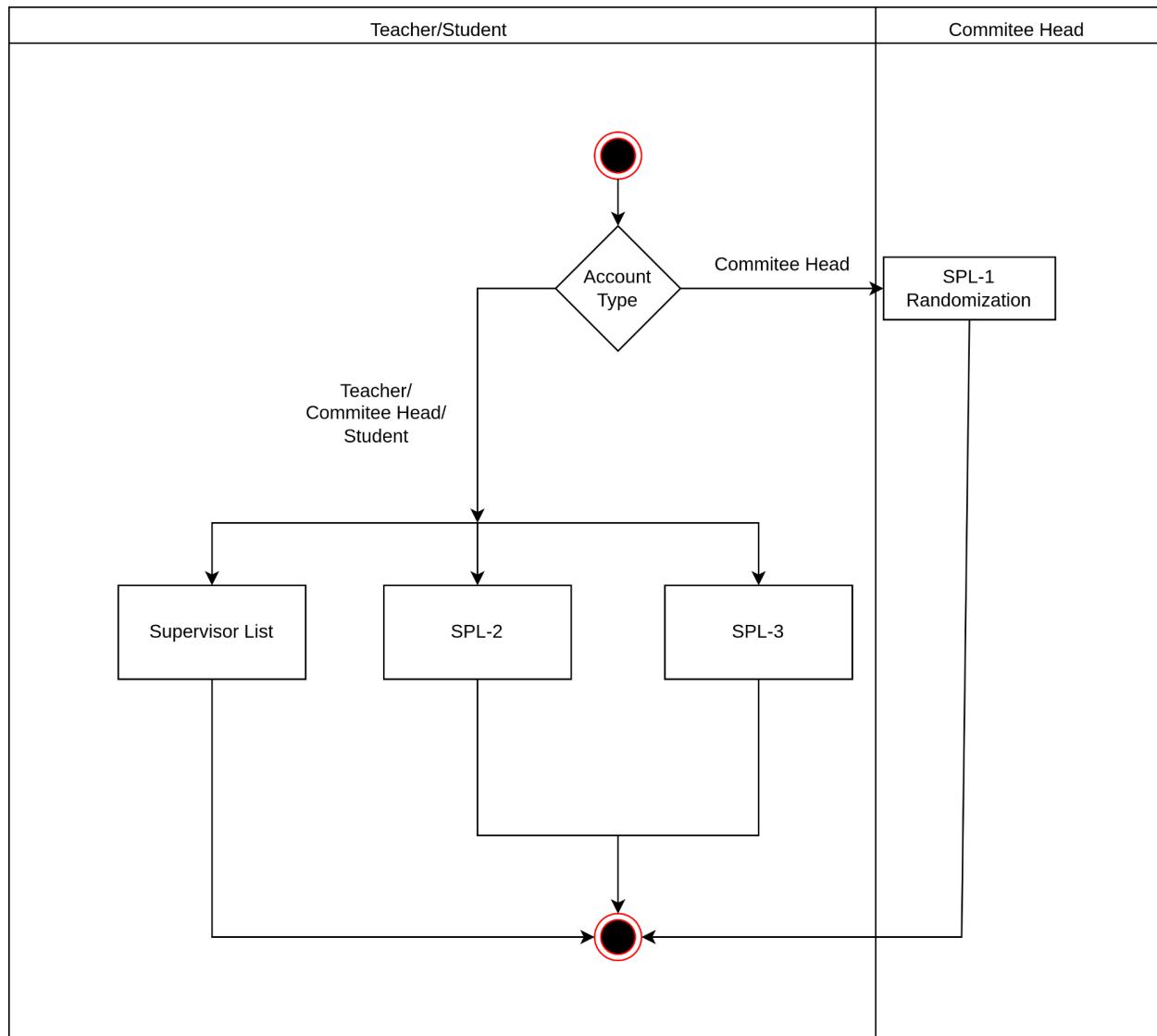


Fig: 4.5.2 (Swimlane of Activity Level 1.3)

### Id-3 (Swimlane of Activity Level 1.3.2)

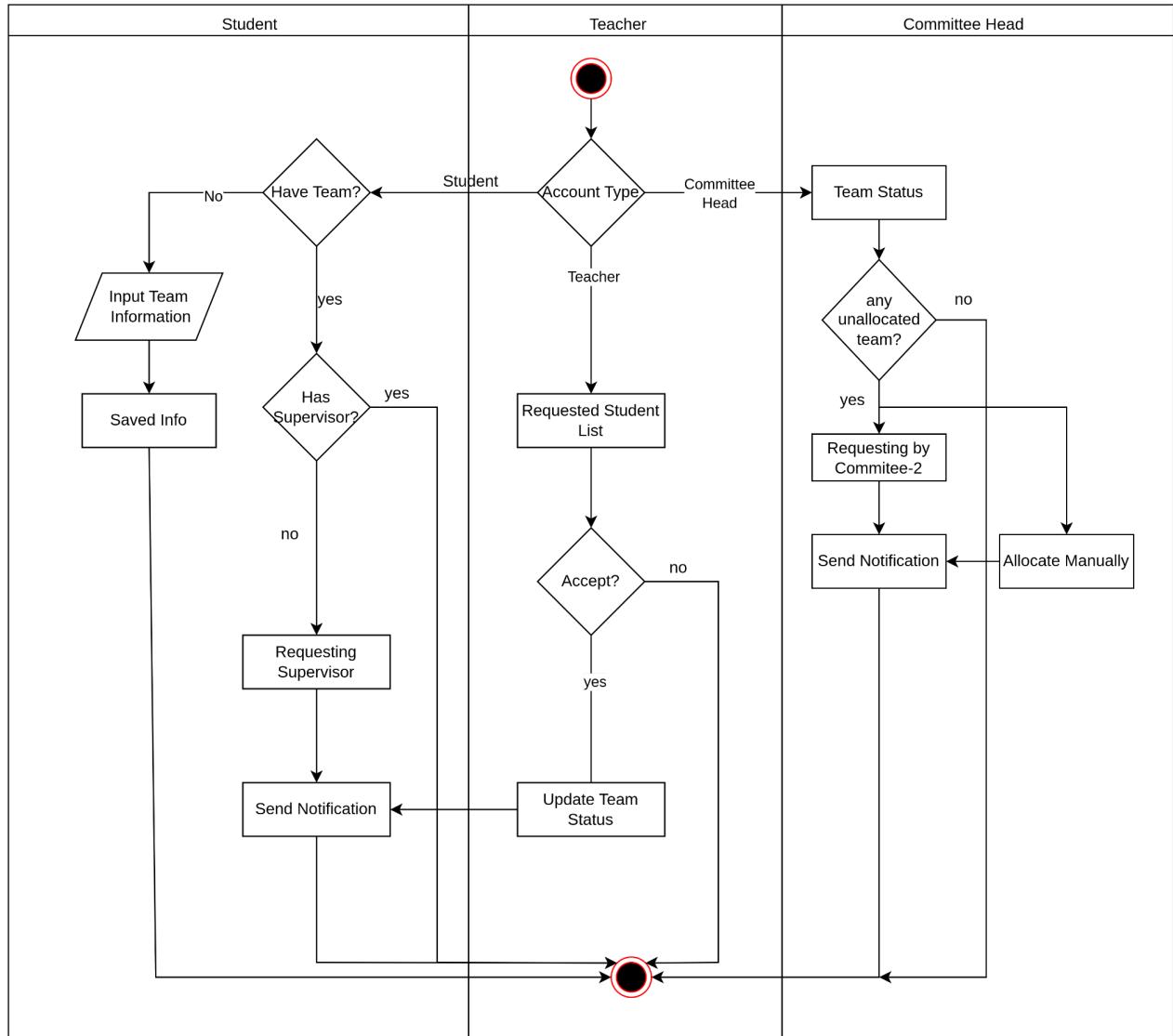


Fig: 4.5.3 (Swimlane of Activity Level 1.3.2)

## Id-4 (Swimlane of Activity Level 1.3.3)

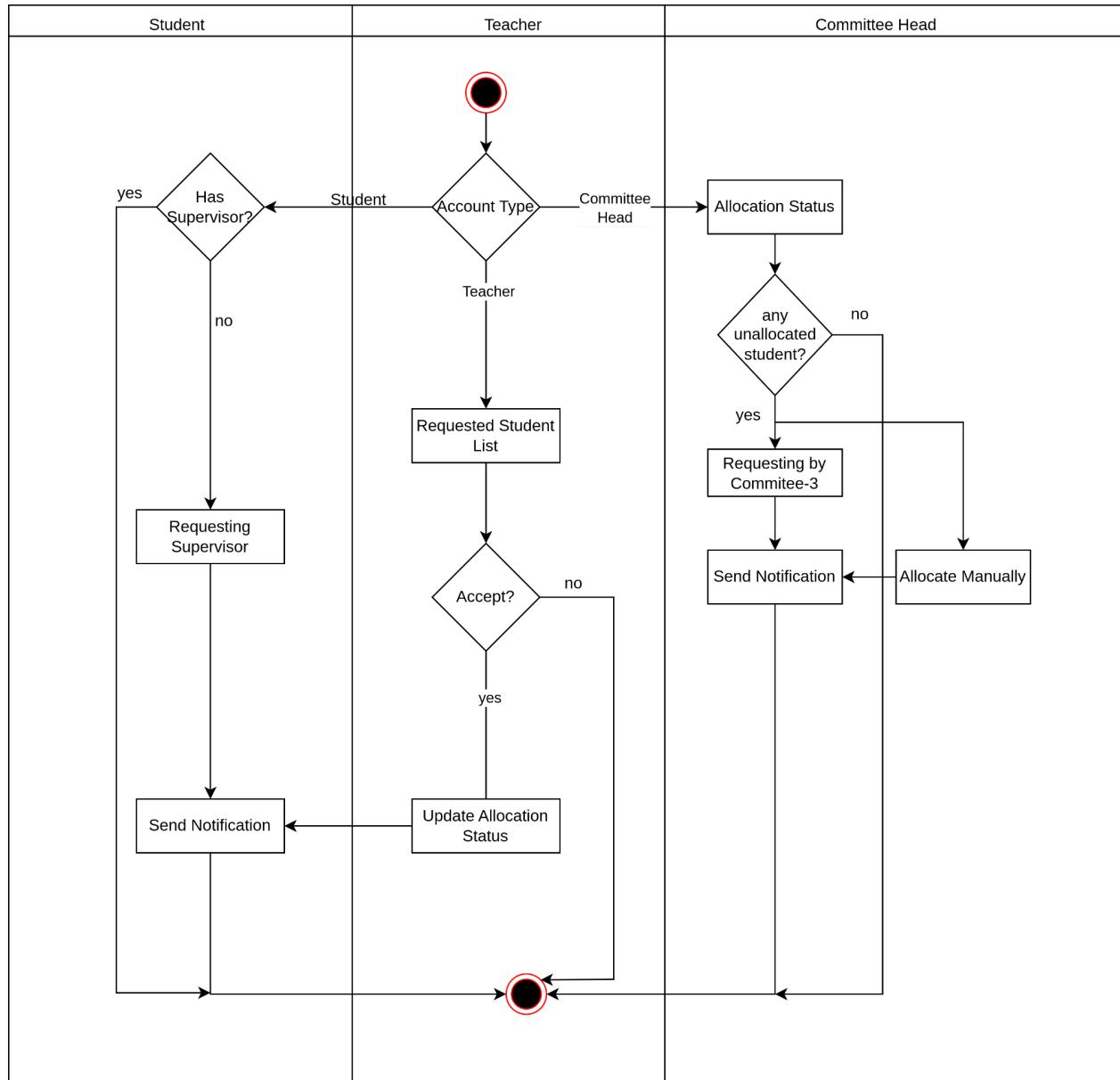


Fig: 4.5.4 (Swimlane of Activity Level 1.3.3)

## Id-6 (Swimlane of Activity Level 1.5)

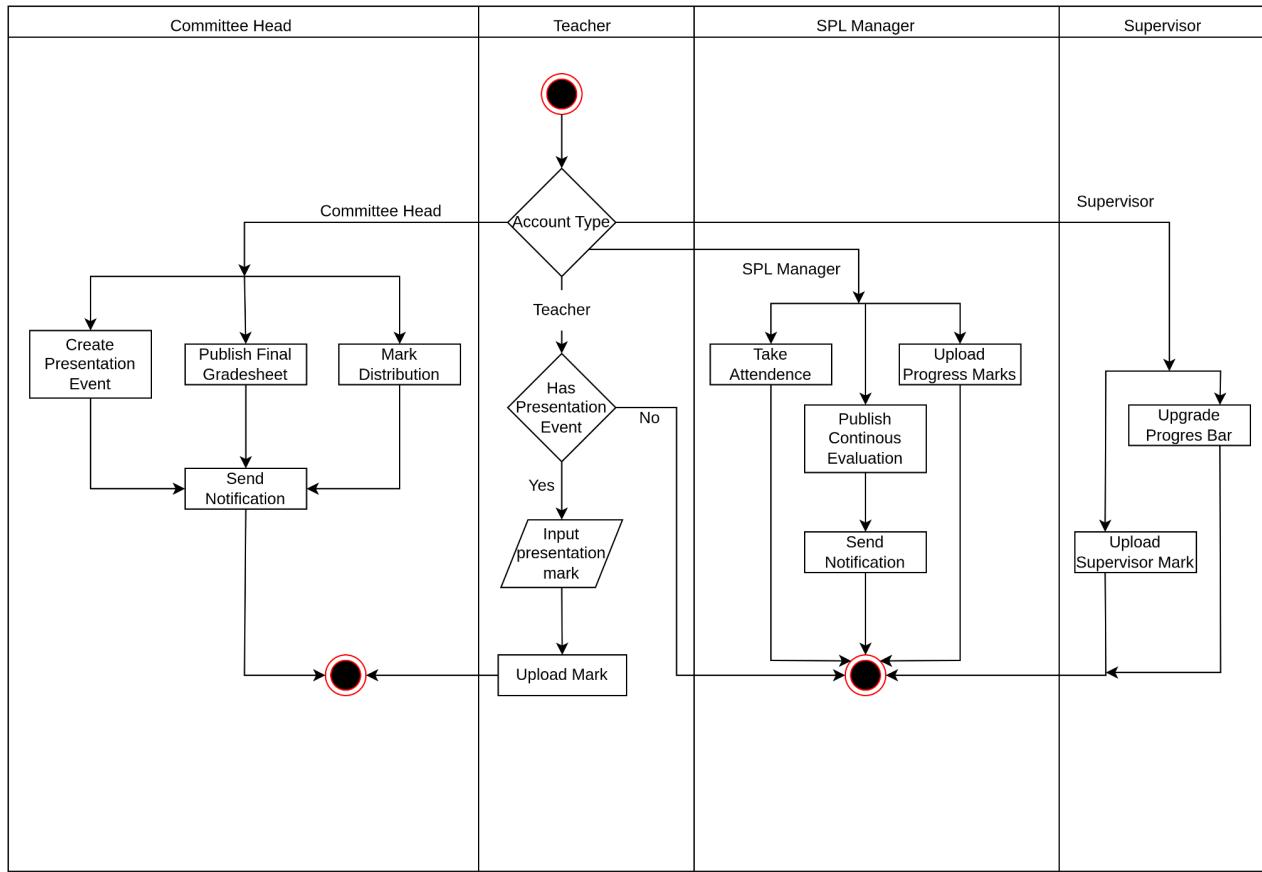


Fig: 4.5.5 (Swimlane of Activity Level 1.5)

## Chapter - 5: Class Based Modeling

### 5.1 Noun List From The Story

1. Account Management
2. Accounts
3. Admin Account
4. Teachers' Account
5. Students' Account
6. Email
7. Password
8. IIT Mail

- 9. Information
- 10. SPL Committee Formation
- 11. Committees
- 12. SPL-1
- 13. SPL-2
- 14. SPL-3
- 15. Members
- 16. Committee Head
- 17. Admin
- 18. Teacher
- 19. SPL Manager
- 20. Evaluation Process
- 21. Notice
- 22. Visibility
- 23. Supervisor Allocation
- 24. Groups
- 25. SPL-1 supervisor
- 26. SPL-2 supervisor
- 27. SPL-3 supervisor
- 28. SPL-1 Committee Head
- 29. SPL-2 Committee Head
- 30. SPL-3 Committee Head
- 31. Hierarchy
- 32. SPL-1 Students
- 33. SPL-2 Students
- 34. SPL-3 students
- 35. Ideas
- 36. Request
- 37. Accept
- 38. Notification
- 39. Progress Bar
- 40. Meeting
- 41. Progress
- 42. Marking System
- 43. Marks

- 44. Percentage
- 45. Attendance
- 46. Continuous Progress
- 47. Presentations
- 48. Code Evaluation
- 49. Supervisor
- 50. Committee member

## 5.2 Verb List From The Story

- 1. Creating
- 2. Sent
- 3. Will be
- 4. Be able to
- 5. Change
- 6. Logging In
- 7. Create
- 8. Using
- 9. Can Edit
- 10. Recover
- 11. Will be
- 12. Formed
- 13. Certain
- 14. Can select
- 15. Remove
- 16. Update
- 17. Can add
- 18. Can post
- 19. Can customize
- 20. Will monitor
- 21. Evaluate
- 22. Able to post
- 23. Can Supervise
- 24. Get

- 25.Assigned
- 26.Randomly
- 27.Initiated
- 28.Will form
- 29.Can be viewed
- 30.Can send
- 31.Request
- 32.Can accept
- 33.Reject
- 34.Use
- 35.Match
- 36.Can Continue
- 37.Maintain
- 38.Mark
- 39.Meet
- 40.Notify
- 41.See
- 42.Attend
- 43.Visible
- 44.Gives Permission
- 45.Will be added
- 46.Can set
- 47.Can Add
- 48.Accept

### **5.3 Noun List From The Story In Solution Space**

- 1. Admin
- 2. Teacher
- 3. Students
- 4. Supervisor
- 5. SPL manager
- 6. Email
- 7. Password
- 8. Information

9. SPL Committee
10. Committee Member
11. Committee Head
12. SPL Manager
13. Evaluation Process
14. Notification
15. Supervisor allocation
16. Hierarchy
17. Ideas
18. Requests
19. Project Room
20. Progress
21. Marking System
22. Presentation
23. Rejection
24. Attendance
25. Groups
26. Visibility
27. Account

## **5.4 General Classification**

1. External Entities
2. Things
3. Occurrence or Events
4. Roles
5. Organizational Units
6. Places
7. Structures

A candidate class is selected for special classification if it fulfills three or more characteristics.

<b>Number</b>	<b>Noun</b>	<b>General Classification Number that Applies</b>
<b>1</b>	Account	<b>4,5,7</b>
<b>2</b>	Teacher	<b>4,5,7</b>
<b>3</b>	Student	<b>4,5,7</b>
<b>4</b>	Supervisor	<b>4,5,7</b>
<b>5</b>	SPL manager	<b>4,5,7</b>
<b>6</b>	Email	<b>1</b>
<b>7</b>	Password	<b>2</b>
<b>8</b>	Information	<b>2</b>
<b>9</b>	SPL Committee	<b>4,5,7</b>
<b>10</b>	Committee Member	<b>4,5,7</b>
<b>11</b>	Committee Head	<b>4,5,7</b>
<b>12</b>	Admin	<b>4,5,7</b>
<b>13</b>	Evaluation Process	<b>3</b>
<b>14</b>	Notification	<b>2,3</b>
<b>15</b>	Supervisor Allocator	<b>2,3,6</b>
<b>16</b>	Hierarchy	<b>2</b>
<b>17</b>	Ideas	<b>2</b>
<b>18</b>	Request	<b>2,3</b>
<b>19</b>	Project Room	<b>2,6</b>
<b>20</b>	Mark Evaluator	<b>2,3,6</b>

<b>21</b>	Presentation	<b>3,6</b>
<b>22</b>	Progress	<b>2,3</b>
<b>23</b>	Rejection	<b>2,3</b>
<b>24</b>	Attendance	<b>2,3</b>
<b>25</b>	Groups	<b>5,7</b>
<b>26</b>	Visibility	<b>2,3</b>

## Potential to be Classes

1. Account
2. Admin
3. Student
4. Teacher
5. Committee Head
6. Committee Member
7. Supervisor
8. SPL manager
9. SPL Committee
10. Email
11. Supervisor Allocator
12. Mark Evaluator

## 5.5 Selection Criteria

The candidate classes are then selected as classes by six Selection Criteria:

1. Retain information
2. Needed services
3. Multiple attributes
4. Common attributes
5. Common operations
6. Essential requirements

A candidate class generally becomes a class when it fulfills around three characteristics.

<b>1</b>	Account	1,2,3,4,5
<b>2</b>	Teacher	1,2,3,4,5
<b>3</b>	Student	1,2,3,4,5
<b>4</b>	Supervisor	1,2,3,4,5
<b>5</b>	SPL manager	1,2,3,4,5
<b>6</b>	Email	6
<b>7</b>	SPL Committee	1,3,4,5
<b>8</b>	Committee Member	6
<b>9</b>	Committee Head	1,3,4,5
<b>10</b>	Supervisor Allocator	1,2,3,4,5
<b>11</b>	Admin	1,2,3,4,5
<b>12</b>	Mark Evaluator	1,2,3,4,5

## **Selected Classes**

1. Account
2. Admin
3. Teacher
4. Student
5. Supervisor
6. SPL Manager
7. Committee Head
8. Committee Member
9. SPL Committee
10. Email
11. Supervisor Allocator
12. Mark Evaluator

## 5.6 Attribute and Method Identification

<b>Class Name</b>	<b>Attribute</b>	<b>Method</b>
1. Account	-name -email -password	+setName() +getName() +setEmail() +getEmail() +setPassword() +login() +updatePersonalInformation() +recoverAccount() +viewNotification()
2. Admin	-SPL Committee	+createTeachersAccount() +createSPLCommittee() +GenerateTemporaryPassword() +promotePassedStudent()
3. Teacher	-designation -hierarchyRank -studyLeave -researchArea	+setDesignation() +getDesignation() +setStudyLeave() +getStudyLeave() +updateResearchInfo()
4. Student	-batch -rollNo -registrationNo -session -currentSPL -SPL_Idea -SPL1Supervisor -SPL2Supervisor -SPL3Supervisor -TeamName -progressStatus	+getSupervisorStatus() +formTeamInSPL2() +requestSupervisor() +showProgressBar() +showContinuousEvaluation()

5. Supervisor	-supervisorOf -SPL1_Students -SPL2_Groups -SPL3_Students	+enterProjectRoom() +postNotice() +submitMarks() +showProgressBar() +updateProgressBar()
6. SPL Manager	-managerOf -SPL_Students	+takeAttendance() +uploadContinuousProgress() +showStudentsProgress() +submitMarks() +postNotice() +viewStudentsProgress() +collectPresentationMarks() +publishContinuousMarks()
7. Committee Head	-SPL_no	+postNotice() +setMarkDistribution() +addCommitteeMember() +AddSPLManager() +removeCommitteeMember() +createPresentationEvent() +getFinalMarks() +initiateSupervisorRequest ByHierarchy() +allocateManually() +generateGradeSheet() +modifyMarks() +showSupervisorList()
8. Committee Member	-SPL_No	+markingInPresentation() +uploadPresentationMark() +postNotice() +showSupervisorList()
9. Email	-sender -receiver	+SendEmail()

10.SPL Committee	<ul style="list-style-type: none"> <li>-SPL_No</li> <li>-CommitteeHead</li> <li>-CommitteeMembers</li> <li>-SPL Manager</li> </ul>	
11.Supervisor Allocator	<ul style="list-style-type: none"> <li>-SPL_No</li> <li>-teacherResearchArea</li> <li>-studentIdea</li> </ul>	<ul style="list-style-type: none"> <li>+matchIdea()</li> <li>+generateSuggestionAccordingToId ea()</li> <li>+getSuggestionList()</li> <li>+showTeacherList()</li> <li>+SPL1RandomAllocation()</li> <li>+requestSupervisor()</li> <li>+CommitteeRequestByHierarchy()</li> <li>+CommitteeRequestBySuggestion()</li> <li>+allocateSupervisorManually()</li> <li>+viewAllocationStatus()</li> <li>+completeAllocation()</li> </ul>
12.Mark Evaluator	<ul style="list-style-type: none"> <li>-markDistribution</li> <li>-presentationMarks</li> <li>-supervisorMark</li> <li>-continuousMarks</li> </ul>	<ul style="list-style-type: none"> <li>+setMarkDistribution()</li> <li>+createPresentationEvent()</li> <li>+uploadPresentationMark()</li> <li>+getPresentationMark()</li> <li>+calculatePresentationMarkAverage()</li> <li>+uploadContinuousMark()</li> <li>+getContinuousMark()</li> <li>+publishContinuousMark()</li> <li>+uploadSupervisorMark()</li> <li>+getSupervisorMark()</li> <li>+getFinalMarks()</li> <li>+finalEvaluation()</li> <li>+generateGradeSheet()</li> <li>+modifyMarks()</li> </ul>

## 5.7 Analysis

The class “Email” carries only a functionalities. But there will be system notifications. So, we can merge these functionalities in one class as name it “Notification” .

Class Name	Attribute	Method
Notification	-notificationType -sender -receivers	+sendEmailNotification() +sendSystemNotification()

## Final Classes

1. Account
  - Admin
  - Student
  - Teacher
    - 1. SPL Manager
    - 2. Committee Member
    - 3. Committee Head
    - 4. Supervisor
2. SPL Committee
3. Supervisor Allocator
4. Marking Evaluator
5. Notification

## 5.8 Class Cards

### 1. Account

Attribute	Method
-name -email -password	+setName() +getName() +setEmail() +getEmail() +setPassword() +login() +updatePersonalInformation() +recoverAccount() +viewNotification()
Responsibility	Collaborator
Login To The System	Admin, Teacher, Student
Update Personal Information	Teacher, Student
Recover Account	Teacher, Student, Notification
Checking Notification	Notification

### 2. Admin

-SPL Committee	+createTeachersAccount() +createSPLCommittee() +GenerateTemporaryPassword()
----------------	---

	+promotePassedStudent()
<b>Responsibility</b>	<b>Collaborator</b>
Create Teachers Account	Teachers
Create SPL Committee	SPL Committee, Teachers
Promote Students	Student

### 3. Teacher

Attribute	Method
-designation -hierarchyRank -studyLeave -researchArea	+setDesignation() +getDesignation() +setStudyLeave() +getStudyLeave() +updateResearchInfo()
<b>Responsibility</b>	<b>Collaborator</b>

### 4. Student

Attribute	Method
-batch -rollNo -registrationNo -session -currentSPL -SPL_Idea -SPL1Supervisor -SPL2Supervisor -SPL3Supervisor -TeamName -progressStatus	+getSupervisorStatus() +formTeamInSPL2() +requestSupervisor() +showProgressBar() +showContinuousEvaluation()
<b>Responsibility</b>	<b>Collaborator</b>
Forming Team	Notification

View Continuous Evaluation	Mark Evaluator
Request Supervisor	Teacher, Notification
Show progress	Student, SPL manger

## 5. Supervisor

Attribute	Method
-supervisorOf -SPL1_Students -SPL2_Groups -SPL3_Students	+enterProjectRoom() +postNotice() +submitMarks() +showProgressBar() +updateProgressBar()
Responsibility	Collaborator
Progress Bar Checking	Student
Marks Submission	Mark Evaluator
Post Any Notice	Notification

## 6. SPL Manager

Attribute	Method
-managerOf -SPL_Students	+takeAttendance() +uploadContinuousProgress() +submitMarks() +postNotice() +viewStudentsProgress() +collectPresentationMarks() +publishContinuousMarks()
Responsibility	Collaborator
Student Regular Progress	Student

Marks Submit	Mark Evaluator
Post Any Notice	Notification
Collecting Presentation Mark	Mark Evaluator
Publishing Continuous Marks	Notification

## 7. Committee Head

Attribute	Method
-SPL_No	+postNotice() +setMarkDistribution() +addCommitteeMember() +AddSPLManager() +removeCommitteeMember() +createPresentationEvent() +getFinalMarks() +initiateSupervisorRequest ByHierarchy() +allocateManually() +generateGradeSheet() +modifyMarks() +showSupervisorList()
<b>Responsibility</b>	<b>Collaborator</b>
Post Any Notice	Notification
Modify Marks	Mark Evaluator
Create Presentation Event	Notification
Initiate Supervisor Request ByHierarchy()	Supervisor Allocator

## 8. Committee Member

Attribute	Method

-SPL_no	+markingInPresentation() +uploadPresentationMark() +postNotice() +showSupervisorList()
<b>Responsibility</b>	<b>Collaborator</b>
Marking in Presentation	Mark Evaluator
Upload Marks	Mark Evaluator
Post Notice	Notification

## 9. Notification

Attribute	Method
-notificationType -sender -receivers	+sendEmailNotification() +sendSystemNotification()
<b>Responsibility</b>	<b>Collaborator</b>
Send Notice	Account

## 10. SPL Committee

Attribute	Method
-SPL_No -CommitteeHead -CommitteeMembers -SPL Manager	
<b>Responsibility</b>	<b>Collaborator</b>

## 11. Supervisor Allocator

<b>Attribute</b>	<b>Method</b>
-SPL_No -teacherResearchArea -studentIdea	+matchIdea() +generateSuggestionAccordingToIdea() +getSuggestionList() +showTeacherList() +SPL1RandomAllocation() +requestSupervisor() +CommitteeRequestByHierarchy() +CommitteeRequestBySuggestion() +allocateSupervisorManually() +viewAllocationStatus() +completeAllocation()
<b>Responsibility</b>	<b>Collaborator</b>
Matching ideas	Student, Teacher
Suggest Supervisor	Student, Teacher
Request Supervisor	Student, Teacher
Manual Allocation	Committee Head

## 12. Mark Evaluator

<b>Attribute</b>	<b>Method</b>
-markDistribution -presentationMarks -supervisorMark -continuousMarks	+setMarkDistribution() +createPresentationEvent() +uploadPresentationMark() +getPresentationMark() +calculatePresentationMarkAverage() +uploadContinuousMark()

	+getContinuousMark() +publishContinuousMark() +uploadSupervisorMark() +getSupervisorMark() +getFinalMarks() +finalEvaluation() +generateGradeSheet() +modifyMarks()
<b>Responsibility</b>	<b>Collaborator</b>
Create Presentation Event	Committee Head
Collect Presentation Mark	Committee Member
Collect Continuous Mark	SPL Manager
Publish Continuous Marks	SPL Manager, Student, Teacher
Final Evaluation	Committee Head, Committee Member

## 5.9 CRC Diagram:

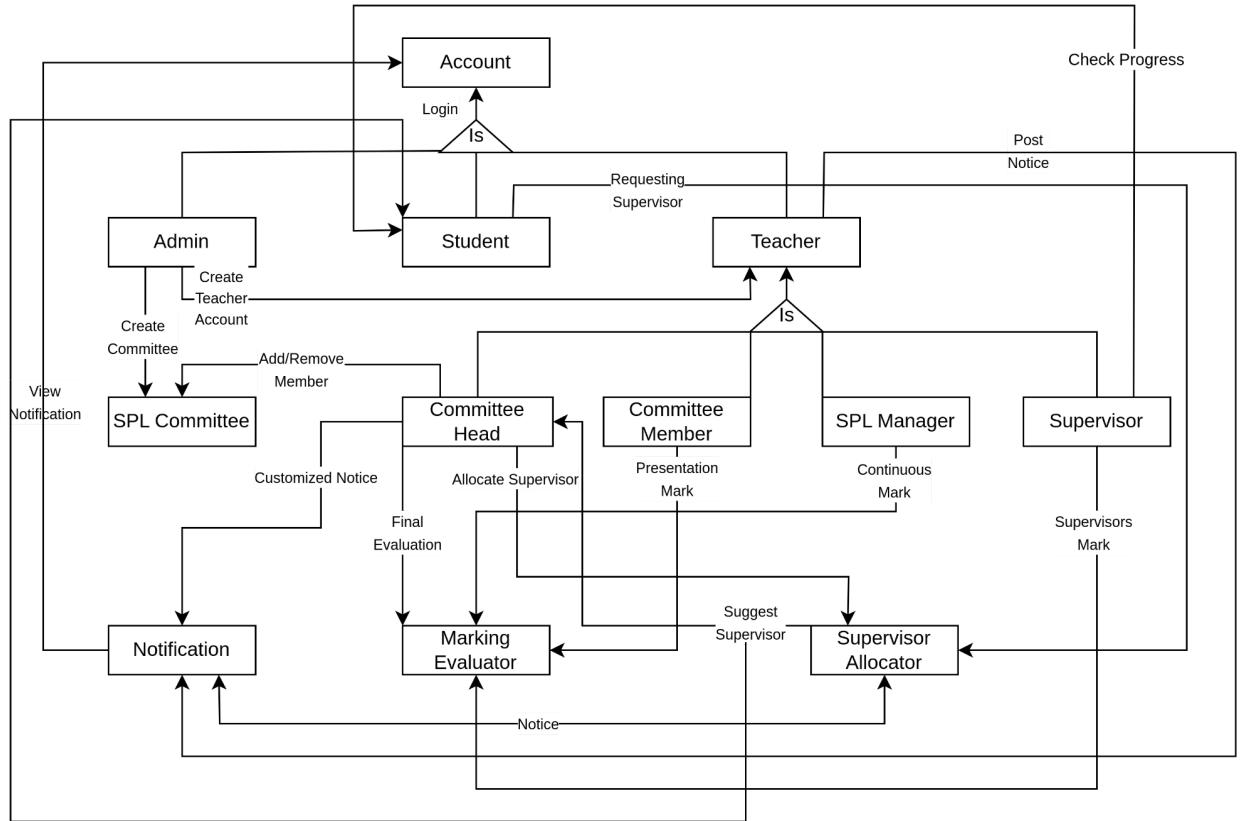


Fig: CRC Diagram

## Chapter - 6: Behavioral Modeling

State diagram represents active states for each class of the events (triggers). For this, we identified all the events, their initiators, and collaborators.

## 6.1 Event Table

No	Event Name	Initiator Class	Colaborator Class
1	Creating Account	Account	Student, Admin
2	Send email	Account	Notification
3	Edit information	Teacher, Student, Admin	Account
4	Recover account	Teacher, Student, Admin	Account
5	Log in	Admin, Teacher, Student	Account
6	Authenticity Checking	Account	None
7	Select Committee Head (SPL-1, SPL-2, SPL-3)	Admin	Teacher
8	Select/Remove Committee Member & SPL Manager (SPL-1, SPL-2, SPL-3)	Committee Head	Teacher
9	Check notice	Teacher, Student	Notification
10	Randomizing SPL-1 supervisor	Committee Head	Teacher, Student
11	Team Formation	Student	Student
12	Promote Next SPL	Admin	student
13	Add SPL Manager	Committee Head	Teacher
14	Request for Supervisor	Student	Teacher, Notification
15	Response on Team/individual Request	Teacher	Student, Notification
16	Committee request following teachers hierarchy	Supervisor Allocator	Teacher, Student, Notification
17	Matching student and teacher's idea	Supervisor Allocator	Committee Member, Student

18	Committee request following the matching	Supervisor Allocator	Teacher,Student, Notification
19	Manually allocate supervisor	Committee Head	Supervisor Allocation, Teacher, Student, Notification
20	Project Room Notice	Supervisor	Student, Notification
21	Progress Tracking	Supervisor	Students, SPL Manager
22	View Progress	SPL Manager, Student	none
23	Set evaluation Process.	Committee Head	Marking evaluator
24	Upload marks	Supervisor, SPL Manager	Marking Evaluator, SPL Committee
25	Create Presentation event	Committee Head	Teacher
26	Marking presentations	Committee Member	Marking Evaluator
27	Publish continuous evaluation	SPL Manager	Student, Marking Evaluator
28	Collect Final Marks	Marking Evaluator	Marking Evaluator
29	Grade Sheet Generator	Marking Evaluator	Committee Member
30	Promote Next SPL	Admin	Student
31	Modify marks manually	Committee Head	Marking Evaluator
32	Sending Email/notification	Notification	Teacher, student
33	Taking Attendance	SPL Manager	none

## 6.2 State Transition Diagram

**ID: 1**

**Name: Account**

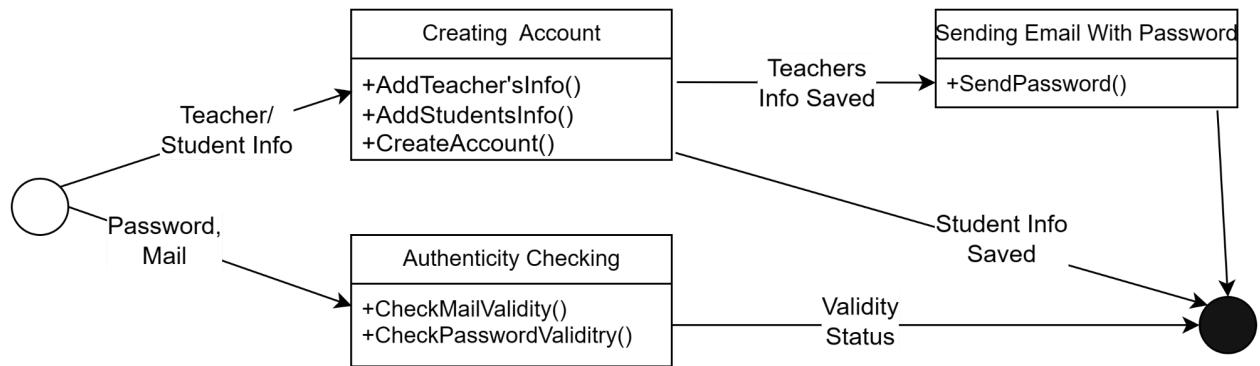


Fig: 6.2.1 Account

**ID: 2**

**Name: Admin**

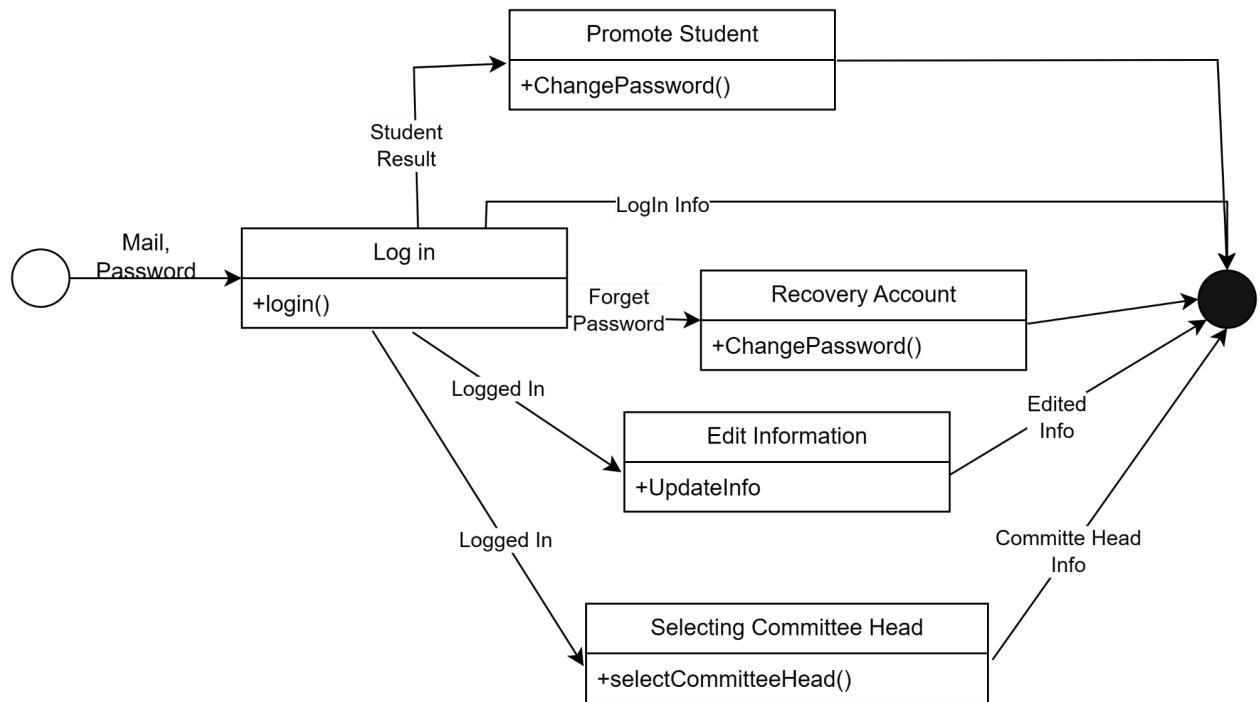


Fig: 6.2.2 Admin

**ID: 3**

**Name: Teacher**

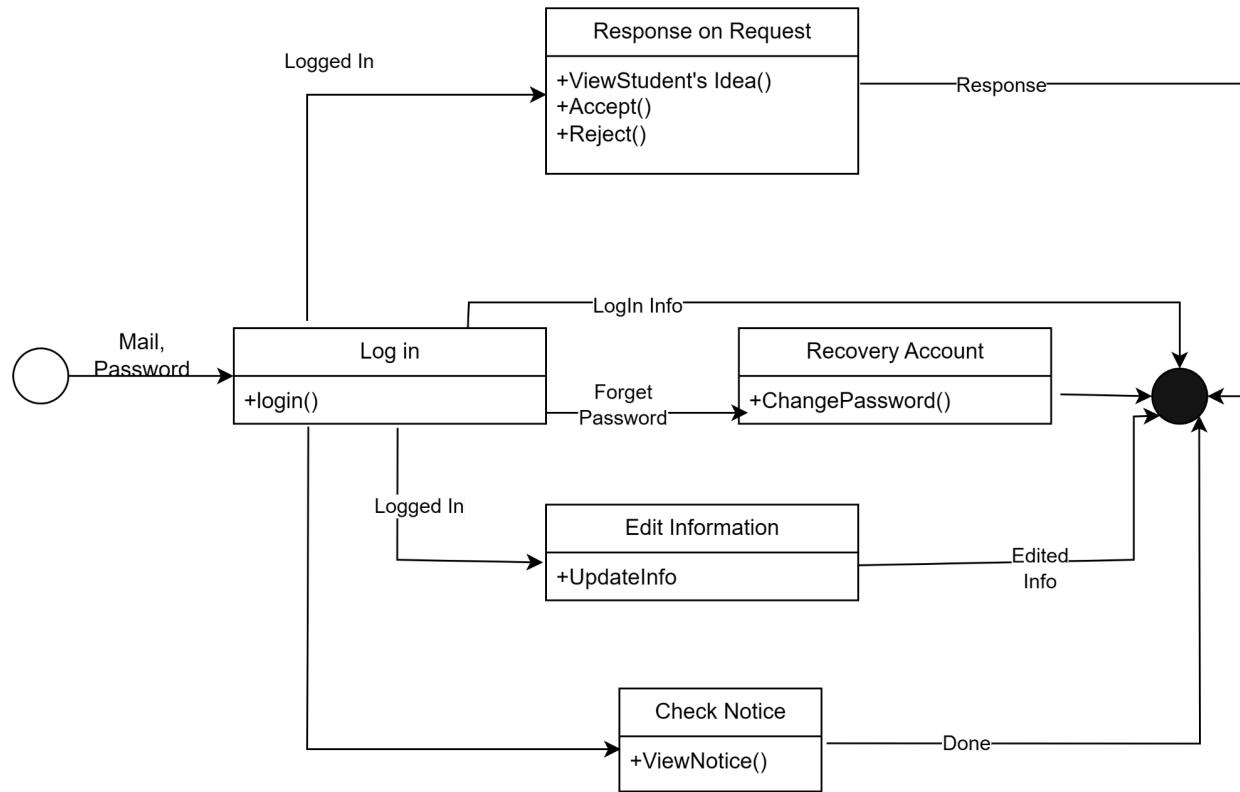


Fig: 6.2.3 Teacher

**ID: 4**

**Name: Student**

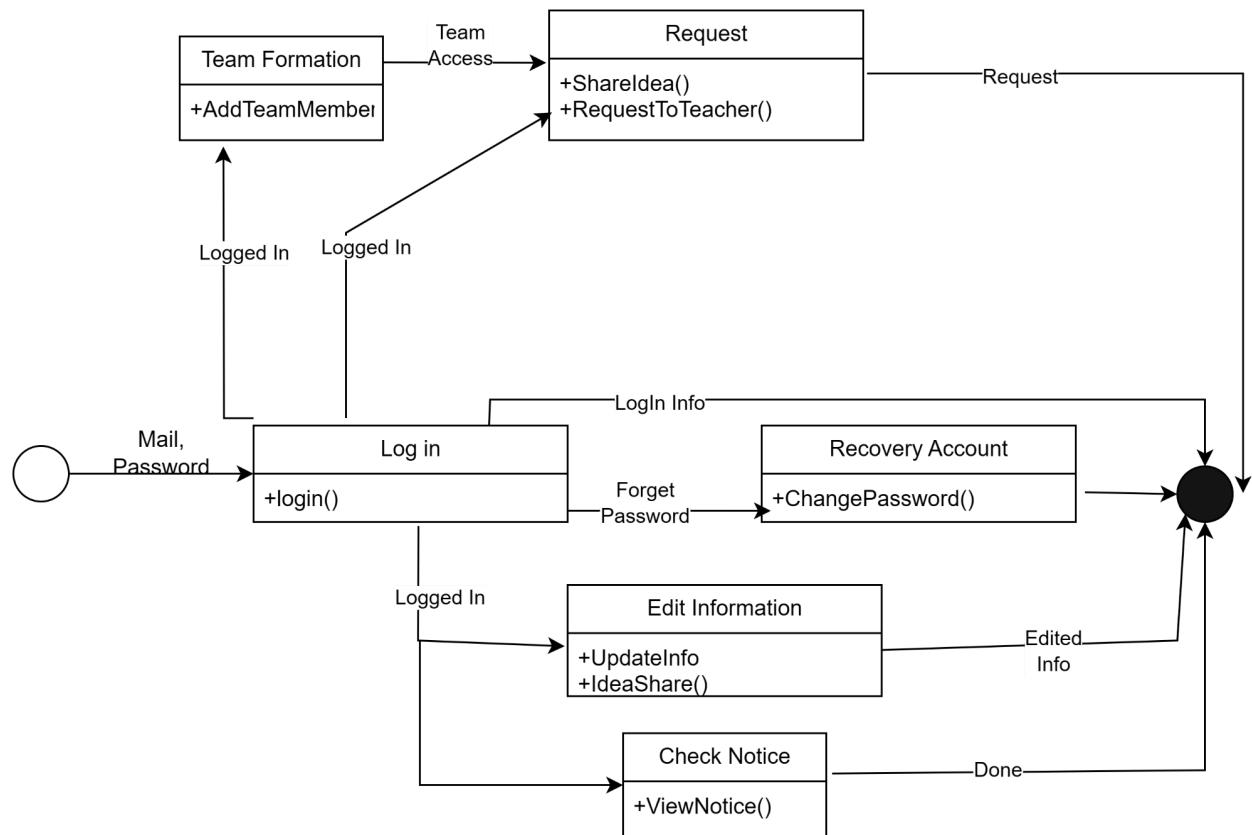


Fig: 6.2.4 Student

**ID: 5**

**Name: Supervisor**

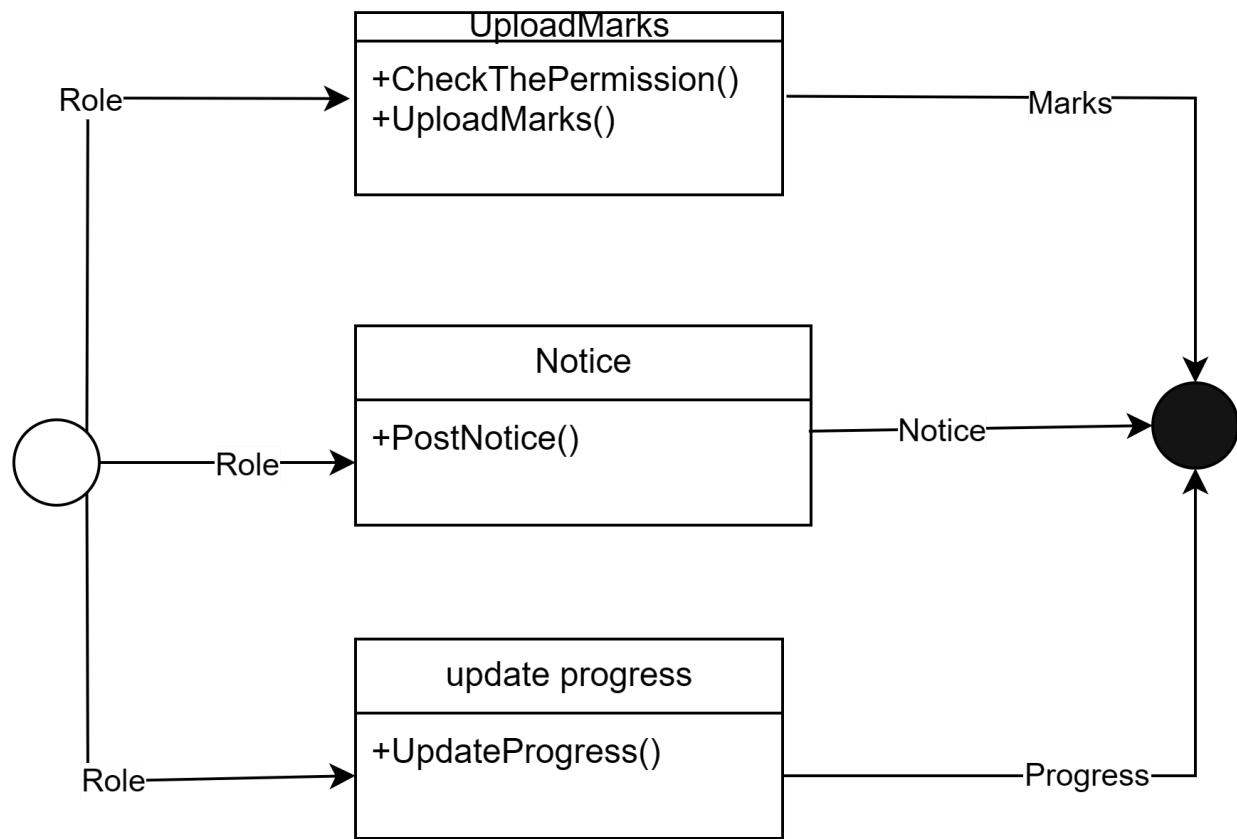


Fig: 6.2.5 Supervisor

**ID: 6**

**Name: SPL Manager**

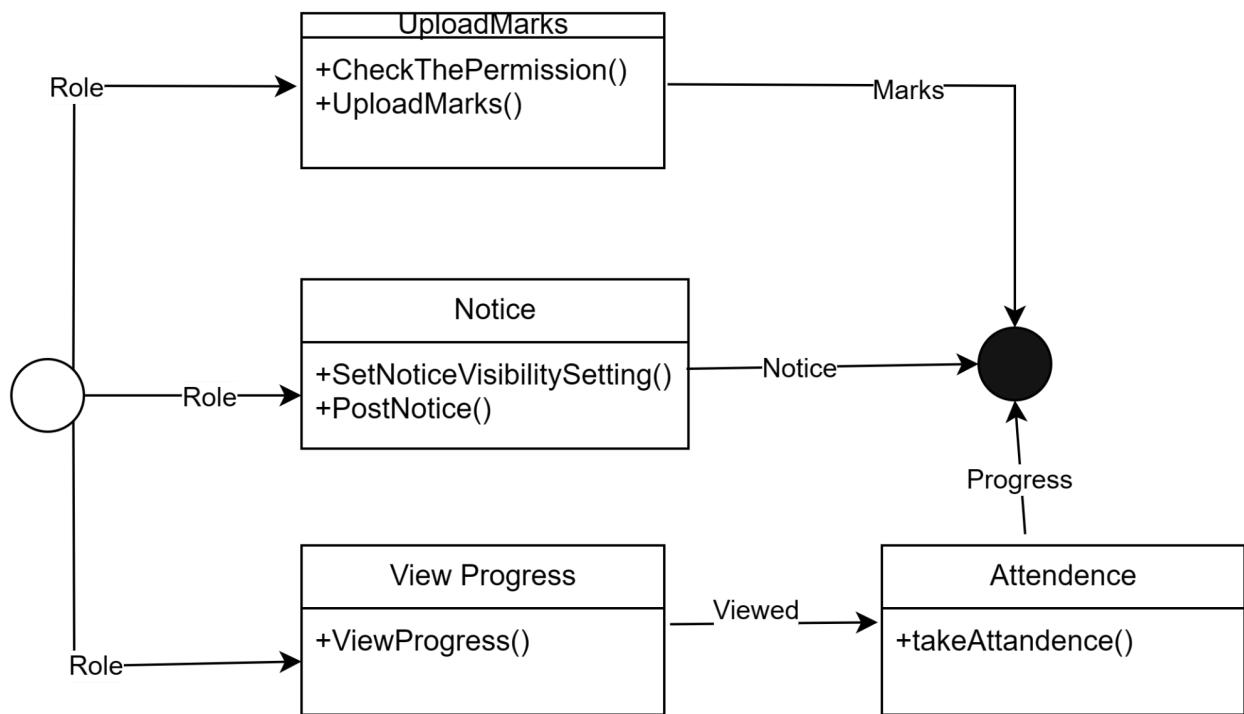


Fig: 6.2.6 SPL Manager

ID: 7

Name: Committee Member

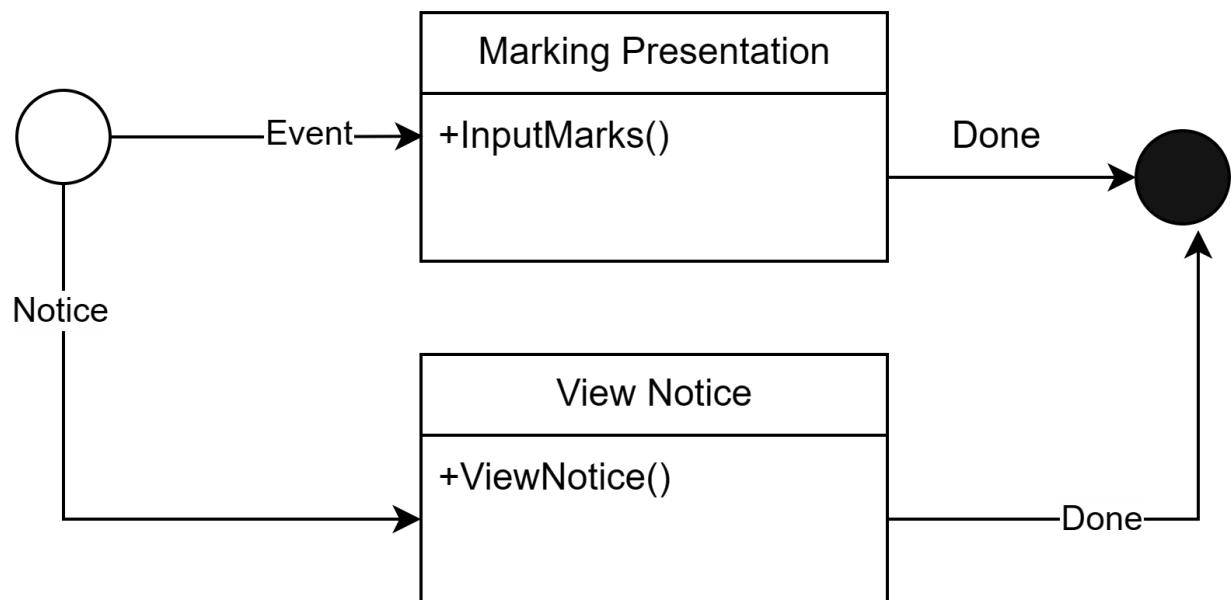


Fig: 6.2.7 Committee Member

**ID: 8**

**Name: Committee Head**

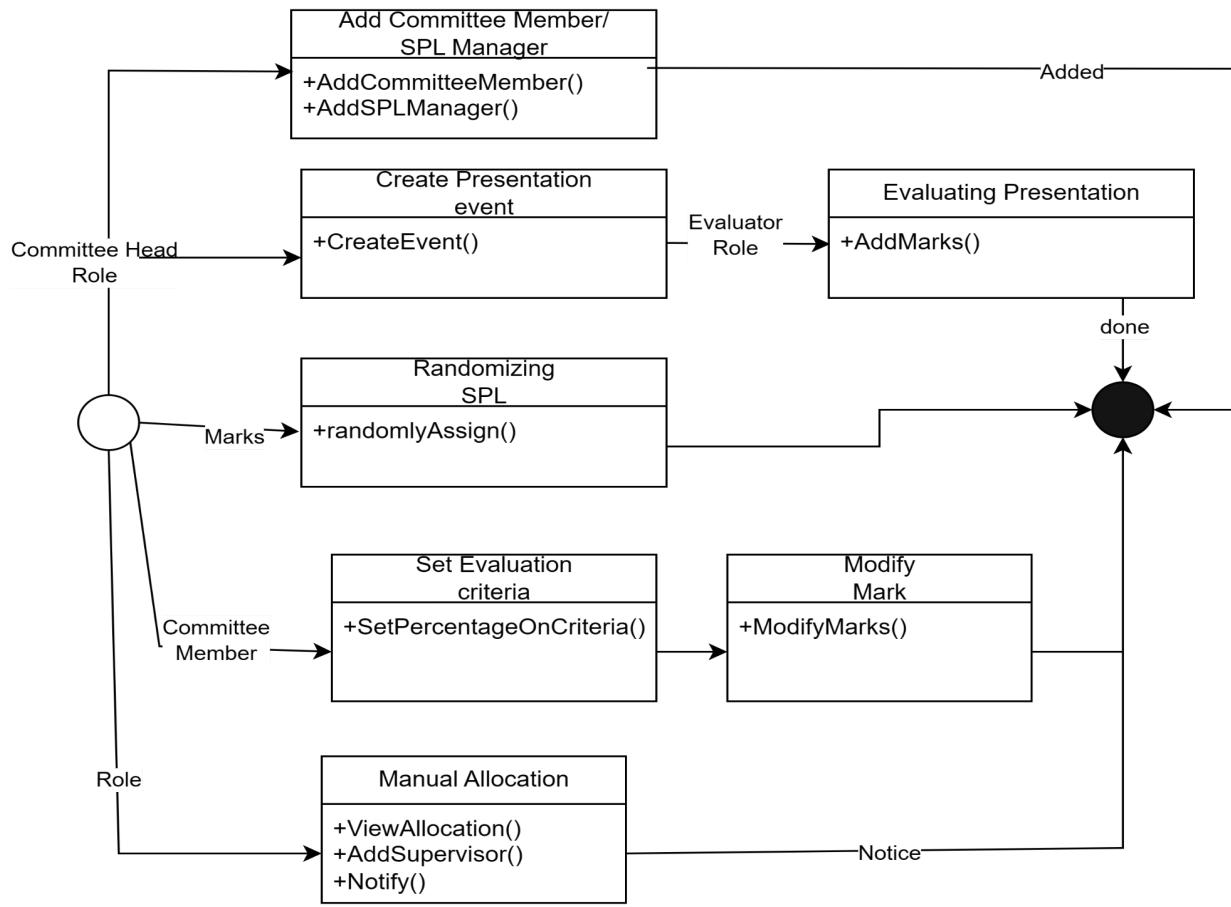


Fig: 6.2.8 Committee Head

**ID: 9**

**Name: Notification**

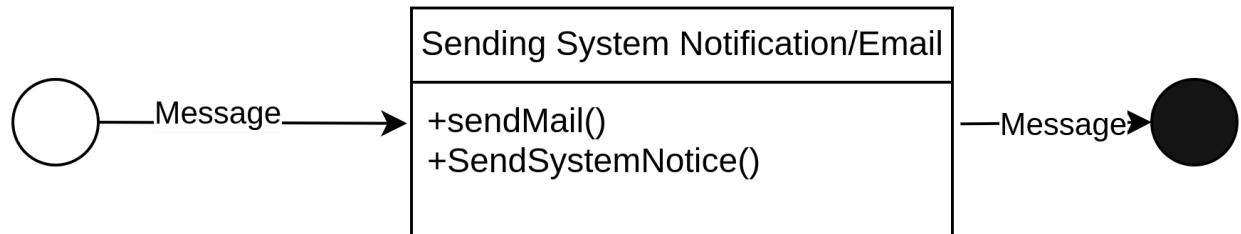


Fig: 6.2.9 Notification

**ID: 10**

**Name: Supervisor Allocator**

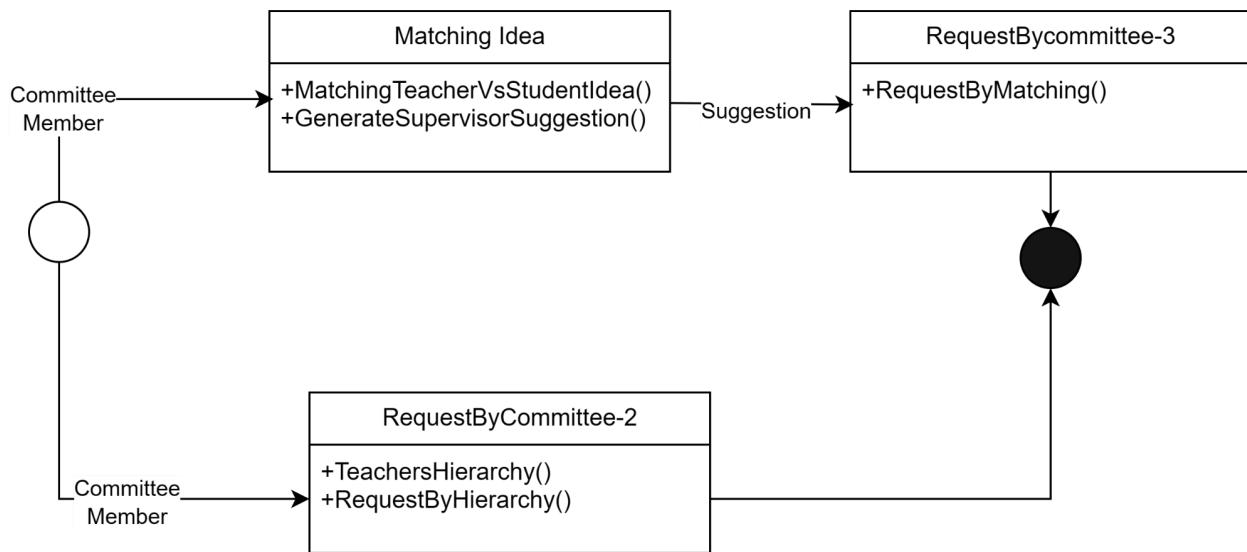


Fig: 6.2.10 Supervisor Allocator

**ID: 11**

**Name: Marking Evaluator**

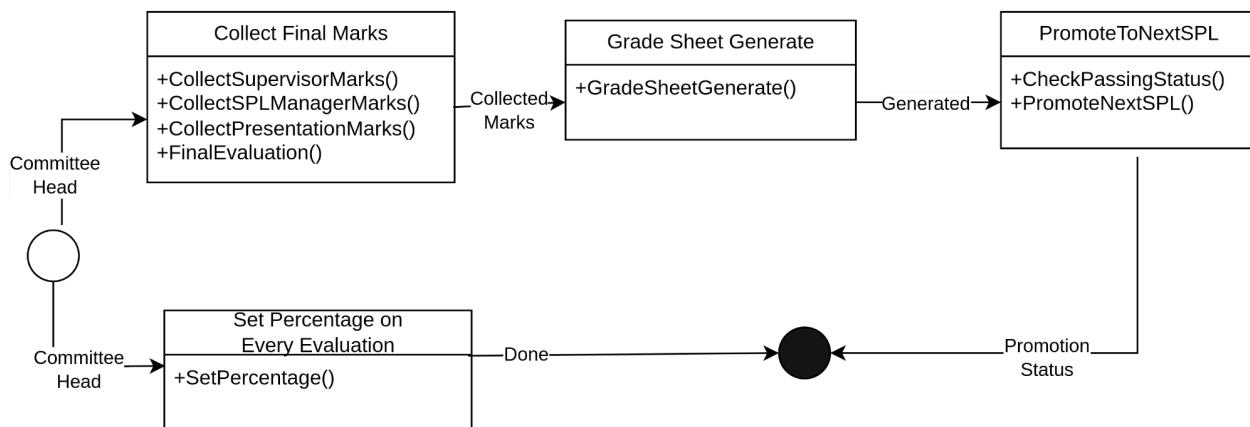


Fig: 6.2.11 Marking Evaluator

# Chapter-7: Flow Oriented Modeling

## 7.1 Sequence Diagram

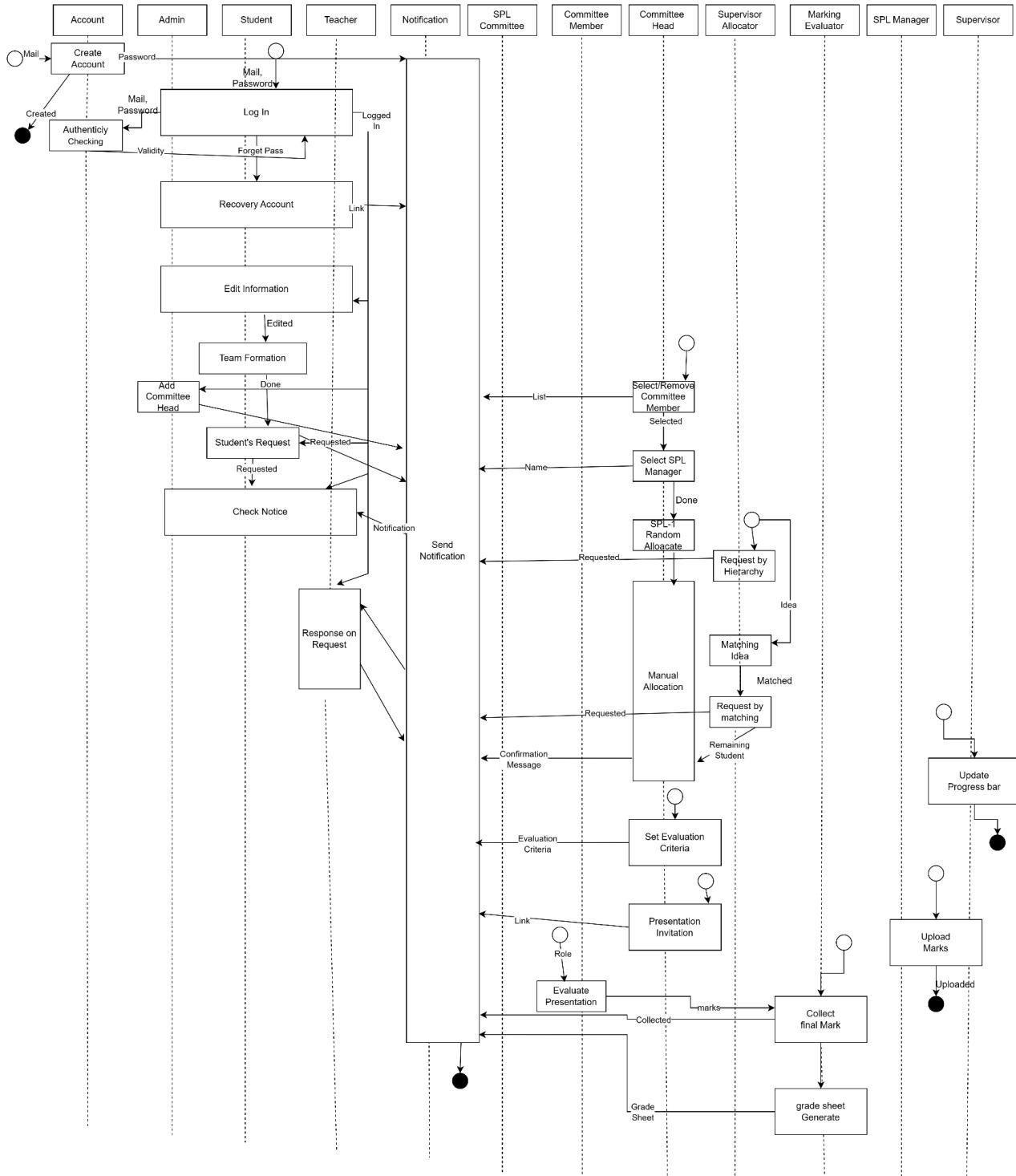


Fig: 7.1.1 Sequence diagram of SPL management system

## 7.2 Data Flow Diagram

A data flow diagram (DFD) is a graphical or visual representation using a standardized set of symbols and notations to describe a business's operations through data movement. For our purposes the DFD Diagrams are:

### Level-0 SPL Management System

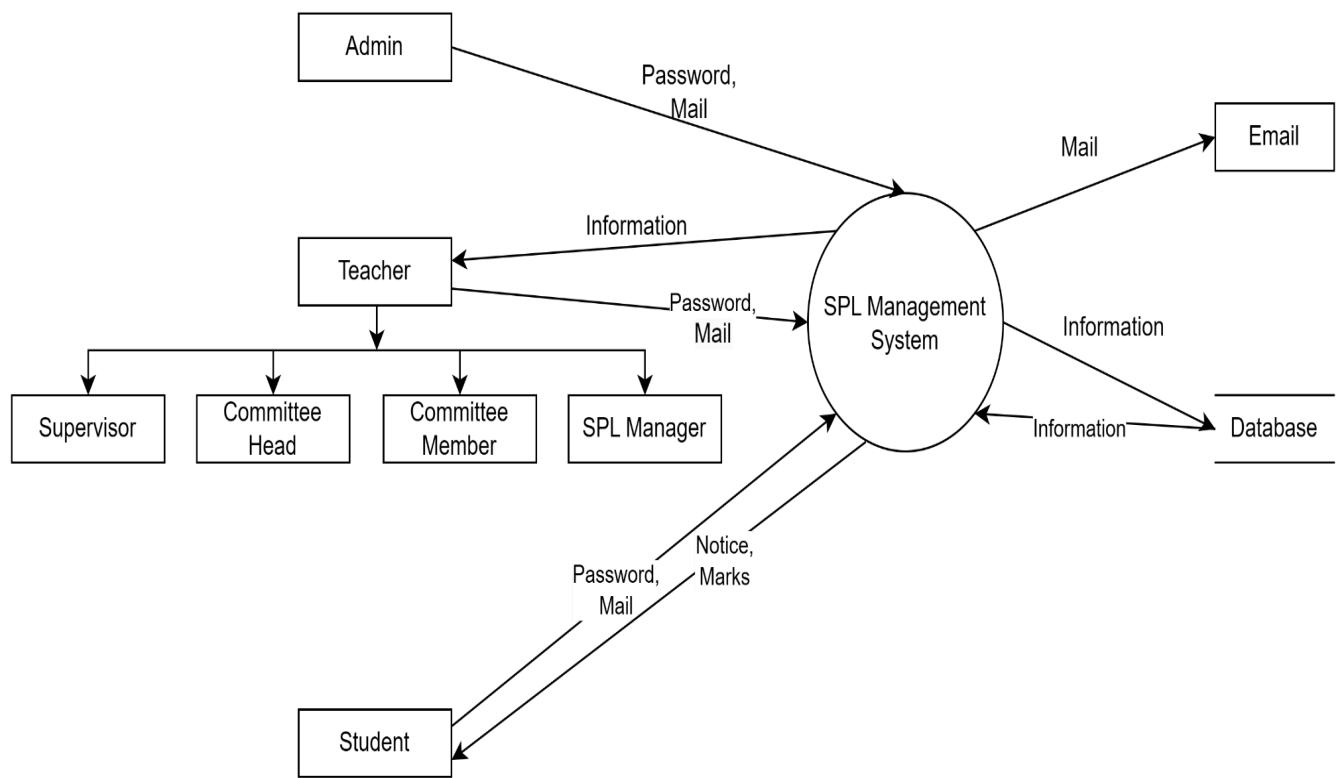


Fig:7.2.1 ( Level-0 ) SPL Management system

## Level-1 SPL Management System

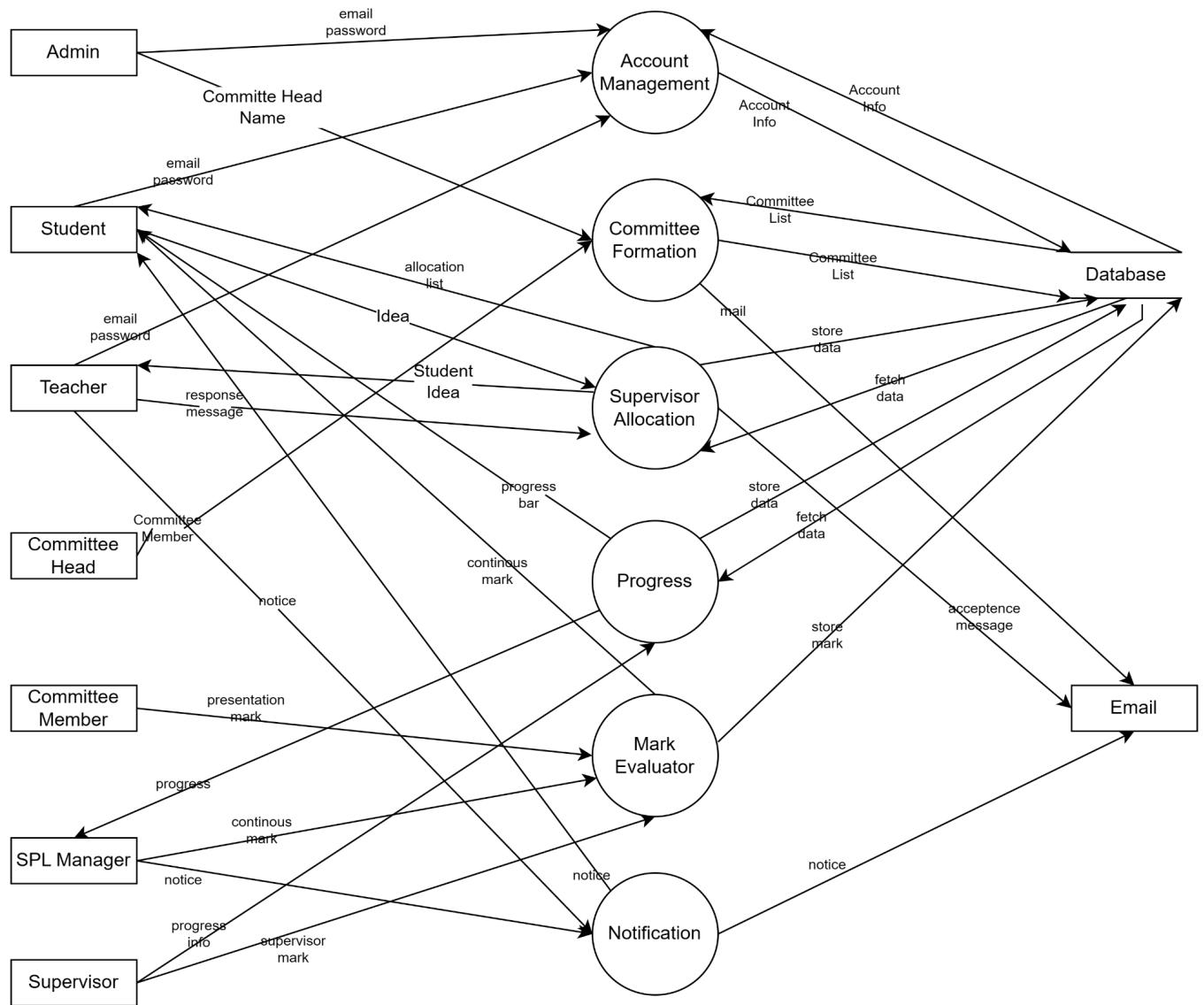


Fig:7.2.2 ( Level-1) SPL Management System

## Level-2 Account Management System

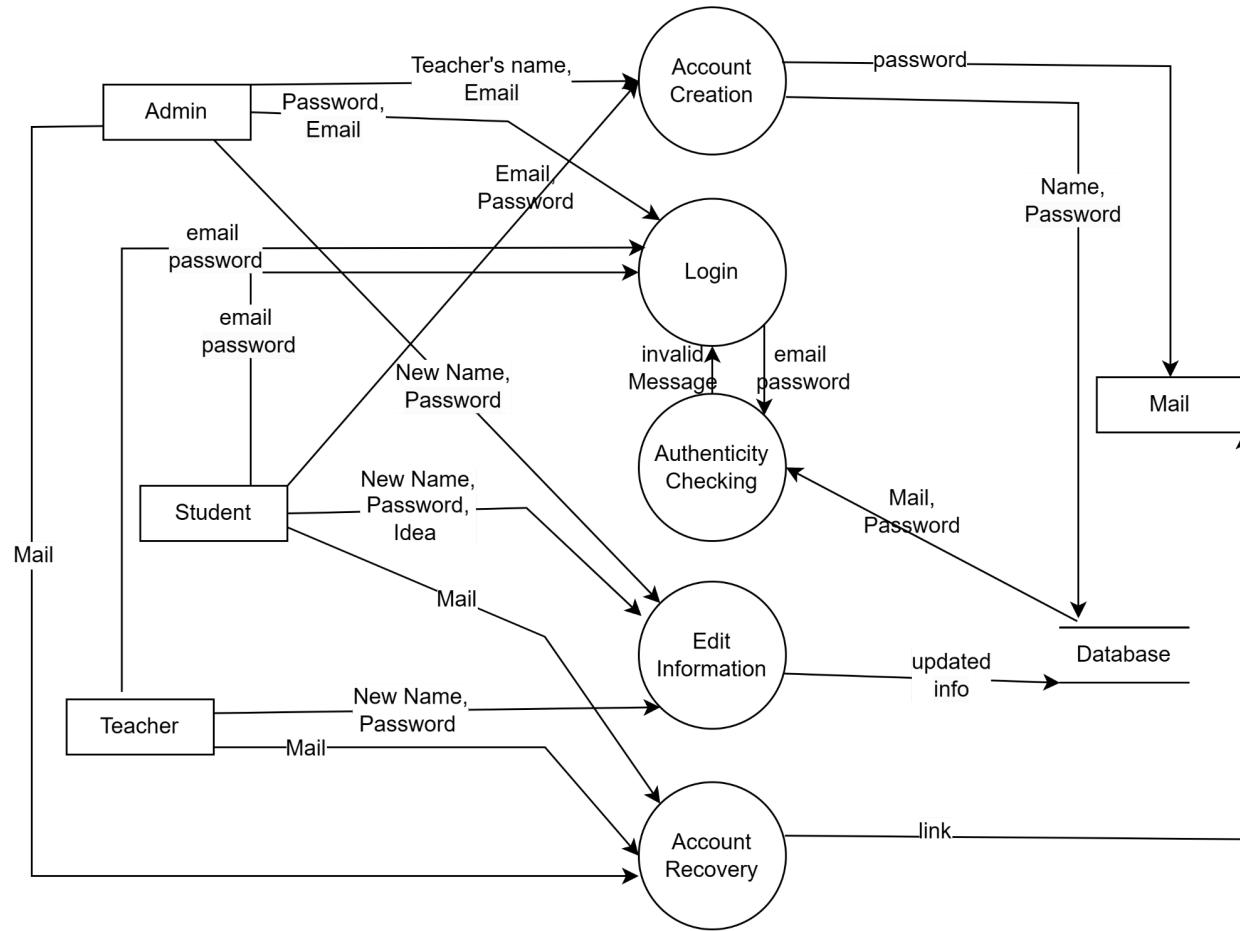


Fig:7.2.3 ( Level-2) Account Management

## Level-3 Committee Formation

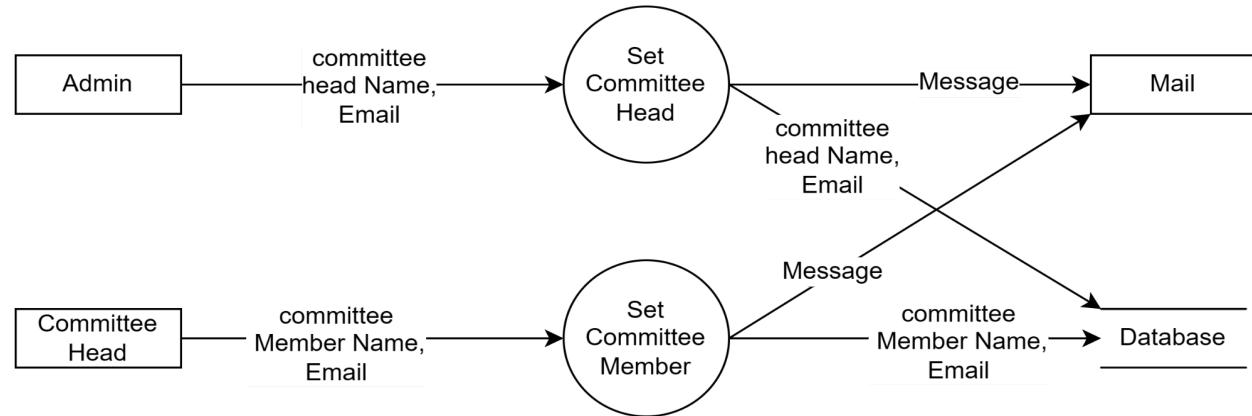


Fig:7.2.4 ( Level-3) Committee Formation

## Level-4 Supervisor Allocation

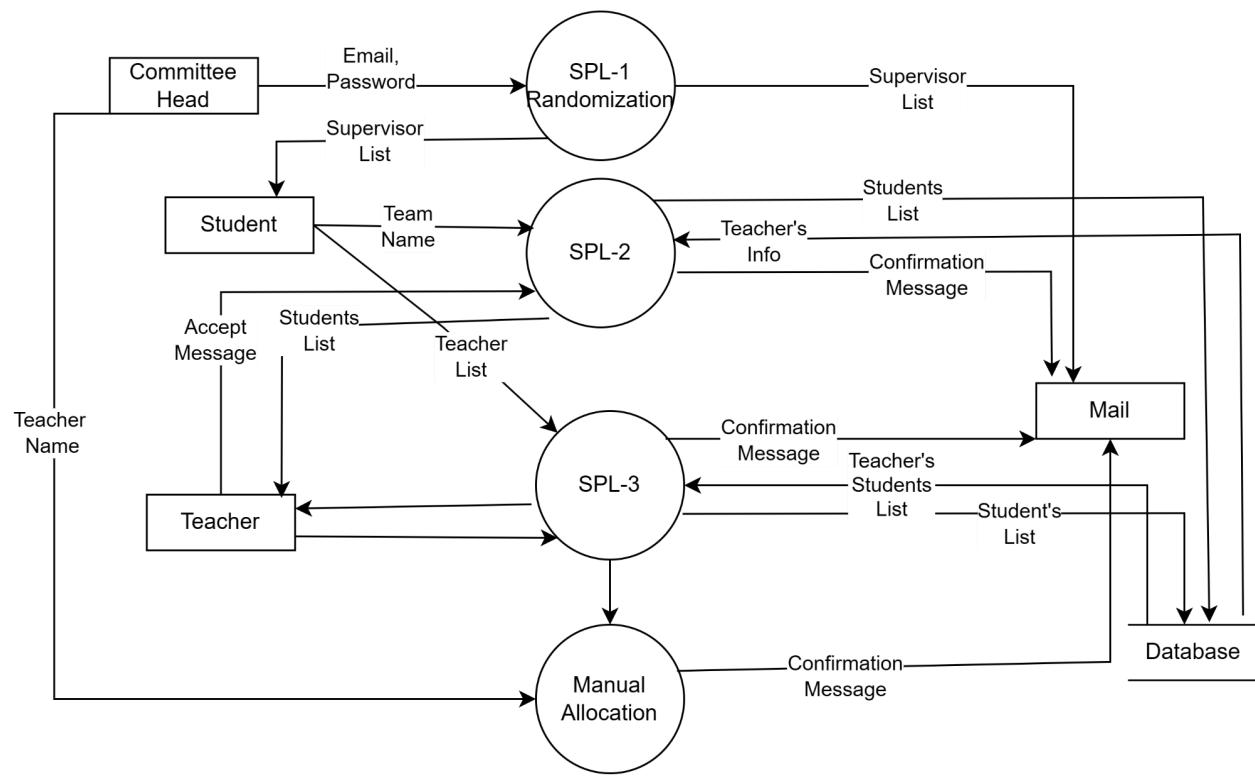


Fig:7.2.5 ( Level-4) Supervisor Allocation

## Level-5 SPL-2

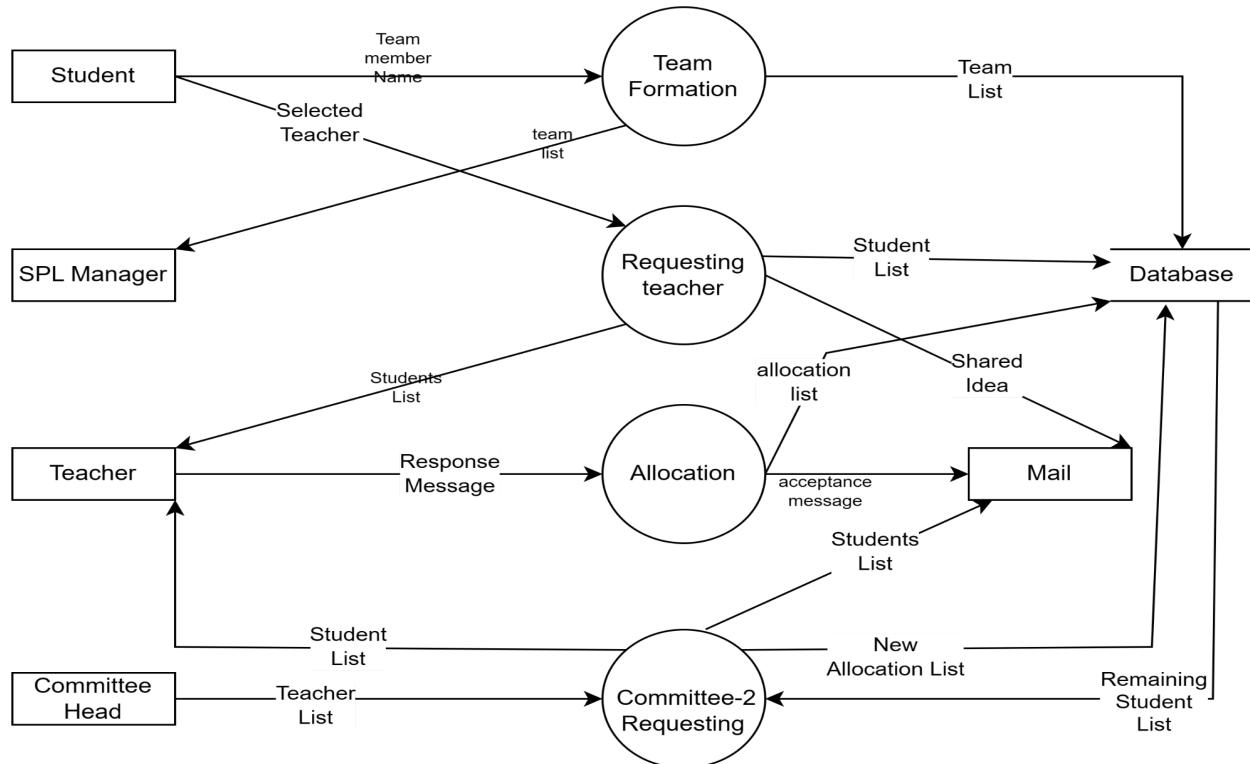


Fig:7.2.6 ( Level-5) SPL-2

## Level-6 SPL-3

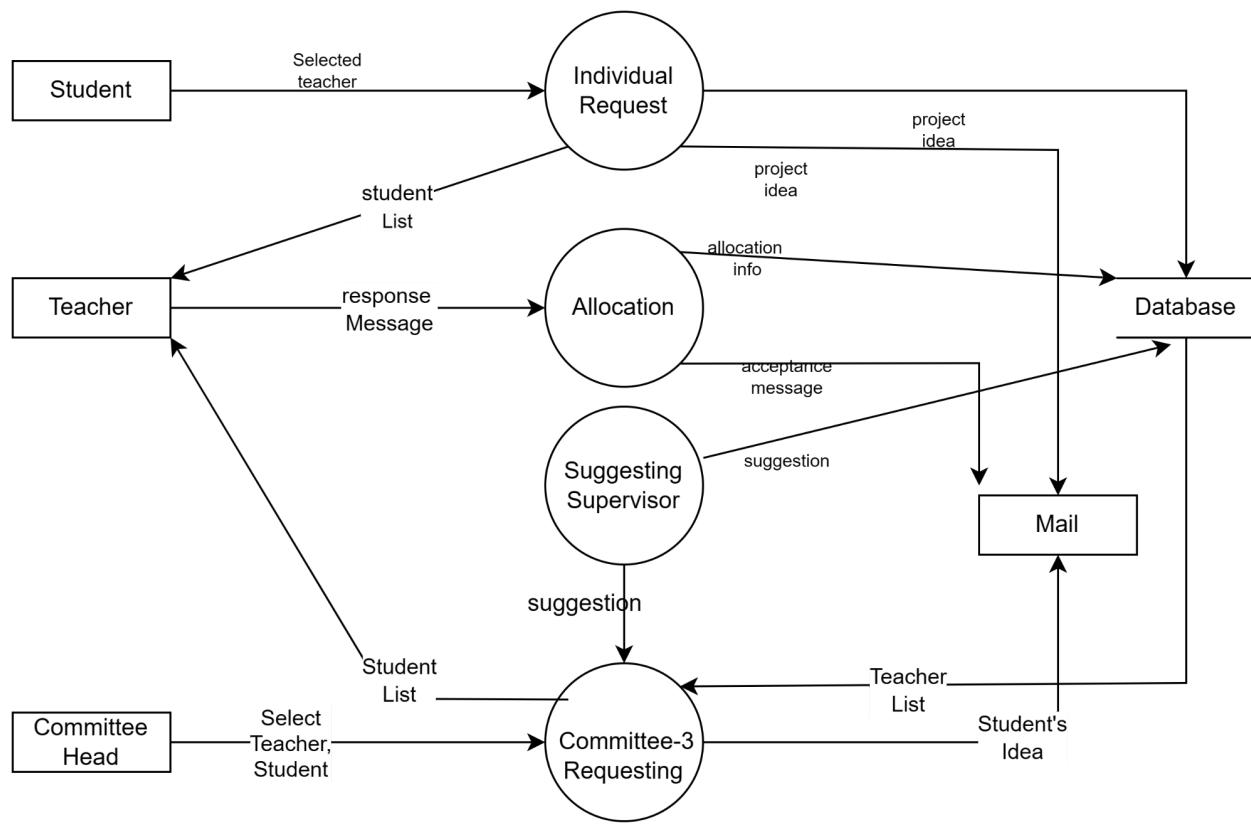


Fig:7.2.7 ( Level-6) SPL-3

## Level-7 Marking System

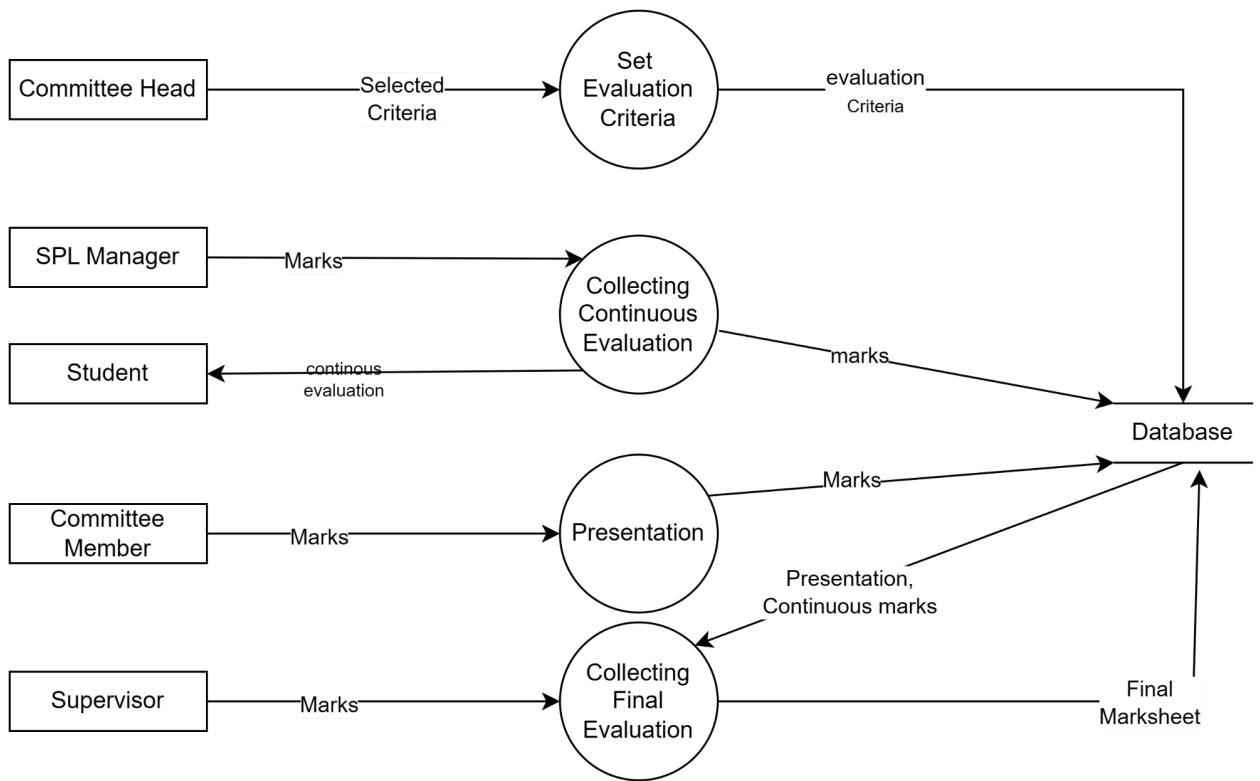


Fig:7.2.8 ( Level-7) Marking System

## Level-8 Notification

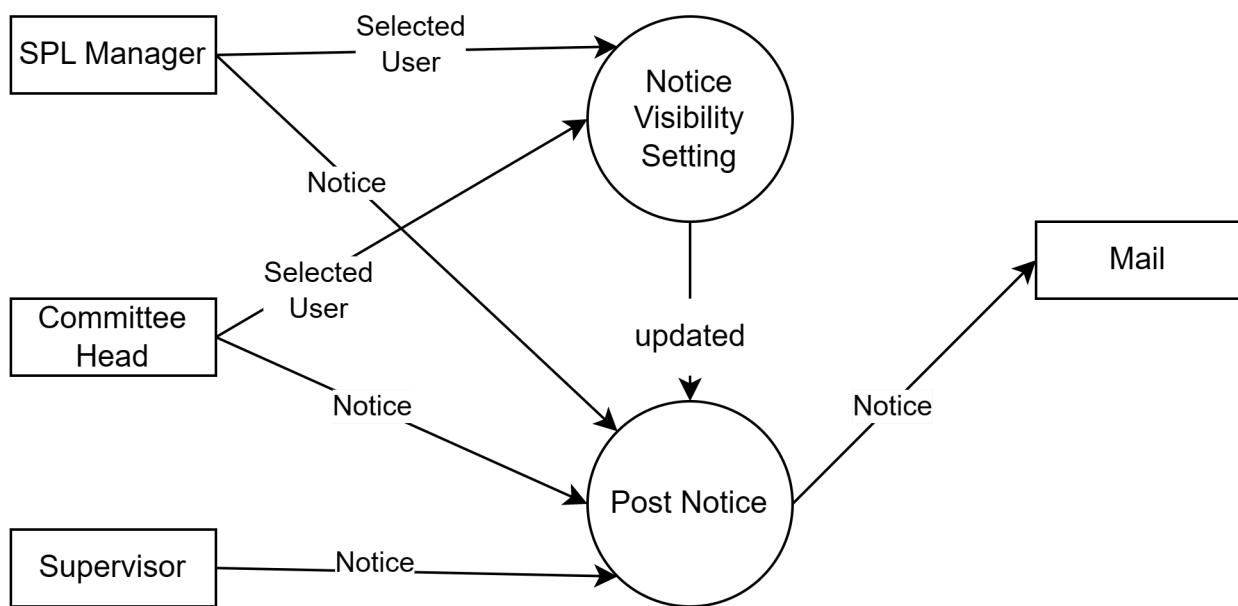


Fig:7.2.9 ( Level-8) Notification

# Chapter-8: Data Based Modeling

If software requirements include the necessity to create, extend or interact with a database or complex data structures need to be constructed and manipulated, then the software team chooses to create data models as part of overall requirements modeling. The entity-relationship diagram (ERD) identifies all data objects that are processed within the system, the relationships between the data objects, and the information about how the data objects are entered, stored, transformed, and produced within the system.

## 8.1 Data Objects

A data object is a representation of composite information that must be understood by the software. Here, composite information means information that has a number of different properties or attributes. A data object can be an external entity, a thing, an occurrence, a role, an organizational unit, a place, or a structure.

## 8.2 Data Object Identification

We identified all the nouns whether they are in problem space or in solution space from our story:

Serial	Noun	Attributes	Remark
1	Account		P
2	Teacher	11, 12, 28, 32, 33, 34, 39, 40, 51	S
3	Student	11, 12, 28, 32, 33, 34, 36, 37, 51	S
4	Supervisor	11, 12, 28, 32, 33, 34, 51	S
5	Admin	11, 12, 28, 32, 33, 34, 51	S
6	User	11, 12, 28, 32, 33, 34, 51	S

7	<b>SPL</b>	8,9,10,12,13,14,17,32	S
8	SPL-1		S
9	SPL-2		S
10	SPL-3		S
11	Password		S
12	Information		S
13	SPL-No		S
14	Year		S
15	SPL Details		S
16	Committee		S
17	<b>SPL Committee</b>	19, 21	S
18	Member		S
19	<b>Committee Member</b>	11, 12, 28, 32, 33, 34, 51	S
20	<b>SPL Manager</b>	11, 12, 28, 32, 33, 34, 51	S
21	<b>Committee Head</b>	11, 12, 28, 32, 33, 34, 51	S
22	Evaluation Process		P
23	<b>Notification</b>	46, 47, 53	S
24	Supervisor Allocator		P
25	<b>Project</b>	32, 18, 14	S
26	Request		P
27	<b>Presentation Evaluator</b>	11, 12, 28, 32, 33, 34, 51	S
28	Types		S
29	Mark Types		S
30	Evaluator		S

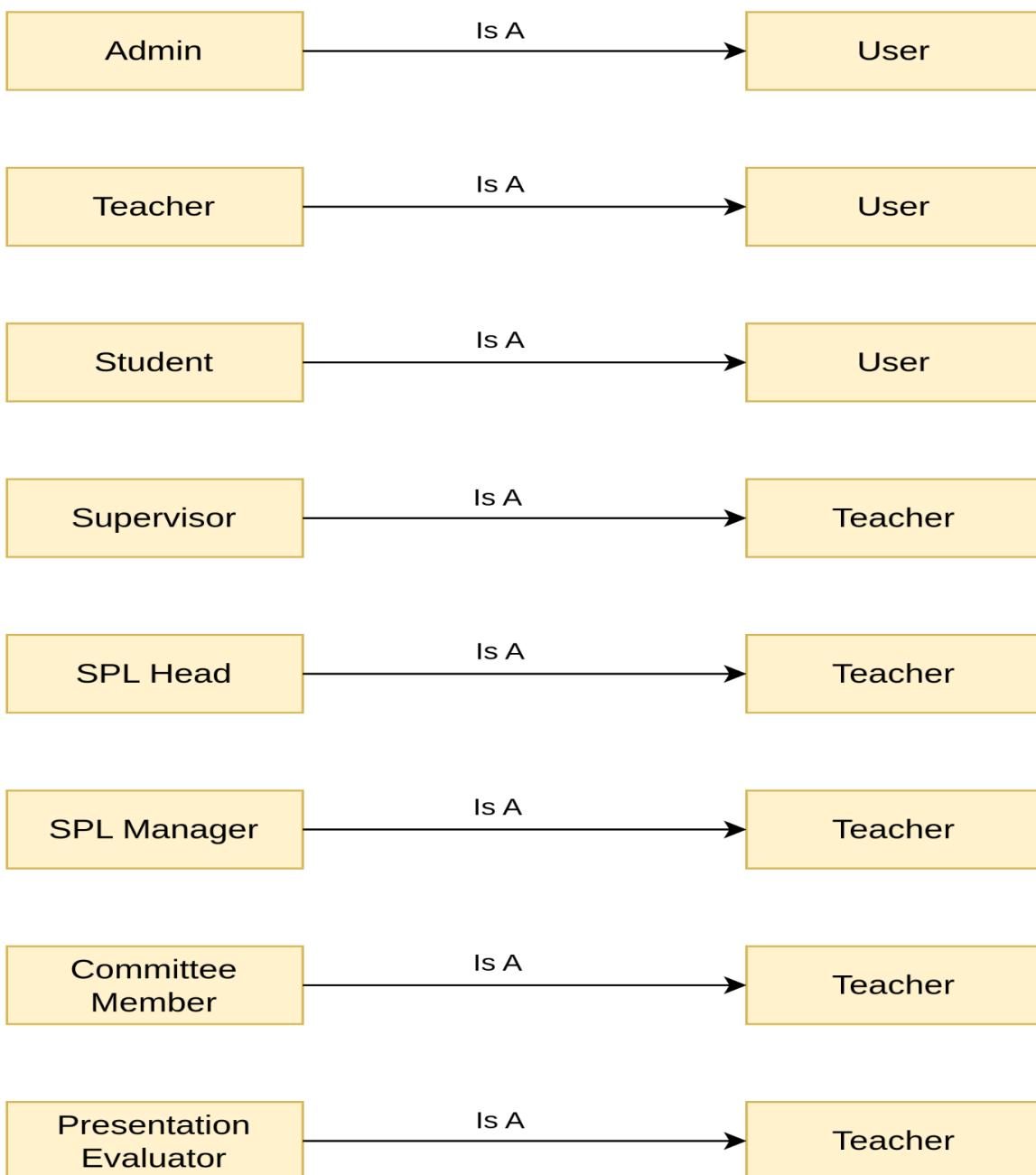
31	<a href="#">Presentation</a>	32, 43, 14	S
32	Name		S
33	Email		S
34	Phone number		S
35	Type		S
36	Roll No		S
37	Reg No		S
38	Time		S
39	Designation		S
40	Hierarchy		S
41	Continuous Mark		S
42	Grade Sheet		S
43	<a href="#">Mark</a>	41, 44, 45, 52	S
44	Presentation Mark		S
45	Supervisor Mark		S
46	Sender		S
47	Receiver		S
48	<a href="#">Team</a>	3, 49	S
49	<a href="#">Team Member</a>	11, 12, 28, 32, 33, 34, 51	S
50	<a href="#">Interested Fields</a>	32	S
51	Credential		S
52	Coding Mark		S
53	Details		S

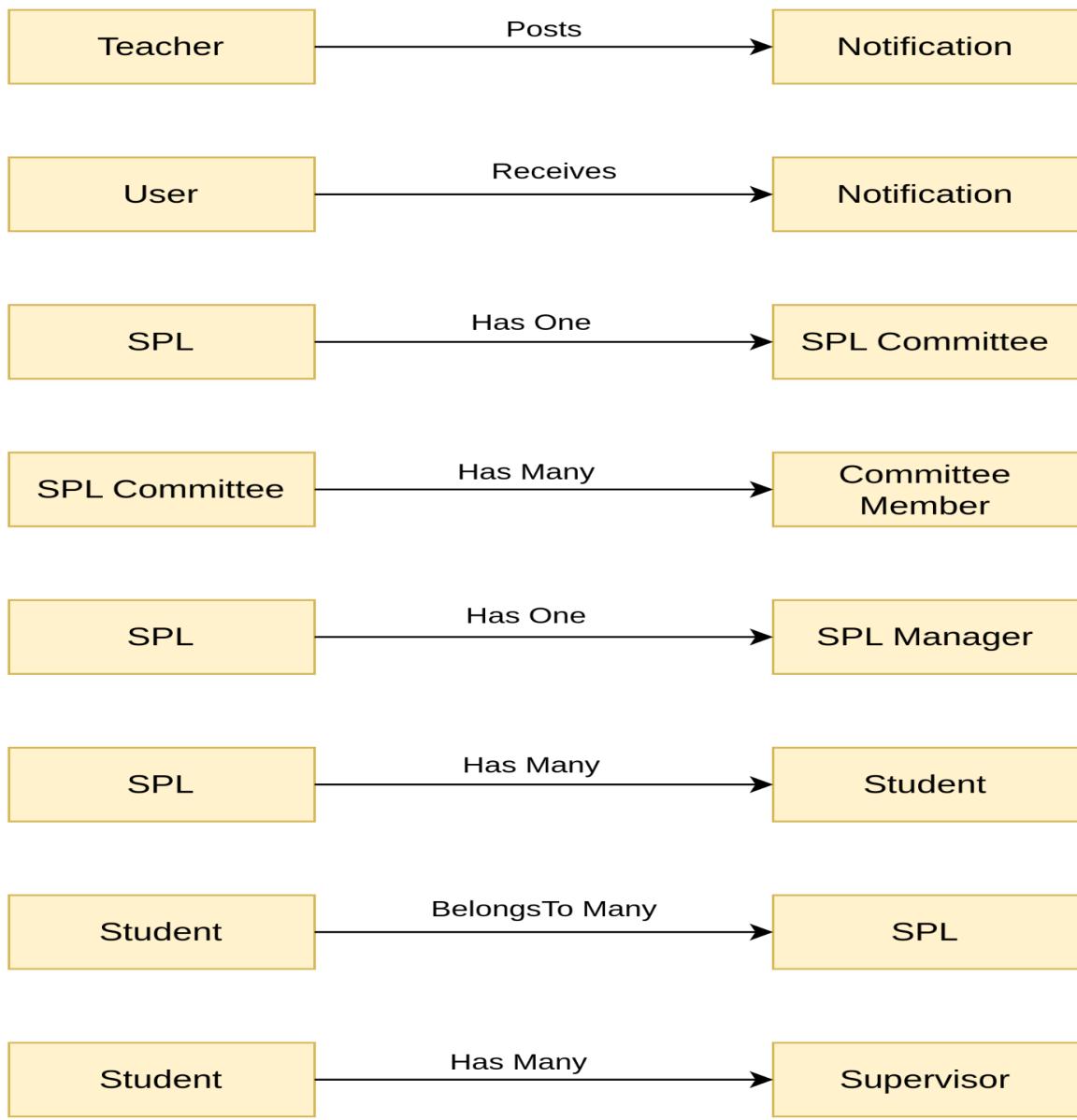
## 8.3 Final Data Objects

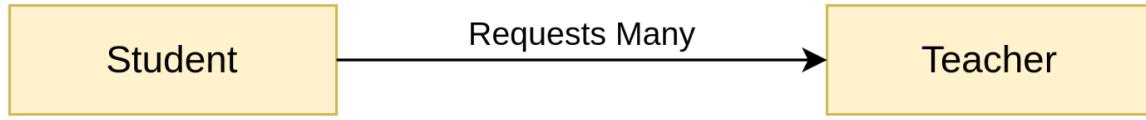
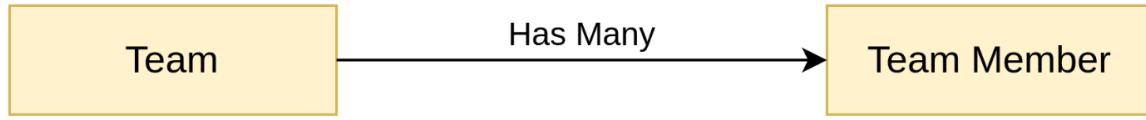
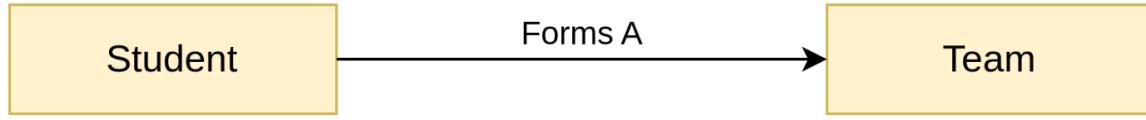
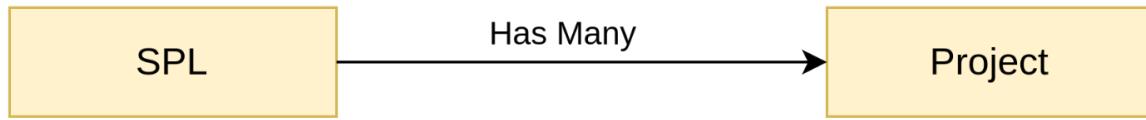
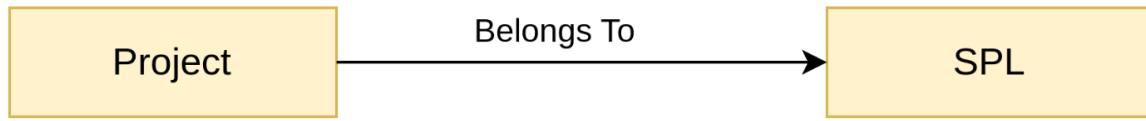
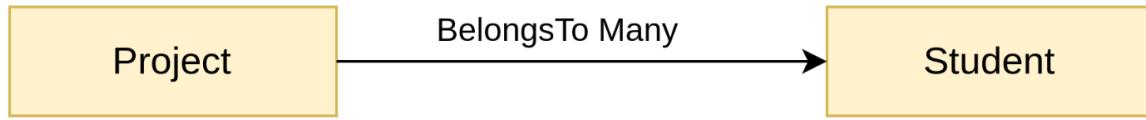
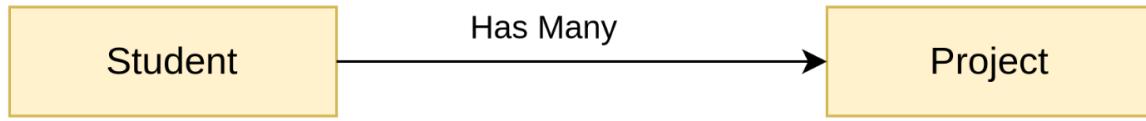
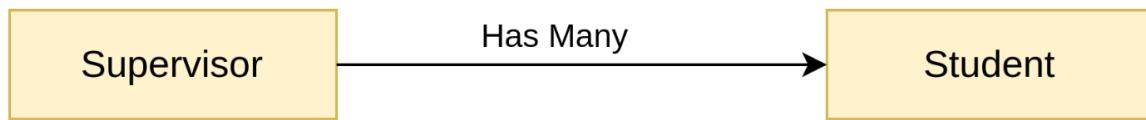
In the following table we finalize the data objects with their attributes Most of the attributes of the data objects are selected from the usage scenario and some of the attributes are selected to complete the system which is not in the usage scenario but important for the data objects.

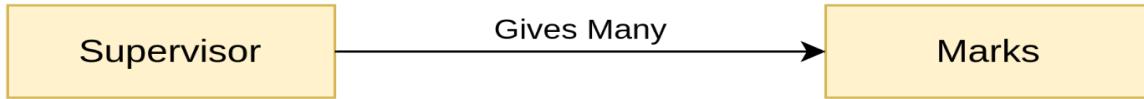
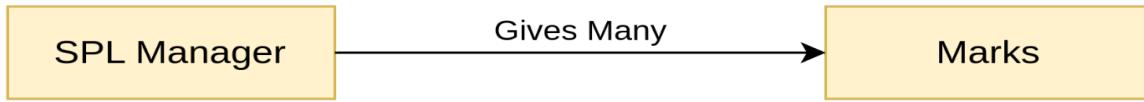
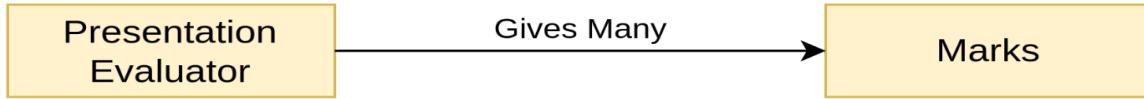
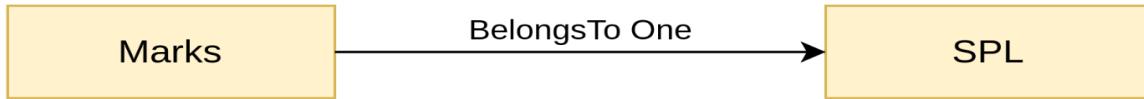
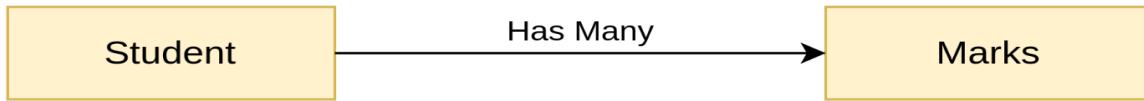
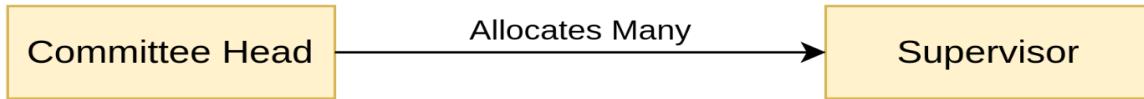
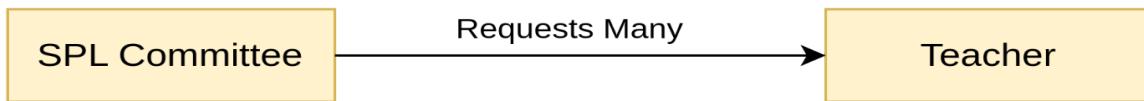
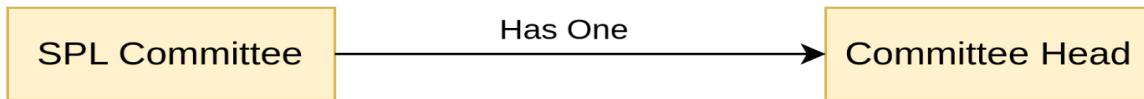
1. User
2. Admin
3. Teacher
4. Student
5. Supervisor
6. SPL
7. SPL Manager
8. SPL Committee
9. Committee Member
10. Committee Head
11. Presentation Evaluator
12. Presentation
13. Project
14. Team
15. Team Member
16. Mark
17. Notification
18. Interested Fields

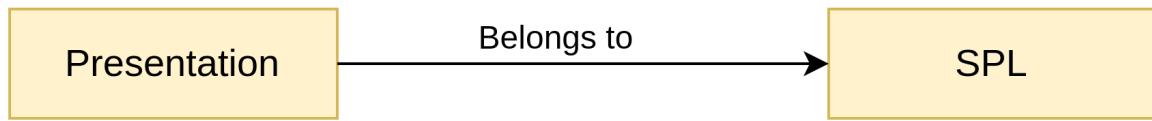
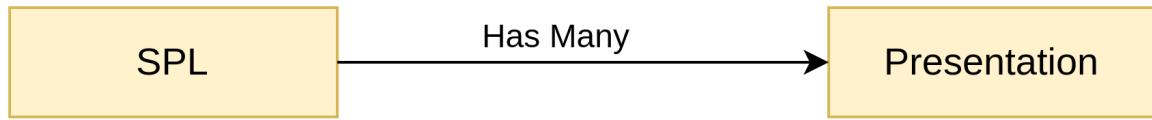
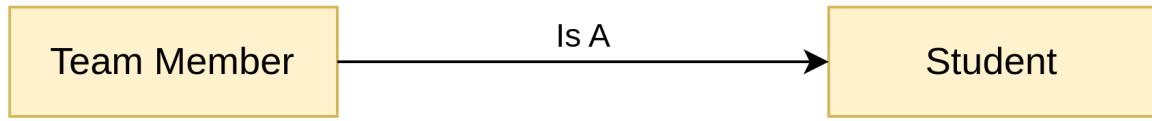
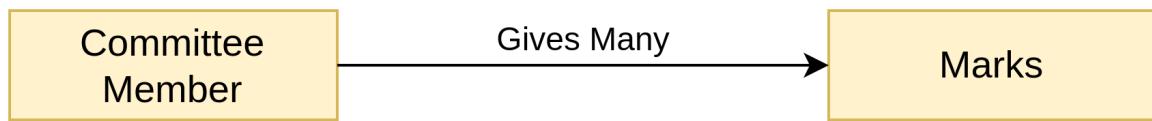
## 8.4 Data Object Relationship











## 8.5 ER Diagram:

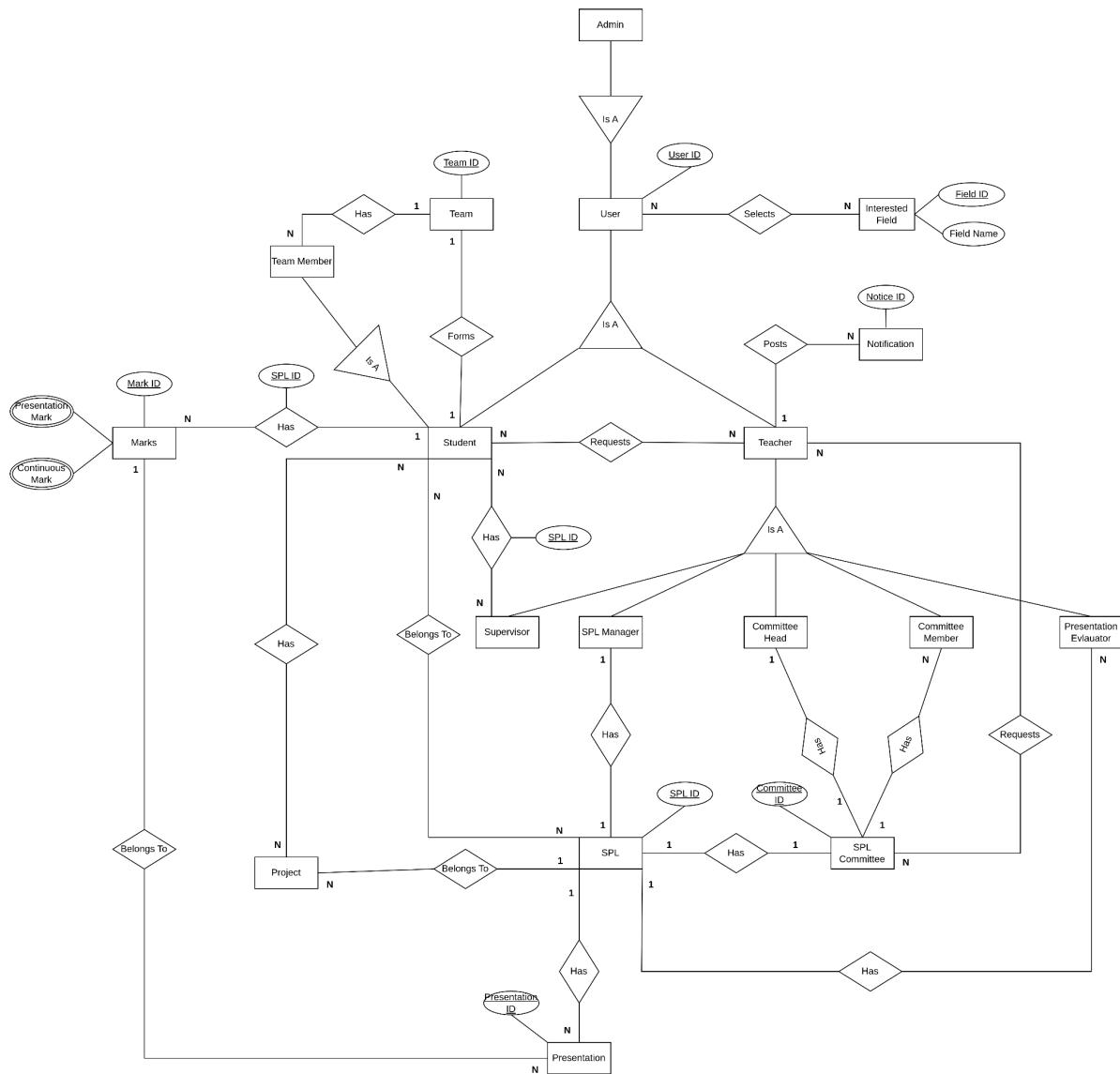


Fig 8.1: ER Diagram

## 8.6 Database Schema

### Definition:

user\_type: [Admin, Student, Teacher]

spl\_name: [spl1, spl2, spl3]

Permanent: Table data will never delete

Temporary: Table data will reset at the beginning of each academic year.

### Schema:

- 1) users(user\_id, name, gender, email, phone, password, user\_type, avatar, details)
- 2) students(student\_id, roll\_number, reg\_number, batch, session, current\_session)
- 3) teachers(teacher\_id, designation, rank, available)
  
- 4) spls(spl\_id, spl\_name, spl\_manager, academic\_year, active)
- 5) student\_spl(student\_id, spl\_id) [many to many according to all spl]
  
- 6) supervisors(supervisor\_id, student\_id, spl\_id)
- 7) presentation\_evaluators(evaluator\_id, spl\_id)
  
- 8) spl\_committee(committee\_id, spl\_id, committee\_head)
- 9) committee\_members(committee\_id, teacher\_id) [many to many according to all spl]
  
- 10) projects(project\_id, spl\_id, supervisor\_id, project\_name, details)
- 11) student\_project(student\_id, porject\_id) [many to many]
  
- 12) team(team\_id, spl\_id, team\_name)
- 13) team\_members(team\_id, student\_id) [one to many]
  
- 14) presentation(presentation\_id, spl\_id, name)
- 15) marks(mark\_id, spl\_id, student\_id, supervisor\_mark, coding\_mark)
- 16) presentation\_marks(mark\_id, presentation\_id, teacher\_id, mark)
- 17) continuous\_marks(mark\_id, date, mark)
  
- 18) notifications(notice\_id, sender\_id, title, message)
- 19) notification\_receivers(notice\_id, receiver\_id, reads) [many to many]
  
- 20) student\_requests(student\_id, teacher\_id) [Many to Many]
- 21) team\_requests(team\_id, teacher\_id) [Many to Many]
- 22) committee\_requests(student\_id, teacher\_id) [Many to Many]

23) interested\_fields(field\_id, field\_name)

24) user\_fields(user\_id, field\_id) [Many to Many]