**Chapter 4**

**Scenario Based Modeling**

This chapter describes scenario based modeling of Online Student Registration and Exam System.

**4.1 Definition of Use Case**

A use case is a software and system engineering term that describes how a user uses a system to accomplish a particular goal. A use case acts as a software modeling technique that defines the features to be implemented and the resolution of any errors that may be encountered.

Use cases define interactions between external actors and the system to attain to particular goals. There are three basic elements that make up a use case:

1. Actors: Actors are the type of users interact with the system.

2. System: Use cases capture functional requirements that specify the intended behavior of the system.

3. Goals: Use cases are typically initiated by a user to fulfill goals describing the activities and variants involved in attending the goal.

Use cases are modeled using unified modeling language and are represented by ovals containing the names of the use case. Actors are represented using lines with the name of the actor written below the line. But here, we use the combination of lines and a circle to represent each actor. To represent an actor's participation in a system, a line is drawn between the actor and the use case. Boxes around the use case represent the system boundary.

There are two types of actor:

1. Primary actor.

2. Secondary actor.

**Primary actor:** Primary actor refers who is directly involved with the system in order to achieve required function and benefit from the system. They interact directly and frequently with the software.

In our proposed system, students and teachers are primary actor.

**Secondary actor:** Secondary actor refers who is indirectly involved with the system but necessary to support the system so that system can perform its functionality without any hinder. Secondary actor either produces or consumes information.

In our proposed system, there is no secondary actor.

**4.2 Use Case Diagrams**

Use case diagram provides the non-technical view of the system. A use case diagram is a graphic depiction of the interactions among the elements of a system. A use case is a methodology used in system analysis to identify, clarify and organize system requirements.

**4.2.1 Level-0 of the use case:**

By analyzing the usages scenario, we select two primary actors. Figure 4.2.1 indicates that these two actors are directly interacted with the hole system. Basically the whole system directly depends on these two actors. But we cannot find any secondary actor by analyzing the usages scenario.

Here, these two actors who are directly involved with our proposed system:

1. Director

2. Teacher



Figure 4.2.1: Level 0 of the use case

**4.2.2 Level-1 of the use case:**

The proposed system is divided into five subsystems. These subsystems are registration, authentication, addition, expense management and report. Here expense management, addition and report are the heart of this proposed project and authentication subsystem is used only for protecting this system from unauthorized user.



Figure 4.2.2: Level-1 of the use case

**4.2.3.1 Level-2 of the “Registration” subsystem:**

The registration subsystem is separated into two actions. These actions are registered as teacher and registered as director. These actions are registered as teacher and registered as director. Teachers are involved with the second action and director is interacted with the first action. Action registered as teacher allows any user to fill up form as a teacher of the proposed system. Registered as director allows the director to fill up form as a director.



Figure 4.2.3.1: Level-2 of the “Registration" subsystem

**4.2.3.2 Level-2 of the “Authentication” subsystem:**

The authentication subsystem is divided into three actions. These actions are log in, log out and maintain profile. Both teachers and director can be interacted with all for actions specified at authentication subsystem. Action log in is used to enter the system, action log out is used to exit from the system and maintain profile is to change the profile information.



Figure 4.2.3.2: Level-2 of the “Authentication” subsystem

**4.2.3.3 Level-2 of the “Addition” subsystem:**

This subsystem is divided into two parts. The first one is adding sector of expenses and adding sub-admin. A number of sectors will be added in the expense sectors. Teachers will be added as sub-admin of the subsystem.



Figure 4.2.3.3: Level-2 of the “Addition” subsystem

**4.2.3.4 Level-2 of the “Expense management” subsystem:**

This subsystem is divided into three parts. Estimation, decision and notification. The sub-admins proposed a certain amount in the estimation. Director may approve or reject the proposal which is illustrated in decision part. A notification will be sent to the sub-admin if the proposal is rejected.



Figure 4.2.3.4: Level-2 of the “Expenditure management” subsystem

**4.2.3.5 Level-2 of the “Report” subsystem:**

This subsystem is divided into three parts. Expense record, general report and special report. If a notification has to be sent to the admin upon the expense, then a special report is generated.



Figure 4.2.3.5: Level-2 of the “Report” subsystem

**4.2.4.1 Level-3 of the “Add expense sectors” subsystem:**

This subsystem is divided into two parts. Add field names and add field access keys.



Figure 4.2.4.1: Level-3 of the “Add expense sectors” subsystem

**4.3 Activity and Swim Lane Diagram**

**Activity diagram** shows the technical view of the system for every use case from which we can understand how the system actually works and how the actors interact with the system.

Here is the activity diagram for “Registration” use case:

**Use case 1: Registration**



Figure 4.3.1: Activity Diagram for “Registration” use case

|  |  |
| --- | --- |
| Director | Teacher |
|  |  |

Figure 4.3.2: Swim Lane Diagram for “Registration” use case

**Use Case 2: Log in**



Figure 4.3.3: Activity Diagram for “Log in” use case

|  |  |
| --- | --- |
| **Director** | **Teacher** |
|  |  |

Figure 4.3.4: Swim Lane Diagram for “Log in” use case

**Use Case 3: Log out**



Figure 4.3.5: Activity Diagram for “Log out” use case

|  |  |
| --- | --- |
| Director | Teacher |
|  |  |

Figure 4.3.6: Swim Lane Diagram for “Log out” use case

**Use Case 4: Maintain profile**



Figure 4.3.7: Activity Diagram for “Maintain profile” use case

|  |  |
| --- | --- |
| **Director** | **Teacher** |
|  |  |

Figure 4.3.8: Swim Lane Diagram for “Maintain profile” use case

**Use Case 5: Add expense sector**



Figure 4.3.9: Activity Diagram for “Add expense sector” use case

|  |
| --- |
| **Director** |
|  |

Figure 4.3.10: Swim Lane Diagram for “Add expense sector” use case

**Use Case 6: Add sub-admin**



Figure 4.3.11: Activity Diagram for “Add sub-admin” use case

|  |
| --- |
| Director |
|  |

Figure 4.3.12: Swim Lane Diagram for “Add sub-admin” use case

**Use Case 7: Expenditure management**



Figure 4.3.13: Activity Diagram for “Expenditure management” use case

|  |  |
| --- | --- |
| Director | Teacher |
|  |  |

Figure 4.3.14: Swim Lane Diagram for “Expenditure management” use case

**Use Case 8:** **Report**



Figure 4.3.15: Activity Diagram for “Report” use case