'STUDENT AID SYSTEM'

Software Engineering Project

CSE470, Section – 06

Submitted by:

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CHAPTER 1

INTRUDUCTION TO STUDENT AID SYSTEM

A Student Aid system will be a web based application system which will use distributed servers for different services. It will be completely designed in a way which will be User friendly. It will be used in various universities, to serve some functions in an efficient manner. As it is mostly focused on student friendly services, it will include some features like, Uploading necessary notes and videos to the dedicated server and can be shared from one user to another within the university, this system will also provide admission information for the ones who is interested to get admission, this system will also provide an important service to the senior students, which is thesis grouping based on their interest area, which they will upload to the system and the system will help then to create groups based on that and the thesis instructors may verify them. So both Students and teacher can use this system with the help of some technical support.

1.1   PURPOSE

This document is about the software Requirement Specifications, called as SRS for our System Aid System. The main purpose of making this document is to clarify all the requirements in a detailed way which this system may have. In this document all the necessary requirement is enlisted to have better understanding about the project, which is not possible if there are no details about the specifications. So we have decided to arrange an impactful meeting for necessary discussions with all the team members along with the stakeholders. After the discussion and detailed conversation, we have prepared this document with necessary details as much as possible.

This document includes a use case which reflects the functions that we will be applying, and the services that will be served by this System. It also indicated some constrains, interactions and user stories.

1.2 OVERVIEW

- The remainder of this document includes 6 chapters with necessary descriptions
- The second chapter includes Planning meeting, identifying stakeholders, Questionnaires, Multiple viewpoints, working towards Collaboration
- The third chapter includes the elicitation part of requirement engineering where Normal requirements, Expected Requirements, Exciting requirements have been discussed
- In the fourth Chapter, we have described what is use case, identified our primary and secondary actors, the use case diagram itself, and description based on our project.
- In the fifth Chapter, we have discussed about class based modeling, where we have identified our potential class, showed the class diagram figure with relation.
- The sixth chapter includes the Risk analysis and management, where we have discussed about all the steps of it, and worked on those instructions for our project.
- The last and final Seventh Chapter includes the overall summary of our project as conclusion.

1.3 CONCLUSION

In this document we have discussed our project overview including project purpose. In the next chapter, Inception of this project will be described.

CHAPTER 2

INCEPTION OF STUDENT AID SYSTEM

2.1 INTRODUCTION

Inception means the beginning. Origin of something that is of requirement engineering. This phase helps to make a first draft about project planning.

The inception phase is not responsible to describe the requirements in detail and also not to give solutions. The purpose in this phase is to achieve concurrence among all stakeholders on the lifecycle objectives for the project. For establishing groundwork, we have worked with the followings for this project:

1. Planning meeting
2. Identifying stakeholders
3. Recognizing multiple viewpoints
4. Working towards collaboration factors
5. Our questions to the stakeholders

Besides there are other few inceptions which is also important:

1. **Understand what to build:** Determine an overall vision, including the scope of the system and its boundaries. Identify the stakeholders: who is interested in this system and what are their success criteria?
2. **Identify key system functionality:** Decide which requirements are most critical.
3. **Determine at least one possible solution:** Assess whether the vision is technically feasible. This may involve identifying a candidate high-level architecture or doing technical prototypes, or both.
4. **Understand** the high-level estimate for cost, schedule, and risks associated with the project.

2.2 PLANNING MEETING

At the beginning of the project, several stakeholders and subject related experts discuss the project and make the plan. Based on that we decided to choose stakeholders depending on the complexity of the project and the time for delivering the project. The meeting may take several days or weeks.

To make the project discussion, we have made several group discussions:

- Date: 6th June,2019

  Place: BRAC University

  Subject Matter: Identifying stakeholders

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- Date: 12th June,2019

  Place: BRAC University

  Subject Matter: Collecting requirements from   stakeholders

  Group Members: Above all members

- Date: 18th June,2019

  Place: BRAC University

  Discussion Matter: Discussion on requirements

  Group Members: Above all Members

- Date: 25th June,2019

  Place: BRAC University

  Discussion Matter: Discussion on report writing about "Inception" phase

  Group Members: Above all Members

2.3 IDENTIFYING STAKEHOLDERS

A stakeholder is an individual, a group of people, or an organization who can affect or be affected positively or negatively by the project. Before we can engage project stakeholders, we first needed to identify them. The stakeholders that we have identified are:

- Students
- Teachers
- Staffs

We analyzed them to place them into appropriate groups:

- Stakeholders include end-users who interact with the system
- Others may also be affected by its installation.

So we are going to develop a system named STUDENT AID which we will be testing in various universities and we will see how it behaves on different situations. Moreover, as it will be tested on universities so the number of our stakeholder is small and so they might also have different type of viewpoints and requirements. It should be done in a logical way to ensure that the stakeholders are not easily omitted. The following are some questions to be asked to stakeholders:

- Who uses the system?
- Who maintains the system?
- Who has knowledge about the system?
- Who approves the project?
- Whose work will affect our project?
- Who is affected by the results of the project?
- Who pays for the project?
- Who will make decisions about the project?

2.4 OUR QUESTIONS TO THE STAKEHOLDERS

We set our first set of context-free questions focuses on the students, benefits and overall project goals. The questions are mentioned above. These questions helped us to identify all stakeholders, to gain the better understanding of which courses to take, admission information, students regular needs related to academic activities and also the challenges to make group for thesis. It also involves the requirements that are needed for successful implementation of the project.

2.5 RECOGNIZING MULTIPLE VIEWPOINTS

1. **ADMIN VIEWPOINT:**
   - User interface should be understandable to the non-technical persons
   - Easy to maintain
   - Facility of individual accounts for teachers and students where user information's must be uploaded
   - Assuring the quality of individual server and database in an efficient way

2. **STAFF VIEWPOINT:**
   - Easy access
   - Staff information might be inserted
   - Assuring hardware security

3. **TEACHERS VIEWPOINT**
   - Can upload sample papers
   - Can chose group by his/her interest
   - Less time consuming operations

4. **STUDENT VIEWPOINT:**
   - Easy to access
   - Users can pre-define their requirements
   - Expects quick response
   - System will give important notifications
   - View the changes they have made
   - Students might get their asked service from the dedicated server
   - Students may upload and download important files (specially notes and videos)

2.6 WORKING TOWARDS COLLABORATION

While asking our stakeholders for their requirements, we found out that each of them had different requirements. Some of them are common as well as conflicting. So, we need to follow the following steps to merge the requirements:

- Find out the common and conflicting requirements
- Dividing the requirements into different categories
- Identifying special requirements according to priority
- Taking final decisions about the requirements

2.7 CONCLUSION

Inception phase helped us to know the multiple viewpoints that the stakeholders had. It also assisted us in understanding the project scope. It is a significant phase for new development efforts in which there will be some risks which needs to be identified before the project proceeds. In the next chapter, we have discussed about finding requirements and scenario.

Elicitation of Student Aid System

Requirements elicitation is process of interacting with customer and end-users to find out about the domain requirements, what services the system should provide, and the other constrains. It combines elements of problem solving, elaboration, negotiation and specification. Requirements elicitation is perhaps the most difficult, most error-prone and most communication intensive software development. To elicit requirements of Student Aid System, we followed the activities that are listed below:

- Collaborative Requirements Gathering
- Quality Function Development
- Usage Scenario

3.1 COLLABORATIVE REQUIREMENTS GATHERING

The developers discuss with the client and end users and know their expectations from the software, fix the rules for preparation and participation as well. The main motive is to identify the problem, give the solutions for elements, negotiate the different approaches and specify the primary set of solution requirements in an environment which is valuable for achieving goal.

To accomplish our system, a meeting place, time and date were selected, a facilitator was chosen and attendees from the software team and other stakeholder organizations were invited to participate.

Requirements elicitation technique:

Interviews: Objective of conducting an interview is to understand the customer's expectations from the software. For our system, it is impossible to interview every stakeholder hence representatives from groups are selected based on their expertise and credibility.

Brainstorming: It is a group technique to generate lots of new ideas hence providing a platform **to share views.**

Observation: Team observe the actual working of the existing installed systems. They observe the actual workflow and draw some conclusions which aid to form requirements expected from the software.

Questionnaires: It is a list of questions about the project requirements. Investing time in a requirements questionnaire will help to ensure not to merely gather up requirements. Few questions listed for our system requirements:

Questionnaires:

- ➢ Who are the users?
- ➢ What is the purpose of this system?
- ➢ What are the benefits?
- ➢ How the students will be benefited?
- ➢ How will you use this feature?
- ➢ Who will learn about the results of someone using this feature?
- ➢ Does the system have mobile device support?
- ➢ Can the solution (system) easily scale to handle the users need?
- ➢ Does the system hook into social networking platforms?
- ➢ Will it be cost effective?

3.2 QUALITY FUNCTION DEVELOPMENT

In this technique customer satisfaction is of prime concern, hence it emphasizes on the requirements which are valuable to the customer. For our Student Aid System, the following requirements given below are identified by quality function development:

Identified Normal requirements:

- o Students will get important notices
- o Students can create their profile using student id, password
- o Student can edit their information
- o Students can contact the administration
- o Student can get course information
- o Can easily form a thesis group
- o Tutorials video will be available
- o Student will be connected to their instructor
- o Student will get help from their classmates and senior

Identified Expected Requirements:

- o The system should be easy to use
- o Students privacy will be secure

- o Student will receive notification
- o Students can upload/download notes
- o Students can upload/download video tutorials
- o Irrelevant videos/notes can be removed

Identified Exciting requirements:

- o Students can get notes from seniors
- o Students can find thesis partner with same interest area
- o Contents of course will be updated
- o Thesis group can be approved by instructor through this system

3.3 USAGE SCENARIO

Student Aid System is a web based system which will give many services to any particular University students. This will contain important information about student admission, course materials of current students and a platform to communicate with other students and faculties for any help regarding studies. Users of this system can be categorized as following:

- ▪ Student:
  - * Senior
  - * Junior
- ▪ Admin
- ▪ Teacher
- ▪ Staff

Student will do registration for using this system. They will provide their information. Administrative use (Admin) will check student's validation and give access for the system. Student can ask any query to admin on student admission. They can get necessary information about admission details or can directly contact to the authority.

Student can find tutorials and notes from this system. Junior can request an access for the notes or tutorials for courses to the senior students as those contents were created by the students who have already done that specific course. Senior student can upload notes and tutorials to the system. So that junior can find their necessary course materials. At the same time, if the course curriculum is changed, the system will update it. It will remove the old notes and videos that are not relevant to the course.

Senior students often get in trouble while forming group for thesis. So there will be a dedicated service for this where student will give information about their interested area. Then depending on the same interest, the system will give suggestions to them. So that students can easily form thesis group. In that time, the grades of the courses which are related to the interested area

will be taken into account while giving recommendation. Thesis instructor will observe this system and if the students match those criteria he may approve them to form a group.

3.4 CONCLUSION

This Requirements Elicitation procedure will help in understanding the necessities of a client or stakeholder. It helps the analyst to gain knowledge about the problem domain which in turn is used to produce a formal specification of the software. We have to concentrate on the most proficient technique to influence the users to accomplish their objectives. In the next chapter we have described about Usecase of our project.

CHAPTER 4

USECASE

4.1 INTRODUCTION

Usecase diagram a scenario based modeling system. It is a graphic depiction of the interactions among the elements of a system. A usecase is a methodology used in system analysis to identify, clarify and organize system requirements and it contains some components.

- The actors, usually individuals involved with the system defined according to their roles
- The use cases, which specific roles are played by the actors within and around the system
- The relationships between and among the actors and the use cases

4.2 ACTORS IDENTIFICATION

The actors are to be identified from the scenario.
These actors are of two types:
- Primary Actor
- Secondary Actor

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.

The identified actors of student information system are:

- Student (Junior and Senior)
- Admin
- System

4.3 FUNCTIONAL REQUIREMENTS

The functional requirements which are needed to be in our use case should be as follows:

- Registration- every student would need to register before using the system
- Information exchange- student and admin need to be able to pass details to each other
- Search- System should be able to find out a preferred item

4.4 INCLUDE AND EXTEND FEATURE

INCLUDE: When any use case needs any help from other use case to run its operation then it includes other use case.

EXTEND: When any service or use case is extension of any other service then one usecase extends the other usecase from where the service is extended.

In our usecase,

IDENTIFIED INCLUDE:

- Students must provide information for registering
- The admin will provide some information to try to help the students in any case
- The search and upload will always be followed by a sorting function so that binary search can be implemented

IDENTIFIED EXTEND:

- The admin may not validate every request for register. Depending on the information provided by the student or the current condition of the system the admin may reject some applicants.
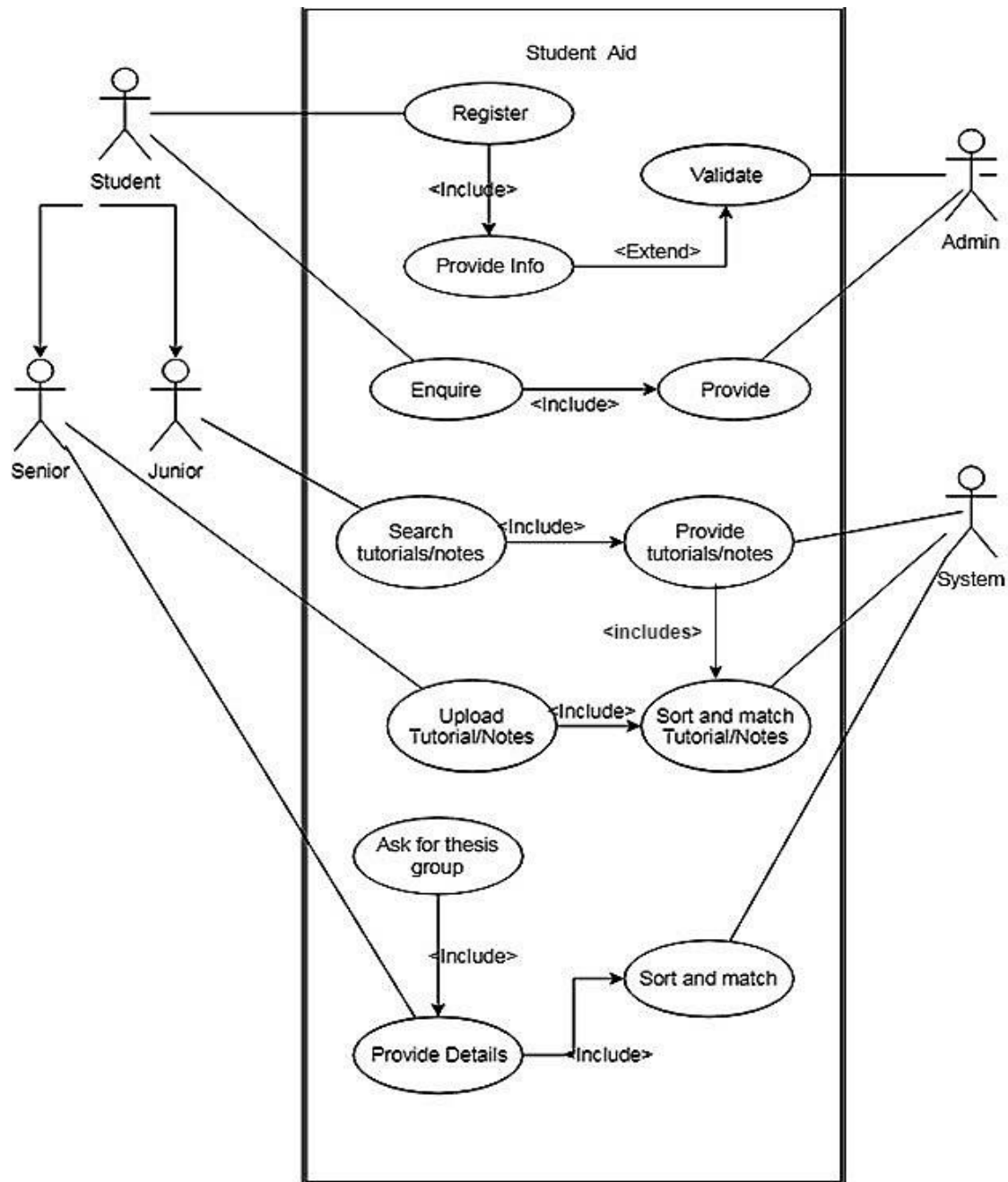
4.5 USE CASE DIAGRAM

Fig: Use case

4.6 CONLCUSION:

This usecase diagram will show how the system operates, in the next Chapter we will describe the Class Based modeling concept.

CHAPTER 5

In this chapter we will be discussing about the concept of class based modelling.

CLASS BASED MODELING CONCEPT

Class-based modeling represents the objects that the system will manipulate, the operations that will applied to the objects, relationships between the objects and the collaborations that occur between the classes that are defined. The elements of a class-based model include classes and objects, attributes, operations, class-responsibility-collaborator (CRC) models, class diagrams.

5.1   IDENTIFYING ANALYSIS CLASSES

Examining all the nouns from the usage scenario potential classes can be identified. For class identification we have to go through the following steps.

STEP 1

Identifying and categorize all nouns in the following ways:

- **External Entities** (e.g. other systems, devices, people) that produce or consume information to be used by a computer-based-system.
- **Things** (e.g. report, displays, letters, signals) that are part of the information domain for the problem.
- **Occurrence or events** (e.g. a property transfer or the completion of a series of robot movements) that occur within the context of system operation.
- **Roles** (e.g. manager, engineer) played by people who interact with the system.
- **Organizational units** (e.g. division, group, and team) those are relevant to an application.
- **Places** (e.g. manufacturing floor or loading dock) that establish of the problem and the overall function of the system.
- **Structures** (e.g. sensors, vehicles or computer) that define a class of objects or related classes of object.

STEP 2

Selection of potential class is performed by considering six selection characteristics.

- **Retained information:** The potential class will be useful during analysis only if information about it must be remembered so that the system can function.
- **Needed services:** The potential class must have a set of identifiable operations that can change the value of its attributes in some way.
- **Multiple attributes:** During requirement analysis, the focus should be on "major" information; a class with a single attribute may, in fact, be useful during design, but is probably better represented as an attribute of another class during the analysis activity.
- **Common attributes:** A set of attributes can be defined for the potential class and these attributes apply to all instances of the class.
- **Common operations:** A set of operations can be defined for the potential class and these operations apply to all instances of the class.
- **Essential requirements:** External entities that appear in the problem space and produce or consume information essential to the operation of any solution for the system will almost always be defined as classes in the requirements model.

5.2   POTENTIAL CLASS TABLE

Potential class	General Classification	Characteristics
User	Role	Accepted all applied
File	Structure	Accepted all applied
Notification	Things	Accepted all applied
Category	Structure	Accepted all applied
Report	Things	Accepted all applied

From this table we found the following potential classes:

- User (Admin, staff, instructor, Student)
- File (Notes, videos)
- Notification
- Category
- Report

5.3   CLASS DIAGRAM FOR STUDENT AID SYSTEM

Admin

Admin
Id Email Password Username Role Contact number

CreateAccount();
CreateRole();
deleteAccount();
deleteFile();
StoreData();

Staff

Staff
Id Email Password Username Role Contact number
getHardwareStatus(); RunningTiime(); Notification();
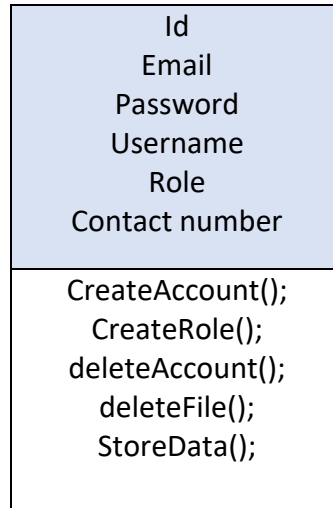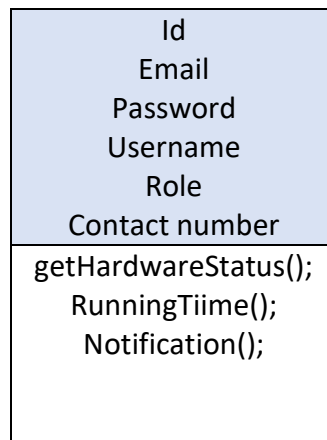
Student

Username
Password
ID
Email
BatchNo
CurrentYear
CurrentSemester
CreditDone
Contact number
Insert_Info();
Update_info();
GetAdmissionInfo();
UploadFiles();
DownloadFiles();
WatchVideo();
Notification();
SetThesisGroup();

Thesis_Instructor

Username
ID
Email
Password
Designation
Contact number
Show_Inserested_Student_List();
Show_Interest_area();
Match_group();
Approve_group();

Notification

ID Type Description Subject
Get_Notication_Info(); Set_Notification_message(); Send_Notification();

File

ID Name Size Type Size From_whom_id
Get_and_Store(); Upload (); Download (); ShowFile();

Report

ID Admin_Name Date Subject
CreateReport(); GetSubject(); Get_Data(); ViewResult();

Category

ID
Type
Description
HasSubCat
Get();
Set();
Update();
Delete();
ChooseSubCategory();

Thesis_Group

User_ID
Name
InterestArea
ContactNum
Email
ShowGroupMembers();
Show_Instructor_details();
Work_progress();

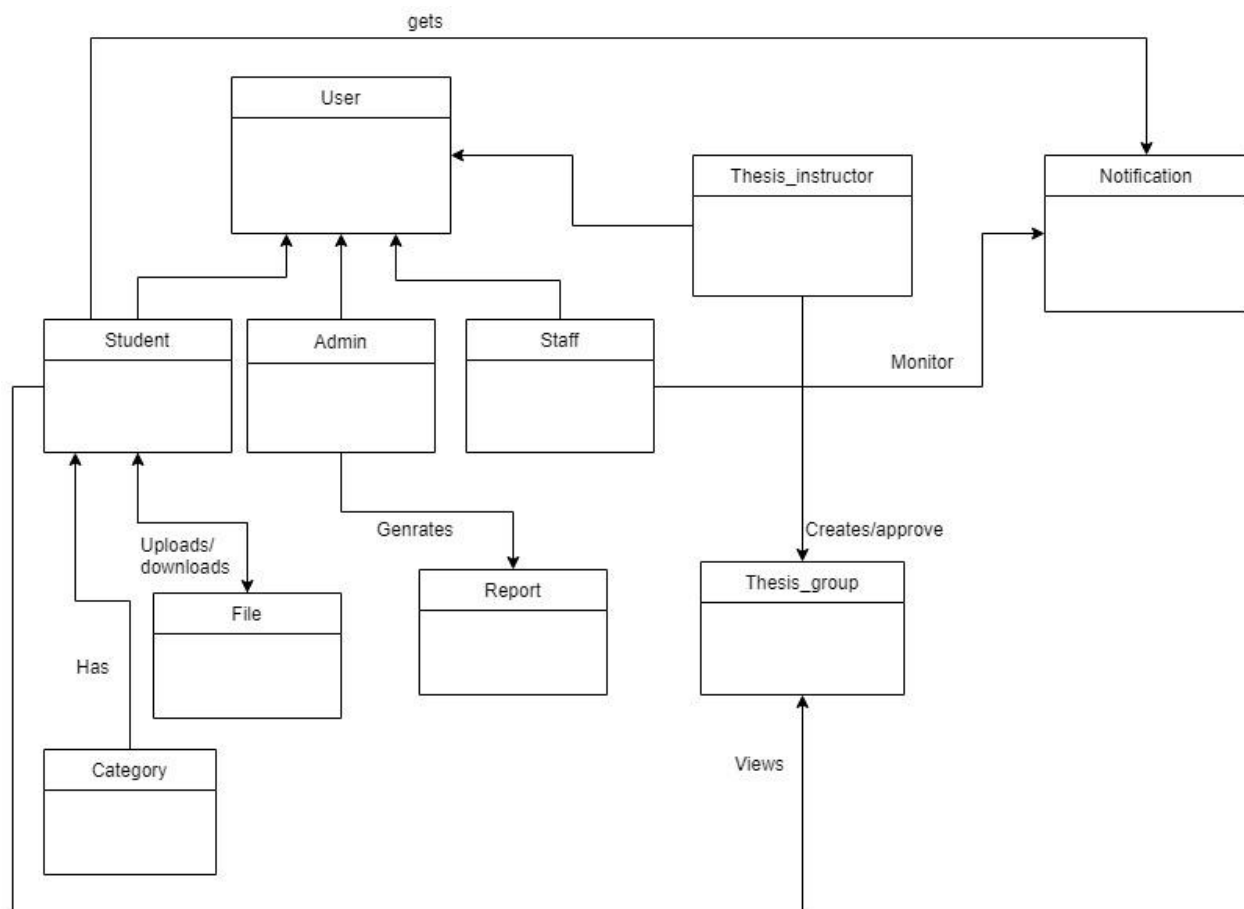## 5.4 CLASS DIAGRAM FIGURE WITH RELATION

Fig: Class diagram

5.4   CONCLUSION

We have identified all potential classes and showed all the relations between the classes. Next chapter is about Risk Analysis and Management.

CHAPTER 6

RISK ANALYSIS AND MANAGEMENT

6.1 INTRODUCTION

Here, we go through the estimation of possible risks may arise and considering those we tried establish a backup plan to resolve those situations. For that we follow the risk management process which are risk identification, analysis, planning process so that if risk occurs we can manage it then we will monitor our planning.

6.2 STEPS OF RISK MANAGEMENT

Risk Management has four steps to it. They are:

- Risk Identification

- Risk Analysis

- Risk Planning

- Risk Monitoring

6.3 RISK IDENTIFICATION

Risk Type	Possible risk
Estimation	The size of our software may become underestimated in future. The time may be underestimated by the team.
Organizational	We may face financial problems, it will force reductions in the project budget.
People	This risk will arise if the Key staffs are ill and unavailable at critical times. Newly appointed staff is not well skilled.
Technology	Connection may get disconnected.
Tools	Tools might get outdated. Taking much time to process data.
Requirements	After done with half of the project, requirements is changed. Customers demand new features which change the requirement.

6.4 RISK ANALYSIS

Risk	Probability	Effect
We may face financial problems, it will force reductions in the project budget	Low	Catastrophic
This risk will arise if the key staffs are ill and unavailable at critical times	Moderate	Serious
The database used in the system may not process as expected	Moderate	Serious
The size of our software may become underestimated in future	High	Tolerable
The time may be underestimated by the team	High	Tolerable
Customers demand new features which change the requirement	Moderate	Serious
Newly appointed staff is not well skilled	High	Serious

6.5 RISK PLANNING AND MANAGING

Here we take up actions in order to avoid, minimize or take contingency plans if the above mentioned risks appeared.

Avoidance Strategies: The probability that the risk will arise is being reduced by this strategy.

Minimization Strategies: The impact of the risk on the project will be reduced by these attempts.

Contingency Plans: If the risk arises, contingency plans are there to deal with the risk.

6.6 STRATEGY TABLE FOR MANAGING RISK

Risk	Strategy to manage risk
Financial Problem	Convincing the senior stuffs about the project's importance so that more budget is provided.
Staff Illness	Creating overlapping between co-workers so that, everyone in a team has good idea about the project.
Recruitment problems	We can alert the customers about difficulties and delays, and make plan to recruit stuffs.
Requirements changes	Derive traceability information to assess requirements change impact; maximize information hiding in the design
Technological Problem	Buying new Technology if current technology is not serving accordingly.

6.7 CONCLUSION

Here, All the steps to manage risks have been described briefly and all the risks, risk types and the strategy to manage those risks are specified in a detailed manner and using this information's while developing the project, will help to reduce the complexity and the risks specified.

CHAPTER 7

OVERALL CONCLUSION

After a lot of efforts, group meetings, discussions, analyzing, describing all the necessary information, finally we have come to finish the SRS report on Student Aid System. Here we have tried our best to identify the stakeholders of our system, had discussions with them, got a list of requirements from them. Based on those requirements we had group meetings and had discussions on the requirements and have tried to illustrate different kind of models, diagrams which will help the developers, software designers and the other people who may be associated with the project to understand the whole system in a detailed manner and perform their task of implementation in a proper way as much as possible. Additionally, other people who are interested in such reports can also read this report. We hope this document gives proper idea about our project in a understandable way.