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APPROVAL

This Project titled " **Smart Kindergarten Solution** ", Submitted by **Mehedi Hasan Rinku**, ID No: **182-16-316** to the Department of Computing & Information Systems, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computing & Information Systems and approved as to its style and contents. The presentation has been held on- 23-08-2022.

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Declaration

I hereby declare that; this project has been done by me under supervision of Abdullah Bin Kasem Bhuiyan, Lecturer, department of Computing and Information System (CIS) of Daffodil International University. I am also declaring that this project or any part of there has never been submitted anywhere else for the award of any educational degree like, B.Sc., M.Sc., Diploma or other qualifications.

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Acknowledgment

Firstly, I want to express my gratitude to Allah to make me successful to complete my project and documentation. Also, I want to thank my parents and family members for showing support, courage and empathy. Without their sincere cooperation, it won't be possible to complete this project successfully. I would like to express my special gratitude to all my respected teachers and most importantly my supervisor **Mr. Abdullah Bin Kasem Bhuiyan,** Lecturer of Daffodil International University, without their guidance and advices it's not possible to successfully to complete this project.

Finally, I would like to thank my parents & teachers who supported me and bravery me a lot to finish this project work. I am so grateful to all of them.

Dedication

I have dedicated my project work to my parents. Special thanks to my parents, whose encouragement and determination inspired me to provide the best effort for the project. My sister Mahena Khan Rite was by my side and was very special with her encouragement. I have dedicated the work of this project to many of my friends and family member who supported me throughout the process. I will always praise them for what they have done. Farjana Ahamed particular helped me with my technical skills, many hours of proofreading master the leader points.

Executive Summary

Smart Kindergarten Solution (SKS) is an Academic project. The main objective of the system is to manage a whole kindergarten school through online. This will make easy for the students, teachers & also guardians to monitor about student & study. This will be the best step for the school to switch the manual system into online based. This Project is based on School students & mainly focuses on the job holder parents. Attendance system will be automated using Artificial Intelligence. Guardian will be updated about when their children will reach to the school & also, they left the school. They can easily gather all the information of daily activity of school. It's not

possible for any job holder parent to go to school daily to gather information but they will get these through this website from anywhere. Guardian can easily get the update of daily basis class work & home work of her children through the system. School authority can reach all the guardians through this site. It will build a better relation with school & guardian. Student & guardian can easily access all the required needed for them. No way to get outdated if anyone uses this site on regular basis. Teacher will daily update information & guardian can provide feedback of a student in daily basis.

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Chapter 1 – Introduction

Introduction

The world is moving faster by using modern technology. Our country is not out of this & we are also growing by the help of technology. At present, each & every sector is focus on using technology in their premises. Smart Kindergarten Solution is a system which will replace the manual system to online based solution. Through this system the school will be managed in online. Student, teacher, guardian will use this system & get all necessary information from this. Study related material will be available here for the student & also guardian can view the study material. Special feature of the system is that attendance system will be automated & it will also be available in the system. There is also special feature to communicate with the admin & provide feedbacks. Account management through this is also a useful feature for the school management. There is many school management system but this is different from others because of advance technology.

1.2 Documents contents

Following chapters will be included in the documentation.

Chapter-1: Introduction

The proposed proposal and project details.

Chapter-2: Initial Phase

This chapter details the initial study of the projected system with its main goals and objectives, drawback areas, various solutions and project background.

Chapter-3: Methodology

This chapter discusses well the domain of the matter, solutions, analysis of existing solutions and final recommendations.

Chapter-5: Planning

This chapter is concerning varied project plans like project coming up with, take a look at coming up with, risk and alter management etc.

Chapter-6: Feasibility

A point-by-point feasibleness ponder report and investigation are recorded here.

Chapter-7: Foundation

Issue space distinguishing proof, in general necessities list, arranged innovation, and the legitimization is aimed to be archived amid this chapter.

Chapter-8: Exploration

It contains the necessary catalogues, including some old systems and basic UML diagrams and prototypes of the new system.

Chapter-9: Engineering

This chapter contains logical and activity modelling of the planned system.

Chapter-10: Deployment

Coding samples and development issues are discussed here with development priorities.

Chapter-11: Testing

Various check plans and results are hooked up to the present chapter.

Chapter-12: Implementation

Implementation strategies, coaching models and connected problems area unit mentioned here.

Chapter-13: Critical Appraisal and Evaluation

Assessment of initial goals that were met and not met with details.

Chapter-14: Lessons Learned

The pre-project-closing survey contains learning and challenges all through the extension.

Chapter-15: Conclusion

A outline of the project with goals and successes and experiences are recorded here.

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Chapter 2 – Initial Study

2. 1 Project Proposal

Introduction

The world is moving faster by using modern technology. Our country is not out of this & we are also growing by the help of technology. At present, each & every sector is focus on using technology in their premises. This Project is based on Smart Kindergarten Solution & mainly focuses on the job holder parents. Attendance system will be automated using Artificial Intelligence. Guardian will be updated instantly when their children will reach to the school & also, they left the school. They can easily gather all the information of daily activity of school. It's not possible for any job holder parent to go to school daily to gather information but they will get these through this website from anywhere. Guardian will be notified about the number of tasks completed & the number of tasks is left within the deadline. Teacher can reach all the guardians through this site. It will build a better relation with school & guardian.

2. 2 Background Study

Maximum school management system is focused on student. But those system miss a major part which is guardian which is really an important part. Guardian are not properly informed about the study of their children & the communication process is not up to the mark. But this system is mainly focus on guardian where guardian will be updated about each & everything about her children like class work, homework, attendance & also communication system with the admin. Guardian will get separate login system so they can observe their children activity & they will get notifications from admit & also can send feedback to the admin.

2. 3 Problem Areas

Description of the Proposed System

This Project is based on School students & mainly focuses on the job holder parents. Attendance system will be automated using Artificial Intelligence. Guardian will be updated instantly through

when their children will reach to the school & also, they left the school. They can easily gather all the information of daily activity of school. It's not possible for any job holder parent to go to school daily to gather information but they will get these through this website from anywhere. Guardian will be notified about the number of tasks completed & the number of tasks is left within the deadline. Teacher can reach all the guardians through this site. It will build a better relation with school & guardian. Student & guardian can easily access all the required needed for them. No way to get outdated if anyone uses this site on regular basis. Teacher will daily update information & provides feedback of a student in daily basis.

Feasibility Study

- **Operational Feasibility (Based on different solutions):**

This project is not only saleable but also expectation for every working guardian. When a student will enter in the school premises face recognition will recognize the face & record to attendance system & also immediately send message to the guardian to notify this & same thing will help when the student left the premises. Also, teacher entry & exit record will be also stored in the system & admin can easily access this. If they get opportunity to get all the information of his child, he will be pleasant with this. They can get the regular update of his child study & connect with teachers if face any problem. And teacher can also provide the important information through all the guardians & students so it also helps them. So, every school will expect this for satisfaction of all the individuals of the school & also reach them next level.

- **Technical Feasibility (Based on operational feasibility for different solutions):**

Web Based: Web based mostly answer means that this method are going to be accessible by victimization browser. User can input the uniform resource locator within the browser & it directs to the system. this method is best suited for web-based answer. as a result of if the system is web-

based it’s accessible from mobile, laptop, desktop & the other devices. So, every kind of users will use this method.

Desktop Based: Desktop primarily based means that users have to be compelled to install the computer code in their computer code to use this technique. Desktop primarily based system means that it’s solely on the market for desktop user that could be a nice limitation. All don't seem to be perpetually victimization desktop in order that they will miss vital notifications & won't able to get info like a shot.

Equipment	Cost per unit	Cost
Web, email, file Servers.	5,000 BDT per month	5,000 BDT
Desktop pc (core i10, 3.6 GHz processor, 16 GB DDR4 RAM, 2 TB HDD)	1,00,000 BDT total	1,00,000 BDT
	Total cost =	1,05,000 BDT

Table 1: Cost Estimation of the Desktop-based solution

App Based: App primarily based resolution suggests that this method are obtainable in app store & user will simply install the app & avail the system. this method focuses the college students United Nations agency haven't the access to use mobile therefore it'll not be worthwhile for them. tho' it’s simple for the guardian & academics conjointly however students won't avail the good thing about the system that could be a nice disadvantage.

- **Economic Feasibility (Cost benefit analysis for different solutions based on operational and technical feasibilities):**

For desktop based & app-based user must have specific devices on the other hand web-based solution is easier to access from any devices. So, there have no extra costing for devices. Teacher & Guardian mainly uses mobile so they can access through mobile & students can use their own

laptop or computer & also can get access though their parents mobile. App also uses ram & sometimes So web-based solution is suitable with the perspective of economic feasibility. The proposed system will give the minute information, as a result the performance is improved which in turn may be expected to provide increased profits.

- **Market research analysis based on the feasibility factors:**

I have researched different school management system which have basic features like student portal, school information, teacher details, notice board, dashboard, shows class work, homework, publish results in the system but no system has face recognition attendance system. Also, another feature direct communication with the teachers is a unique part of the system which differs from other systems. Maximum system is mainly focused on school management on the other hand this system will mainly focus on guardian satisfaction which will create a good vibe to the guardian about the school.

2. 4 Problem Solution

This is sometimes a complex process and user get into a lot of trouble, especially if it is an necessary need. The solution should have the option of controlling the entire system by database for the controller, the user. Users should be able to find what is needed for him & the system will show based on requirements. Automatic user filtering, eligibility testing, requests should be verified. All of these can be deployed through a combination of a web-based application a server-based desktop application or a web-based system.

Chapter 3 – – Literature Review

3.1 Discussion on the problem domain

Smart Kindergarten Solution (SKS) mainly focus on AI based attendance system & also guardian-oriented system. There are many schools' management system but mostly focus on student & teacher. They are not enough bother about the guardian portion but guardians are the major part for a school. Guardian satisfaction plays a major role for a school. Attendance system is mainly process manually which wastes the class time & also guardian are not updated within a short time. Some of the main problem discuss below:

- Guardian can't get information about her child
- Manual attendance system is a waste of class time
- Guardian can't easily communicate with the authority
- All resources can't access from a single platform

3.2 Discussion on the problem Solution

Smart Kindergarten Solution is an online based school management system which provides all kind of resources for the users. Now a day's technology is everywhere. Everything is getting computer based and data driven. There are some solutions should consider about the issue stated below:

- **Access**

  Guardian access to the school management system creates a different level because it creates guardian satisfaction. So, guardian access on this system solves a major problem.

- **Privacy**

  Privacy is always concerning issue for online based system. In this system without user authentication no one can enter the system. Network address server, external firewall and VPN ought to be utilized to guarantee secure inaccessible get to.

- **Security**

Security is a big issue. In this system only admin can create account so there is no way for outsider to access the system. All information of school exits here so maintain security is important & full access to only admin ensure security.

- **User Identity Verification**

Admin of the system only have the access to create user & he provides the specific username & email address to the user. Without that username & email address no one can login the system.

3.3 Comparison among the leading solutions

- At this cutting-edge age, unused advances are coming Overhauling and making life simpler. These days the world is like a town since of the web. There are thousands of arrangements to the same issue completely different ways. In spite of the fact that **Smart Kindergarten Solution** may be a special arrangement, there are a few existing systems that work within the same space. Here in this area, I am planning to compare the well-known and prevalent current site. And this records qualities, shortcomings and qualities.
    - http://sifatidealacademy.com/ (Bangladesh)

Information

Figure 1: The overview of the site-1

Figure 2: The overview of the site-2

Best Features

- ✓ Very well organized and wonderful design
- ✓ Have a organize program for find information

Limitations

- ✓ No private login options
- ✓ Not guardian access system
- ✓ All features are not working

3.4 Recommended Approach

From the above discussion it is clear that there is no need for existing website features it clarifies the functionality and new system needs to be considered for consideration. The new system aspects listed here should be provided-

- ➢ The system is user friendly & easy to use
- ➢ Restricted access to outside user
- ➢ AI based attendance system
- ➢ Guardian access to the system

Chapter 4 – – Methodology

The program improvement group chooses the strategy of computer program advancement that works for the most excellent of the extend that guarantee fruitful extend and administration of the venture in an effective way. All strategies have distinctive qualities and shortcomings and they are chosen for their claim particular reasons. Frequently the victory rate of advancement depends on the chosen strategy for the reason of advancement. This chapter will examine in detail almost the chosen strategy and the fitting reasons for choosing the strategy with appropriate data.

4.1 What to use

Software development ways really play a significant role within the computer code development method. There square measure several computer code development ways like body of water model, agile computer code development, image model, , spiral model, speedy application development, joint application development and dynamic system development model etc. Here i will be able to describe three ways with their blessings and downsides.

Structured System Analysis and Design Method (SSADM) or Waterfall Model

Waterfall approach was 1st SDLC Model to be used wide to confirm success of the project in computer code Engineering. this can be the foremost common model for computer code development. This approach is structured and according to the classic sort of computer code development. This model methodology truly follows a linear sequence that refers to the term that any part can begin operating only the previous part is completed and doesn't enable to travel to the previous stage if any amendment is needed to satisfy the wants.

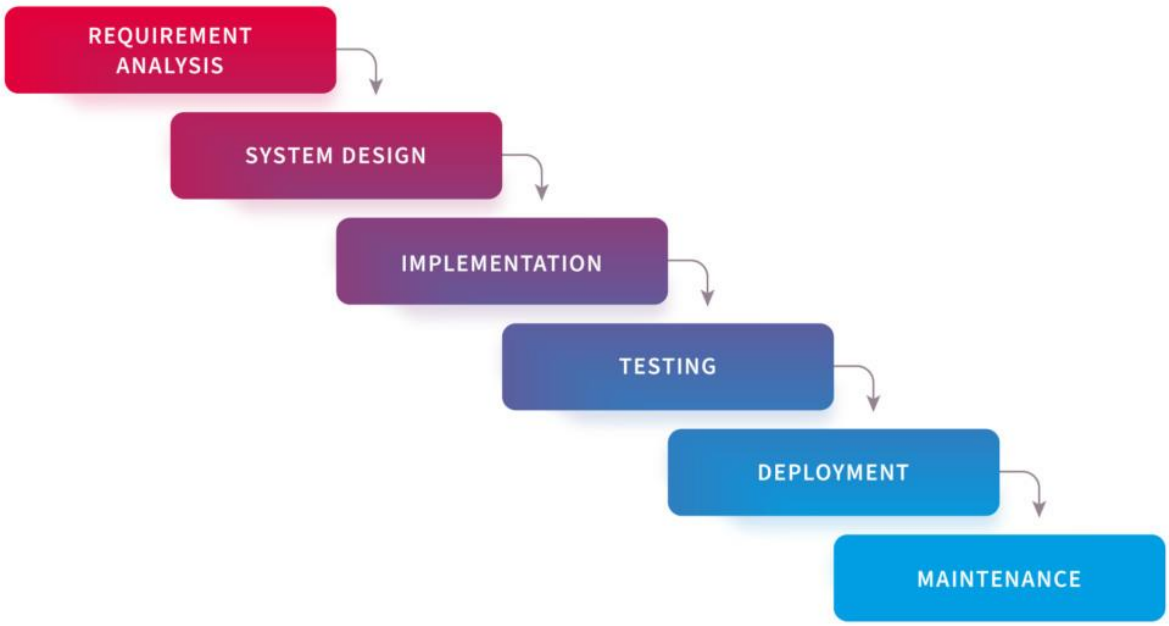

Figure 4: Structured System Analysis and Design Method (SSADM) or Waterfall Model

Advantage of Structured System Analysis and Design Method (SSADM) or Waterfall Model:

- It follows a clear structure.
- Each stage has to be complete, Before the next stage of development.
- The waterfall model early determines the end goal .
- For smaller projects with well-defined and understood needs, the waterfall model works well
- The project is dependent on the project team with minimal client intervention.

Disadvantage of Structured System Analysis and Design Method (SSADM) or Waterfall Model:

- The waterfall model doesn't support changes.
- It is not recommended for complex projects where requirements change frequently.
- This method excludes end-users and clients.
- Testing period comes late in the developmental process.
- Documentation takes a lot of time for developers and testers.

Rapid Application development

Rapid Application Development is an effective method which provides faster and quality development work than other software development methods. It focused on iterative releases. It is designed in a way that gives credit for the maximum benefits of software development in an easy way.

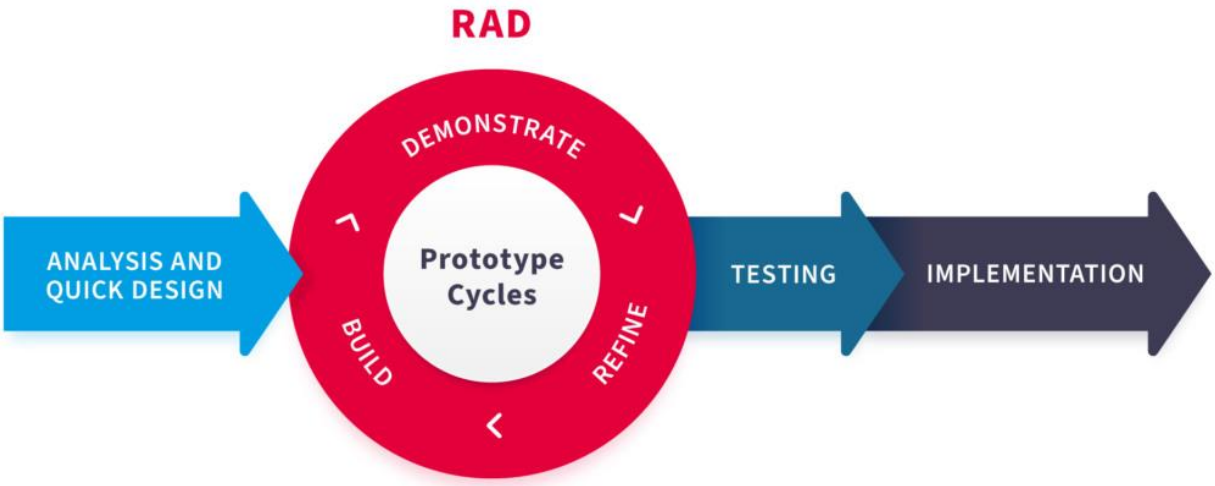

Figure 5: Rapid Application development Model

Advantage of Rapid Application development

- It is flexible & easy to change
- It is effective when you need to reduce the overall risk of the project
- It is flexible to adapt the change
- Due to code generators & reusable code, manual coding has declined
- Due to use prototyping, there is less chance to error

Disadvantage of Rapid Application development

- It's not effective for small projects
- All applications are not compatible with RAD
- It is not suitable when technical risk is high
- If developers are not committed to develop to delivery software on time RAD projects may fail

Choosing Methodology

By considering 2 higher than criteria, I actually have determined to use the DSDM methodology for my project good preschool resolution. i think DSDM are going to be the simplest choice for my good preschool resolution project. DSDM ensures the merchandise & product quality among the timeframe that is admittedly vital & it's versatile to use for any organization. there's a chance to vary the wants of the shoppers & this method can facilitate to cope up with this.

4.2 Why to Use

The system should specialize in to with success meet the given time-frame with the budget needs. the strategy helps to realize the most objectives of the project by maintaining the verified planned steps. selecting the most effective one is absolutely a tough call. The methodology of such an educational project can opt for an extended thanks to complete the project & give the result.

4.3 Sections of Methodology

There are some sections of the DSDM which needs to follow by the development team. They are:

- **Pre-project stage**

  In this section, the initial project concept includes terms & condition, budget and basic requirements.

- **Feasibility study Stage**

  This portion measures the economical, technical and operational feasibility of the proposed project

- **Requirement Gathering Phase**

  In this section using various techniques both functional and nonfunctional requirements of the project are identified.

- **Requirement Analysis and Prioritization Phase**

  In this parcel accumulated needs inspected and prioritized the necessities utilizing a prioritization Strategy Moscow.

- **Search and Engineering Stage**

This is the most unvaried section of the strategy is employed to explore the necessities and build the unvaried resolution.

- **Review stage**

  In this part, developed system ar tested with users and returns the previous stage if the amendment is required.

4.4 Implementation Plans

When the project in the final stage then comes the implementation phase where advanced applications are released to use. Available the new system to the use & if they find any issue associate with it & identify the issue and resolve it. Releasing criteria, configuration and planning are decided in this portion. If everything looks OK then comes the launched of the new system.

Chapter 5 – – Planning

5.1 Project Plan

This segment decides the way to arrange the completion of the extension. Fundamentally, the venture is partitioned into a few particular parcels and taking after the arrange, all the work will be completed inside a indicated time outline which can be chosen in this stage.

5.1.1 Work Breakdown Structure

This is often the arrange where the extension can be partitioned into littler assignments and through this, the venture can be completed while keeping up the legitimate timeline and in a less complex and more productive way. This structure gives us an assessment of the time framework. Without this system, completing the venture can be more complicated to the total. Hence, the proposed framework is separated into areas and sub-sections by a chart underneath:

Serial	Task Name	Durations	Start Date	End Date
1	User authentication	7 Days	Sat 08/01/2022	Thu 13/01/2022
2	Enroll student, teacher & guardian	15 Days	Fri 14/01/2022	Sat 29/01/2022
2	Face recognition	15 Days	Sun 30/01/2022	Thu 14/02/2022
3	Class work & Homework providing module	4 Days	Fri 15/02/2021	Mon 19/02/2022
4	Providing exam details	6 Days	Tue 20/02/2022	Mon 26/02/2022
5	Result module	7 Days	Tue 27/02/2022	Tue 06/03/2022
6	Communication process of guardian & authority	10 Days	Wed 07/03/2022	Fri 17/03/2022
7	Attendance report	4 Days	Sat 18/03/2022	Wed 22/03/2022
8	Notice board	5 Days	Thu 23/03/2022	Mon 28/03/2022
9	Accounting Module	10 Days	Thu 29/03/2022	Tue 08/04/2022
10	Tiffin	5 Days	Wed 09/04/2022	Fri 14/04/2022
11	Feedback system	12 Days	Sat 15/04/2022	Sat 27/04/2022
12	Notification System	15 Days	Sun 28/04/2022	Thu 13/05/2022
13	Totals	115 Days		

Table 2: Work Breakdown Structure of DSDM

5.1.2 Resource Allocation

All assets are distributed and overseen to total of the proposed extend in an organized way. Asset allotment is exceptionally significant & one of the foremost imperative parts of project planning . Since usually an scholarly single project, I will play distinctive parts at distinctive times since there's no group. The allocation of resources for the BBSM project to meet the pre-determined task delivery deadline is as follows:

Time box	Task	Resource
TB 1	User authentication	Analyst, User
TB 2	Enroll student, teacher & guardian	Analyst
TB 3	Face recognition	Analyst
TB 4	Class work & Homework providing module	Analyst, User, Developer
TB 5	Providing exam details	Analyst, Team leader
TB 6	Result module	Analyst, User
TB 7	Communication process of guardian & authority	Analyst, Designer, Developer
TB 8	Attendance report	Analyst, Designer, Developer
TB 9	Notice board	Designer, Developer
TB 10	Accounting Module	Designer, Tester, User
TB 11	Tiffin	Designer, Tester
TB 12	Feedback system	Analyst
TB 13	Notification System	Analyst, Designer, Tester, User

Table 3: Resource Allocation list

5.1.3 Time Boxing

This is another important part of DSDM project planning, in DSDM divided tasks into time boxes to meet targets on time. In this section, all tasks are divided into several time boxes with a time duration. These tasks must be completed within the time allocated for the repetitive procedure.

SL	Task	Duration	Resource
1	User authentication	7 Days	Analyst, User
2	Enroll student, teacher & guardian	15 Days	Analyst
3	Face recognition	15 Days	Analyst
4	Class work & Homework providing module	4 Days	Analyst, User, Developer
5	Providing exam details	6 Days	Analyst, Team leader
6	Result module	7 Days	Analyst, User
7	Communication process of guardian & authority	10 Days	Analyst, Designer, Developer
8	Attendance report	4 Days	Analyst, Designer, Developer
9	Notice board	5 Days	Designer, Developer
10	Accounting Module	10 Days	Designer, Tester, User
11	Tiffin	5 Days	Designer, Tester
12	Feedback system	12 Days	Analyst
13	Notification System	15 Days	Analyst, Designer, Tester, User

Table 4: List of the time boxes

5.1.4 Gantt Chart

The Gantt chart may be a graphical representation of the venture movement plan. It appears as an advance bar duration from beginning to conclusion date instead of the day. Gantt chart for Keen Kindergarten Arrangement connected below:

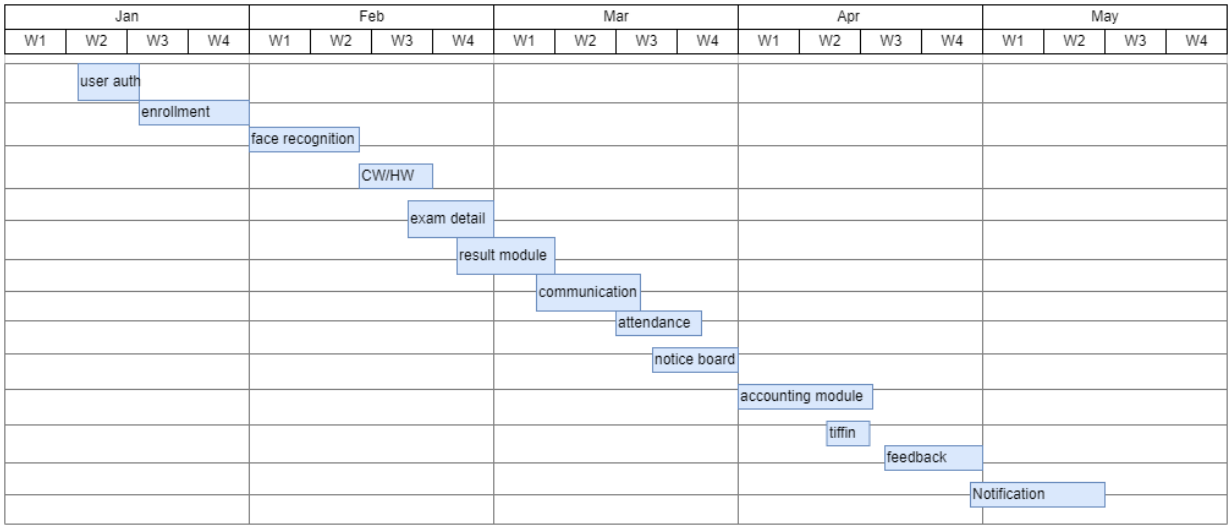

Figure 6: project file cycle gantt chart

5.2 Test Plan

The test arrange is based on the distinction between the given input and the anticipated yield of the specific framework. Program improvement has been tried amid the confirmation and approval handle

5.2.1 Testing against the time boxing

The time box process is based on estimating a specific and maximum single time for a particular department. Test against time box

User name	Example	Role	Example
Time box ID			
Time box content			

Test Type	Test steps	Expected result	Actual Result	Comment
Unit test				
Integration Test				
System Test				
Acceptance Test				
Security Test				
Usability Test				
Reliability rest				

Table 5: Sample of testing against the time box

5.2.2 Required Test

Different types of testing modules exist but based on functional and non-functional tests there are the mainly two types of a system:

Functional Testing:

- **Unit Testing:** This testing works for a specific little portion of program plan. In this segment we isolated units in littler portion & test them by making people or a gather of units. This can be tried by the designer by utilizing common input & watching the anticipated yield.
- **Integration Testing:** In this testing it works with tried components & makes a automatic framework that's illustrated by plan. This portion combines group of elements to create the expected outcome based on the input which is provided by the programmer. Experimental purpose black box & white box were included here.

- **System Testing:** It works for a number of operating systems including Windows & Linux. It is only workable with black box testing. It receives the required input & shows the expected output with internal work.

- **Acceptance Testing:** In this testing users are directly involved. This testing comes after completing the all-previous testing is done. It is based on user expectations & satisfaction as well as meeting business needs.

Non-Functional Testing:

- **Security Testing:** Security testing is completed outwardly & through security testing Associate in Nursing application includes an online application. It verifies unauthorized users or access and protects against internal & external attacks as well as SQL injection.

- **Usability Testing:** This testing ensures the system user friendly & however simply users will communicate and access services. this type of testing & validation occurred during this usability testing.

- **Reliability Testing:** User will directly move with the testing. This ensures the dependability of the operation of the system. It tests & confirms the variability of system failure.

5.2.3 Test Case

Test case included test case no, test sort, test portrayal and test steps.

Test case no
Test type

Test Description			
Test Steps	Expected Result	Actual Result	Comment

Table 6: Sample Test case

5.2.4 User Acceptance Test Plan

The final step in the user acceptance test segment. It specifies and tests the effectiveness of the test by the user involved

Test case no
Test type
Test Description
Precondition of testing
users Name
Act as

Test Steps	Expected Result	Actual Result	Comment

Table 7: User Acceptance Test plan

5.3 Risk Management

Risk management is the process which identifies, analysis & response to any risk which may occur in an ongoing project in the life cycle of the development of the project. Track down the remaining project & meet the goal & expected outcome. The risks of the project may include project timeline, budget & project effectiveness. There are different types of risk management involved:

- Risk identification
- Risk assessment
- Risk precaution
- Steps taken for attainable risks.

5.3.1 Risk identification

- Risk Identification is one among the foremost necessary half & processes of risk management designing. the primary step in risk identification is establish|to spot} & identification of risk that will occur & have an effect on the project in addition as identify & raise its feature together with the options of the document. in step with the project, some identification criteria are going to be even that area unit given bellow:
- Tracking risk with potential risk identification & documentation

- The details of identified risk includes the actual fact.
- Implications including future outcomes & risk factors.

Details of risk identification and track the risks of this project are given below:

Type of Risks	**Causes**	**Impact and consequence**
Scheduling	There are several reasons to occur programing risks included--> ▪ Unintentionally delay reason behind Corona Pandemic scenario ▪ Specific portion failure includes information loses of user and admin.	Project late submission
Database Error and Destroy	In this project two major panel here, admin and users. So sometimes it's tough to manage	User could not find their expected place to stay
Unauthorized Access	A person trying to access this system without permission. This can make it difficult to include risks ▪ User may change information	Confidential information can be hacked as well as changed
Technical problem ❖ Hardware	▪ Lacking of required speed ▪ Lacking of required performance ▪ Lacking of required configuration	Automated attendance may failure

Project Backup	Lack of project backup on GitHub or another platform	▪ Effects on costs ▪ Lost whole project
Network Failure	Lack of access to some integrated API and Internet connection required for information update.	User fail to get information on time.

Table 8: Risk identification Table

5.3.3 Risk Precaution

Risk action is planned after completing the risk identification & risk assessment. There have to take a number of steps that can take to begin the process of preparation for mediation

- Occurred & prevent potential risks
- Occur & reduce potential risks
- Addressing those which may have occurred & potential risks

Types of risks	**Action**	**Action Taken By**	**Action Required**
Scheduling	To make proper time estimation by using Gantt chart. Technology Use: Forecast, Hive etc.	Involved developer	Before starting project development

Database Error	▪ To make the necessary normalization. ▪ To create the necessary relationship at the table	involved developer	on the time of Information include, upgrade and erase
Unauthorized Access	▪ To perform code whereas keeping up code smelling ▪ To dispatch multi verification framework of this project.	involved developer	When setting the authentication segment
Technical problem • Hardware			
Project Backup	▪ Lacking of project backup on GitHub or Similar to this	involved developer	Update frequently
Network Failure	▪ Lack of access to some integrated API and Internet connection required for information update	involved developer	On time of project development

Table 9: Risk precaution

5.3.4 Steps Taken for Attainable Risk

After identification and evaluation of potential risks, the responsible person takes the necessary steps. These are:

Types of risks	Description	Likelihood	Impact	Steps Taken
Scheduling	One of the most common risks is the possibility of missing project schedules and deadlines.	Rare	High	During the time Boxing and Gantt chart created and work breakdown structures.
Database Error	Possibility of duplicate entry, invalid relationship.	Likely	High	Normal form normalization and entity relationship images have been used and data dictionaries have been created.
Unauthorized Access	Unauthorized access to the system.	Unlikely	High	Implement proper authentication system and access authorization.
Technical Problem ❖ Hardware	Hardware crashes can cause unresponsiveness.	Frequent	Medium	Backup and regular maintenance and monitoring have been ensured.

Network Failure	Internet failure or connection problem.	Frequent	Low	The backup server is configured and high-speed bandwidth is allocated.

Table 10: Risk dealing steps

5.4 Change Management

5.4.1 Factors that might cause change

There are unit many varieties of changes required for this method that area unit included:

- Changes within the programming segments
- Changes within the practical necessities
- Changes on completely different module of computer program
- Changes inside the security dealing with portions

5.4.2 DSDM Welcome Change

Sometimes project management life cycle ought to be modified based mostly of the necessity of the project. For this reason, we've got to follow some procedures which may take up differing types of challenges supported the specified system. For this, here DSDM is one among the applicable, suitable, reliable & correct workable strategies. during this system we've got to follow the procedure to keep up & perform changes throughout development:

It will add many approaches:

- It develops a system for chase any module updates technique
- It takes reviews from variety of users once dynamic roles, like student details, attending automation changes.
- It performs when completion of changes
- It ensures the protection functions

- It ensures the responsibility similarly as measurability

5.4.3 Considering Business Priority

The changes are considering to meet the expected goals and objectives with the business objectives. That's why we need to prioritize the effectiveness of the change as well as the requirements that will result in the strong benefits expected from the users involved.

Priorities included

Area if topic	Priority Level
Scheduling segments	5
Functional requirements	7
User interface	5
Automated attendance segments	6
Security handling segments	7

5.4.4 Change Workshop

As well as knowing the profile of the team members, their interaction will be firmly established. Developers may have to involve in making necessary changes and additions arrange a workshop by creating questionnaires on what should be needed to make changes and additions to this system for the betterment of the project.

5.4.5 Changes that are allowed

Changes need to be adapted based on the priority level of the change Changes need to be made based on different resources, costs, schedules, quality and risk During the development of a certain part of this system, we need to allow changes according to our priorities.

5.4.6 Key Decision Taker of Change

The key decision makers of the change will be taken by various experts in different areas. This project includes individual decision makers for change here:

- Requirements Analyst
- Developer
- Tester

The analyst will modification the purposeful necessities if required and therefore the developer might conceive to modification the relevant code as per demand.

5.5 Quality Management

Quality administration is keeping up the quality that clients joined together to fair acknowledge all through the venture start. Quality administration depends on numerous characteristics included -

- To track day to day category work & home work.
- Communication among group individuals and clients
- Continuous changes on request

5.5.1 Rules Applied to Maintain Quality

The rules for maintaining standards are applied from system to system and from user to user. There are some rules that need to be followed while maintaining quality including quality control and quality assurance.

5.5.2 DSDM Standard Quality Measures

Solution quality: Arrangement quality has been guaranteed backed by anticipated commerce wants and user desire by chasing user's necessities. to total these strategy 2 sorts of prioritizations has been utilized:

- Time Boxing
- MoScoW

These 2 approaches are completed by keeping up the schedule.

Process quality: strategy quality has been guaranteed and upheld focused on Organization. to total this strategy quality 2 sorts of approach has been laid out and used.

- CMMI
- DSDM

5.5.3 Quality Plan and Measuring Meter

A few sorts of quality set up are kept up amid this organize included:

- Scheduling and resource allocation are done properly
- Testing has been wiped out each stage once completion of modules
- When all the changes are made at that point have to be tracked and archived all the changes legitimately for any continue execution.

Chapter 6 – Feasibility

6.1 All possible types of Feasibility

Operational Feasibility:

Concerning usability, ease-of-use & feasibility of the proposed system, the proposed SKS has reasonable validity. Verifying user inputs, very simple & smooth navigation system, simple solution that will make the system simple & easy to use. Administrators, users can access easily their portals with valid credentials & perform their tasks very efficiently.

Technical Feasibility:

Specialized possibility tests deny that SKS clients can oversee their exercises less demanding than past manual forms. The framework is outlined & made strides. Employment advanced & most

recent web innovation which guarantees that the framework is consistent with any web browser counting low-speed web associations. The framework has got to control grouping to preserve secure get-to-to framework information. This web-based application is stage free & assets are affordable.

So, in this venture viewpoints the specialized perspectives are given below:

Hardware:

- Laptop (Configuration)
- Wi-Fi Router

Software:

- PyCharm
- Microsoft office
- Google chrome
- Windows 11
- XAMPP

Database:

- SQlite3

Technology:

- **HTML**
- **CSS**
- **JavaScript**
- **Bootstrap**

Server Side:

- **Python**
- **Django**

Economic Feasibility:

There are different choices to create the proposed framework counting, web-based Application, desktop application etc. Web based application cost given below:

Equipment	Cost per unit	Cost
Extranet network with VPN	2000 BDT per month	2000 BDT
Desktop pc (core i9, 3.6 GHz processor, 16 GB DDR4 RAM, 1 TB SSD)	120000 BDT	120000 BDT
Web, File and Email Servers	20000 BDT per month	20000 BDT
Total:		142000 BDT

- Desktop Application cost:

Equipment	Cost per unit	Cost
Web, email, file Servers.	20000 BDT per month	20000 BDT
Desktop pc (core i7, 3.6 GHz processor, 32 GB DDR4 RAM, 1 TB SSD)	120000 BDT	120000 BDT
Total		140000BDT

A domain name and hosting service is required to make the system live.

Market Research Analysis Based on the Feasibility Factors:

This category includes market and user demand. Kindergarten is very essential part of a society.

There have a huge number of kindergartens around us & students of the school are very young age so here guardians are also very important part but maximum kindergarten solution is not bother about guardian prospects. At present manual system will not work for any organization kindergarten is not out of this. So online based solution is mandatory & the student of kindergarten are very young so guardian have the access to monitor all these. Most of the kindergarten solution are based on student & teacher based. Guardian are the stakeholder for a kindergarten & their satisfaction plays a vital role for the institute. Maximum guardians are working people so if all information available through online will be a great advantage for the institute from the competitors. Automated attendance system will provide a huge advantage because it will save class time & also all the attendance information will be updated on time. Education related all information will be available on site so it's easier to track all.

6.2 Cost Benefit Analysis

Cost Benefit Analysis focuses mainly on estimating earnings and expenses. The total cost and income are compared to get the benefit. The cost benefit analysis for this project is given below:

Total Cost:

SL no	Equipment	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Web based application cost	142000 BDT	-	-	-	-	142000 BDT
2	Desktop Application cost	140000 BDT	-	-	-	-	140000 BDT
3	CC camera	80000BDT					80000BDT

4	Domain and hosting Cost	20000 BDT	20000 BDT	20000 BDT	20000 BDT	20000 BDT	100000BDT
5	Employee Expenses	40000 BDT	40000 BDT	40000 BDT	40000 BDT	40000 BDT	200000BDT
6	other cost	20000 BDT	20000 BDT	20000 BDT	20000 BDT	20000 BDT	100000BDT
7	Total Cost	442000 BDT	80000 BDT	80000 BDT	80000 BDT	80000 BDT	762000 BDT

Table 11: total cost Estimation for the project

Total Earn:

SL No	Earn Sector	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Govt. tax 1	150000 BDT	180000 BDT	210000 BDT	240000 BDT	270000 BDT	1050000 BDT
2	Govt. Tax 2	150000 BDT	210000 BDT	240000 BDT	260000 BDT	300000 BDT	1210000 BDT
	Total	300000 BDT	390000 BDT	450000 BDT	500000 BDT	570000 BDT	2260000 BDT

Table 12: Earning estimation for the project

Total Revenue:

SL No	Sectors	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Total Earning	350000 BDT	390000 BDT	450000 BDT	500000 BDT	570000 BDT	2260000 BDT
2	Total Equipment Cost	442000 BDT	80000 BDT	80000 BDT	80000 BDT	80000 BDT	7620000 BDT
	Total Revenue	92000 BDT	310000 BDT	370000 BDT	420000 BDT	490000 BDT	5360000 BDT

Table 13: Estimation Revenue on a five-year scale

So, it is clear that the promotion of this system, the government. By collecting VAT and taxes from different purposes, a huge amount of money will be earned in a year. Revenue will increase year by year. So, this project will be beneficial for the government and also for the people.

6.3 Is DSDM Good or Bad for this Project

Typically, an instructive extend & ought to need to total at interims a difficult and quick time can all fundamental functionalities. The extend might have welcome changes all through the occasion in this way it has to be create iteratively. SKS guarantees the unvarying approach & force strict run the show & direction. be that as it may, it guarantees the standard in case the work done at interims calculable time. It also guarantees client interaction all through the extend. So, it’s clear that SKS is that the leading technique to take after for Savvy Kindergarten Arrangement .

Chapter 7 – Foundation

7.1 The problem area identification

To find out the problem is a great opportunity to improve any project. This part can be done by the users because they are the real user of the system. So, below here are some issues identified by the user:

7.1.1 Interview

Interview is the best option whether you want to gather information or find out the real problem or goal of the project. Finding out the problem you can realize your real solution. So, for the proposed system, some question will be set for the interview:

1. **For User:**
    - Can get notification
    - Can get feedback confirmation

2. **For Admin**
    - See the user information
    - Fix any kind of problem of user

7.1.2 Observation

Observations techniques are also very helpful to collect user requirements and know the real problem. Mainly observation techniques are used to go to the work place and find solutions for the users. Thus, the main points of observation are:

- User email verification

- Guardian can view all details of child
- Admin can see the user data

7.1.3 Questionnaires

Questionnaires are one of the best strategies for gathering information effectively and asking specific questions to users. Some queries are set for the user which can be MCQ or short question. Thus, the question is given below:

	Question for problem identification
Question – 1	What is the main motive to use the system?
Answer	
Question – 2	Tell us your thought about what can a guardian do?
Answer	
Question -3	What are the access teachers will get to input?
Answer	
Question -4	What can a student get from the system?
Answer	

7.2 Rich Picture

The Rich picture is a bird's eye view of the system's user activity. It also envisions conflicting issues, communication and business processes:

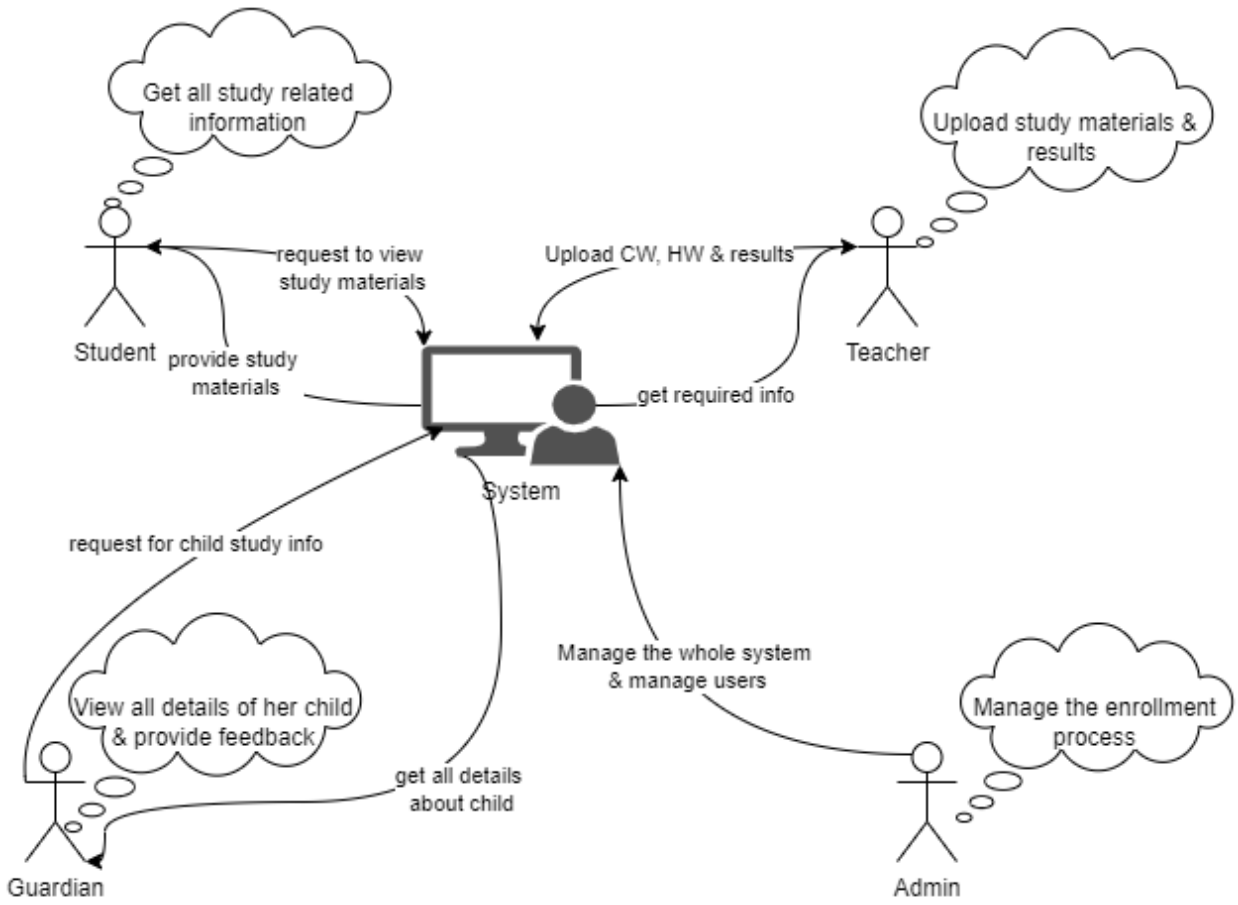

Figure 7: rich picture

Key Actors

There are many of actors in SKS. The most importance actors are:

- Admin
- Student
- Guardian
- Teacher

Short description of rich picture:

The picture appears that the admin can screen and oversee each handle and oversee clashes. It appears that the strife between the client and the admin. It also shows that many problems can occur because it has enough interdependency.

7.3 Specific Problem Area Identification

Different types of problems are found in identification section while using data collection techniques. Rich picture diagram describes the complete system processes of SKS through analyzing these I have found some specific issues they are:

- Multiple admin access in the system
- Online payment module
- Tiffin selection process
- Teacher review system

7.4 Possible Solution

The possible solution for the identified problems is

- Multiple admin registration system
- Integrate online payment module like SSLCommerz
- Tiffin management system
- Create a review section for teacher.

7.5 Overview Requirement list

The final requirement list is given below:

Functional Requirements:

- User authentication System
- Face recognition
- Enrollment system

- Communication process
- Provide CW & HW

Non-Functional Requirements:

- Exam details update
- Provide Result
- Notification system
- Provide Attendance report
- Display exam results
- Show tiffin list

7.6 Technology to be implemented

There have different types of technology available to implement for the proposed system. But it's very important to choose the right technology for the success of the system. The available options are:

Client-server Application Technology

This technology is desktop-based where user has to install the application on his devices & store data to remote servers. To run this application client request data to the remote server & server response against the request.

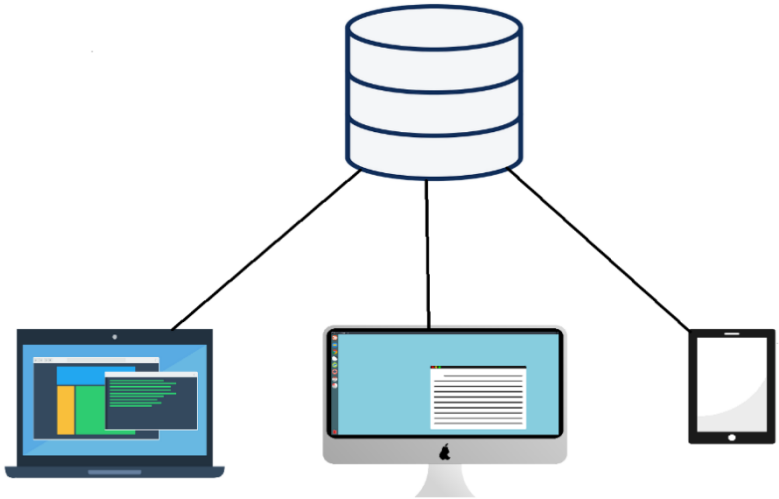

Figure 8: Client-server model

The feature of the client-server model application is given bellow:

- It's easier to add feature to the server without interruption.
- Data can be easily recoverable through decentralized server model.
- Less maintenance is required for the server.
- Application should be physically installed.

Web application

Web application is a web-based system where no need to installation because it's hosted on remote server. It's accessible through internet and requires both type of scripting in web browser. There have client-side & server-side. The features of the web-application are:

- No installation is required
- It's accessible from anywhere through internet.
- It's less costly than other technology

7.7 Recommendation and justification

The proposed Smart Kindergarten Solution should be accessible from anywhere & anytime. Different type of user will use the system from different devices so it should be web-based solution & through internet user can easily access the system & get benefit of the system. So web-based application will be the recommended for the proposed system & all types of user can access the system.

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Chapter 8 – Exploration

8.1 Old system Use Case

Use case diagram portraits the flow of the business performance of the system. Now I'm going to provide the old system use case.

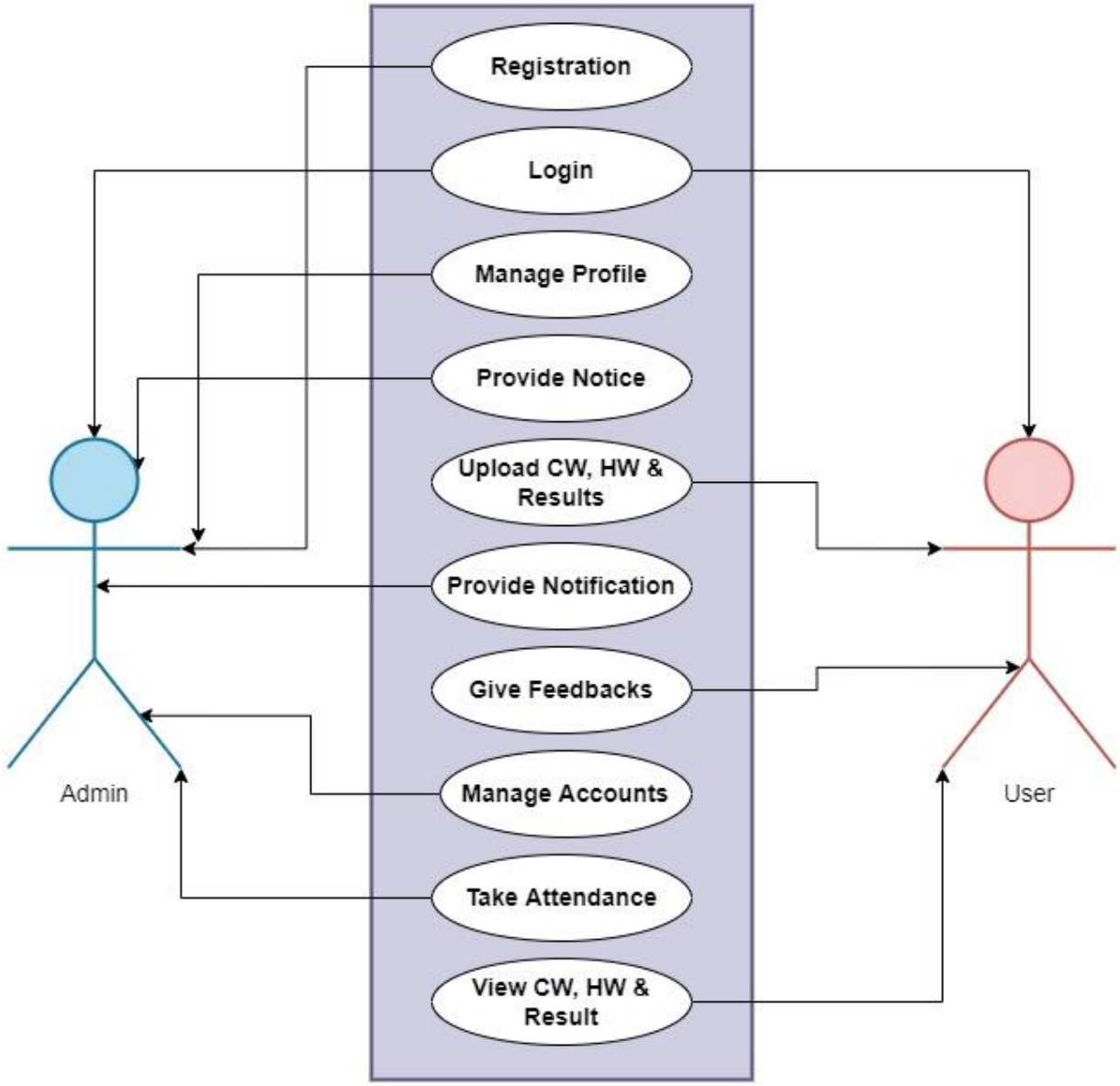

Figure 09: Use case diagram

8.2 Activity Diagram

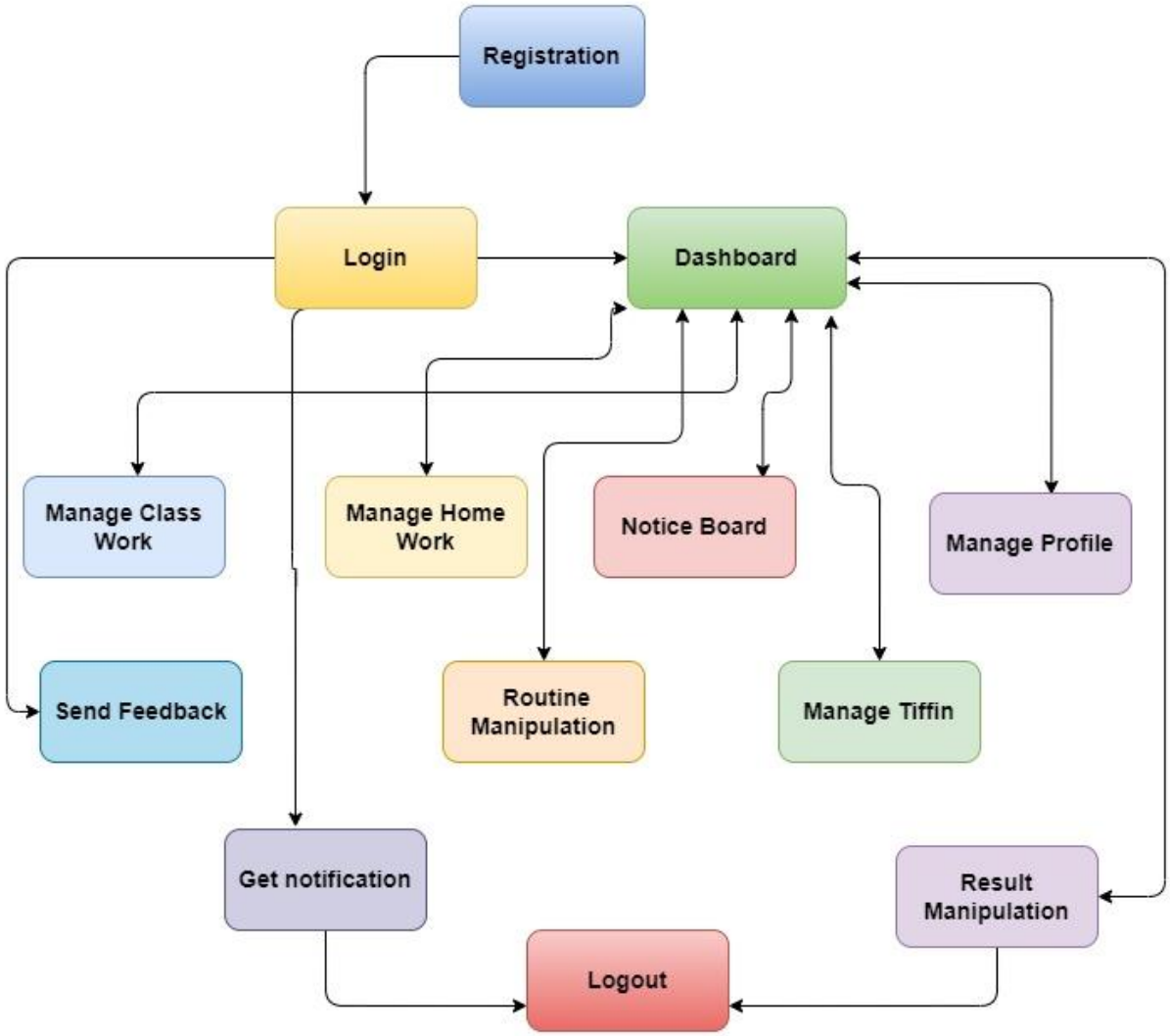

Figure 10: User activity diagram of SKS

8.3 Full System Use Case Diagram

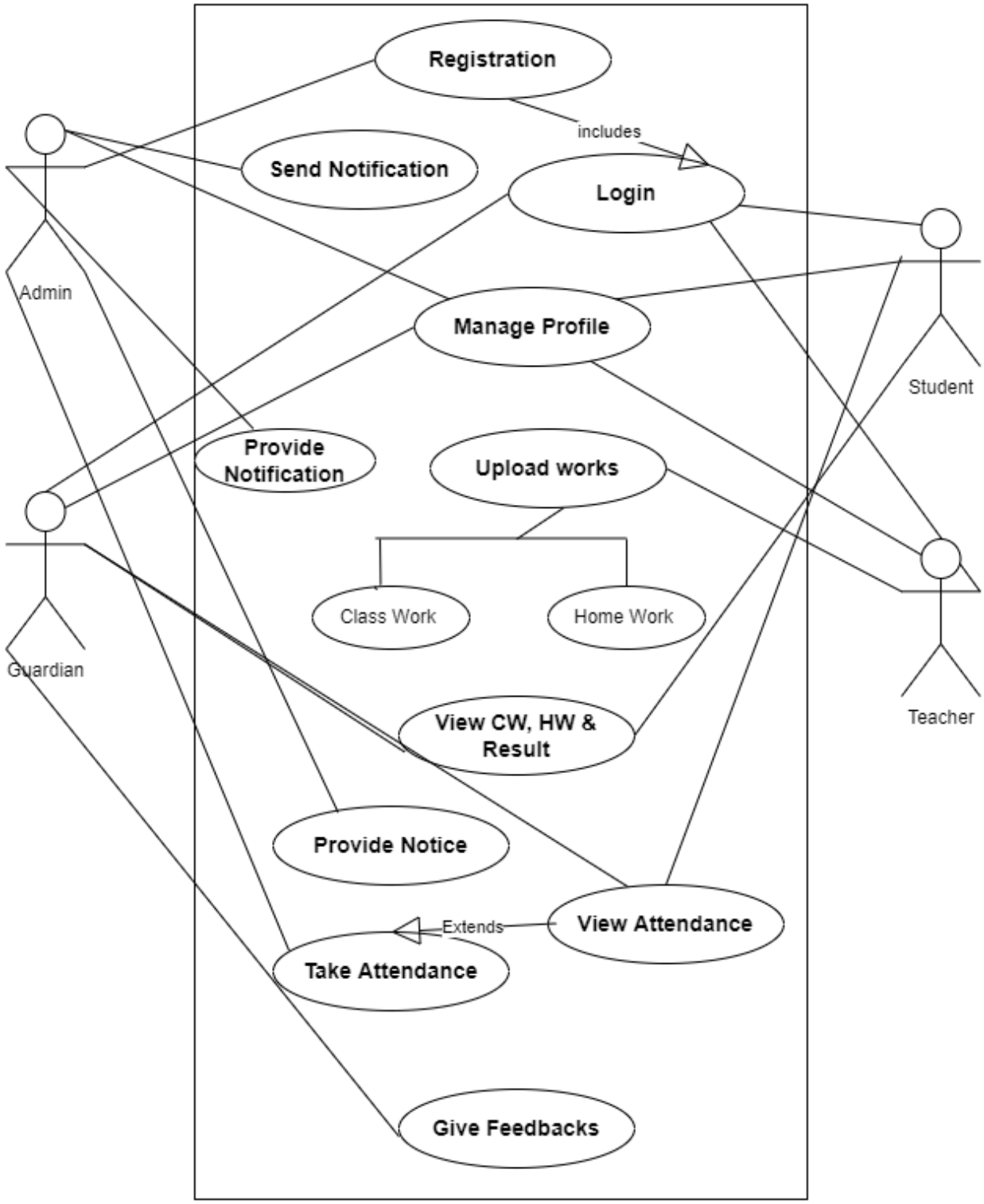

Figure 11: Use case of the proposed SKS

8.4 Full System activity diagram

The proposed SKS framework is comprise of distinctive sorts of clients with different workflow. The action graphs of those are given underneath

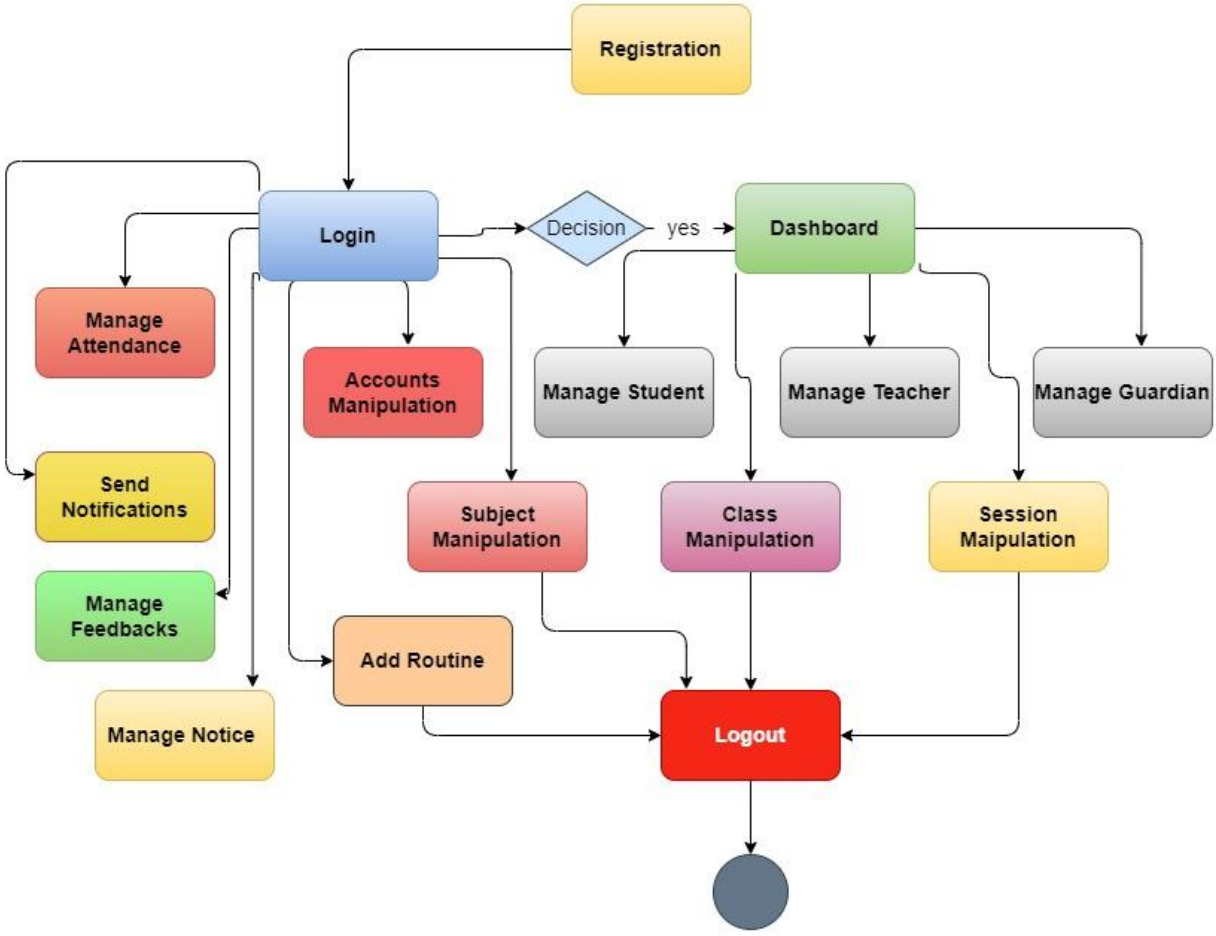

Figure 12: Admin activity diagram of SKS

Student full activity is given below:

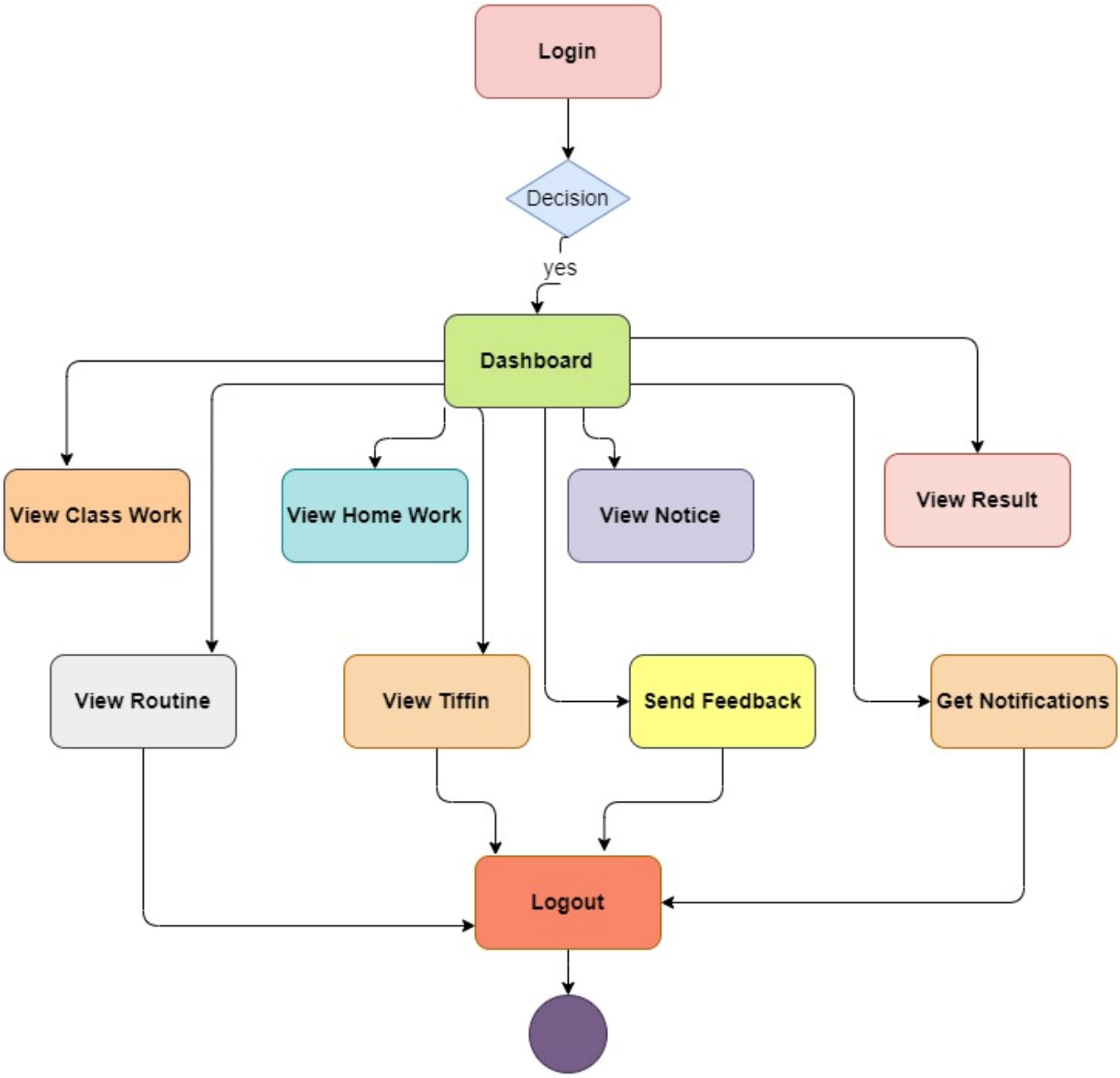

Figure 13: Student activity diagram of SKS

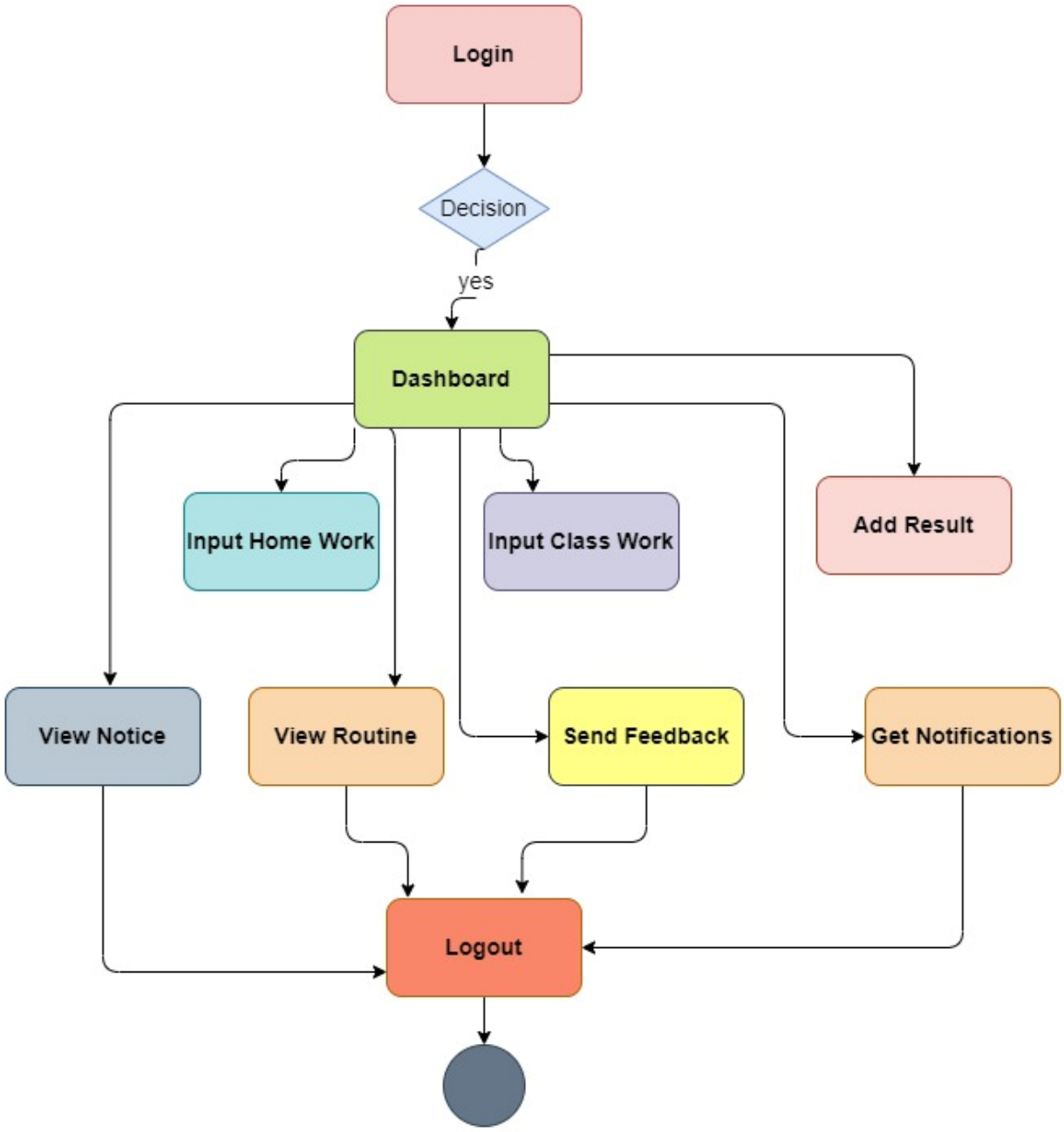

Figure 14: Teacher activity diagram of SKS

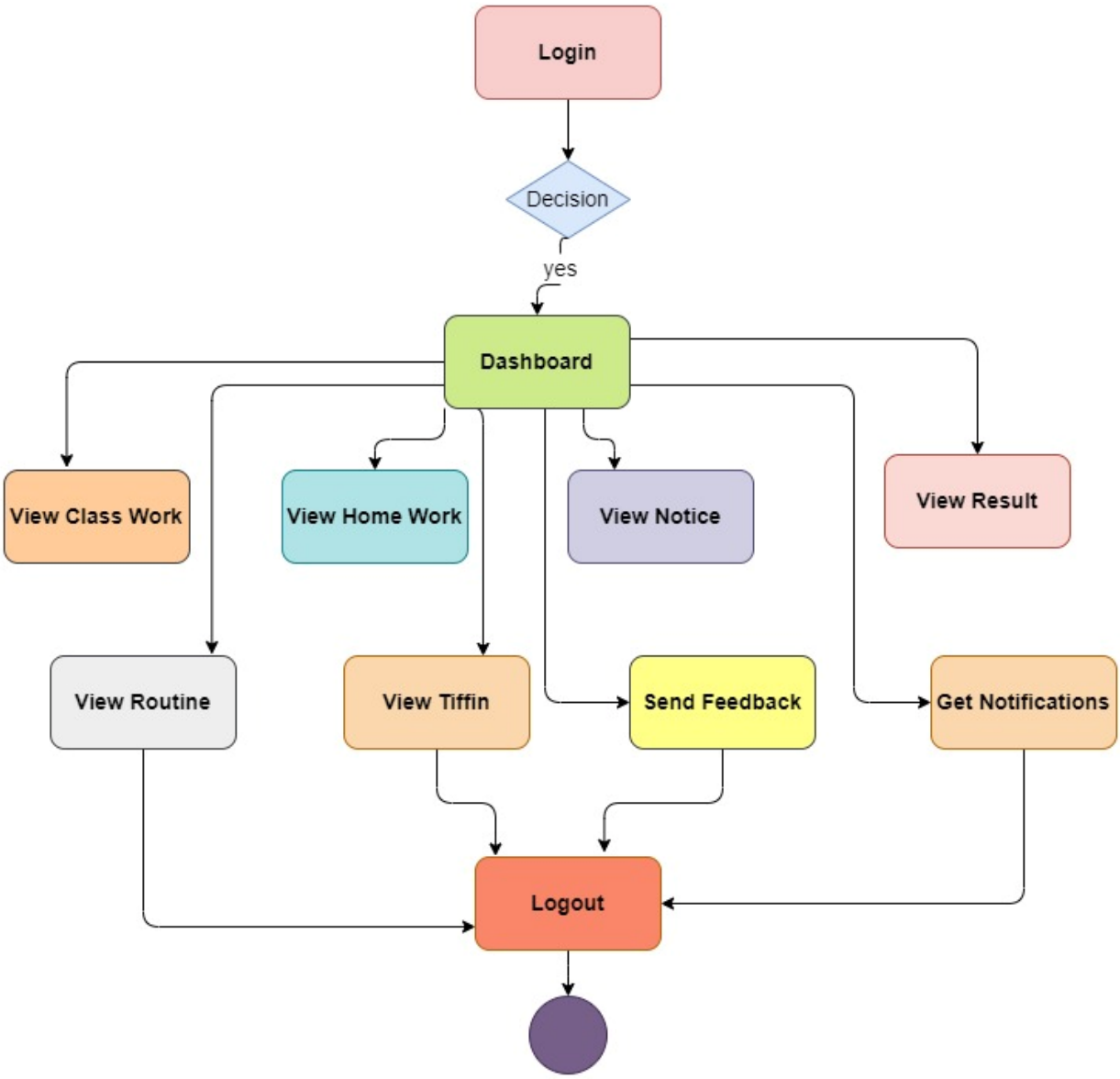

Figure 15: Guardian activity diagram of SKS

8.5 Requirement catalog

Requirement catalog is the list of requirements which are identified in the project. Now I'm going to visualize the identified requirements in the requirement catalog following the standard format:

User Authentication Requirement Catalog:

Source	Sign in	Priority	Requirements
Admin	All user	Must	M-01
Functional Requirement			
User Authentication System	Admin will enroll all the user in the system & all user must have to use the given email address to sign in the system otherwise they will not able to access the system		
Nonfunctional Requirements			
Description	Target value	Acceptance value	comment
Login registration per day	20	15	

Table 14: Requirement catalog for login registration

Face Recognition for attendance system Requirement Catalog

Source	Sign in	Priority	Requirements
Admin	All user	Must	M-02
Functional Requirement			
Face recognized attendance system	All the registered student will be recognized when they enter the		

	school premises through AI.		
Nonfunctional Requirements			
Description	Target value	Acceptance value	comment
Daily attendance student count	500	350	

Table 15: Requirement Catalog for Face Recognition for attendance system

Providing CW & HW Requirement Catalog

Source	**Sign in**	**Priority**	**Requirements**
Admin	All user	Must	M-03
Functional Requirement			
Providing CW & HW	Daily basis teacher will update the CW & HW section providing the necessary files		
Nonfunctional Requirements			
Description	Target value	Acceptance value	comment
CW & HW per day	50	35	

8.6 Prioritized Requirements List (PRL)

I'm following the MoSCoW priority strategy to prioritize the requirement list. Now I'm showing the priority list for Smart Kindergarten Solution below:

SL	Requirements	Priority
1	User authentication	Must have
2	Enroll student, teacher & guardian	Must have
3	Face recognition	Must have
4	Class work & Homework providing module	Must have
5	Providing exam details	Must have
6	Result module	Must have
7	Communication process of guardian & authority	Must have
8	Attendance report	Must have
9	Notice board	Must have
10	Accounting Module	Must have
11	Feedback system	Must Have
12	Notification System	Must Have
13	Tiffin	Could Have

8.7 Prototype of the new system

Admin panel prototype:

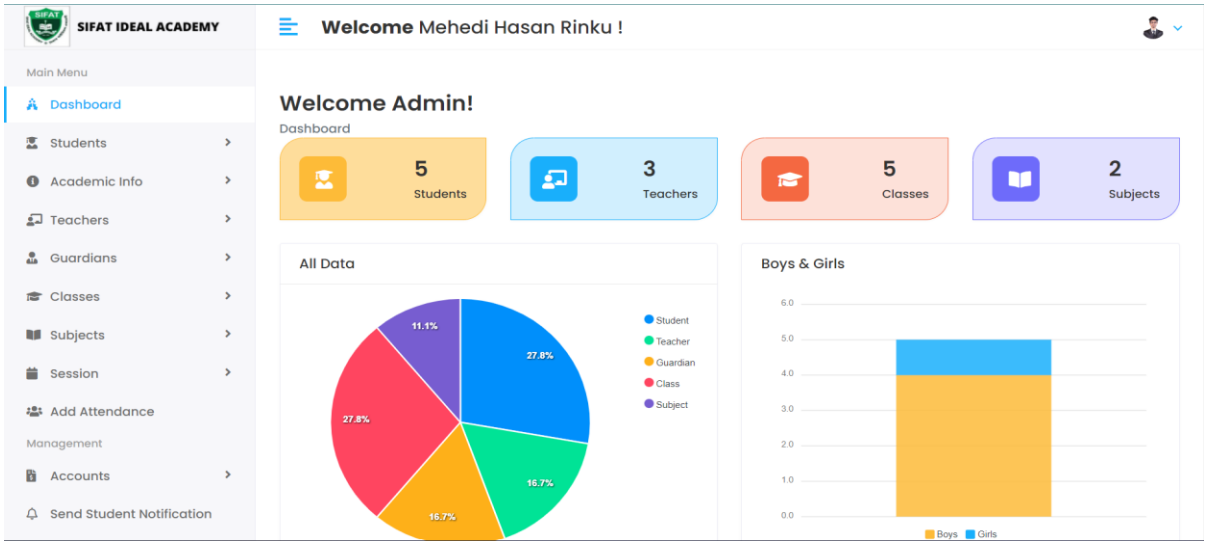

Figure 16: Admin panel prototype

Login Page Prototype:

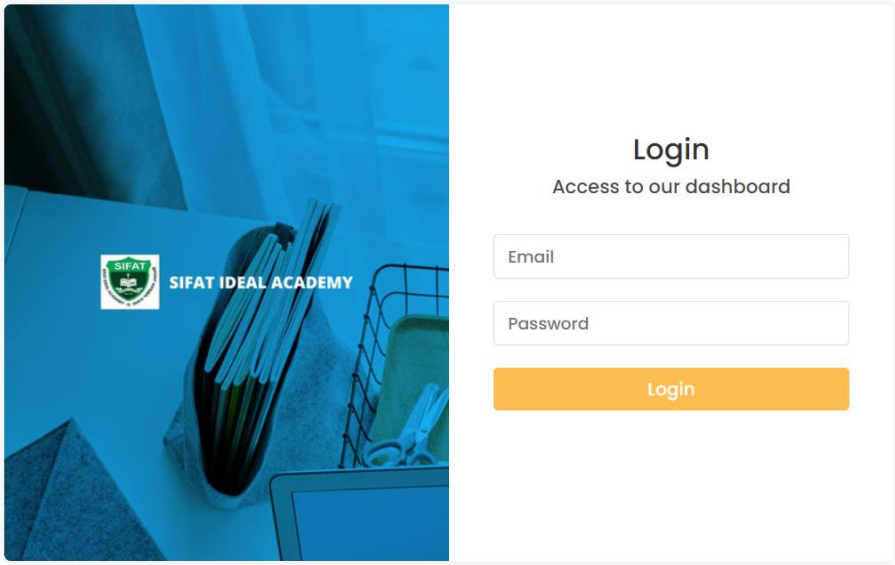

Figure 17: Login prototype

Add Student Prototype:

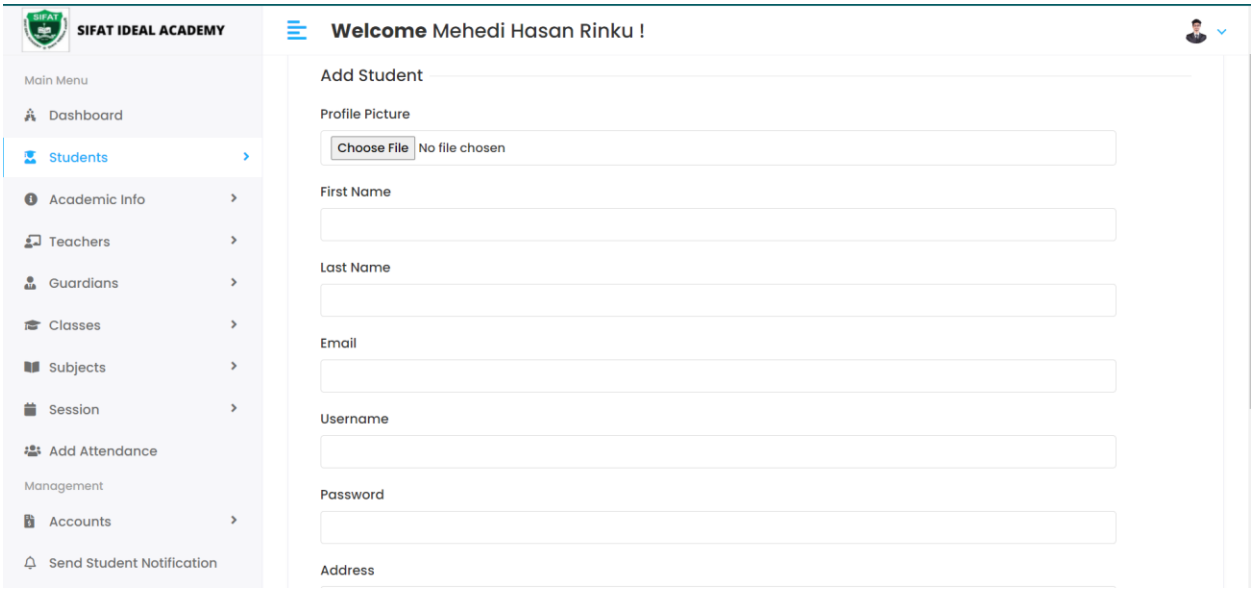

Figure 18: Add Student prototype

View Student Prototype:

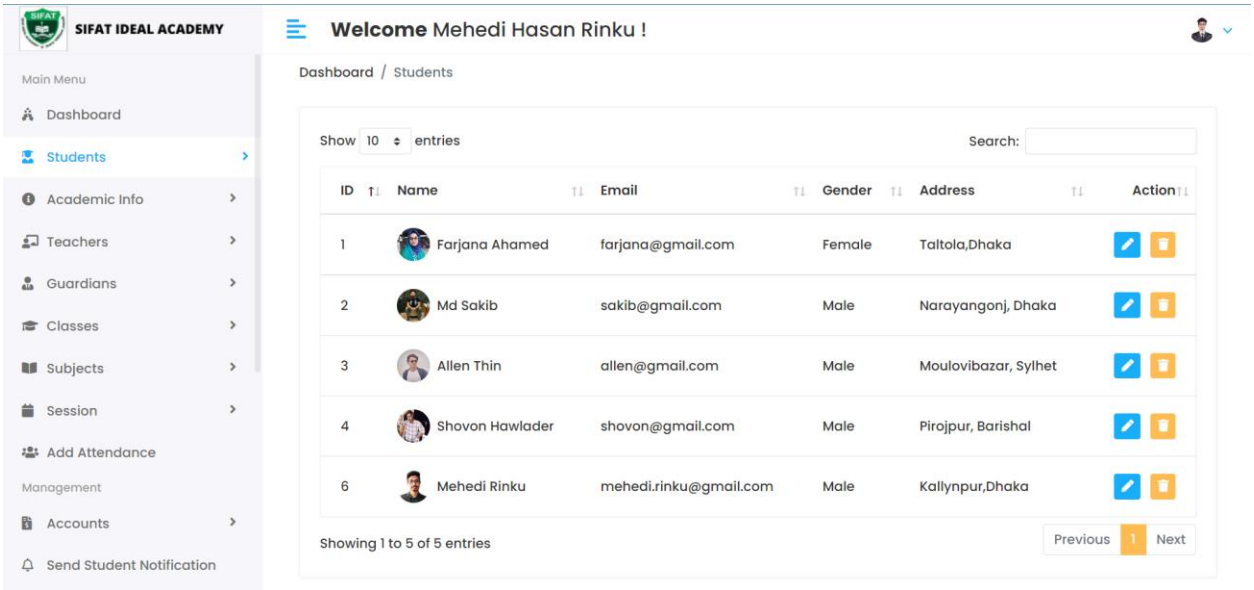

Figure 19: View Student prototype

Academic Info Prototype:

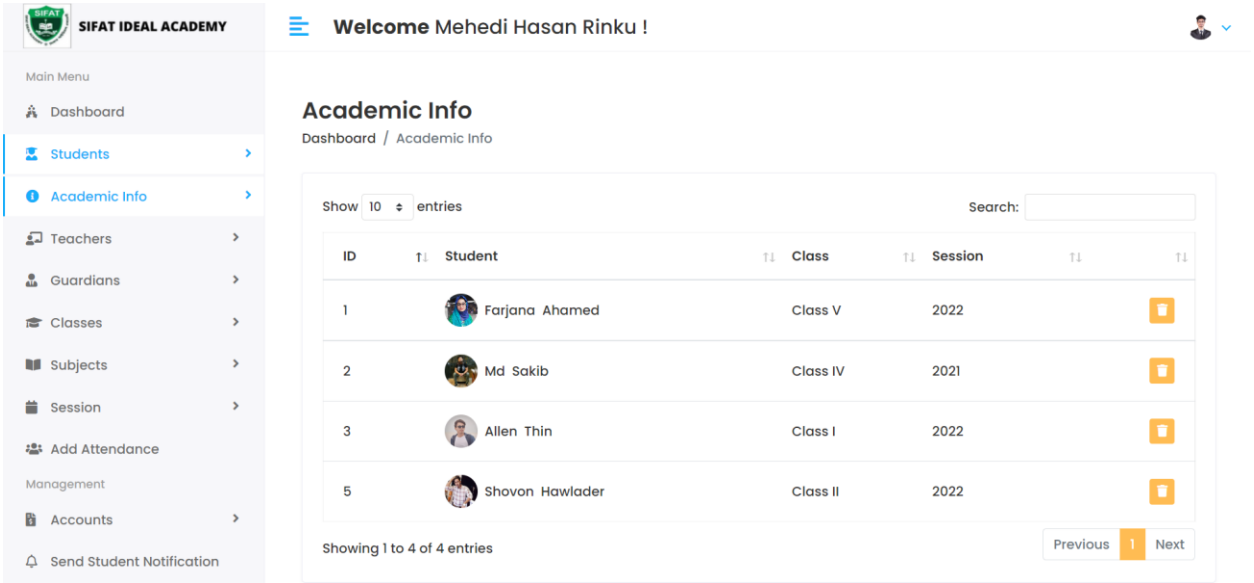

Figure 20: Academic info prototype

Student Feedback Prototype:

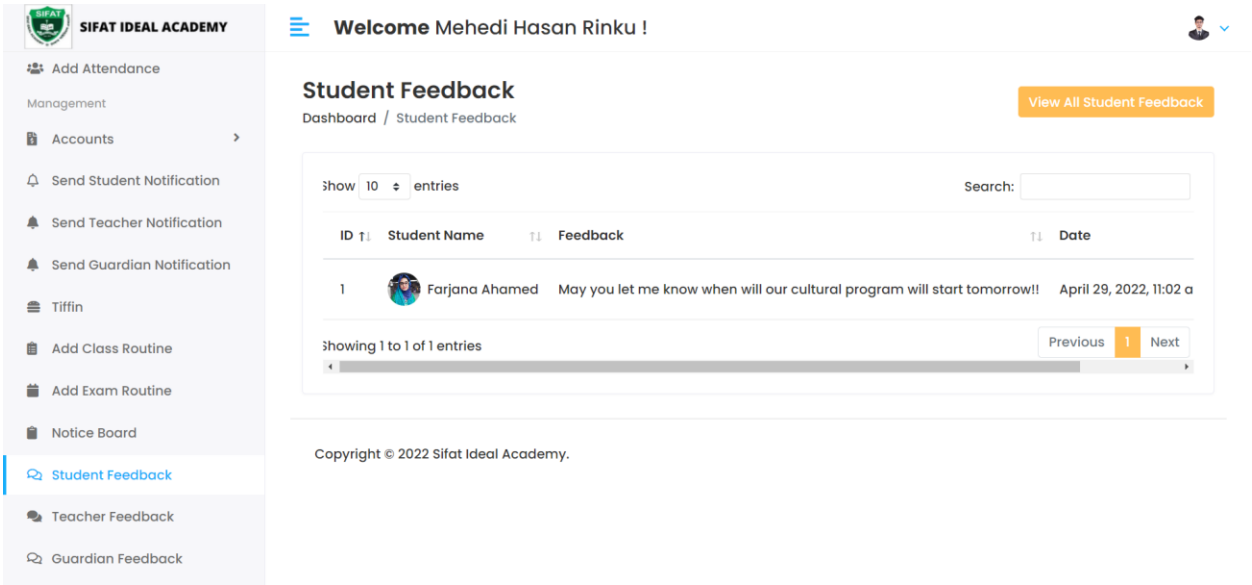

Figure 21: Student Feedback prototype

View Attendance Prototype:

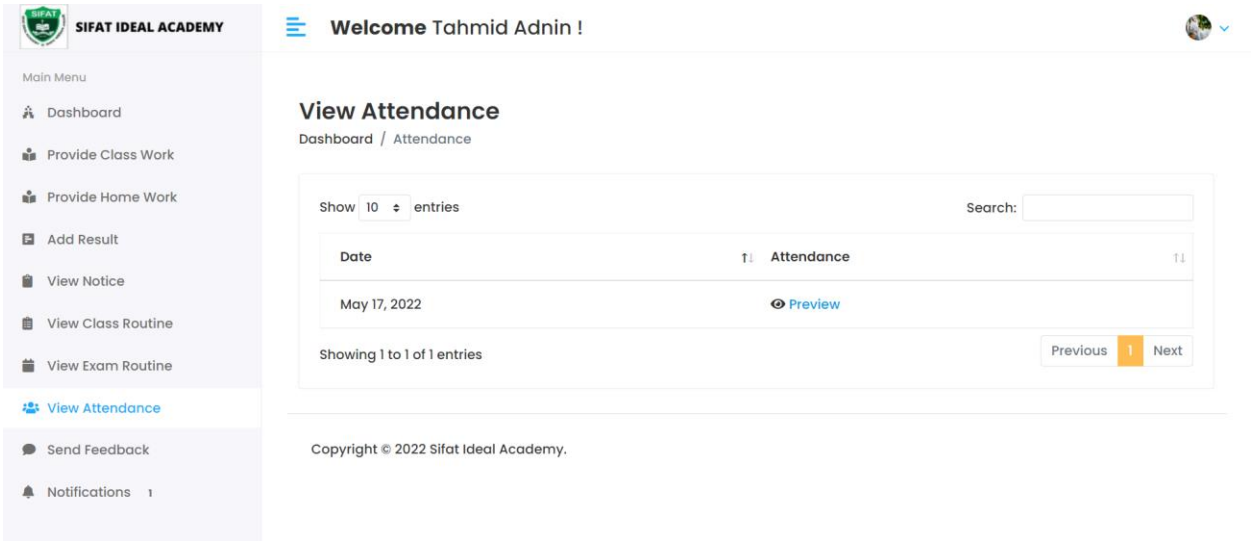

Figure 22: View Attendance prototype

Notification Prototype:

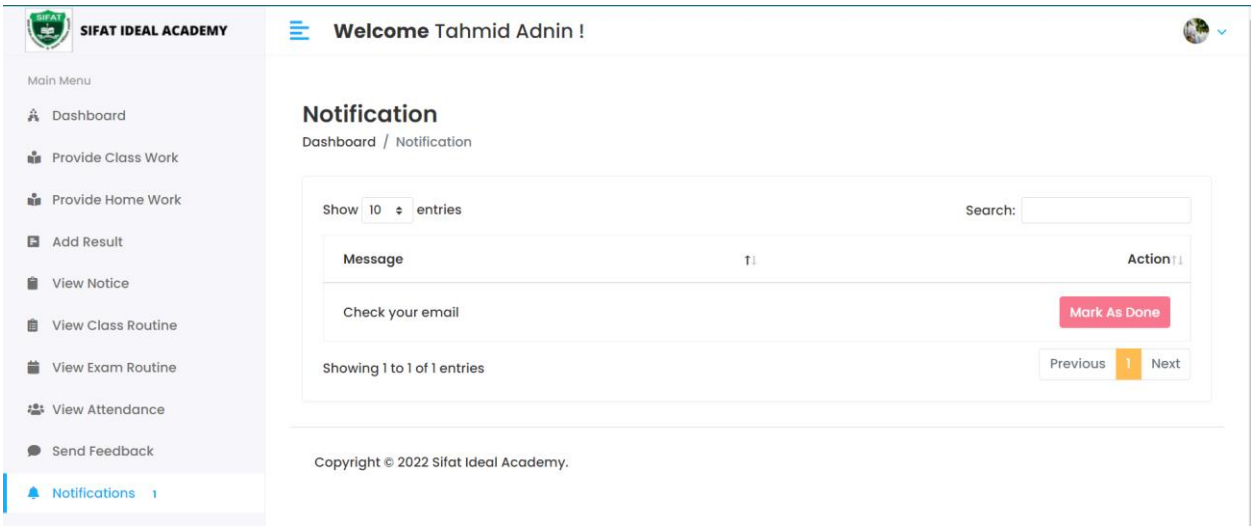

Figure 23:Notification prototype

Result view Prototype:

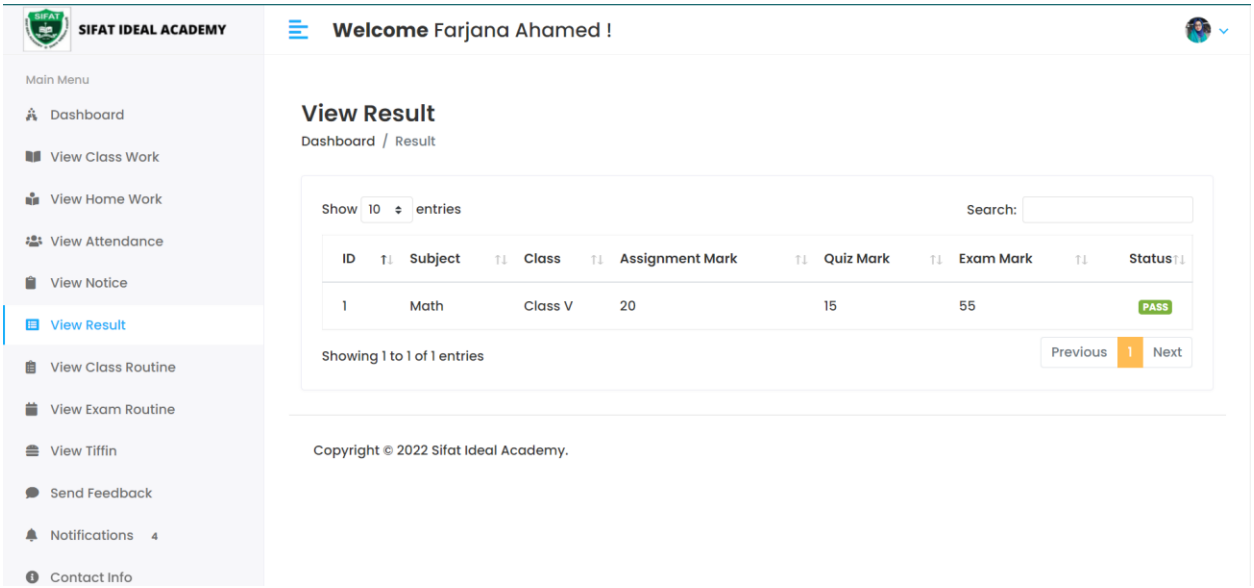

Figure 24:Result view prototype

Chapter 9 – Engineering

9.1 New system modules

The new SKS system has different modules. Now I'm describing some key modules with their working process of the system.

Login Module:

SL	User Action	SL	System action
1	User click on the SKS website link	1	The user will get a login form
2	User will have to provide a login credentials	2	The user validates with email & password
3	User will click on login button	3	If user authentication validates it will redirect to the home page. If any information is invalid it will show an error message.

Table 16: Login module

Enroll student module:

SL	User Action	SL	System action
1	Admin click on student section & click add student sub section	1	It will direct to add student information form
2	Admin will have to provide student details	2	System will acquire all the information.
3	Admin will click on add student button	3	If all information is filled & username is unique it will accept it otherwise it will show error message.

Table 17: Enroll student module

Add attendance module:

SL	User Action	SL	System action
1	Admin click on add attendance section	1	It will direct to add attendance form
2	Admin will have to provide attendance file	2	It will accept all files
3	Admin will click on add attendance button	3	The attendance file will be uploaded & will be visible for the other users.

Table 18: Add attendance module

Accounts Module:

SL	Customer action	SL	System action
1	Admin will click of accounts section	1	The system will provide add salary & add fee section
2	If admin chose add fee section it will redirect to add fees form	2	The system will show the form where have to input student name, class, session, fee type & amount.
3	If admin chose add salary section it will redirect to add salary form	3	The system will show the form where have to input teacher name, month, section & amount.

Table 19: Account module

Send Student Notification Module:

SL	Customer action	SL	System action
1	Admin will click of send student notification section	1	The system will show the student list.
2	Admin will click send notification button to whom he wants to send	2	The system will show a form to write the notification
3	Admin will click send notification	3	The system will send the notification the exact student.

Table 20: Send Student Notification Module

Student Feedback Module:

SL	Customer action	SL	System action
1	Admin will click of student feedback section	1	The system will show the student feedback list
2	Admin will click reply button to reply the feedback	2	The system will show a form to write the feedback
3	Admin will click send reply	3	The system will send the reply the exact student.

Table 21: Student Feedback Module

Provide Class Work Module:

SL	Customer action	SL	System action
1	Teacher will click on provide class work section	1	The system will redirect to add classwork form

2	Teacher will select class & subject	2	The system will redirect to the class work upload section
3	Teacher will upload & click add class work button	3	The system will store the file & preview to the student & guardian.

Table 22: Provide Class Work Module

Add result module:

SL	Customer action	SL	System action
1	Teacher will click on add result section	1	The system will redirect to add result form
2	Teacher will select subject, class & session year to fetch student	2	The system will show the students & then assign assignment mark, quiz mark & exam mark.
3	Teacher will click add result buttom	3	The system will store the data& view to the student & guardian.

Table 23: Add result module

9.2 Use case diagram for SKS

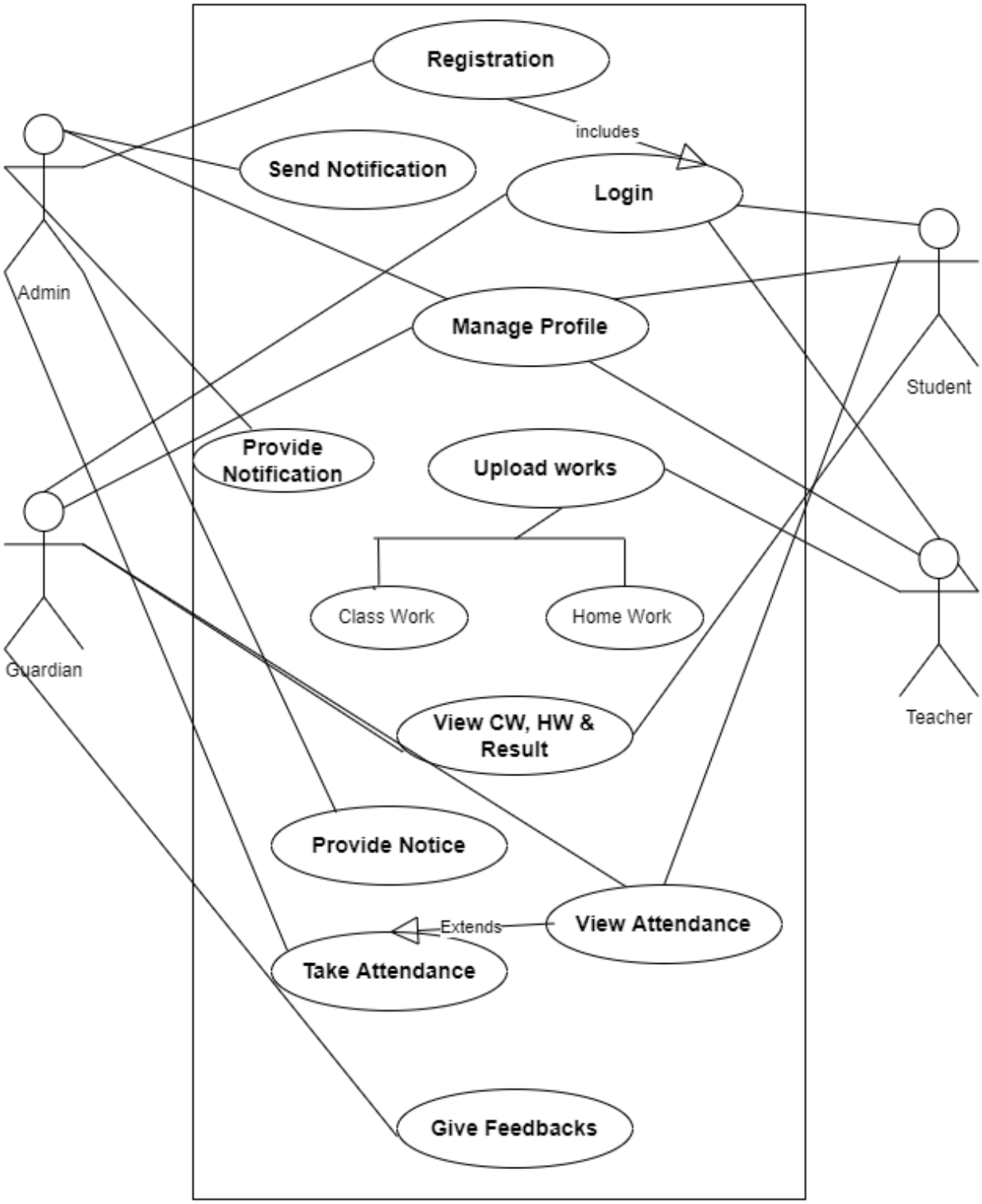

Figure 25: Use case diagram for SKS

9.3 Class diagram for SKS

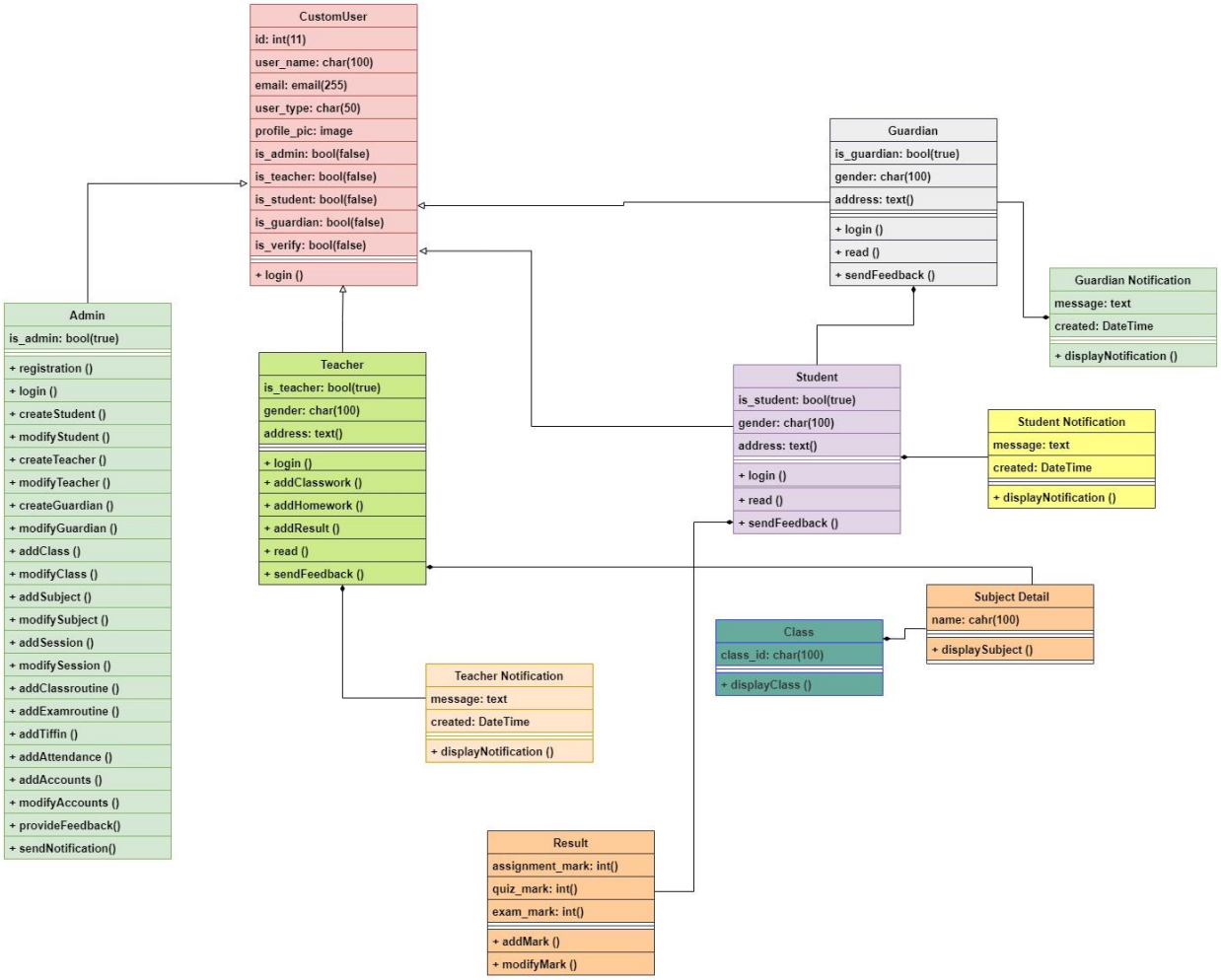

Figure 26: Class diagram for SKS

9.4 Entity Relationship diagram

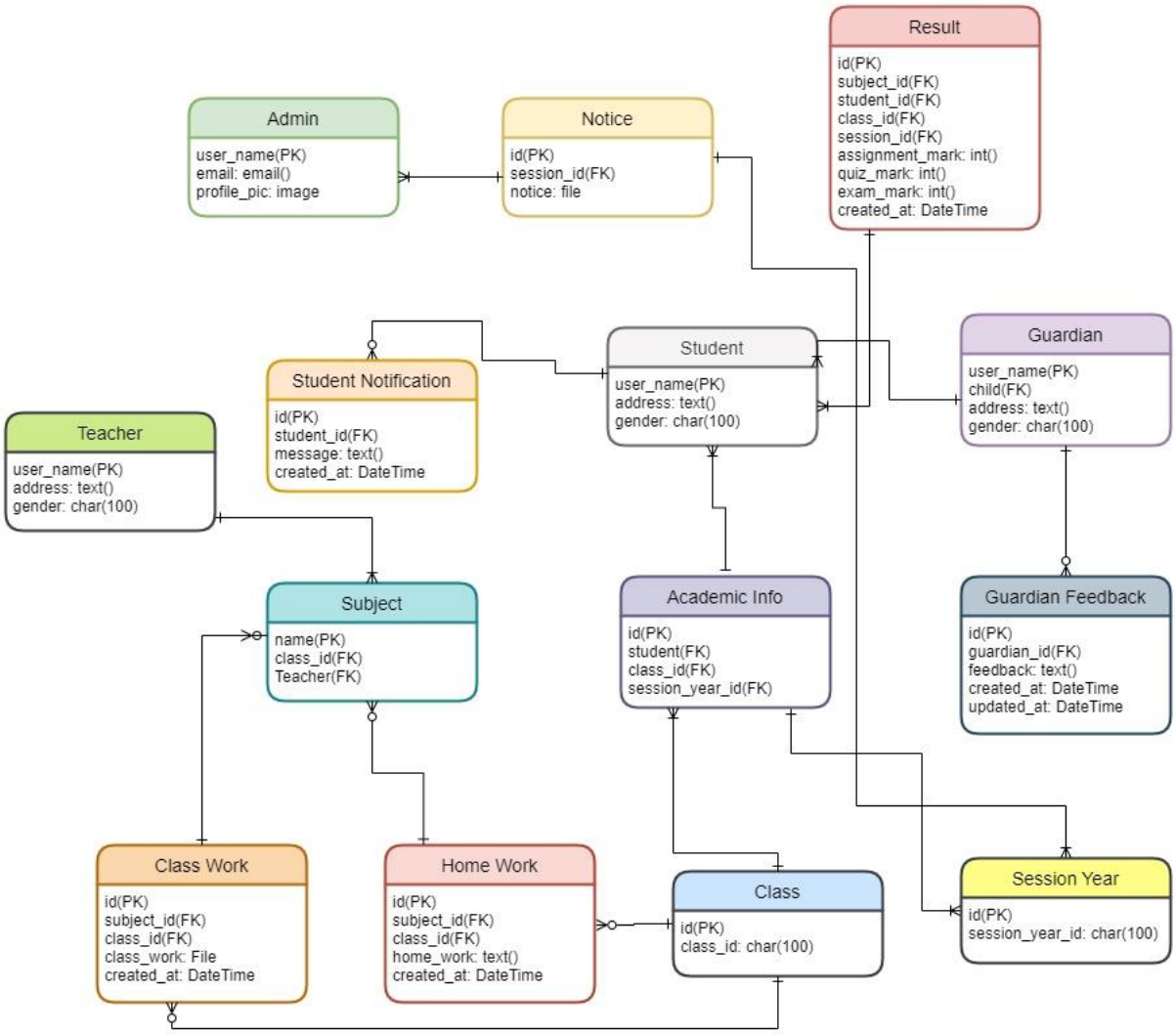

Figure 27: Entity Relationship Diagram

9.5 Sequence Diagram

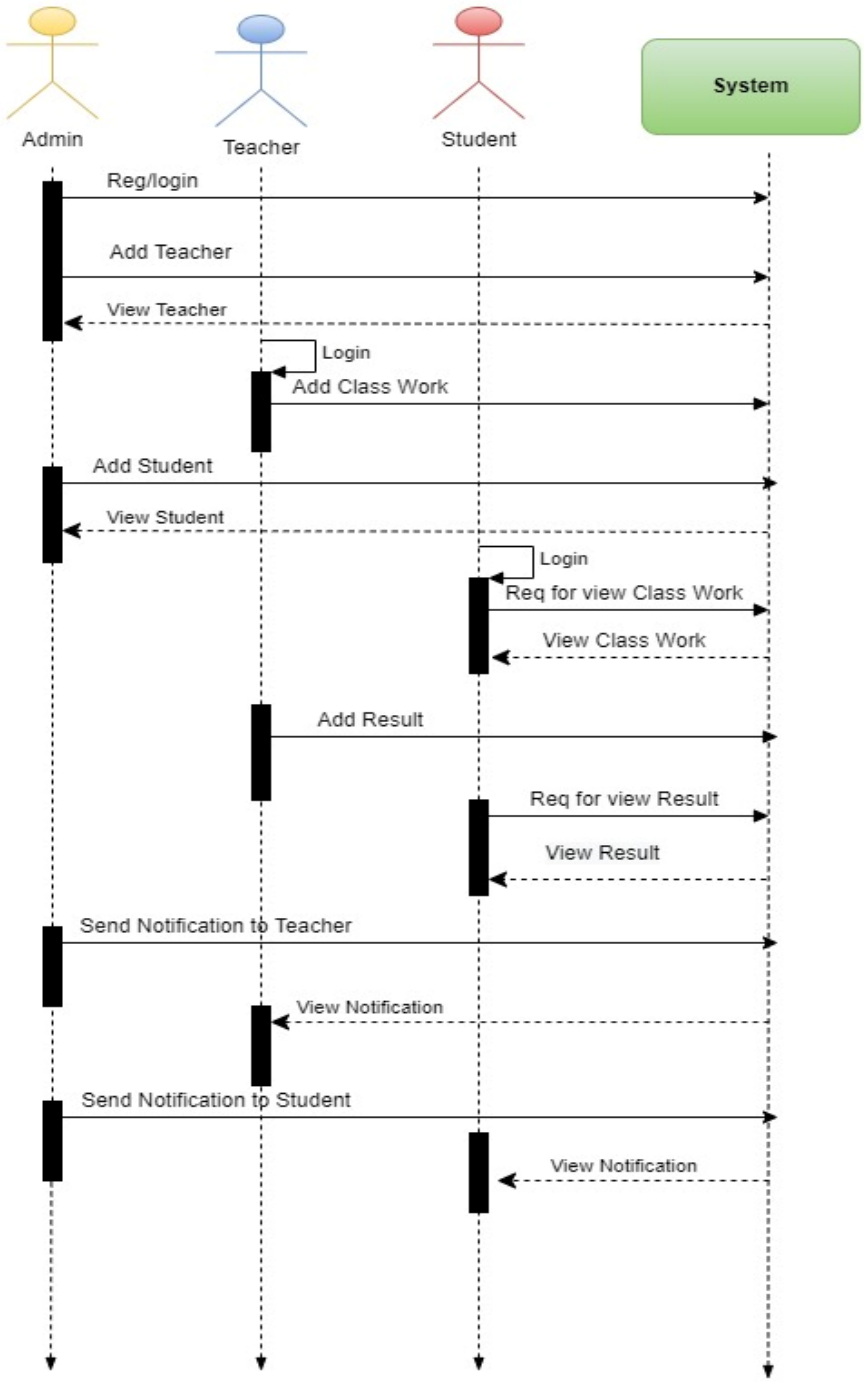

Figure 28: Sequence Diagram

9.6 Component diagram of SKS

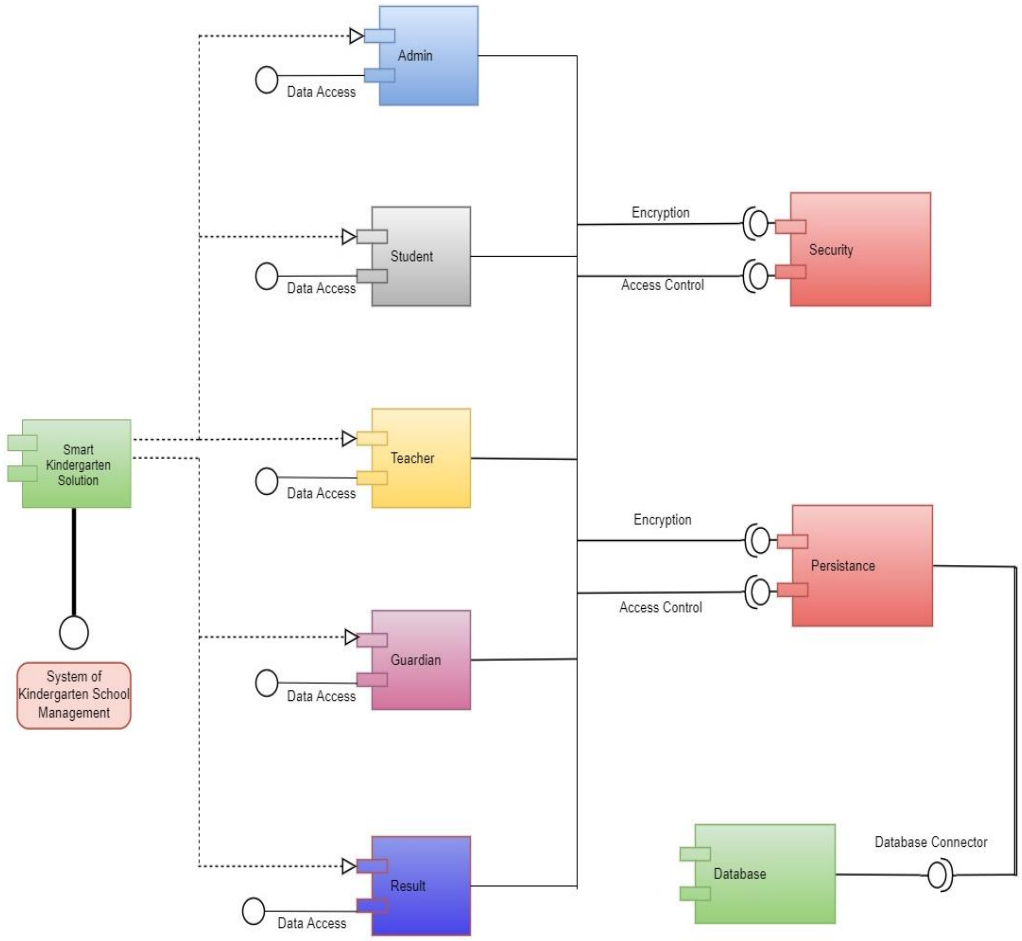

Figure 29: Component diagram of SKS

9.7 Deployment diagram of SKS

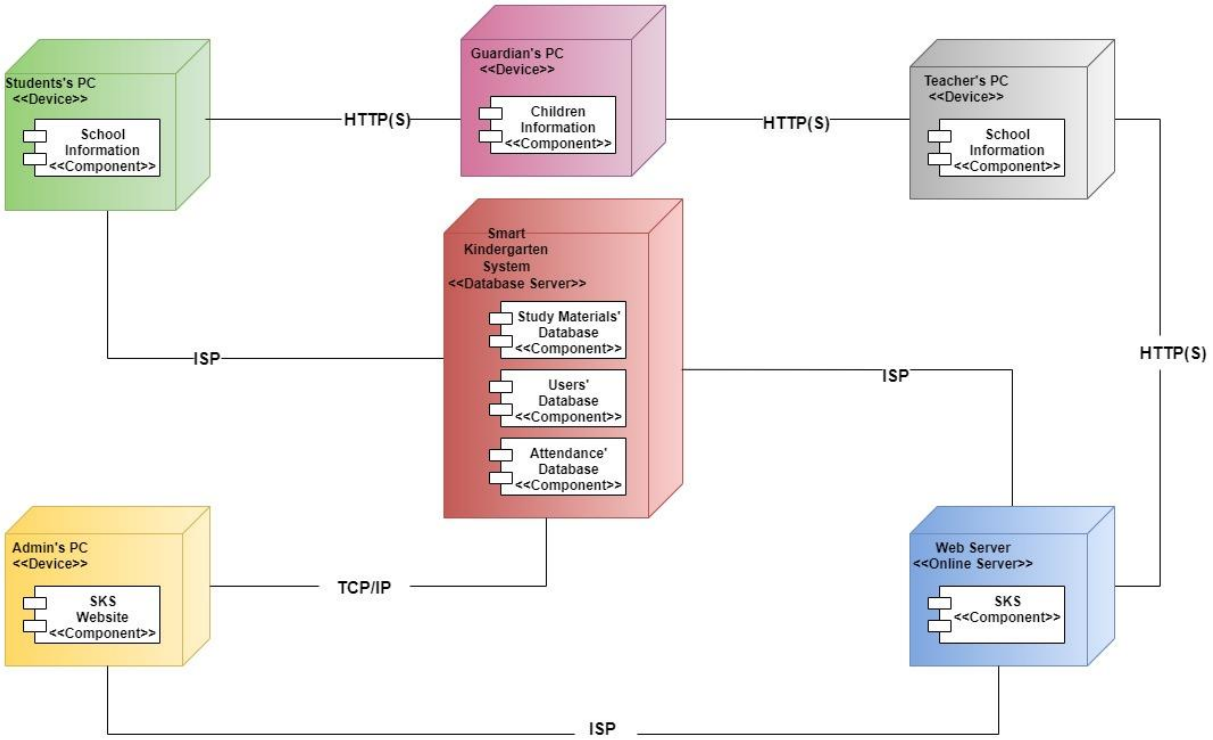

Figure 30: Deployment diagram of SKS

9.8 System interface design

Home page interface:

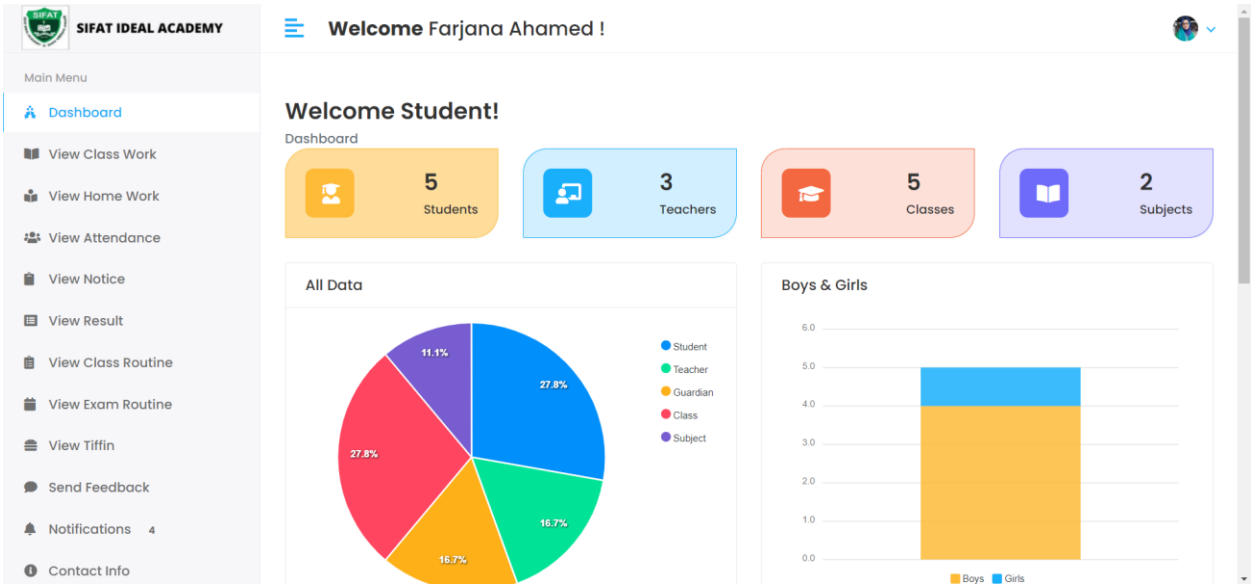

Figure 31: Home page interface

View Class Work interface:

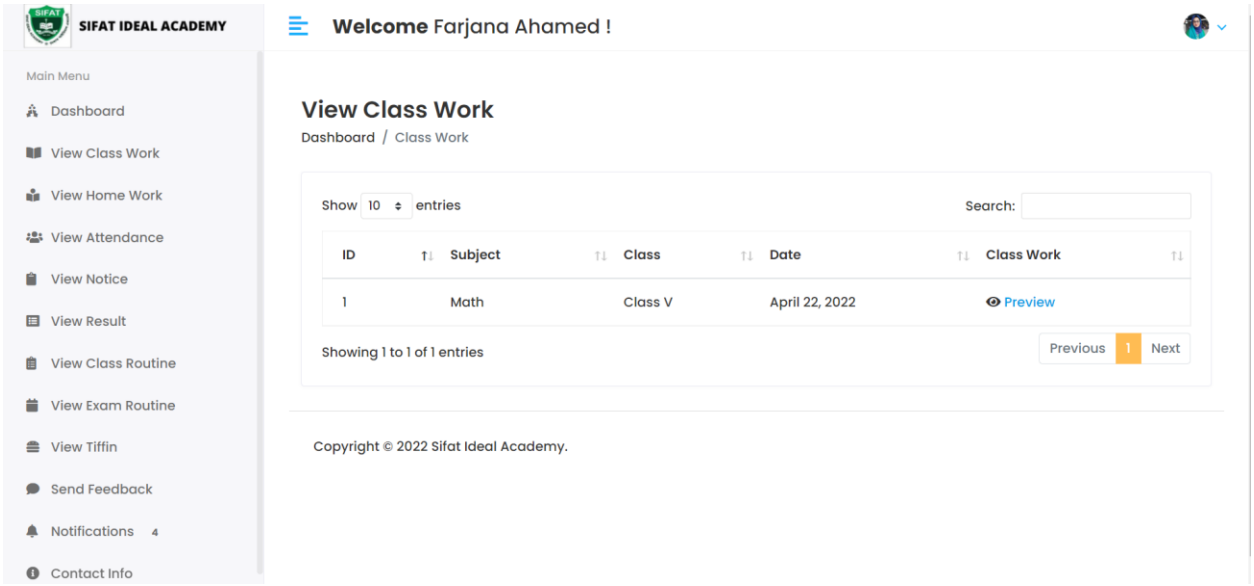

Figure 32: View Class Work interface

View Result Interface:

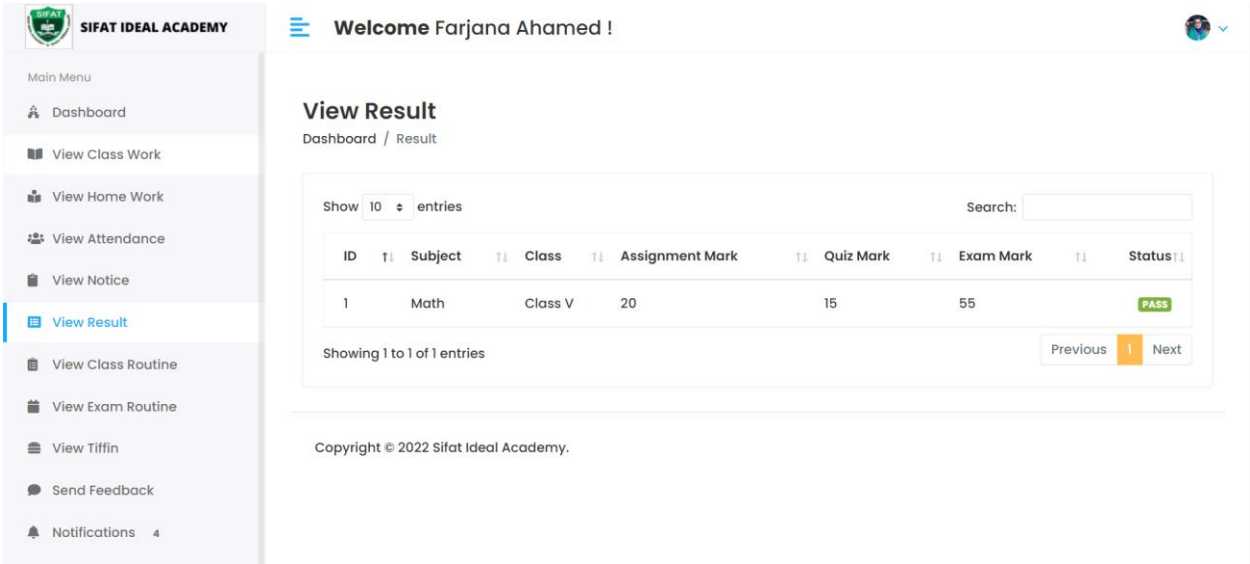

Figure 33: View Result Interface

Admin panel interface:

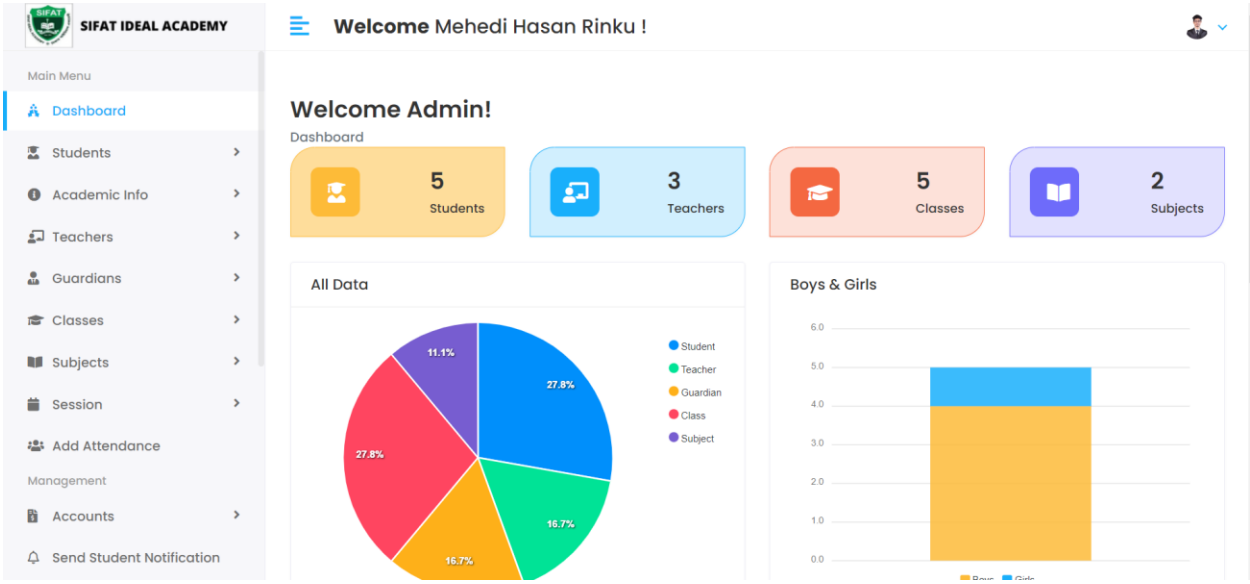

Figure 34: Admin panel interface

Add guardian by admin interface:

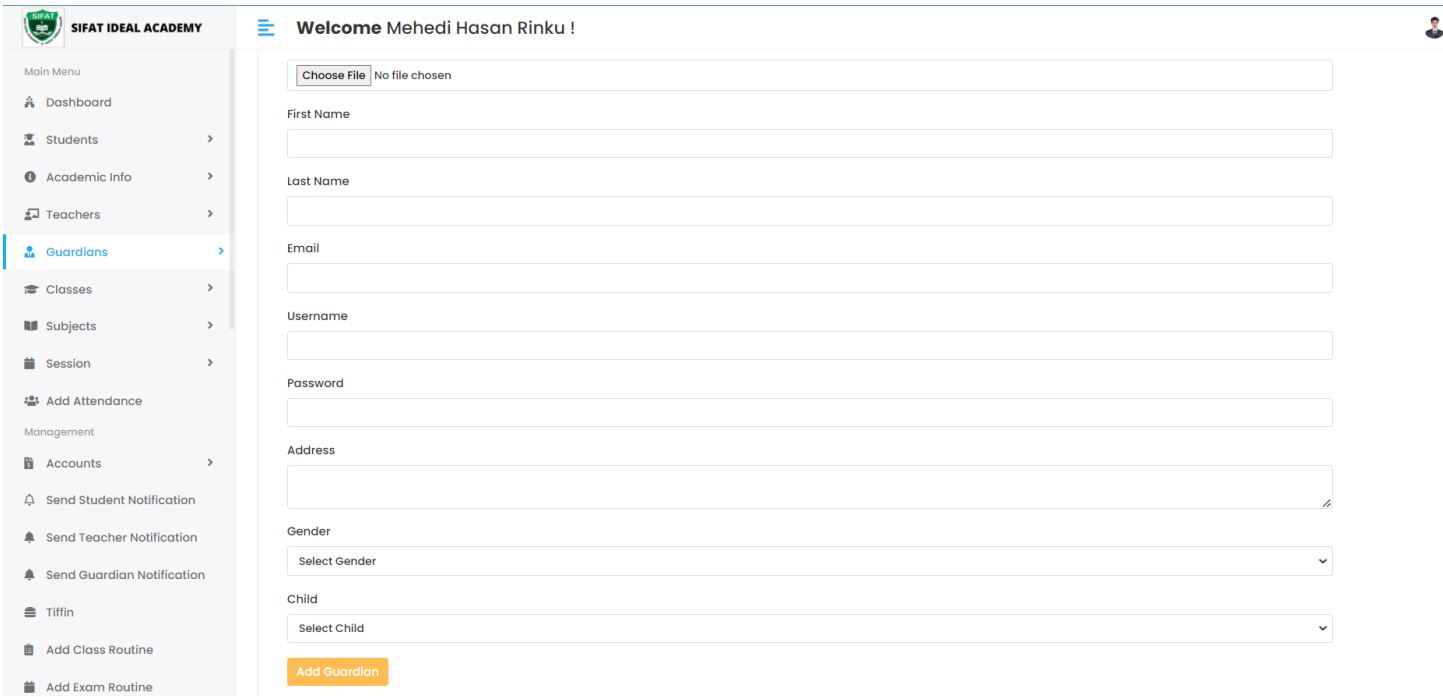

Figure 35: Add guardian by admin interface

Guardian profile update interface:

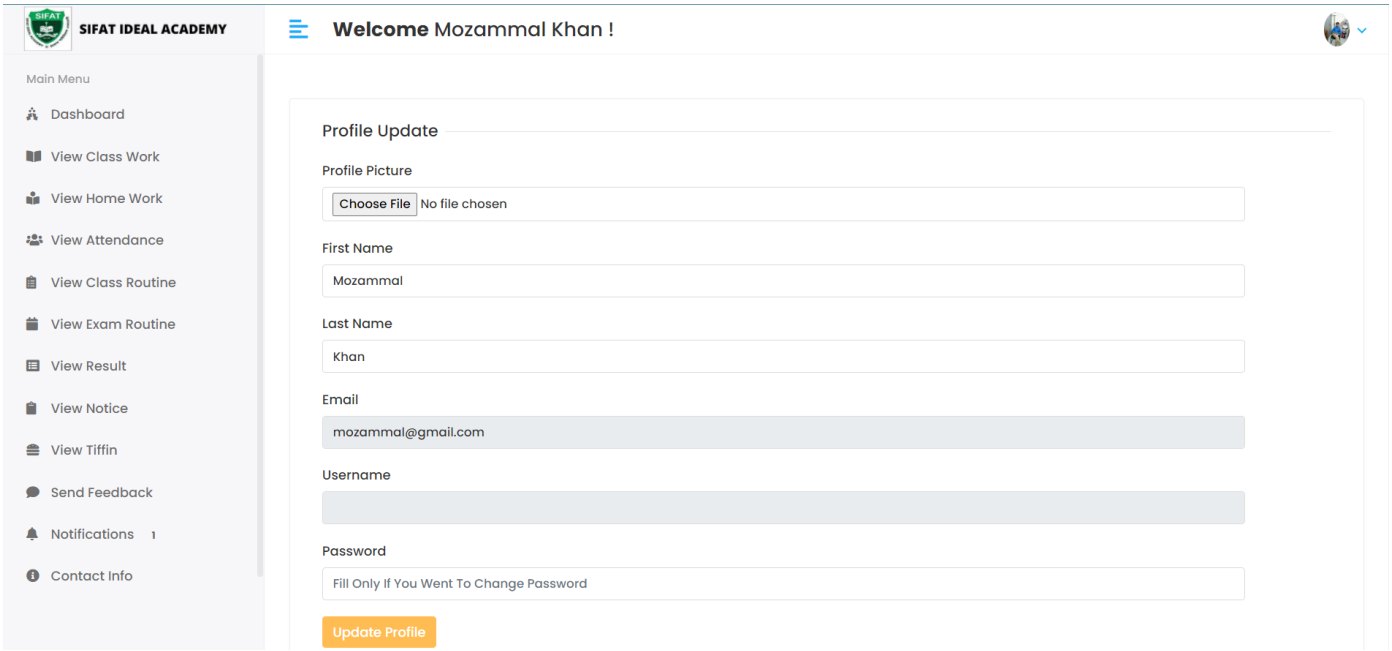

Figure 36: Guardian profile update interface

Chapter 10 – Deployment

10.1 Core module coding sample

For this project I have used HTML5, CSS3, Bootstrap, JQuery & JavaScript for front-end development. For back-end I have used Python & Django Framework. And also used SQLite3for database management. Now I'm showing some parts of my coding below:

Login sample for the user:

```
def dologin(request):
    if request.method == "POST":
        user = EmailBackEnd.authenticate(request,
                                         username=request.POST.get('email'),
                                         password=request.POST.get('password'),)
        if user!=None:
            login(request,user)
            user_type = user.user_type
            if user_type == '1':
                return redirect('admin_home')
            elif user_type =='2':
                return redirect('teacher_home')
            elif user_type =='3':
                return redirect('student_home')
            elif user_type =='4':
                return redirect('guardian_home')
            else:
                messages.error(request,'Email & Password are invalid !')
                return redirect('login')
        else:
            messages.error(request,'Email & Password are invalid !')
            return redirect('login')
```

Figure 37: Login page

```
def doLogout(request):
    logout(request)
    return redirect('login')
```

Figure 38: Logout page

Add student system:

```
@login_required(login_url='/')
def ADD_STUDNET(request):


    if request.method == "POST":
        profile_pic = request.FILES.get('profile_pic')
        first_name = request.POST.get('first_name')
        last_name = request.POST.get('last_name')
        email = request.POST.get('email')
        username = request.POST.get('username')
        password = request.POST.get('password')
        address = request.POST.get('address')
        gender = request.POST.get('gender')


        if CustomUser.objects.filter(email= email).exists():
            messages.warning(request,'Email Is Already Taken')
            return redirect('add_student')
        if CustomUser.objects.filter(username= username).exists():
            messages.warning(request,'Username Is Already Taken')
            return redirect('add_student')
        else:
            user = CustomUser(
                first_name= first_name,
                last_name= last_name,
                username= username,
                email= email,
                profile_pic= profile_pic,
                user_type= 3
```

Figure 39: Add student system

```
@login_required(login_url='/')
def VIEW_STUDENT(request):
    student = Student_detail.objects.all()

    context ={
        'student':student
    }
    return render(request,'Admin/view_student.html',context)
```

Figure 40: View student system

```
def attendance(name):
    with open('attendance.csv', 'r+') as f:
        myDataList = f.readlines()
        nameList = []
        for line in myDataList:
            entry = line.split(',')
            nameList.append(entry[0])
        if name not in nameList:
            time_now = datetime.now()
            tStr = time_now.strftime('%H:%M:%S')
            dStr = time_now.strftime('%d/%m/%Y')
            f.writelines(f'\n{name},{tStr},{dStr}')


cap = cv2.VideoCapture(0)

while True:
    ret, frame = cap.read()
    faces = cv2.resize(frame, (0, 0), None, 0.25, 0.25)
    faces = cv2.cvtColor(faces, cv2.COLOR_BGR2RGB)

    facesCurrentFrame = face_recognition.face_locations(faces)
    encodesCurrentFrame = face_recognition.face_encodings(faces, facesCurrentFrame)

    for encodeFace, faceLoc in zip(encodesCurrentFrame, facesCurrentFrame):
        matches = face_recognition.compare_faces(encodeListKnown, encodeFace)
        faceDis = face_recognition.face_distance(encodeListKnown, encodeFace)
        # print(faceDis)
        matchIndex = np.argmin(faceDis)
```

Figure 41: Attendance system

10.2 Possible Problem Breakdown

To develop the whole system at a time will be difficult so it should be divided into smaller part to complete the task in easier way. It will make simple the task & also efficient. The potential breakdown process of the system is:

- Analysis & database design part
- Dashboard management process
- User panel development

Analysis & database design

- Identify requirements
- Prioritize the requirements
- Data collection
- Normalize the collected data
- Run Django Admin panel
- Create model section for database

Dashboard management

- Registration & login system for different user
- Design & development different pages
- Develop Admin manipulation system
- Develop Student manipulation system
- Develop Teacher manipulation system
- Develop Guardian manipulation system

User panel development

- Front end development

- Registration & Login system
- Student, teacher & guardian enrollment system
- Add CW & HW system
- Add result system
- Automated attendance system
- Send notification system
- Send feedback system
- Add notice system

Chapter 11 – Testing

11.1 Test plan acceptance

Testing is a crucial part to develop a successful software. The plan to test the system should done in the analysis phase. User & Developer need to adopt the testing plan. Test plan of this project will ensure the relevant test requirements & fulfill the criteria of user acceptance.

There have two types of testing:

- Functional Testing

Functional testing are mainly three types. They are:

- Unit Testing
  - Input filed validation
  - Filtering of admin approval
  - Approval, pending request & rejection from admin panel.

- Module Testing
  - Submit the login form without data entry
  - Register with the invalid data

- Integration Testing
  - Login with valid credentials
  - Successful uploading information

- Nonfunctional Testing

In my project I'm going to implement four types of non-functional testing. They are:

- Acceptance Testing:
  - Updating personal information from different user perspectives
- Security Testing:
  - Different page access for different user role
  - Login attempts with valid credential
- Accessibility Testing
  - User-friendly testing
  - Proper color contrast testing
- Usability Testing
  - Admin panel testing
  - Test the system with different user

11.2 Test case

Test acceptance plans should be prepared for the exam after finalization. These are the test cases of SKS system

Unit test –test case:

Test case name	Unit test
Test class	
Test description	

Data source	Test setup	expected result	Actual result

Module test –test case:

Test case name	Unit test		
Test class			
Test description			
Data source	Test setup	expected result	Actual result

Integration test –test case:

Test case name	Unit test		
Test class			
Test description			
Data source	Test setup	expected result	Actual result

11.3 Unit testing

<u>Unit test-1</u>

Test case

Test case name	Unit test
Test class	User registration

Test description	User Email or username verification		
Data source	Test setup	expected result	Actual result
User entry	Submit the form	an error message	need validation

Table 24: Unit test case-1

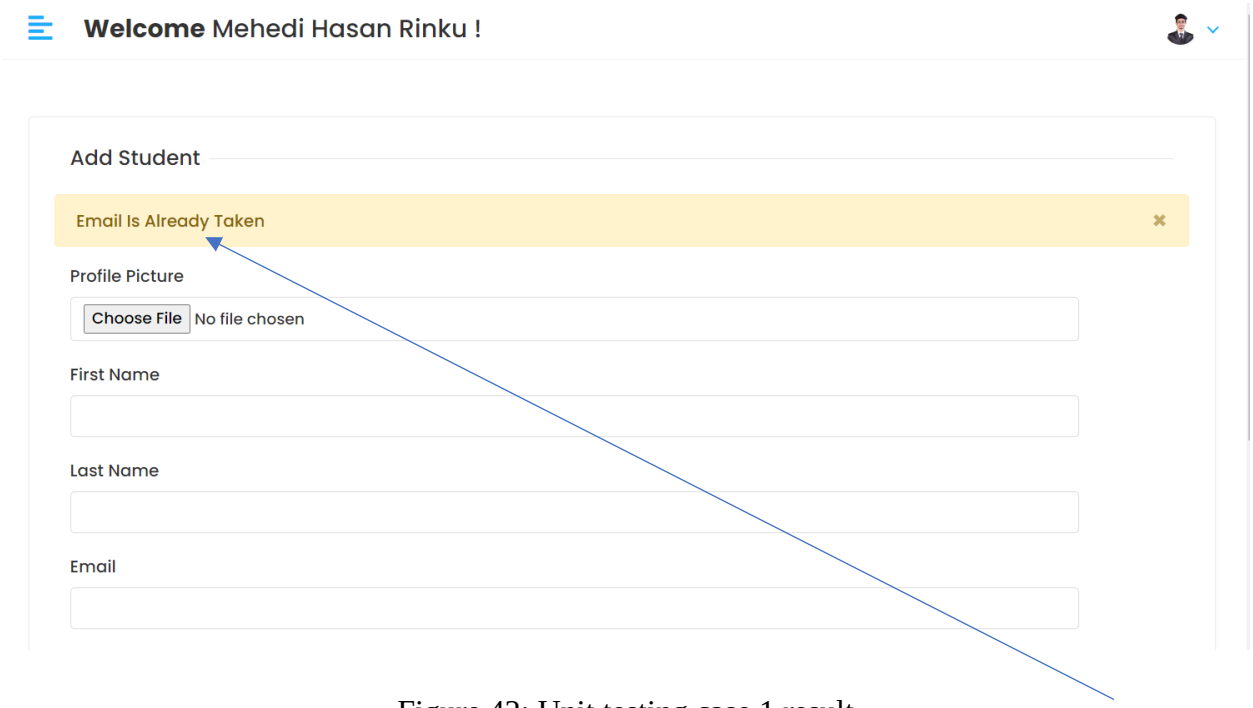

Figure 42: Unit testing case 1 result

<u>Unit test-2</u>

<u>Student enrollment</u>

Test case name	**Unit test**		
Test class	Student enrollment		
Test description	User Email and Username		
Data source	Test setup	expected result	Actual result

User entry	Input all data and submit the form	Got an error message	Need unique email address & username

Table 25: Unit test case-2

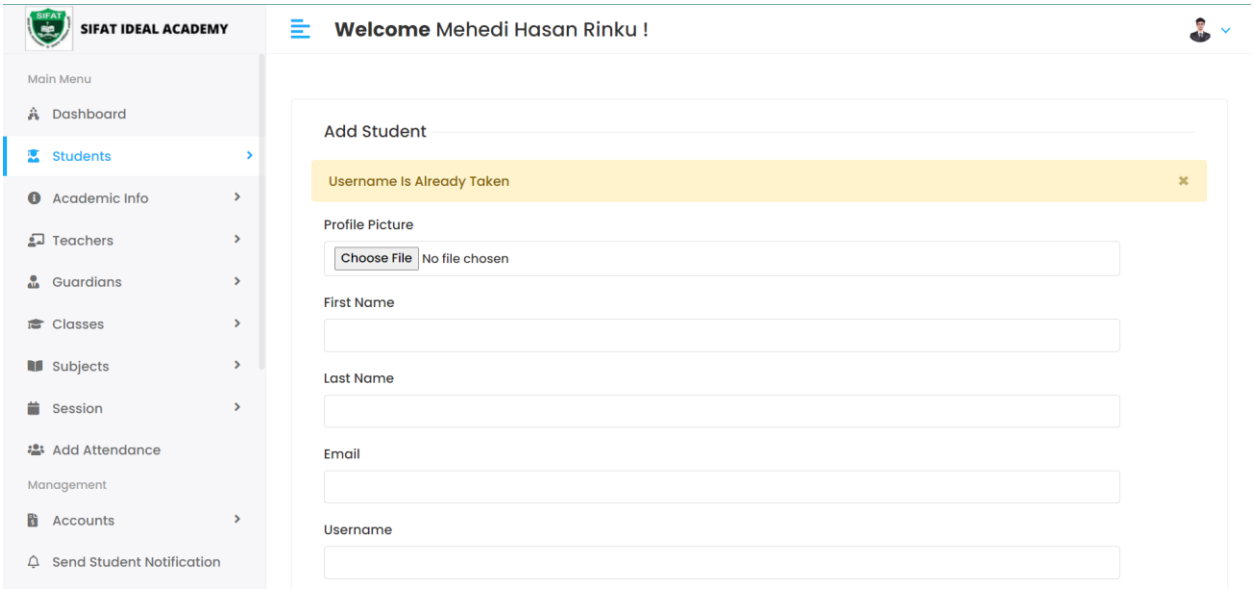

Figure 43: Unit testing case 2 result

Use case-3

User login

Test case name	**Unit test**		
Test class	User login		
Test description	Registered email and password		
Data source	Test setup	expected result	Actual result
User entry	Input wrong registered data in the form	Invalid message	Need valid registered input

Table 26: Unit test case-3

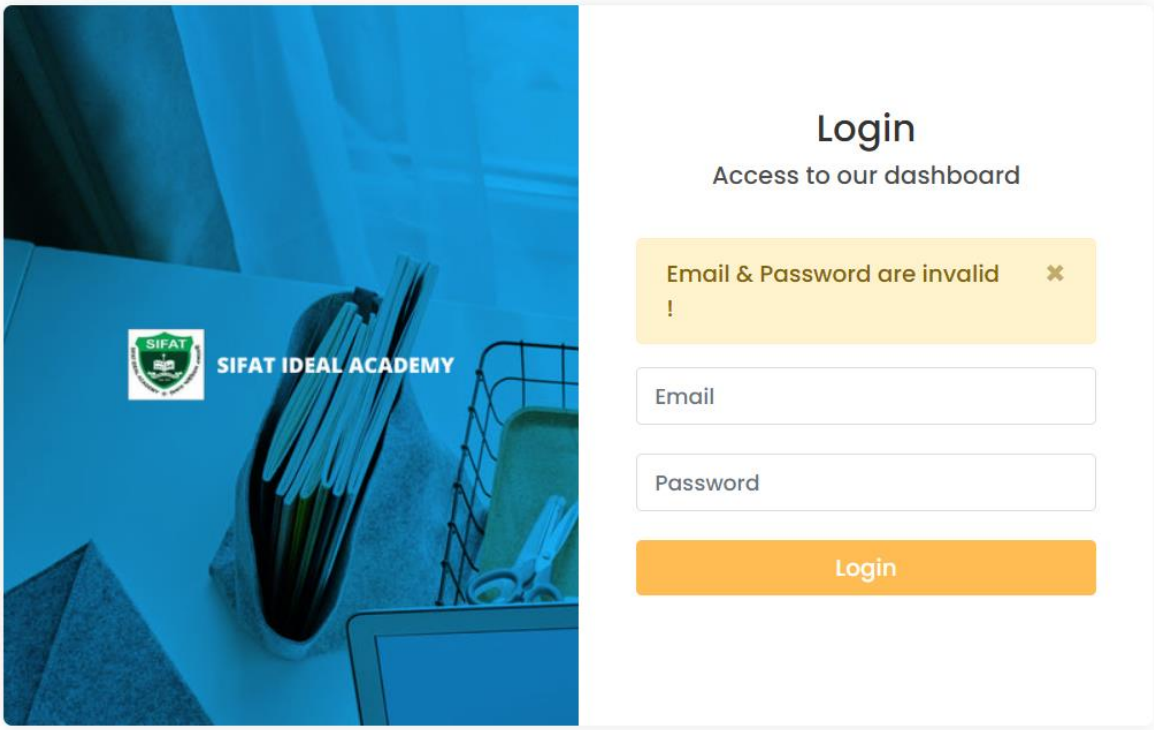

Figure 44: Unit testing case 3 result

11.4 Module test

Module test-1

Test case name	Unit test		
Test class	Enroll Guardian		
Test description	Admin need to fill up all field		
Data source	Test setup	Expected result	Actual result
User entry	Blank field is not acceptable	Got warning message	Need proper info

Table 27: Model test case-1

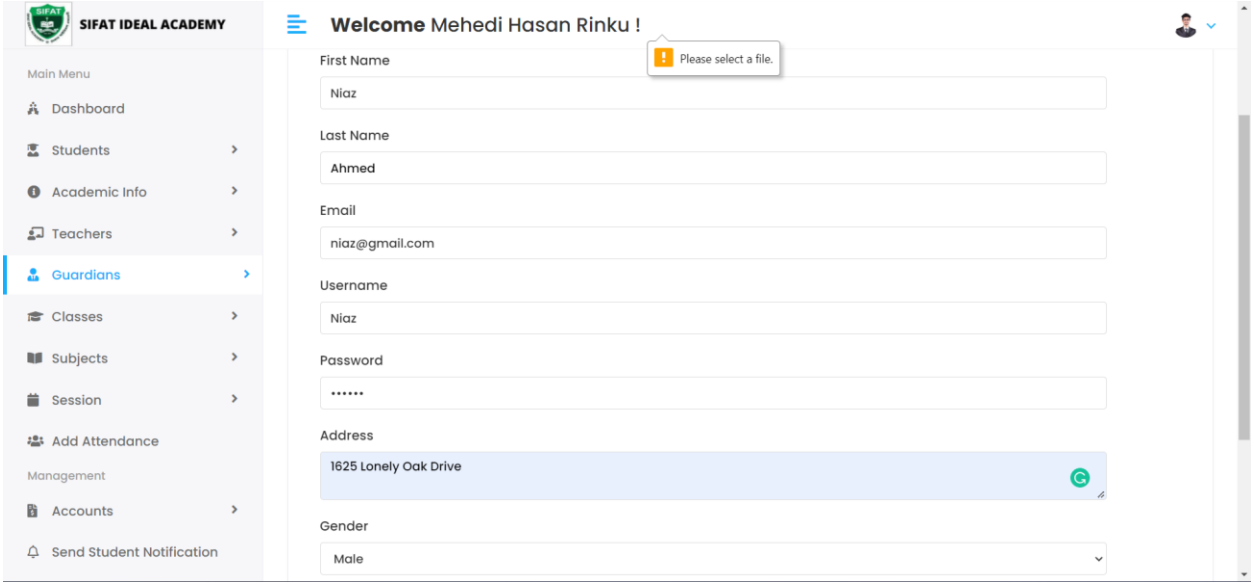

Figure 45: Module testing 1 result

11.5 Integration testing

Test case name	Unit test		
Test class	Student		
Test description	1. Login Controller 2. Divert In the event that Verified Middleware Test Portrayal Fruitful login endeavor and dashboard redirect		
Data source	Test setup	Expected result	Actual result
User entry	1. Go to login section 2. Provide valid email & password 3. Click on login	User authentication is needed	It shows that email or password is invalid.

Table 31: Integration testing

User login integration test

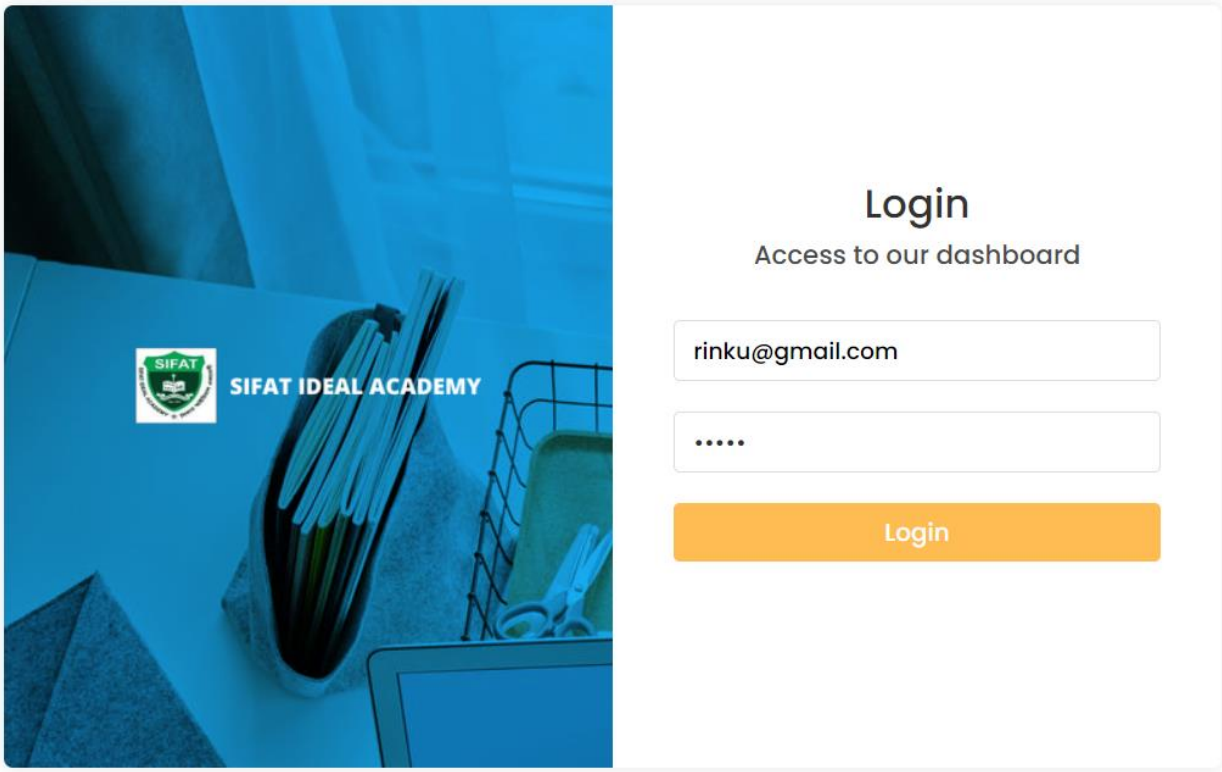

Figure 46: User login integrate test

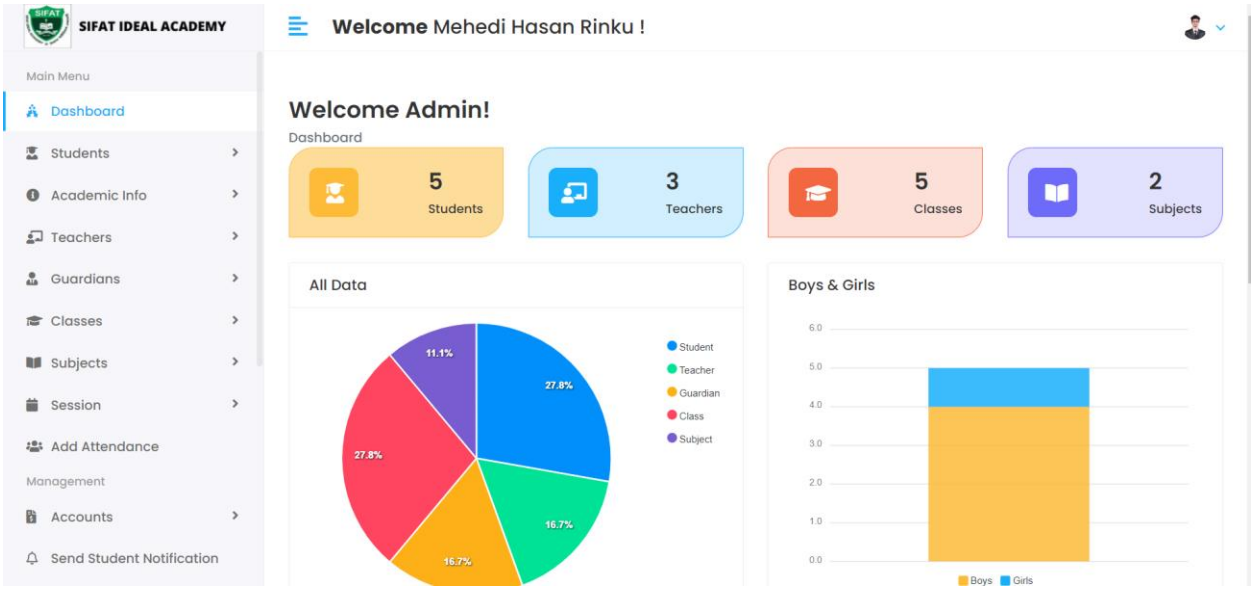

Figure 47: User login integration test result

11.6 Security testing

Test case name	Unit test		
Test class	Admin		
Test description	Login Controller		
Data source	Test setup	Expected result	Actual result
User entry	Invalid login attempt security testing	Shouldn't be logged in showing invalid message	The result is Expected.

Table 28: User security testing

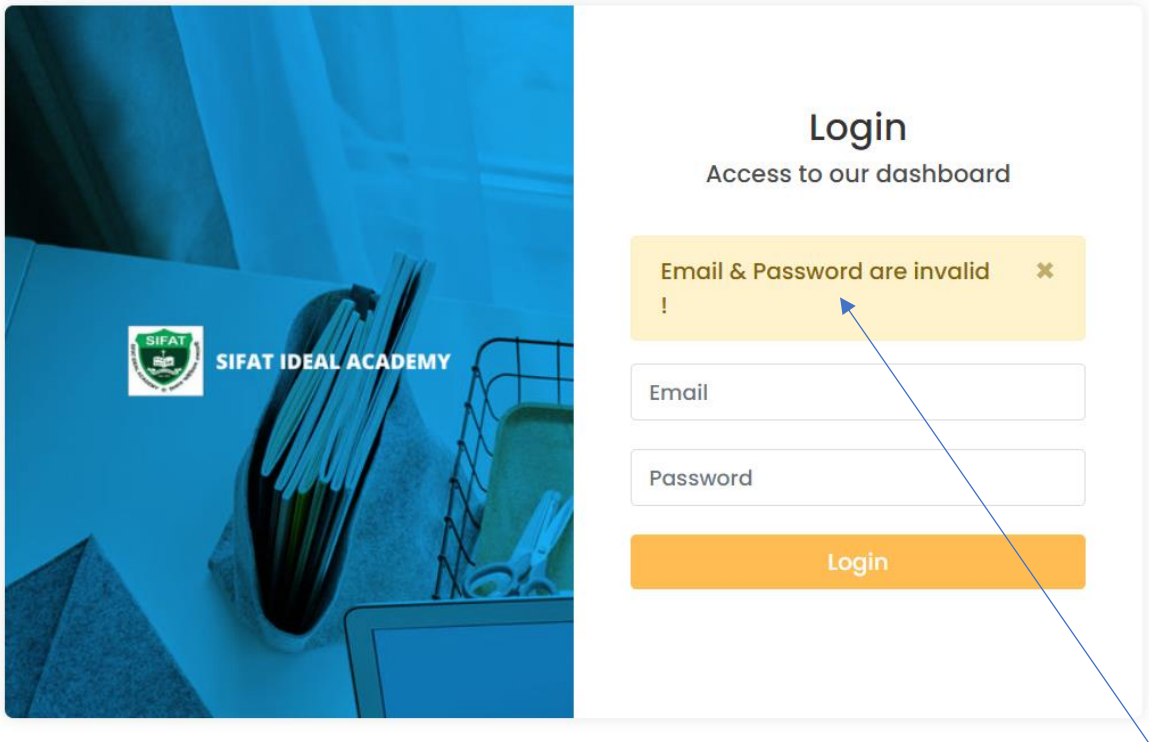

Figure 48: User security test results

11.7 Accessibility testing

Accessibility testing case-1

Test case name	Unit test		
Test class	Student		
Test description	Student Controller		
Data source	Test setup	expected result	Actual result
User entry	Student use the system	No error occurs Using the system.	The user didn't Face any difficulties.

Table 29: Student controller accessibility test-1

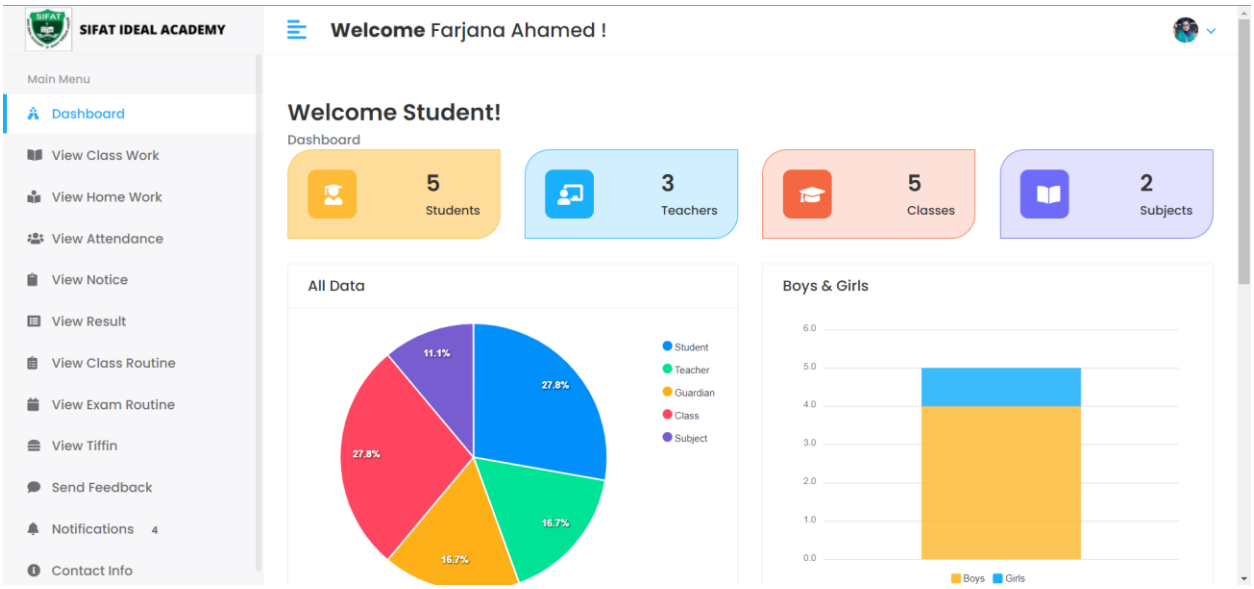

Figure 49: Student controller accessibility test

Accessibility testing case-2

Test case name	Unit test		
Test class	Admin Controller		
Test description	User-friendliness testing		
Data source	Test setup	Expected result	Actual result
User entry	Giving access to the admin to use the system	The system is user-friendly.	The result is Expected.

Table 30: Admin controller accessibility test-2

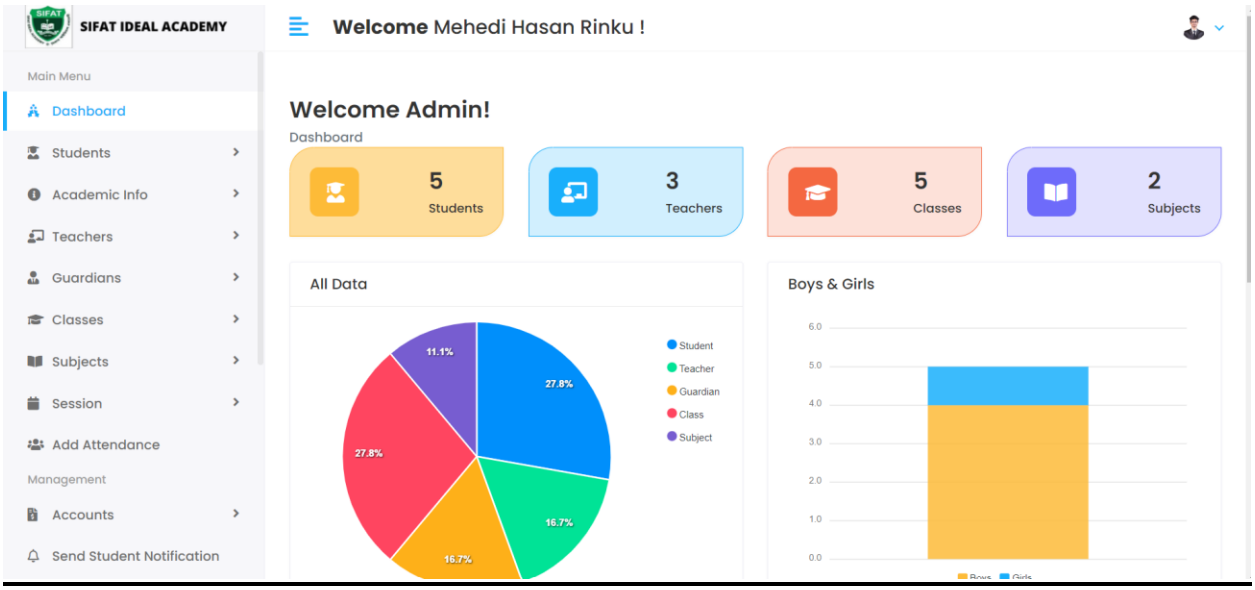

Figure 50: Admin controller accessibility test

Chapter 12 – Implementation

12.1 Training

Preparing is the method to commonplace the unused framework with the client. When the framework is completely operational, the advancement group must guarantee the clients are adequate to oversee the action of the framework. A chart depicting the preparing strategy is given below:

SL	User	Training Scope	Time period	Comment
1	User	Registered as user	40 Minutes	Users are perceiving the methods accordingly.

2	Admin	Add a database of external user	2 Hours	Admin can easily use the system.

Table 35: User training

12.2 Implementation Scheme

Big Bang

Big Bang scheme shuts down the existing process & enables the new system immediately. This is faster than any other scheme & uses the new system when the test is over. Loss of the old system can lead to exchange and instability as data can be lost & new system can crash. It has been included in the human resource consideration of a single site.

12.3 Scaling

My plan is to give my project to the authority of Sifat Ideal Academy so that they can use the system for their purpose to run their institute.

12.4 Load Balancing

Load balancing means optimize the system so that a certain amount of user can access the system & use the system smoothly. Load balancing indicates how many users can access the system at a time & how long the system can long last which is known as load balance & load equalizer. This process breaks down the load into different server so that the system can run faster. In this proposed system four types of users will access this system daily & perfect load balancing strategy should be created to handle them.

Chapter 13 – Critical Appraisal & evaluation

13.1 Objective could be met

The objectives which were initially declared are given below

- ✓ Registration & user login system
- ✓ Admin & user management
- ✓ User enrollment system
- ✓ AI based attendance system
- ✓ Feedback process

Objective -1

- How much it could be better ?
- Why it couldn't be done ?
- Which objectives haven't achieved ?
- Why objectives haven't achieved ?
- What could be the solution to complete these objectives ?
- How much better the features could be ?
- Which features are not completed ?
- Why those features are not completed ?
- What could be the approach to complete those features?

Achievement rate and others

The registration process & login system are implemented perfectly for all the users (Admin, Student, Teacher & Guardian). Admin can manage all the users. Admin can enroll student, teacher & guardian. Admin can update class, session, academic info, subject, class routine, exam routine, notice board, accounts, attendance report, manage notification & reply feedbacks. Teacher can successfully update class work, homework, update results. I have used Django official

authentication process for authentication system of users. Success rate of each objective is 100 percent. The system is now capable to the satisfy the user requirement & any school can use the system.

13.2 Objectives that totally don't meet of touched

I have expected to make the process so that guardian can daily get update of the attendance report through SMS which will be more guardian friendly & helpful for them.

The reasons why it couldn't be touch

I have faced some issue to integrate Bulk SMS system in my project so that I can't satisfy this requirement. In future it will be implemented in this system to make smoother attendance report update process.

What could have been done

If we could implement the Bulk SMS system in our system it will automatically send SMS to the guardian about the attendance report to the guardian so without reaching to the website guardian can get the update through phone SMS.

Chapter 14 – Lessons Learned

14.1 Pre-project-Review-closing

Smart Kindergarten Solution (SKS), at the start of the project I have decided to create a web-based solution for Sifat Ideal Academy with the basis of their requirements. I had to follow the predefined structure such as project proposal, title defense, documentation & development. Main concern of

the project is to create a online based solution for a kindergarten school so that they can manage their activity through this system.

14.2 What I have learned

It was my new experience to stablish a full-face working software. I have gain how to adopt with creating a structure. I have experienced how to deal with structure, layout & database. I have improved about time management & practical experience with different testing like black box and white box testing, unit testing, acceptance testing & usability testing. I have gain knowledge how to breakdown a big task into smaller parts & integrate them. While doing the project I have improved my programming skills & learned how to secure a system. For the first time I have used framework to complete my project so it was also my new learning. I have understood the difference between raw coding & using frameworks. Hope this learning will help me in my future.

14.3 The problem I face

While doing this project I have faced some difficulties & challenges to complete the project. First challenging issue was proper planning how to start the project & create the work plan. Then I have faced issue to prioritize the requirement of the user. Planning to complete the task within a short time was another challenging issue. Firstly, I have planned to complete the task within 3months & created a time box to complete the full project but after few days I have sort out that it's not possible to complete within this time frame so I have to rearrange my time frame. At the middle of the project some requirements were updated so I have to adopt with the changes. I have used OpenCV for face recognition in my attendance system it was difficult task for me. And lastly, I have faced issue to manage the whole database of this system.

14.4 What solution Occurred

Where there is problem there must have solutions so when I have faced issue, I always tried to find different way of solution. I enjoy to take challenges so it was a great experience to solve any issue

of my project. When I have faced issue to sort out the proper time framing, I have separated my whole task into different portion & estimated time frame for specific task which makes easier to create my time box. When some new requirements included it was also challenging to integrate the new requirements with the running project but I have successfully managed them to implement in my project. For AI based attendance system I have to use face recognition system so I used OpenCV to solve the issue. Lastly, to complete the task within time frame I have followed the time boxing strictly & successfully completed my task on time.

Chapter 15 – Conclusion

15.1 Summary of the project

Smart Kindergarten Solution is an online based solution for a kindergarten school. A school named Sifat Ideal Academy wanted to shift their education service into online model & this project fulfilled their requirements. With providing enough security all the study related information is stored in the system & student & guardian can easily access all the information. Admin of the system has the only access to enroll new student, teacher & guardian so no outsider can't access the system it ensures the security. The whole system is built with the help of HTML, CSS, jQuery, JavaScript, Bootstrap, SQLite, Python & Django Framework. Different types of diagrams, charts & tables are provided in the documentation.

15.2 Goal of the project

The main goal of the project is to stablish an online based solution for a kindergarten so that education related all information can be available in online & registered student & guardian can access it. Now I'm providing the list of the main objective of the project below:

- Online based solution
- Get all education related information through online

- Day to day basis update about study material
- Online base communication system with the authority
- Automated attendance system.

15.3 Success of the project

When the requirements of the user are satisfied by the project, the project become successful. Success depends on the user satisfaction using this system & when can get all the facilities what they are expected & the system is capable to do that. So, I can say the project is successfully completed.

15.4 What I have done in the documentation

In my documentation I have briefly discuss what procedure I have followed & which process I have completed to complete the task. I have included time boxing, different charts, graphs & screen shots of the project so that anyone can easily understand about the project through this document. Different testing results are also attached in this document. It means all the required information are attached in this documentation.

15.5 Value of the project

Day by day technology is improving & I have tried to use the latest technology in my project so this creates a top value in the market. There are huge number of schools which are managed fully manually so this system will create a great value for them. At present when all are digitalized there is no option to stay analog so adopting with the new technology will add extra value for any organization. The system focused on guardian oriented so guardian satisfaction will create a huge impact for any kindergarten. This project will not any create value for the institute but also create a value for my professional life.

15.6 My Experience

It was really a great experience for me to start a task from zero to complete the full task. Taking new challenges & successfully overcome these was a great learning. I have experienced the full life cycle of a software. Now I know how to start a project & how to execute it. Time management was another experience of my career from this project.

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