AN INTELLIGENT WEB-BASED SYSTEM FOR SRI LANKAN STUDENTS TO FIND SUITABLE TUITION CLASSES.

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Abstract

This project is aims to developed an Intelligent web-based system for students to find suitable tuition classes in more effective procedure. This project process is specially reference to the country Sri Lanka. Main purpose of this project is to make a proper connection between teachers and students/parents with the new technologies.

This project is developed as web-based system by using web development languages, backend development technologies and some other intelligent base technologies by adding some special features which can improve the tuition class experience more efficient. Using proposed system students or parents are allowing to register and login to the system to select teachers according to their subjects and they can pre-asses the teachers and then join to the classes. As the same way teachers can register & login to the system and create their profiles. Rather than that teachers' will get some rating from the students and also, they can share their class schedules among students.

Using that system students and teachers can improve their tuition class conducting experience and also improve teaching and learning process than before and it will increase the class selection opportunity of the students too. As planed this system will have hosted in some hosting server which allows students and their parents to get easy access to find good and quality tuition class among their area and also online tuitions. Using this system developer will cover from Grade 5 scholarship students to Advanced Level students who are include local and international schooling schemes. According to that system owner is planning to get contribution of all tuition class masters who are conducting grade 5 scholarship classes to Advanced Level tuition classes from both local and international schemes.

Once the system hosted this will be an effective and more helpful system to students and their parents to find suitable tuition classes according to their requirements. Furthermore, in future planning to upgrade the system with the use of Artificial Intelligent and Machine learning technologies as an AI system which able to select the most suitable teacher for the student according to the teachers teaching types and students education and social environments with sentimental analyzing techniques.

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1st Chapter – INTRODUCTION

1.1 Background of the study

There are number of tuition classes and tuition class conductors in our country and still there is no any system which helps to select tuition masters according to the students or students' guardians' choice with the reviewing feedbacks of each of them. Tuition class sector also rapidly spread all over the country from grade 5 scholarship examination practice classes to Advanced Level classes. Not only them the students who are studying in international schools are attending private tuition classes. The main reason for that is competitiveness in Education field. With this most of local and international education scheme students tend to the tuition class education. Rather than the school education there are some classes for Spoken English and computer literacy teaching.

In this project I am targeting this sector and going to introduce the computerized solution for the students and their guardians to find suitable tuition for them easily. Whether there are number of tuition classes in all over the country for above mentioned areas there are no proper method to get idea about the teacher and preview their reviews. Because of these reason students have to try number of classes to find the relevant and suitable teacher. Sometimes there are some teachers who don't have any qualifications or sustainable subject knowledge to conduct tuitions but with the marketing strategy they get popular and conduct classes. But students are unable to get subject achieves and then only teacher will refuse. This is the real scenario which I had faced when we are in Advanced Level classes. So, I am going to develop an intelligent web-based system for the all-student groups who are participating tuition classes to find suitable tuition class.

1.2 Problem Statement

As mentioned in the background of study, developer's main focus point is to develop an intelligent web-based system to increase the student's choice range of tuition classes and also increase the accuracy and teacher's teaching quality when conducting tuitions. As the background of the project description still there is no any web system of tuition conductors' collection. This will be a collection of all teachers in all over the country. These teachers variate from grade 5 scholarship examination to advanced level in local education scheme and grade 1 to 12 in international education scheme. Rather than that spoken English trainers and computer literacy instructors also will be there.

The problem which I address during this study is tuition class finding process productivity. In this process teachers allows to register for this web-system and then they can promote themselves. Also, students or guardians can create their registration to the system and they can search tuition class teachers and also, they can rate their teachers according to their previous experience as a student of that relevant teacher. Base on the ratings teacher is going to sort and once student is going to search teachers based on scheme and highly started teacher will appear first in the list. Once student select the teacher, he or she able to see the teacher's basic details and preview video on his/her teaching and also class details. These classes may be physical or online.

Using these web-system students or their guardians able to filter teachers based on his or her geological location. Furthermore, students or guardians able to find most relevant and good teacher in his/her area with this system. According to my understanding this will be a good experience when finding tuition classes for students.

1.3 Motivation and significance of the project

1.3.1 Motivations

The biggest motivation is to develop this kind of system is I had some bad experiences when I was a schooling girl and when finding tuition for the Advanced Level tuitions and also when I was a responsible person for find suitable tuition for my sister too. We have to test number of teachers to find the suitable teacher and once teachers teaching match for us his theory knowledge was poor. With this COVID-19 pandemic that situation get worse than the previous as I identified.

Furthermore, there is no any system or a data collection which helps students and their guardians to select teachers by analyzing the according to the past students' feedbacks. So, I think if there is available this type of data collection system it will be more helpful for the students and their guardians to find tuition class. On the other hand, this type of system will be helpful for the teachers. They can add their class schedule details and promote their tuition too.

1.3.2 significance of the project

The significance of the project is once the system develop students may able to select their tuition classes in effective way and they will be able to pre asses and select teachers according to the other students' feedbacks. In the other hand teachers also able to promote themselves and can easily share with students about their tuition class venues and schedules too. With this I had identified three main group of people who getting significance from this project.

i.   Students and their guardians

Students are the main beneficiary group of people for that project and project also focuses on students and their guardians. As mentioned above because of this project student will be able to find their tuition classes in smooth way and efficient way.

ii.   Teachers

Teachers are the side beneficiary group of people for the proposed project. While students and their guardians finding suitable teachers talented teachers can promote themselves in effective way and they can attract students who match with their teaching style.

iii.   Future project developers and Researchers

This study will be helpful for the future researchers who conduct research with related topics and developers who planning to introduce new systems in related area.

1.4 Aim of proposed project

The aim of this project is to implement an intelligent web-based system for students to find suitable tuition classes. In this project I am planning to cover local and international education scheme students from grade five scholarship to advanced level. Furthermore, once project is developed students and teachers can use this system to improve the class selection process more effectively and learning & teaching experience will be able to flow smoothly.

1.5 Objectives of the project

1.5.1 Main Objectives

Tuition class learning and teaching process is the now most famous and practically adopter process for the students. With that situation parents tends to send their children to the tuition classes from pre-school level. However, with these current competitive ambience tuitions also took the important place. But tuition class finding is not much easier process and there are no any particular strategies. Furthermore, there is no any pre-assessment methodology for the tuition master and guardians and students can not have any kind of pre-image of the teacher based on others experience. This project is focusing these issues and I hope to address above mentioned issues with covering following objectives,

- To conduct a critical evaluation of similar kind of systems to identify important functions and also issues and drawbacks of these systems.

- Identifying the reasons to decrease student's tuition class selecting opportunities.

- Identifying the real-life inconvenience which students and parents have to face when tuition class finding.

- Identifying real-life environment problems relates with online learning and reaching process.

- To design user-friendly interfaces which is suitable for both technical and non-technical users

- To select the best technology for the implementation.

- Implement the computerized system to solve those problems in effective way.

- To contact qualified teachers and motivate them to join with the system to achieve their students via online.

- To use AI technologies to add chatbot function for the system to make enquiries to students and guardians.

- To host the system and encourage students to add ratings about the teaching process of the teachers according to their experience.

- To encourage students and their parents to use the web system to find suitable tuition classes for them.

- Collect past students' data according to the teachers and do some study regarding the teachers' results performance and the students.

- As future implementations planning to add sentimental analysis technology and according to the student's capacity suitable teachers will select by the system.

1.5.2 Expected deliverables

In this project there are number of expected deliverables through the whole process. Followings are some examples for those deliverables.

- Software Requirement Specification
- Questionnaire
- Designing documents for the system
- Test cases
- Deployment plan

- Feasibility study
- Source codes
- User Manuals
- Final system

1.6 Limitations of the project

- Covid-19 Pandemic situation – The most considered limitation of the project is this pandemic situation because system developer is required more details of the tuition masters in order to achieve actual target of the system development. But with this situation its much difficult. Furthermore, using the system students can find physical classes but it's much difficult to attend them and conduct them.

- Time constrains – Developer is required to develop the system within short time period and that time is not enough to collect more feedbacks about the teachers. So, to reach the real target of the system will take much time.

- Limited access to data – There are no any pass data resources which related with this area and to conduct statistical analyse for the data using AI technologies is much difficult.

- Coverage – According to the project scope this system will cover both local and international education scheme students from grade 5 to 12. But from the first stem this covering part is not practical and system has to missed some student groups too.

- Multi language – In our country there are different languages as Sinhala, English and Tamil. But this website is based on the English language as the most common and prefer one. So, people who week in English are cannot get the advantage of this system.

- Resource Limitations – According to the planned project need tuition class conductors' information and past pupils' information. But there is no any proper source for those data.

- Digital Literacy – As this system is developed as web-based system people who do not have adequately computer literacy to use the web-systems are unable to get the benefit of this system.

1.7 Chapter outline

Following chapter consists with the clear description on background introduction, problem statement, motivation and significance of the project, aims and objectives of the study and finally limitations.

2nd CHAPTER–LITRETURE REVIEW

2.1 Literature Review

This part is to represents the technical and literature review relates with researcher's study to develop an intelligent web-based system for students to find suitable tuition classes with special reference to grade five scholarship students to Advanced level students from both local and international schemes. In this project development process researcher basically divided the system with investigation the current educational priorities and methods with the COVID-19 pandemic and difficulties which students and teachers face when finding suitable tuition classes. In present environment is arranged with the COVID-19 but generally tuition class finding issues also address by this system. With the COVID-19 pandemic situation this online learning process will be affected to both school students and also undergraduates. When considering the online learning and lecturing process among the university or higher educational center undergraduates they made a remarkable and quick shift to online territory [1].

However, online or physical tuitions are conducting by the tuition masters in all the time, but selecting a suitable class for the student is not much easier. In this process students and their guardians also work with dedication and try to find most suitable class for their child. Through this system development inconvenience related with this will be solve as much as possible.

Following table is clearly showing the articles which refer related with the study areas and findings of the study. As the project plain rating system and chatbot are the most conspicuous functions in this project development and in future system will upgraded as the system which suggest the most suitable teacher for the student by analyzing students' education and social levels after collect enough data related with the teachers to conduct sentimental analysis.

2.2 Critical Evaluation of existing systems

Table 1- Literature Review

Title of the publication	Author	Key Findings	Source
Online Learning in Sri Lanka's Higher Education Institutions during the CO VID-19 Pandemic	Ryotaro Hayashi, Marito Garcia, Angelica Maddawin, K. P. Hewagamage	Online education affected to both school and university students but undergraduate students made a remarkable and quick shift to online territory.	Ryotaro Hayashi, Marito Garcia,Angelica Maddawin,K. P. Hewagamage, "Online Learning in Sri Lanka's Higher Education Institutions during the CO VID-19 Pandemic1," Asian

			Development Bank, Manila,Philiphines, 2020.
Interactivity and interactive functions in web-based learning systems: a technical framework for designers	C. Chou	When developing a web-based learning system is should be consisting with user-friendly interfaces with simple commanding common language which make easy to use any person whether he/she has technical knowledge or not.	C. Chou, "Interactivity and interactive functions in web-based learning systems: a technical framework for designers," British Educational Communications and Technology Agency, taiwan, 2003.
Tutor match	-	allows any tutors to create accounts, Schedule their class times, teach students via the system, get some income via the system, any of the person can join as the tutor is the pros of this system, Easy to manage students and class schedules, File management system is with the system, Automated billing system is there and generates receipts after concussion of each and every lesson.	https://tutormatch.me
An Overview of Chatbot Technology	Eleni Adamopoulou and Lefteris Moussiades	History of the chatbot technology and how Artificial Intelligence connect with the chatbot and how much important that feature.	Eleni Adamopoulou and Lefteris Moussiades, "An Overview of Chatbot Technology," International Hellenic University, Greece, 2020.
Tutopiya		This system is doing online tuition classes with their own tutors. Student or guardians can select subject and grade and join for the trial tuition too. There are some responsible people to answer the students and parents' questions and parents able to assess the student's status by login their accounts.	https://www.tutopiya.com/
A Question Answering and Quiz Generation Chatbot for Education	Sreelakshmi A.S. , Aishwarya Nair, Abhinaya S.B., Jaya Nirmala S.	Chatbot is a technology which imitate human conversation through text chats and commands. This technology usage with education sector. This report study is focused on the developing a study aid in the form of a chatbot that can assist primary and middle school students in India.	A Question Answering and Quiz Generation Chatbot for Education Sreelakshmi A.S. , Aishwarya Nair, Abhinaya S.B., Jaya Nirmala S. , "A Question Answering and Quiz Generation," India, 2019.

Chatbot for University Related FAQs	Bhavika R. Ranoliya_, Nidhi Raghuwanshi_ and Sanjay Singh	Artificial Intelligence conversational agents are becoming popular for web services and systems like scientific, entertainment and commercial systems, and academia. But more effective human-computer interaction will take place by querying missing data by the user to provide satisfactory answer. In this paper we have proposed and implemented an interactive chatbot for university environment using AIML. [7]	Bhavika R. Ranoliya, Nidhi Raghuwanshi and Sanjay Singh, "Chatbot for University Related FAQs," 2017 International Conference , India, 2017.
A web-based intelligent tutoring system	Zhiping Li, Yu Sun and Minkun Liu	This is the study which focus on developing a web base system with the represents domain knowledge based on ontologies to improve the sharing and reusing of teaching materials. This is super intelligent system which based on users' cognitive abilities, knowledge levels, learning styles, psychology characteristics. [2]	Zhiping Li, Yu Sun and Minkun Liu, "A WEB-BASED INTELLIGENT TUTORING," Natural Science Fund, Yunnan.
A rating scale for measuring product/ service satisfaction	Robert A.	D-T scale for measuring and free-scale measuring are the considered measuring scales for rating study in this case. The measure has reasonable reliability coverage with other rating scales and free-response measure. D-T scale reduces the skewness of satisfaction response according to this study. [3]	R. A., "A Rating Scale for Measuring Product/Service Satisfaction," Journal of Marketing, Westbrook.

3ʳᵈ CHAPTER– ANALYSIS

3.1 Feasibility Study

To exhibits the viability of the study system developers conducting some analyzing method and it called as feasibility study. In simple word system stakeholders conducting different area analytical study to determine whether this system implementation is worth or not. Using this study stakeholders making some changes to the system and if this study prove relevant implementation is not much practical they will come up with new changes. This feasibility study directs the project to the success. Feasibility study is consisting with few sub areas as,

- Technical feasibility
- Operational Feasibility
- Economic Feasibility
- Legal feasibility
- Schedule feasibility
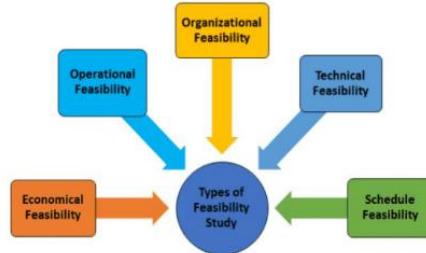
Figure 1- Feasibility study types

3.1.1 Technical Feasibility

Under this feasibility type checks whether developer is capable enough to carry out the planed outcome of the project according to the mentioned technical areas. Furthermore, under the technical feasibility study, we are going to analyze the probability of connecting all mention technical and hardware requirements for both developer and the user side. Accessibility level of the system by users and users' ability to handle the system an efficient way also considers during this study. According to above mentioned points on developer side she is able to handle all mentioned programming languages such as html5, php, python, CSS, bootstrap and so on and other server requirements. Hardware requirements also fulfilled by the developer. As mentioned above to develop this php server and web hosting server is needed and to complete those needs also developer has potential.

On the user side to access the web-system users' need to have a device which able to access internet with the internet connection. This requirement also with considerable target user groups in this environment. When consider the above mentioned factors this system is technically feasible.

3.1.2 Operational Feasibility

During this feasibility study type measuring how the operational flow is implemented and whether it reach actual target of the proposed project. This project is to developed an intelligent web-based system for Sri Lankan students and their guardian to find suitable tuition classes. In here there are some main functions as encourage teachers to register the system and students to use system to find suitable tuition classes. With this main operations developer has to fulfill data collecting and developing the system with intelligent feathers to ensure the standards of the tuition class selection. To get the more students feedbacks on the teacher who registered with the system also another main operation and this process has to complete with the support of the relevant teacher. As this is win-win system we can get contribution of both teachers and students to complete these operations. With the all above mentioned points this project is operationally feasible.

3.1.3 Economic Feasibility

Cost factor for the project is consider in this feasibility study type and worthiness of doing this project is analyzing during this study. According to the system development plan developer is planning to use cost free software development frameworks for the code implementation and free of charge local host servers for the testing part. Furthermore, hardware requirements for the development are already with the project developer since I am using my own laptops, Wi-Fi router. When it comes to the live hosting I have to spend some money for the domain and hosting server. Not only that, for the data collecting and teacher registration part also have to spend some strategic cost in first stages. Total hypothetical cost factors for the project as follows,

Table 2- Estimated cost factors for project

Financial Fact	Amount
Domain	2000/=
Hosting server (per month)	2500/=
Registration and data collecting process	3000/=
Other accessories (Including final thesis printing)	2000/=
Total estimated cost	9500/=

When considering all above mentioned factors this system is economically feasible for the proceed further.

3.1.4 Legal Feasibility

This part is mainly considered about the legal part which relates with the project development. During this analyze project developer is going to investigate whether proposed project going to face some conflicts with the legal requirements or not. In web systems the mainly occurred legal issues are the copyright law and the privacy policy violations. This system is a new idea and since there is no any legacy or a same system with the same purpose in Sri Lanka this may not be occur any critical legal issues. The privacy and the teachers character standard are going to ensure by the system administrator. Therefore, this proposed system is legally feasible.

3.1.5 Schedule feasibility

Schedule feasibility is the last type of the feasibility study which connected with the time factor. In here project developer is analyzing whether given time period is enough to complete the proposed project. Total time period for the development is 48 weeks and as planed following is the Gantt chart for that.

Task \ Months	June				July				August				September				October				November				December				January				February				March			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project Initialization	█																																							
Shortlist Project Area			█																																					
Requirement Gathering					█																																			
Writing and Submit Project Proposal							█																																	
Analysis									█	█																														
Design											█	█	█	█																										
Development																█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█								
Testing																																	█	█	█					
Dissertation Writing					█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Implementation																																				█	█			
Submit Dissertation																																								█
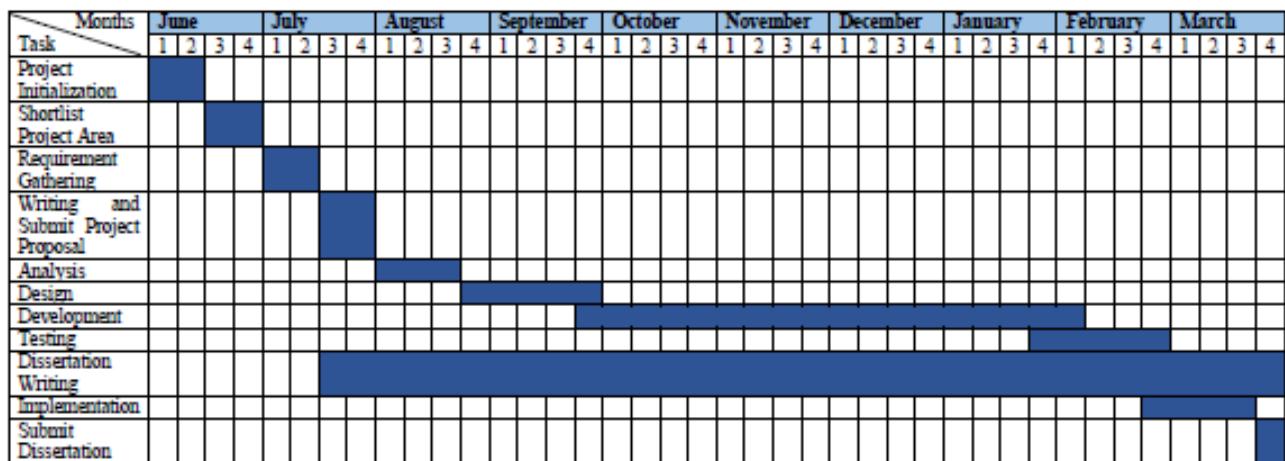
Figure 2- Gantt chart

The proposed project deployment is planned for the March last week and utilizing these weeks I am planning to complete the project as mentioned above chart. When considering these facts, this proposed project is schedule is feasible.

According to the conducted feasibility study under technical, operational, legal, economic and schedule areas we can say overall proposed project is feasible.

3.2 Fact finding techniques

For developed this proposed system developer is planning to flow three main fact-finding technics as, further study of exiting similar systems, Questionnaire and interviews. Using these fact-finding techniques developer is going to gather relevant information for the development. Questionnaire and interviews will conduct by focusing students, their parents and also with teachers who conducting tuition classes. Because system 's target user groups are them and they are the most effective information source for analyze the requirements.

Following is the interview structure which is uses to interview teachers.

01) How long you are working as a tuition class teacher?
02) What types of classes you are conducted before this pandemic situation?
    i. Mass class only
    ii. Mass and group class
    iii. Individual classes
    iv. All of above
03) Because of the pandemic situation have you move to online class platforms?
04) What kind of advertising methods you used to aware your target student groups about your tuitions?
05) Have you ever used any kind of internet marketing for your tuition?
06) Would you like to connect with web-based system to spread your tuition class information to your target student groups?
07) Do you think is it beneficial if you can spread about your tuitions to students, all over the Sri Lanka?
08) How much you interest to use web-based system to aware your target student groups?
09) Would you like to have some rating system to prove your ability and past students' opinion of your teaching process?
10) Do you aware on chatbot function?
11) Do you think is it helpful if we can add chatbot functionality to answer system users' questions?
12) What is your opinion on implement a rating system to measure quality of tuition classes?

13) Do you like to share your class schedules and venues with the students and their guardians using this proposed web-system?

14) Do you like to share class registration form for your tuition using this proposed web system?

Thank you for your response!

While interviewing the teachers, developer is going to share questionnaire among students and their relevant guardians' groups to get to know about their opinions of the proposed system.

Section A
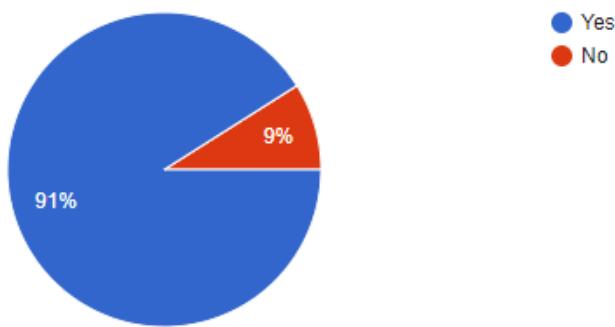
01) Have you ever attended or sought tuition class?
   a. Yes
   b. No

(If "Yes" → Section B, if "No" → Submit the form.)

Answer Analyze:

134 responses
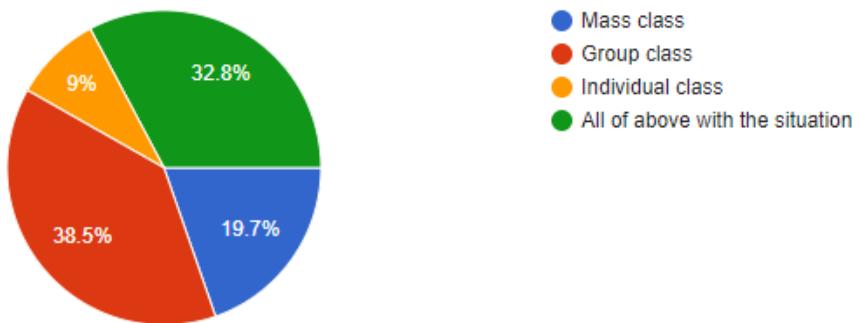
Section B

02) What type of tuition class you prefer/ preferred most?
   a. Mass class
   b. Group class
   c. Individual class
   d. All of above with the situation
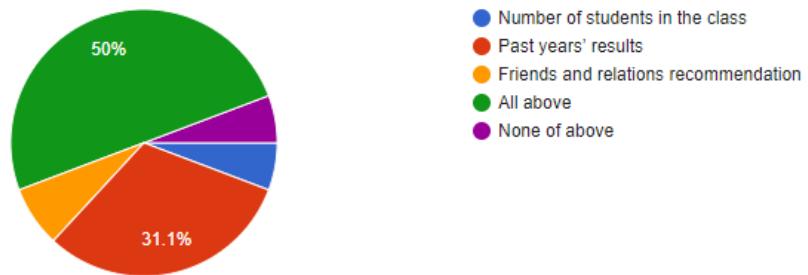
03) What are the mainly considered factors when you selecting the tuition class?

    a.   Number of students in the class

    b.   Past years' results

    c.   Friends and relations recommendation

    d.   All above

    e.   None of above

04) If you selected answer "e", then your opinion

    ………………………

Answer Analyze:

7 responses

Teaching method and pattern

According to the way of teaching

Qualifications of the teacher

Understanding and ability to improve my knowledge level

It has to be in a calm environment with an understandable lecturer.

Which is suitable for my understanding
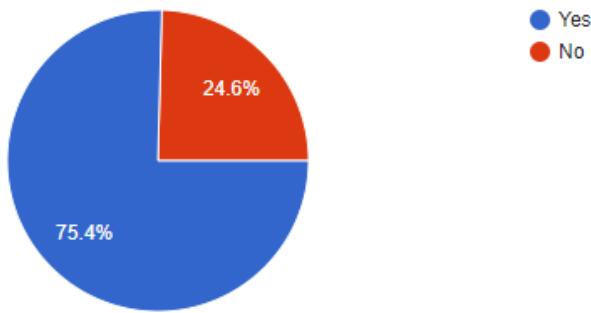
Understand

Section C

05) Are you frequently use internet to find your Grocery and service suppliers?

    a. Yes

    b. No

122 responses

- Yes
- No

24.6%

75.4%
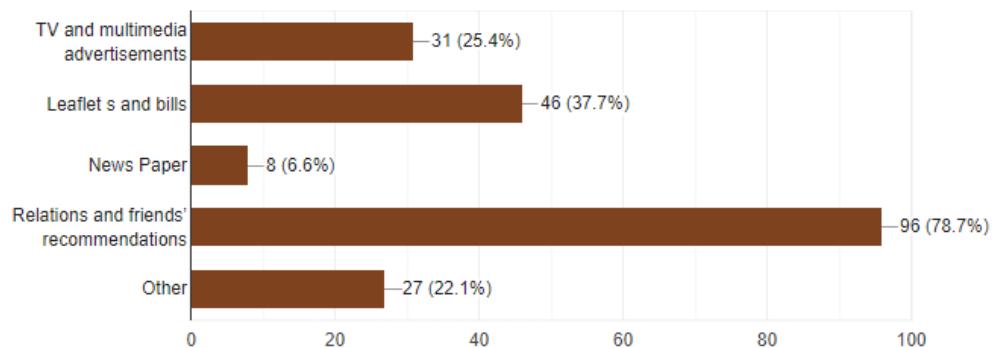
06) What are the methods you used to find tuition classes?

    a. TV and multimedia advertisements

    b. Leaflet s and bills

    c. News Paper

    d. Relations and friends' recommendations

    e. Other

TV and multimedia advertisements — 31 (25.4%)
Leaflet s and bills — 46 (37.7%)
News Paper — 8 (6.6%)
Relations and friends' recommendations — 96 (78.7%)
Other — 27 (22.1%)
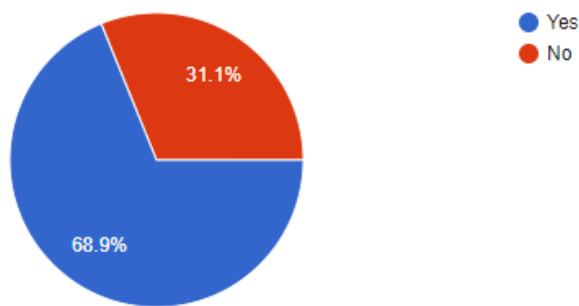
07) Would you like to select tuition classes using the web-search?

    a. Yes

    b. No

Yes
No

31.1%
68.9%
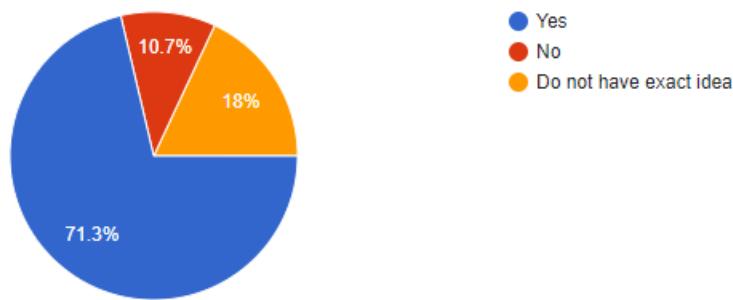
08) Do you think web-based system is useful to find tuition classes to students?

    a. Yes

    b. No

    c. Do not have exact idea

- Yes
- No
- Do not have exact idea

10.7%
18%
71.3%
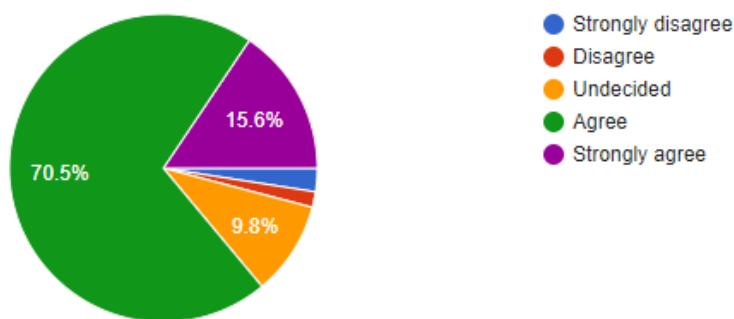
Section D

09) It is useful if students and guardians can search tuition class based on subjects and class types.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

15.6%
70.5%
9.8%
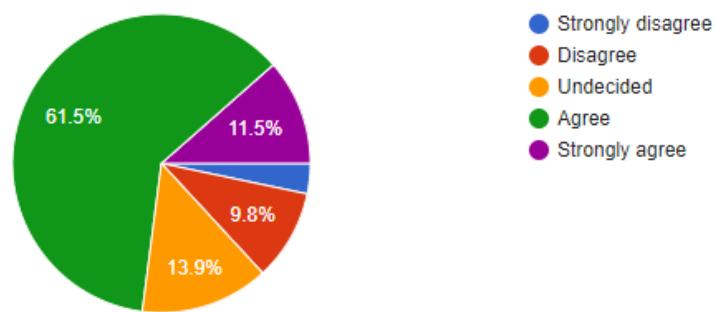
10) The filtering function to filter teachers based on geographical area will be improve the usability of the system.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

Legend:
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

Pie chart values: 61.5%, 11.5%, 9.8%, 13.9%
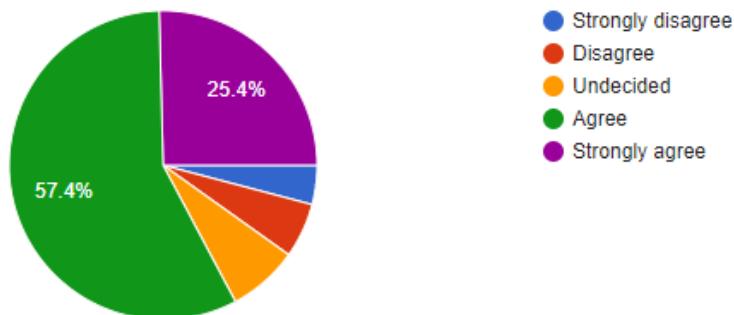
11) It is more reliable if you could have rough idea about the teacher's teaching process before join the class.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

Legend:
- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

Pie chart values: 25.4%, 57.4%
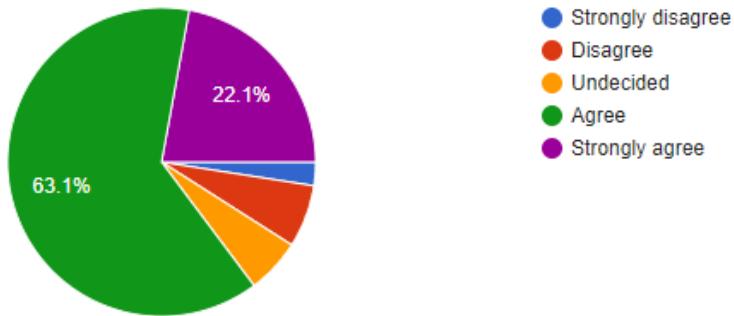
12) Past students' feedbacks and results are the factor which illustrate the quality of teachers teaching process.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
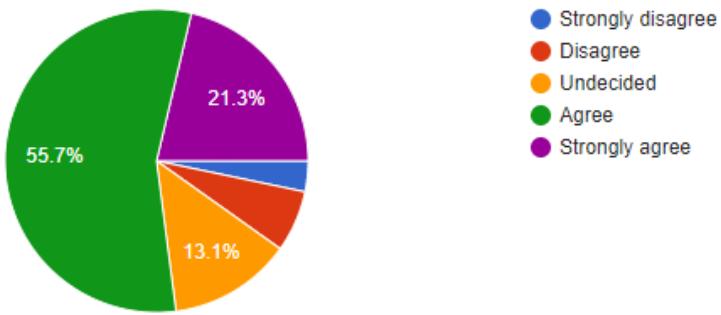
13) It is helpful, if you can get the students' registration form and class details through the web system without visiting the tuition center physically.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree
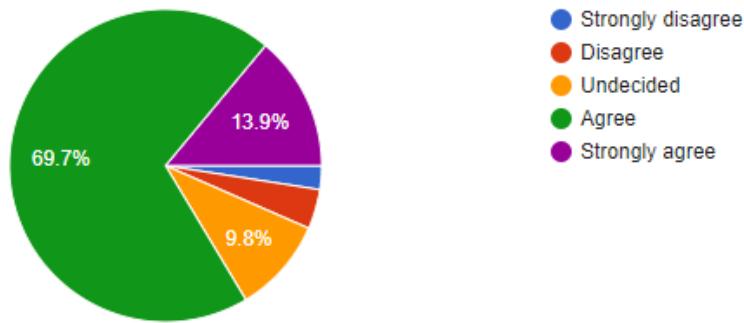
14) It is improving the students and guardians class selection opportunity, if system contains all possible class venues and schedules of the teachers'.

- Strongly disagree
- Disagree

19

- Undecided
- Agree
- Strongly agree
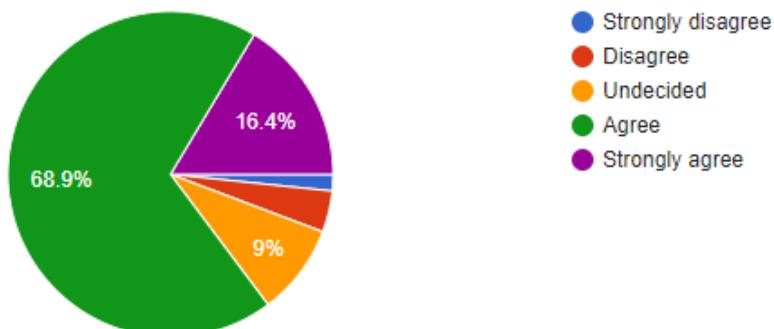
122 responses

15) If this proposed system contains an intelligent chat box agent to answer yours some of frequently arise questions, users will be able to get proper advantage.

- Strongly disagree
- Disagree
- Undecided
- Agree
- Strongly agree

122 responses

3.3 Functional Requirements

Functional requirements for the proposed system illustrate required activities which preferred from the system stakeholders by fulfilling actual system purpose. Since this system is intelligent system which allows students and their guardians to find tuition classes, there are three main user groups as, Administrator, Teachers, students and their guardians. According to the analyze followings are the mainly considered functional requirements of the proposed system.

i)   Register with the web system

ii)   Search teachers according to the subjects and class types

iii)   Log in to the system

iv)   Students basic details picker

v)   Teachers profile updating and manipulate

vi)   Filter the results

vii)   Rating engine

viii)   Chatbot function

ix)   Class registration form download and email functions

3.4 Non-Functional Requirements

The specific criteria which implies the quality of the system are called as Non-Functional requirements. These non-functional requirements help to keep the quality of the system development and users' attraction. Followings are the identified non-functional requirements for the proposed system.

i)   Availability – Since this is a web-based system and target group is all the students in Sri Lanka, this system must available in live link 24/7.

ii)   Usability – This system could be get access any user who is with computer literacy or not. Because this must be a system which should open to all users to use without some extra effort.

iii)   Reliability – This system will contain teachers' details and class schedules and venues also. In order to that system must be reliable to give prosper usage to the users. Furthermore, since

this system accepts user ratings and use them to rate teachers, correctness and reliability of the information are more important.

iv) Performance – Performance of the system also most important function for this proposed system. Because this system may have number of users at same time and may occur some traffic too.

v) Security – User accounts details security must be ensuring.

3.5 Resource Requirements

Following table clearly shows both software and hardware requirements to fulfill the project goals in an efficient way.

Table 3- Software and Hardware requirements

Software Requirements	Hardware Requirements
OS- Windows 10	• Personal Computer
Development Framework- VS Code, Rasa, Bold360	• RAM with more than 4GB
Database- phpMyAdmin, Navicat Lite	• Internet Router
Servers – Apache and MYSQL & Hosting Service for live publications	
Languages- HTML5, JavaScript, CSS & Bootstrap, PhP, Python	
Special Technologies- AI and NLP and ML	

3.6 Methodology for the system development

Among the most of software development models here selected the waterfall model as the processing model. Selecting the suitable project development methodology also a task and in here I selected waterfall model to fulfil this development process. Because of this is one-person task covering and the minimum development time project waterfall method is the most suitable method as the developers. This model consists with following steps, Requirements, Design, Development, Testing, Deployment and Maintenance. In this methodology developers don't move one step to another until completing previous one. So, these types of projects can use waterfall model to make the project successful.
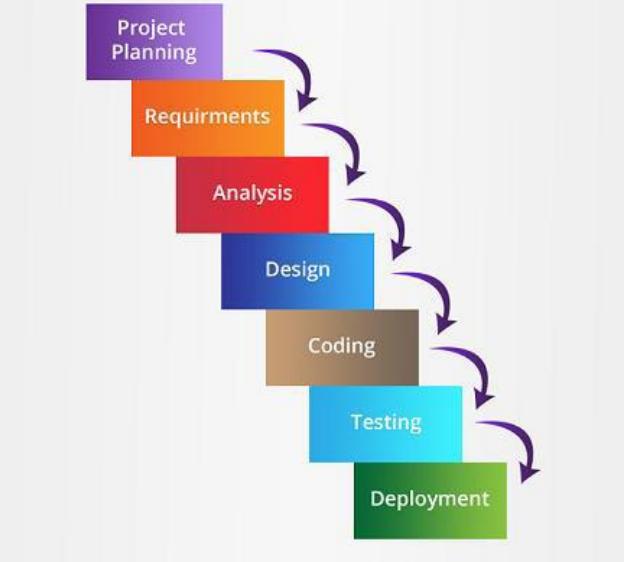
Figure 3- waterfall methodology

4th CHAPTER– DESIGN

Software design part is the another milestone of software development project and to make an efficient and user friendly system, this design part will contribute. This design will have based on the purposes of the system and identified requirements and defined functions of the system.

Using system design process, it illustrates elements of the system like modules, architecture and also components.

4.1 Unified Modelling Language Diagrams

4.1.1 Use case diagrams

Use case diagrams are the one of main diagram type which coming under UML diagrams and all the users and the users' actions within the system will be clearly define using these diagrams.

Following is the use-case diagram for the proposed system. This system will have stakeholders as Teachers, Students and parents and also system admin. Their actions within the system is illustrates with the following diagram.
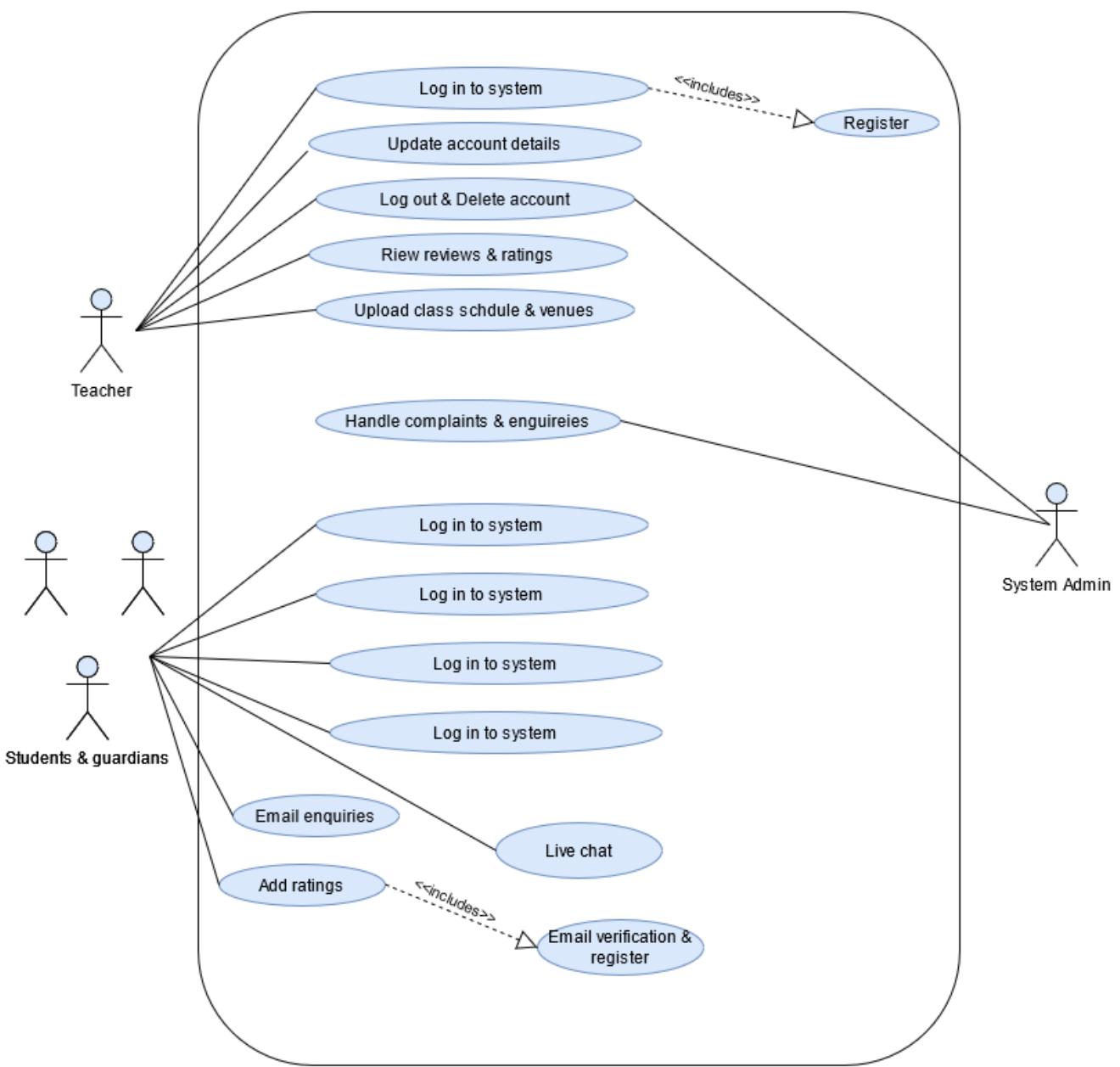
Figure 4- Use case diagram

4.1.2 Class Diagrams

Following diagram is illustrating the all elements in the system with their attributes. Class diagram for the proposed system as follows.
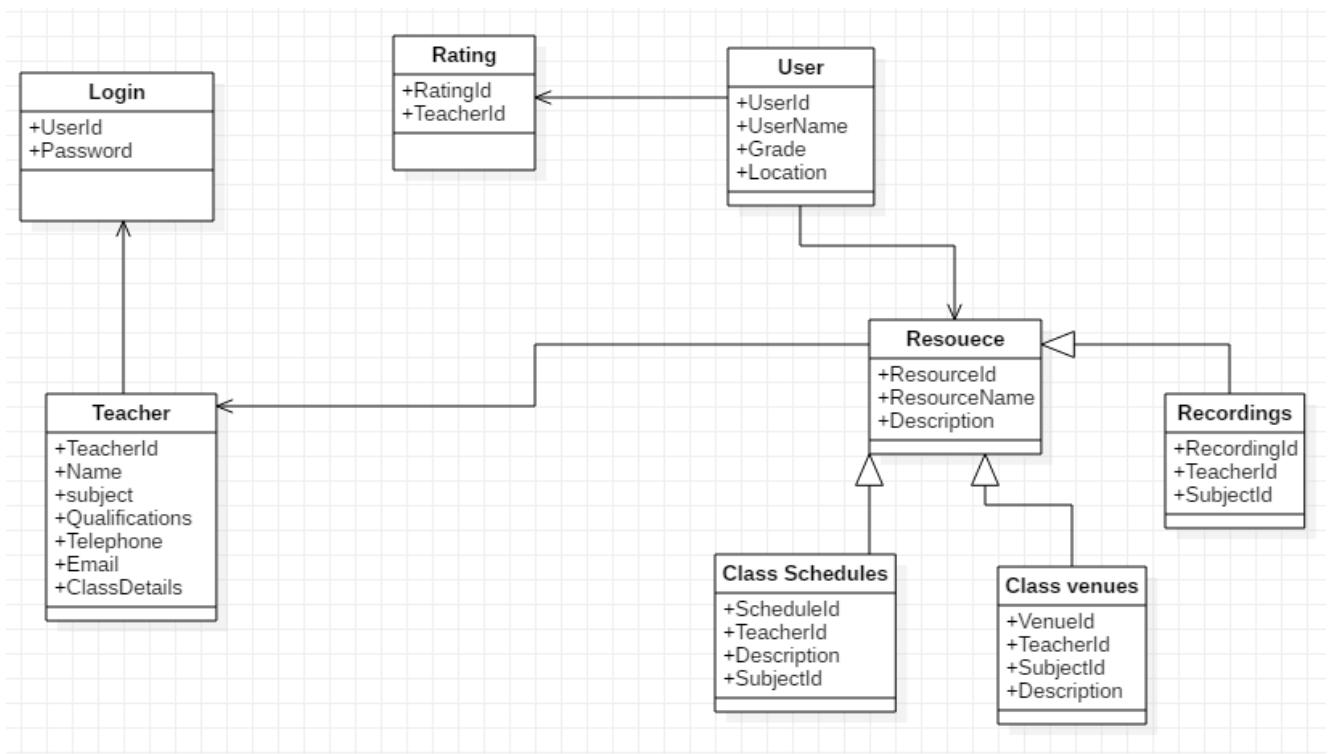
Figure 5- Class diagram

4.1.3 Sequence diagrams

Sequence diagrams are the another important UML diagram which are illustrating the process of the system. Following diagram is for students' or their guardians' class searching process. Following diagram is showing the teacher's system registration sequence diagram.
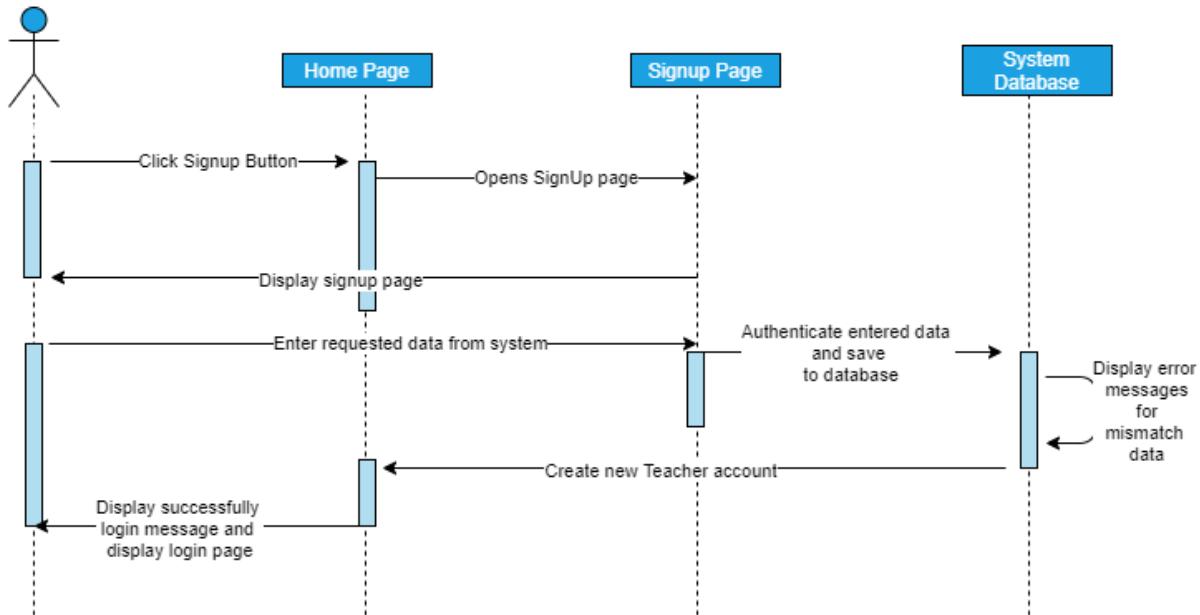

Figure 6- Sequence Diagram for user registration

25
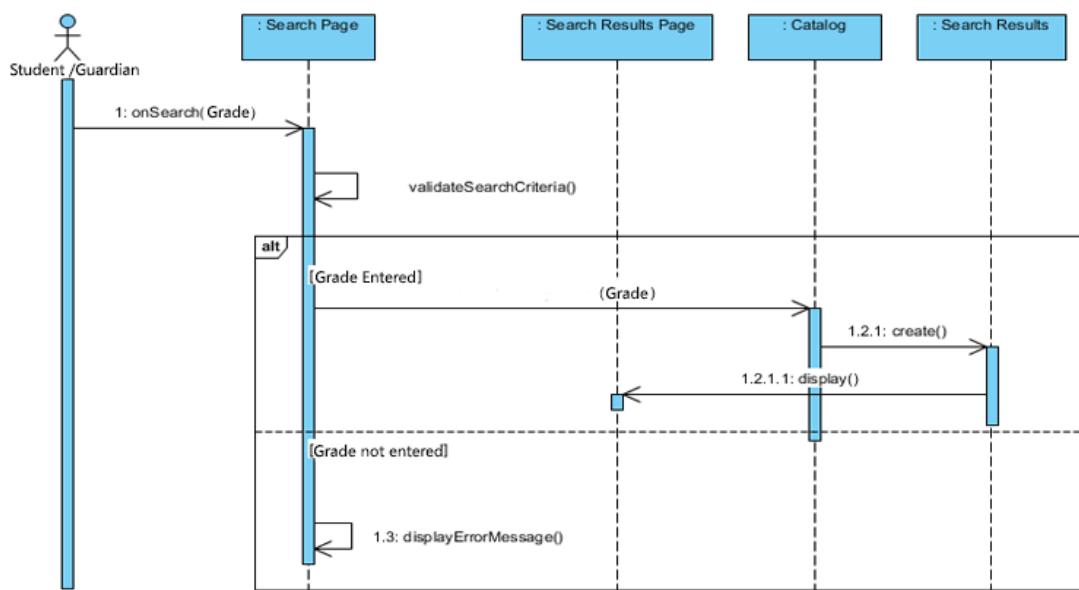
Figure 7- Sequence Diagram for searching tuition

Following activity diagrams is showing the teachers' system login process.
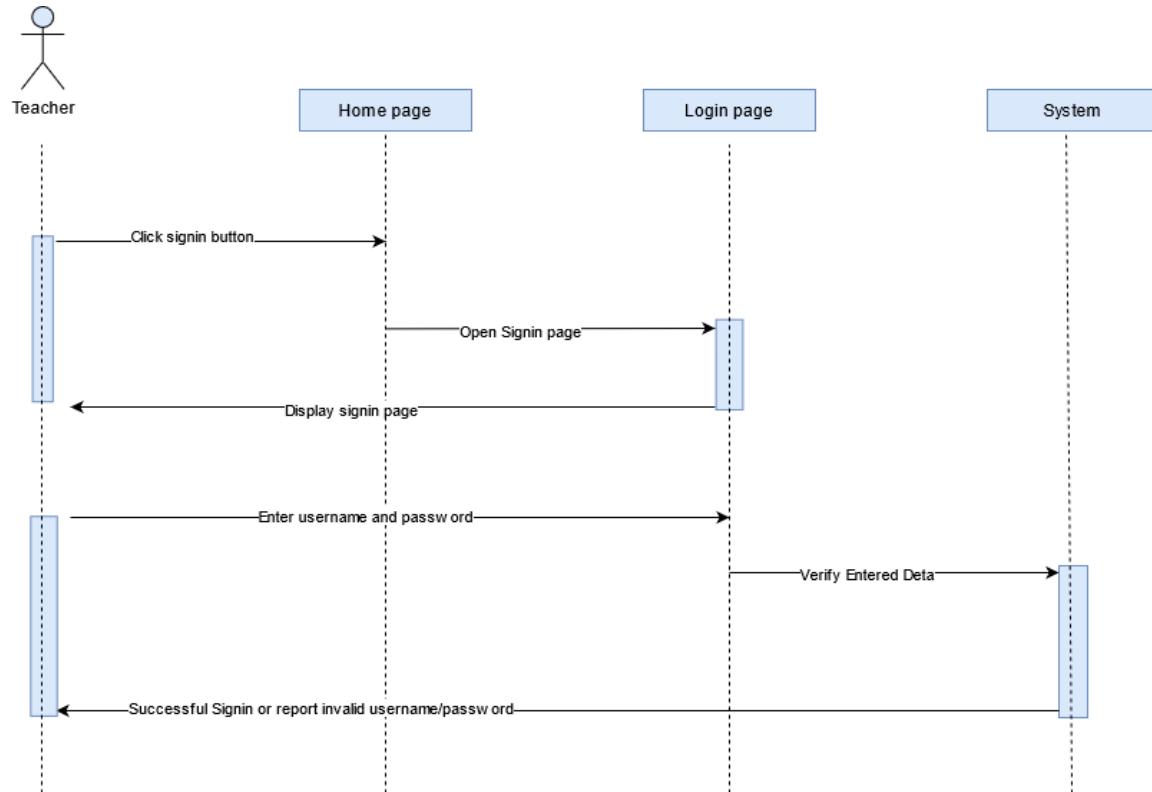
Figure 8- Sequence diagram for teacher login

4.1.4 Activity diagrams

Activity diagrams in UML diagram main class are implies the flow of activates in the system. Following activity diagram clearly shows the teacher account creation process in the proposed system.
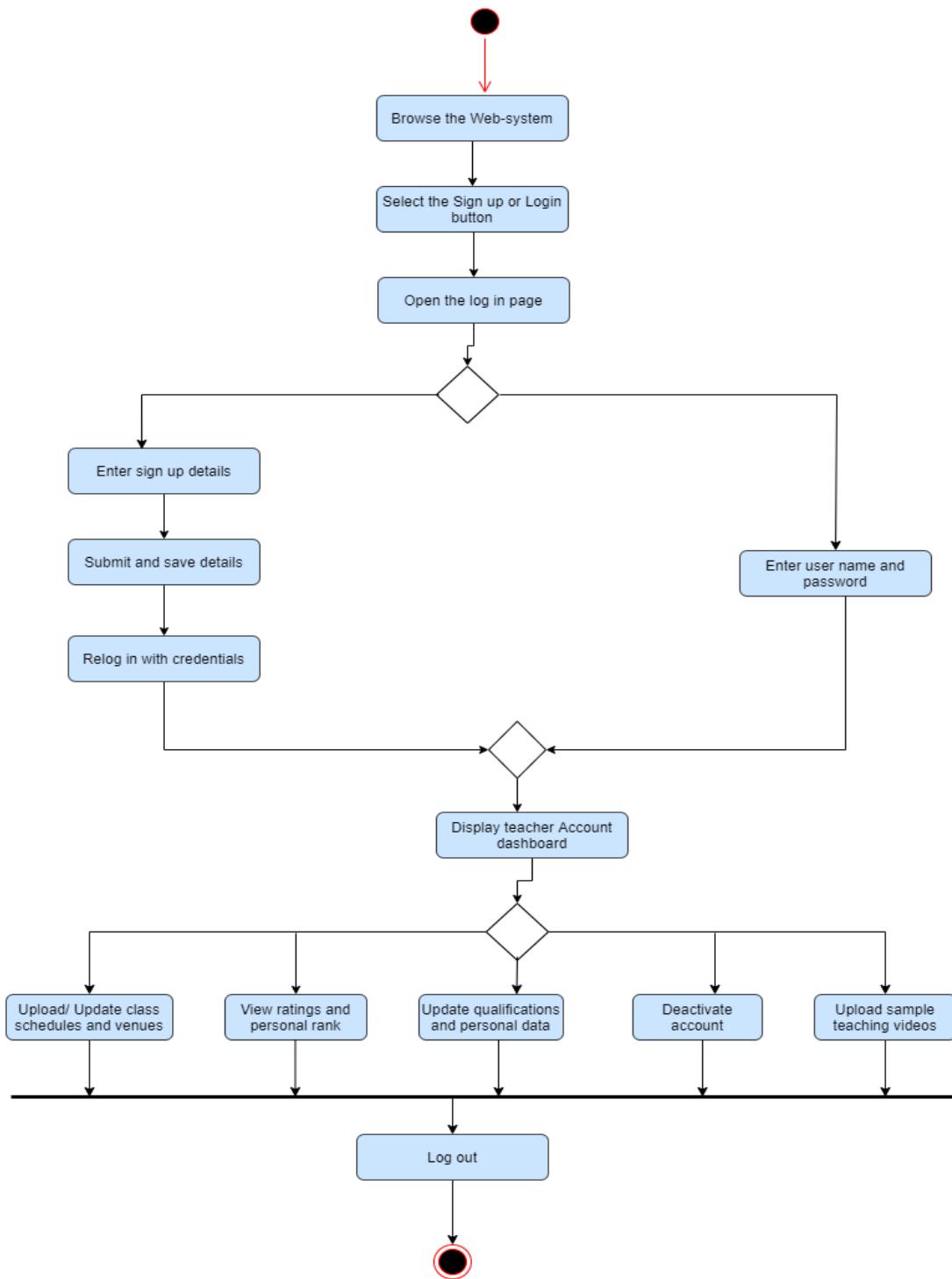

**Figure 9- Activity diagram for user account updating**
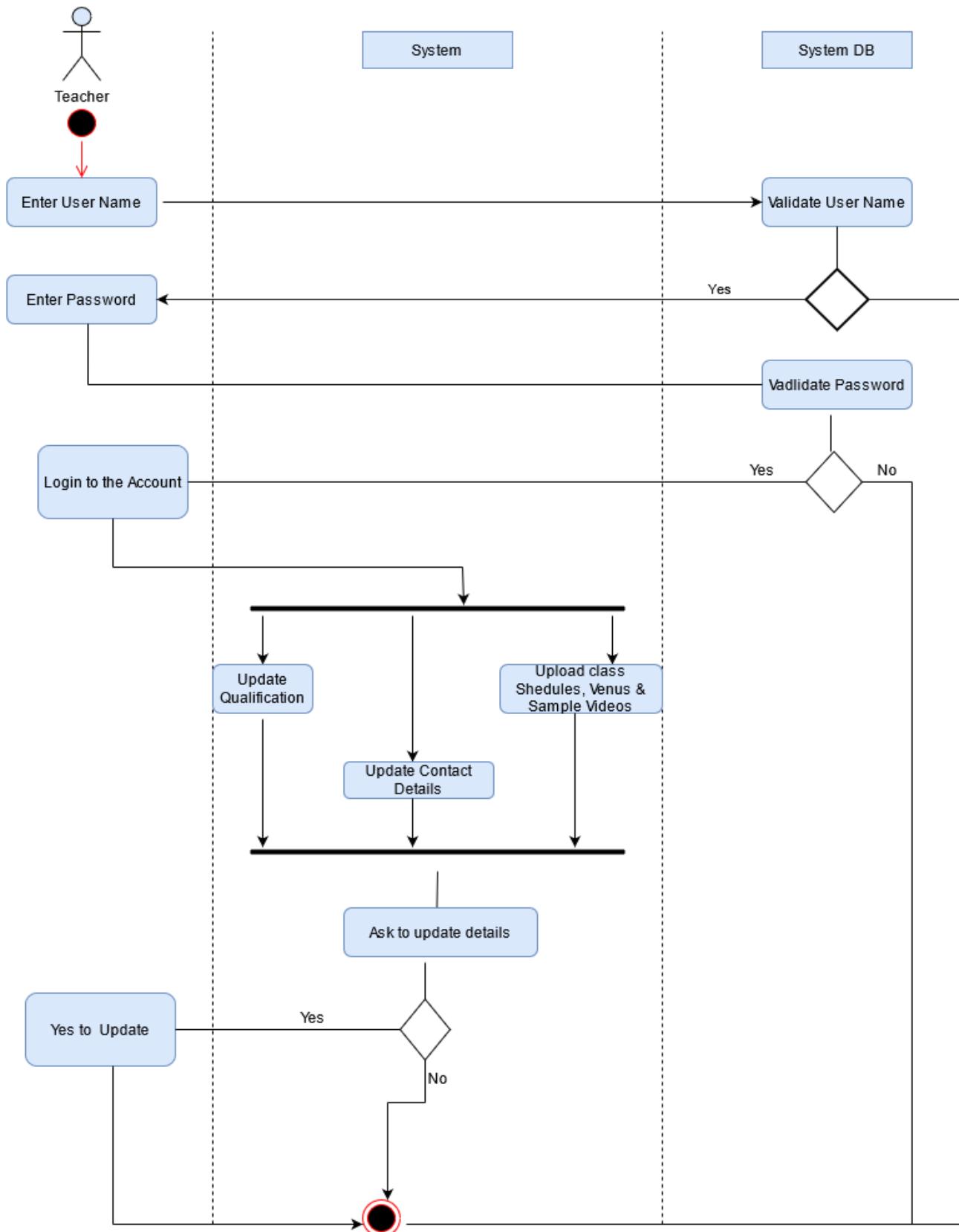
Figure 10- Activity diagram for teacher account updating with swim lanes

4.2 Interface Design

Interface design is the one of important designing part to the system development process. Interfaces are the main interactive platform which make a connection between the system backend and the system users. All users for the any kind of system are not technical people and even are they technical people, they also needed a good quality user-friendly interfaces to attract them to the system. Because of that when the interface design process is proceeding developer has to consider some design principles which direct the interface as a success and efficient interface. Followings are the considered interface design principles and disciplines for this development. [4]

I. Alignment

Alignments of the website content is more important and it is affect hardly in the device changers. Because this system can get access using laptops, personal computers, tabs and also mobile phones. As the common way mobile phones are the rapidly used device for the internet access and responsiveness of the web system is more important.

II. Movements

Movements also another important interface de4sign principle and this implies that when user access to the web site or system, to make fulfill his/her purpose how many times he/she needs to do some movements in the web system. If user able to make his target fulfill with small number of movements that means system design is good. When considering this development student is the main user for the system and he/she visiting the system to find the suitable tuition class for him/her. If student able to select the suitable tuition with less number of movements without messing up within the site browsing, he/her visit the site again and again.

III. White space

White space also another important principle and spaces are need to the interface and too much of interfaces also make the system browsing boring. In order to that when designing the interfaces designers need to keep on eye the white spaces of the interface.

IV. Balance

This principle implies the correct arrangement of the system and when the balance principle is fulfilled by the developer it makes the interface more stability with good structure.

V. Contrast

Contrast allow our design to emphasize or highlight key elements to the system design.

Rather than above mentioned designing principles followings also much important in the interface designing process.

- Hierarchy
- Unity
- Repetition
- Patterns and Rhythm

4.2.1 Mock screens of the proposed system

4.3 Database Design

4.3.1 Entity Relationship Diagrams

An Entity relationship diagrams are the diagrams which use to implies the relationship between the entities relates with the system database. An entity of the system can be an object in the system.

4.3.2 Normalization

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