CS 480
Software Requirements Specification Document

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Version: 1

1. Introduction

This section gives a scope description and overview of the SRS document. This section also provides the purpose of this document.

1.1. Purpose

The purpose of this document is to provide the detailed description for the "Lab Assist" software. This document illustrates the purpose of the system. It also defines the system constraints, interfaces and interactions of the software. The primary purpose is to provide a proposition to a customer for approval and serve as a guide for future documentation and overall design.

1.2. Scope

LabAssist is a web-based application designed to provide students with an additional point of contact with instructors and tutors. The system will also offer a statistical reporting system to enable faculty and tutors to tailor lab hours to student needs.

Students login to the system through a web portal to indicate the classes and subjects that they are seeking help in. Additionally the software will provide a Question and Answer system for students that require additional help. This information is then relayed to a database where the statistical reporting system will do analysis and provide reports to professors and staff. For security purposes, there will be two separate login portals. One for kiosk use and the second for user login.

Furthermore, the base application will not support the ability to schedule tutors/staff automatically based on availability. The system will interface with the University authentication system for user authorization/authentication.

1.3. Definitions, Acronyms, and Abbreviations

Admin/Administrator
An individual with the ability to see statistical information, manage tutors, manage staff, and see statistical information for everyone in the same department, as well as respond to questions in the Question/Answer system.

Department
Division of organizational structure. Examples are Math, Computer Science and Mechanical Engineering.

Kiosk
A login portal that accepts logins with a user ID for use with lab arrival and departure logging.

LDAP
Lightweight Directory Access Protocol. A computer protocol used for communicating with directory systems, often containing user information.

SMTP
Simple Mailbox Transfer Protocol. A computer protocol used for sending email messages.

Stake Holder
Individuals who have any form of interaction with the system but who is not a developer.

Staff
A person with the ability to view statistical information and manage classes taught by themselves, as well as respond to questions in the Question/Answer system.

Student
An individual seeking help in class(es) or subject(s).

SysAdmin/System Administrator
Individual with the ability to create terms and manage Administrators, but lacks ability to view statistical reporting.

Term
Current academic period. Ex. Fall, Spring, Winter, Summer.

Tutor
An individual employed and given permission to respond to students.

PHP Server-side scripting language used for web development.

Web-Portal
User interface for system users.

1.4. References

[1] Apache.org. (2017). "Welcome to The Apache Software Foundation!." [online] Available at: https://www.apache.org/ [Accessed 27 Sep. 2017].

[2] Php.net. (2017). PHP: "Hypertext Preprocessor." [online] Available at: http://php.net/ [Accessed 27 Sep. 2017].

1.5. Overview

Section two of this document provides an overview of system functionality and interactions. Section two also defines the stakeholders and system constraints and assumptions for the product. This section provides the information that is most critical to potential consumers/users of the product.

Section three details the requirement specification and defines the system interfaces. This section is tailored to potential developers of this product.

Section four illustrates the prioritization of the requirements and the proposed stages of release.

Section five provides the identity of the approvers of the software requirement specification document.

2. Overall Description

This section will give an overview of the whole system. The system will be explained with how it interacts along with other systems, and introduce the basic functionality of the system. It will also detail who will use the system, and what functionality will be available to which users. It will conclude with a description of the constraints/assumptions the system is operating under.

2.1. Product Perspective

The system consists of a web portal with two distinct modes. The first will be used for tracking time in/out of people using or tutoring in a lab, while the second will provide statistical information on this usage, as well as an quick place for students to ask tutors questions when they are not in the lab.

The first mode, called Kiosk Mode for its intended usage of being available to anyone for quick and easy usage, needs to interact with a card reader to gather user IDs easily. This is important because not only is swiping your card easier than entering a 10-digit number, not everyone has theirs memorized, and having to look it up online would take a substantial amount of time.

The second mode, called User Mode for its being the general mode for everyone who isn’t using the clock in/out functionality, must be able to authorize users in some way to prevent people from accessing functionality they shouldn’t be able to, or masquerading as other users without their permission. To do this, the system will use the WVU user authentication system to ensure people are who they say they are, thus absolving us of the responsibility of

storing user names and passwords and giving people the tools to manage them.

Since the intended primary function of the system is its statistical abilities, and statistics of any sort require data, the system makes use of a database for data storage. Kiosk mode only needs to be able to enter clock in/outs, while User mode needs to be able to access varying parts of the database to record things and provide statistical reports.

2.1.1. System Interfaces

LabAssist does not have any pre-existing systems that it needs to interact with to be able to do its job.

2.1.2. Interfaces

Users will interact with LabAssist through a web interface with two possible modes, Kiosk and User mode.

The main difference between Kiosk mode and User mode is that User mode has a concept of a current user, someone who is actively using the site. With Kiosk mode, once you have clocked in/out the system goes back to its initial state, waiting for another person to use it. With User mode, the system does not do this reset until the user explicitly log out.

2.1.3. Hardware Interfaces

The system interacts with a hardware card reader, but does not need to make any sort of special effort to interact with it since the card reader presents itself as a keyboard input device, with a card swipe producing the equivalent of manually keying the ID number and hitting enter on the keyboard.

2.1.4. Software Interfaces

The system is not mandated to be able to connect to any particular sort of software.

2.1.5. Communications Interfaces

The system communicates to the WVU authentication system using the LDAP protocol. Communications to and from the database are taken care of by the operating system.

For sending email notifications to users, the system will use SMTP.

2.1.6. Memory Constraints

The system does not have any hard memory constraints.

2.1.7. Operations

To backup and restore the system, it will use the backup/restore capabilities of the database.

2.1.8. Site Adaptation Requirements

Before the web portal can function, the configuration must be changed to provide connection information for a database initialized with the correct tables, as well as a LDAP compatible server for user information.

The computers that will be used for kiosks also need a card reader attached to them.

2.2. Product Functions

The systems functionality is split into two modes: Kiosk and User. To control access to functionality and data, users are also split into five distinct classes: Student, Tutor, Staff, Administrator and System Administrator. All of the user classes are able to use User Mode, but only Student and Tutor can use Kiosk mode. See Fig. 1 for a visual explanation.

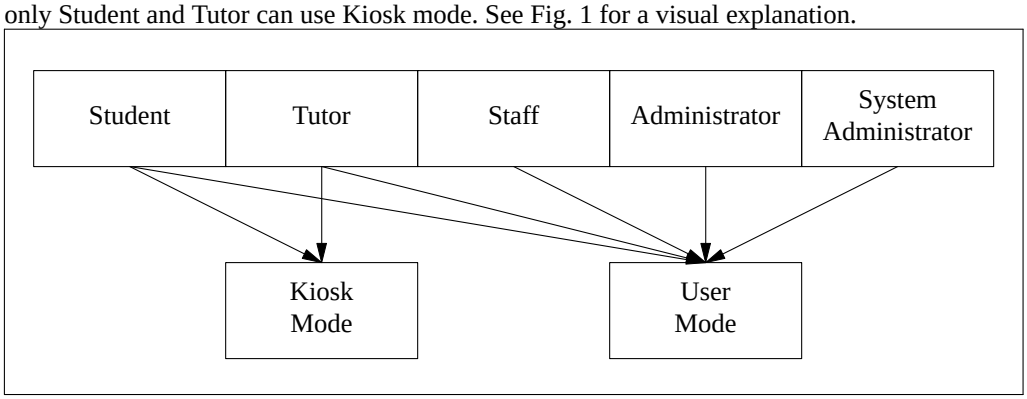

Fig. 1: Users and the Modes they Use.

2.2.1. Kiosk Mode

Kiosk Mode is the mode concerned with data entry into the time-keeping system. Students will use it to log when they are coming to the help lab, and what they are coming for help with, and Tutors will use it to log when they are in the lab.

The system also needs to be concerned with ensuring that this time-keeping data is good, and that people aren't mismatching clock in/outs or simply forgetting to clock out.

2.2.2. User Mode

User Mode is the ''general use'' mode of the system. All of the classes of user can use it, but their class determines what functionality of it they can use. There are four main functions available in user mode:

1. Scheduling
2. Question/Answer
3. Statistical Reports
4. Administration

Scheduling is available to Students, Tutors and Staff. Students can use it to view the schedule of Tutors, Tutors can notify Staff as to when they are available to tutor, and Staff can use this information to arrange Tutors into the schedule that the Students see. The system may also be able to do this automatically.

Question/Answer is available to Students, Tutors and Staff. Students can ask questions, and then the Tutors and Staff can answer these questions. Once a question has been answered, a student can then ask follow-up questions, and Tutors/Staff can ask for clarification.

Statistical Reports are available to Staff and Administrators. Staff and Administrators can view statistical graphs detailing the usage of the lab in the following qualities:

1. Times Most Utilized
2. Days Most Utilized
3. Classes Most Utilized

Only Administrators can view reports for the following qualities:

1. Professors Most Utilized

Administration is accessible to Staff, Administrators and System Administrators. This is what allows Staff to promote Students to Tutors, System Administrators to promote Staff to Administrators and allows classes to be created.

2.3. User Characteristics

This system is intended to be usable by the general student and faculty of the University. Thus, while we assume the general user is aware of how to use a webpage, we assume that this is the limit of their technical ability.

Therefore, we need to make sure that we don't end up using confusing or technical terminology, because not everybody is familiar with it.

2.4. Constraints

There are no particular constraints foreseen for the system.

2.5. Assumptions/Dependencies

The system assumes that we have access to the University authentication system over LDAP, and thus we depend on having this continued access.

2.6. Apportioning of Requirements

Depending on both time and implementation difficulty, the ability for the system to automatically schedule tutors based off their declared times may be pushed off to a further version.

We don't foresee any other features that will have issues with timing during implementation.

3. Specific Features

This section contains all of the functional and quality requirements of the system. It gives a detailed description of the system and all of its features.

3.1. External Interface Requirements

This section provides a detailed description of all inputs into/outputs from the system. It also gives a description of the hardware, software and communication interfaces and provides basic prototypes of the user interface.

3.1.1. User Interfaces

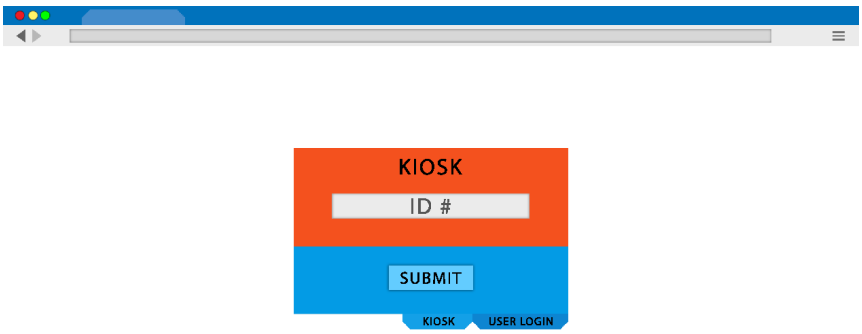

Fig. 2: Kiosk Mode Login

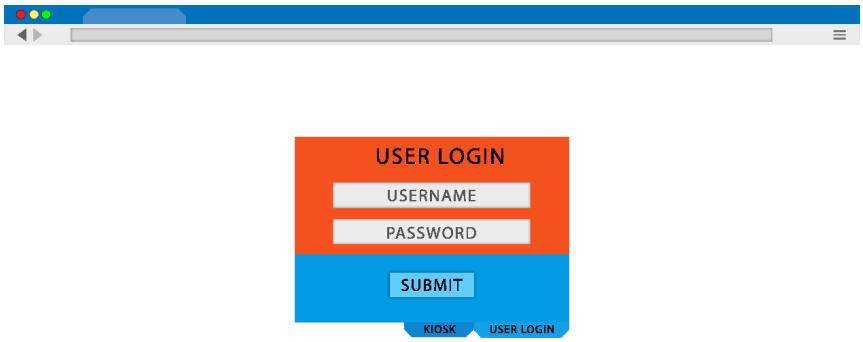

Fig. 3: User Mode Login

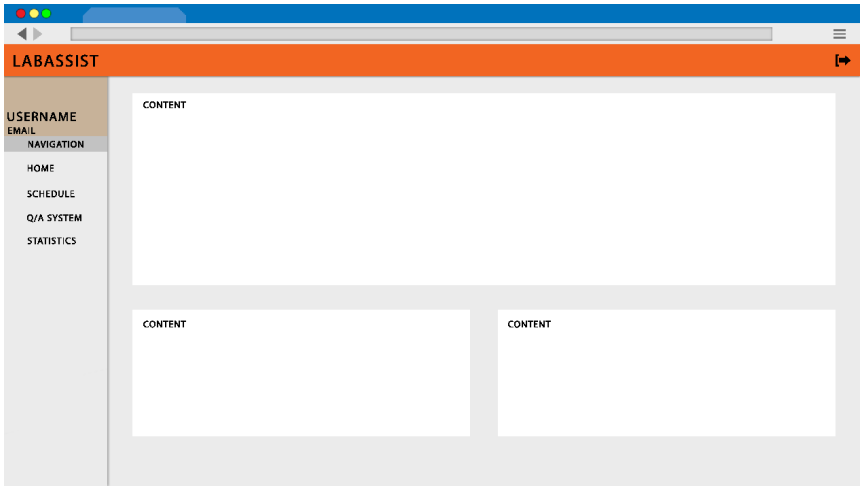

Fig. 4: User Mode Homepage

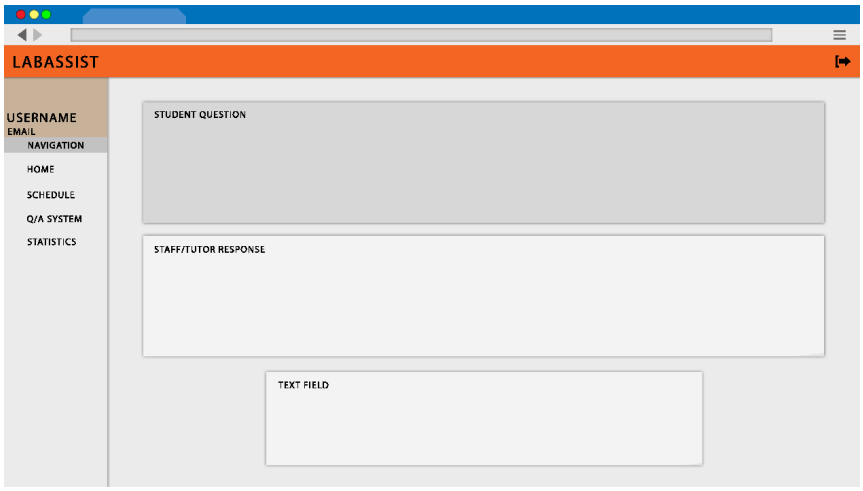

Fig. 5: Question/Answer Forum Thread

Users have two methods of logging into the system as shown in Figures 2 and Figure 3. Figure 2 shows the kiosk system login. This interface is designed for use by students and tutors for arrivals and depatures only. It does not log the user into the web portal.

Figure 3 demonstrates the User Mode login to access the portal. All users of the system have the ability to login with this interface to access further functionality such as Question/Answer system as well as statistical/administrative duties such as reports and management. Both the Kiosk (Figure 2) and User Mode (Figure 3) trigger a new user registration if this is the first time the user has logged into the system.

Figure 4 shows the format of the portal once a user has successfully logged in. The portal contains navigation links to all functions a user has permission to access.

3.1.2. Hardware Interfaces

Our only direct hardware interface is the key-card reader attached to the client kiosks that students and tutors use to sign in/out. Other than that, we don't have any specialized hardware usage, with the connection to the database being managed by the operating system on the web server.

3.1.3. Software Interfaces

The database and web server communicate with each to both read and write data to and from the database.

3.1.4. Communications Interfaces

The database and web server need to talk with each other, but the exact way they do so is not important, and left up to the operating system.

The web server also communicates with the credential system of the University over LDAP to allow access to the full functionality of the system.

3.2. Functional Requirements

This section includes all of the fundamental requirements for various actions within the system.

3.2.1. User Roles

3.2.1.1. *Functional Requirement 1*
ID: FR1

TITLE:

Each User has an Assigned Role

DESCR:

Each user shall be assigned a role from the following list (in order of increasing power):

1. Student
2. Tutor
3. Staff
4. Administrator
5. System Administrator

3.2.1.2. *Functional Requirement 2*
ID: FR2

TITLE:

Users have a default Role

DESCR:

Each new user of the system shall be assigned the role of Student by default.

3.2.2. Login/Logout (All Users)

3.2.2.1. *Functional Requirement 3*

ID: FR3

TITLE:

Access the Website

DESCR:

The user shall be able to access the website using a modern web browser.

3.2.2.2. *Functional Requirement 4*

ID: FR4

TITLE:

Enter Kiosk Mode

DESCR:

The user shall be able to enter their Student ID no. to login to Kiosk mode.

3.2.2.3. *Functional Requirement 5*

ID: FR5

TITLE:

Real Names, Emails and Usernames Associated with ID Numbers

DESCR:

When the user logs in to Kiosk Mode for the first time, they shall be prompted for their university username and password.

Using this information, their real name and email address will be read from the university's systems and stored in the database with their ID number and username.

3.2.2.4. *Functional Requirement 6*

ID: FR6

TITLE:

Clock in/out via Kiosk Mode

DESCR:

The user shall be able to perform the following steps once logged into Kiosk Mode.

1. If you are a tutor, select whether you are in the lab as a tutor or as a student.
2. If you have no unmatched arrivals: Select the class you are here for.

The system shall then do one of the following:

- If you have an arrival not matched with a departure, mark a departure for that arrival.
- Otherwise, register an arrival for the selected class as the type of user you selected from step 1 above.

Afterwards, the user shall be returned to the starting page for Kiosk Mode.

3.2.2.5. *Functional Requirement 7*
ID: FR7

TITLE:

Missed departures are adjusted.

DESCR:

At midnight, all arrivals without a corresponding departure shall have one generated for 11:59 PM that day, and a notification stating such shall be emailed to the user.

3.2.2.6. *Functional Requirement 8*
ID: FR8

TITLE:

Enter User Mode

DESCR:

The user shall be able to use their university-issued username and password to enter User Mode.

3.2.2.7. *Functional Requirement 9*
ID: FR9

TITLE:

Student ID Number Associated with Usernames

DESCR:

When the user first logs in to User Mode, they shall be prompted for their Student ID number if they have not previously logged into Kiosk Mode and associated their username with their ID.

Once they have done so, their real name and email address will be pulled from the University's systems and stored in the database alongside their username and ID number.

3.2.2.8. *Functional Requirement 10*
ID: FR10

TITLE:

Exit User Mode

DESCR:

The user shall be able to log out of User Mode, requiring them to log back in before they can access the system again.

3.2.3. Scheduling (Students/Tutors/Staff)

3.2.3.1. *Functional Requirement 11*
ID: FR11

TITLE:

User must be in User Mode

DESCR:

The user shall be currently logged in to User Mode to use scheduling features.

3.2.3.2. *Functional Requirement 12*
ID: FR12

TITLE:

Students may view the schedules of Tutors

DESCR:

Students shall be able to view a schedule that shows the times when Tutors are

available in the lab, and which tutor or tutors are in the lab at that time.

3.2.3.3. *Functional Requirement 13*
ID: FR13

TITLE:

Tutors may register when they are free to tutor

DESCR:

Tutors shall be able to use a form to submit times when they are available to do tutoring.

3.2.3.4. *Functional Requirement 14*
ID: FR14

TITLE:

Staff may schedule Tutors into the lab

DESCR:

Members of the Staff shall be able to view a list of when Tutors are free to tutor, and fill out a schedule as to when and which tutors are available in the lab.

3.2.3.5. *Functional Requirement 15*
ID: FR15

TITLE:

Tutors will be notified when their schedule changes

DESCR:

Tutors shall be notified via email whenever they are added to a schedule, their time in the schedule is changed, or they are removed from the schedule.

3.2.4. Questions/Answers (Students/Tutors/Staff)

3.2.4.1. *Functional Requirement 16*
ID: FR16

TITLE:

User must be in User Mode

DESCR:

The user shall be currently logged in to User Mode to use question/answer features.

3.2.4.2. *Functional Requirement 17*
ID: FR17

TITLE:

Students can Submit Questions

DESCR:

Students shall be able to select a class they are in and submit questions to be answered by the Tutors/Staff assigned to that class.

3.2.4.3. *Functional Requirement 18*
ID: FR18

TITLE:

Students are Notified when Questions are Answered

DESCR:

Students shall be notified via email whenever a question they have posted is answered by a tutor or staff member.

3.2.4.4. *Functional Requirement 19*
ID: FR19

TITLE:

Students may View Questions

DESCR:

Students shall be able to view a list of questions they have submitted, and the answers to those questions if they are available

3.2.4.5. *Functional Requirement 20*
ID: FR20

TITLE:

Tutors/Staff are Notified of Questions Needing Answers

DESCR:

Tutors and Staff shall be notified via email when a question is posted that they are allowed to answer.

3.2.4.6. *Functional Requirement 21*
ID: FR21

TITLE:

Tutors/Staff can Answer Questions

DESCR:

Tutors and Staff shall be able to answer questions asked by Students in classes they are assigned to.

3.2.4.7. *Functional Requirement 22*
ID: FR22

TITLE:

Tutors/Staff can View Questions

DESCR:

Tutors and Staff shall be able to view all of the questions asked by Students in classes they are assigned to, regardless of whether or not the question has been answered.

3.2.5. Statistical Reports and Data (Staff and Administrators)

3.2.5.1. *Functional Requirement 23*
ID: FR23

TITLE:

User must be in User Mode

DESCR:

The user shall be currently logged in to User Mode to use statistical features.

3.2.5.2. *Functional Requirement 24*
ID: FR24

TITLE:

Staff/Administrators can View Statistical Charts on Lab Usage

DESCR:

Staff and Administrators shall be able to view statistical charts detailing the following:

- Times Lab Most Utilized

- Days Lab Most Utilized
- Classes Lab Most Utilized

3.2.5.3. *Functional Requirement 25*
ID: FR25

TITLE:
Staff can only View Reports for their Own Classes

DESCR:
Staff shall only be able to view reports for classes they are responsible for teaching.

3.2.5.4. *Functional Requirement 26*
ID: FR26

TITLE:
Administrators can View All Reports

DESCR:
Administrators shall be able to view reports for all classes, and shall also be able to view the following reports:

- Professors Lab Most Utilized

3.2.6. Administrative Functions (Staff/Administrator/System Administrator)

3.2.6.1. *Functional Requirement 27*
ID: FR27

TITLE:
User must be in User Mode

DESCR:
The user shall be currently logged in to User Mode to use administrative features.

3.2.6.2. *Functional Requirement 28*
ID: FR28

TITLE:
Staff may Promote/Demote Tutors

DESCR:
Staff shall be able to promote Students to Tutors, and demote Tutors to Students.

3.2.6.3. *Functional Requirement 29*
ID: FR29

TITLE:
Staff can Add Their own Classes

DESCR:
Staff shall be able to add/remove classes that they teach. Each class shall be assigned a term that it occurs during.

3.2.6.4. *Functional Requirement 30*
ID: FR30

TITLE:
Administrators are Staff with Additional Privileges

DESCR:
Administrators shall be able to do everything Staff can do.

3.2.6.5. *Functional Requirement 31*
ID: FR31

TITLE:
Administrators can Add/Remove Staff

DESCR:
Administrators can add/remove staff from the system.

3.2.6.6. *Functional Requirement 32*
ID: FR32

TITLE:
System Administrators can Create Terms

DESCR:
System Administrators shall be able to create terms for classes to be assigned to.

3.2.6.7. *Functional Requirement 33*
ID: FR33

TITLE:
System Administrators can Promote/Demote Administrators

DESCR:
System Administrators shall be able to promote Staff to Administrators, and demote Administrators to Staff.

3.2.6.8. *Functional Requirement 34*
ID: FR34

TITLE:
System Administrators can Set Time Bounds

DESCR:
System Administrators shall be able to set bounds on the times tutors can be in the labs, such as "No tutors before noon or after 7:00 PM"

3.3. Performance Requirements

The system shall be able to handle at least 20 simultaneous users, and at least 2 simultaneous requests for statistical charts.

3.4. Logical Database Requirements

The database is the main repository for all the information the application stores. The database stores three main things:

1. Users
2. Classes
3. Lab Usage

Users are any user of the system. For every user, we assign them a unique numeric ID, and then collect the following information about them:

- Student ID number
- Real Name
- Email Address
- User Role

See Figure 6 for an E/R diagram of the system.

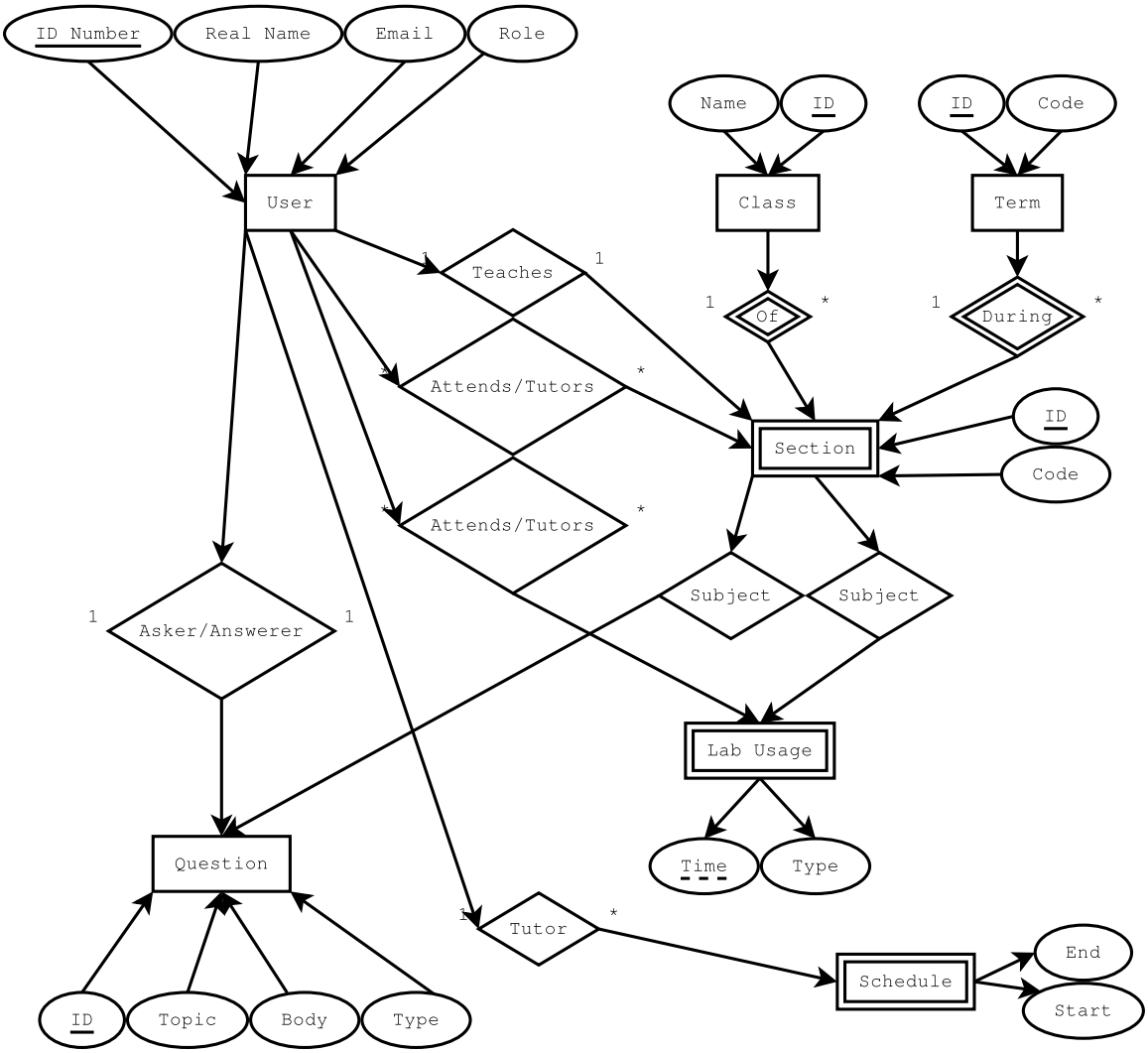

Fig. 6: E/R Diagram of the System.

3.5. Design Constraints

The system does not have any external standards or regulations it must comply with.

3.5.1. Reliability

The system shall be online 99.9% of the time, except for announced and scheduled maintenance.

3.5.2. Availability

The system shall be able to recover from a system failure without human intervention.

3.5.3. Security

The system shall ensure the database is not accessible from the network, and shall use HTTPS for all User Mode traffic to prevent leaking of user credentials or data.

The system shall also log the use of Administrative actions to provide accountability for what happens to the system.

4. Change Management Process

This section details the procedures that need to be undertaken for a change to be made to this document, and thus to the requirements for the project.

Desired changes to the document must be emailed to both Adam Cantrell and Benjamin Culkin. After group discussion of both the contents and scope of the proposed change, any questions & modifications of the changes will be sent back to requestor. After their approval, the necessary changes will be made if it was decided to accept the changes.

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