Asia-Pacific International University
Faculty of Information Technology

ACAS (Administrator of CAIS Admission System)

A Senior Project Proposal in Partial Fulfillment of the Requirement for the IT483 Systems Development Project II class taught by Mr. Tola San
First-Semester, 2021-2022

I certify that this assignment is my own work and is free from plagiarism. I understand that the assignment may be checked for plagiarism by electronic or other means. The assignment has not previously been submitted in any other course or institution. I have read and understood Asia-Pacific International University's academic integrity policy.

Signature: Date:

201600290
Sela Choup

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1 Introduction

Cambodia Adventist International School has been operated traditionally for more than 20 years using the paper-based registration system that goes through a process of the administering new and old new students. There have been many issues raised over the registration methods from the CAIS administration and the student's guardian during COVID-19 pandemic outbreak. It is very difficult for the parents who are living far and near to come to school for registration of their children for their class enrollment. The school is growing with extreme care and concerns until the board committee came to express their need for a new registration system that could meet the concerns of the guardian, simplify the work in the office, reduce the workloads of the administrator, and properly manage accurate records and documentations within the system.

After the study on their needs, I had proposed a solution that can effectively reduce their concerns and meet the needs of the current and future situation. The development of CAIS online student registration will be implemented with the following functions to register, manage, and authorize the application process of old student registration, new student enrollment, and new transfer students.

1.1 Project's Objectives

1.1.1 General Objective

The project objectives of ACAS are to maintain the data consistency and integrity on the reliability of automation process of online registration done by the system's algorithm designed to simplify the tasks that has been previously handled by human. This web application development will be useful to maintain data from the registration form from a student, processes the form, and sends a confirmation of registration from within the office administration back to the student.

1.1.2 Specific Objectives

The specific objective with clear intention of this proposed system is to support the needs of an academic organization of CAIS on simplifying the school online registration process as below:

- To develop a user module to apply for registration form from an online-based website
- To develop a student's profile module to welcome him/her on their acceptance to become one of the school students and to re-apply for their new application process
- To develop a registrar module to manage user, registering student's application form, manage exam, manage classroom, manage student profile, and student enrollment
- To develop an administrator module to create, read, update, and delete users

2 Related Works

Student online registration system has been widely published and uses in many academic institutions like that of CamEd, AIMS and AIU. The objective of this ACAS project is to solve the same school problems with different method and functionality. Though the method and functionality are different, the similarity between those system and our ACAS will present itself relatively at some points. The CamEd Online Portal (CamEd, 2021) with student launch access is an ideal web

application for this system. However, we really appreciate SARRA of AIU that's used to be our foundation of standard with its incredible structures, features, database design and its functionality.

3 Preliminary Investigation

3.1 Company Profile

The main customer of ACAS is likely Cambodia Adventist International School (CAIS), is a private, non-profit co-educational Christian school (k-12) founded and operated by the Seventh-day Adventist Mission in Cambodia. CAIS is located on the #419, street Rada, Phum Tum Nub, Phnom Penh Thmey, Khan Sen Sok, Phnom Penh, Cambodia. The principle of CAIS is currently named, Mr. Dean Edwardson. While the vice-principal of CAIS, Mr. Sopheak Meas is the one whom I have contacted during the preliminary process has phone contact as +855 12 946 041 along with an email address: sopheakmeas@yahoo.com.

3.2 Organizational Chart (an organization chart for the part of the organization you are studying)

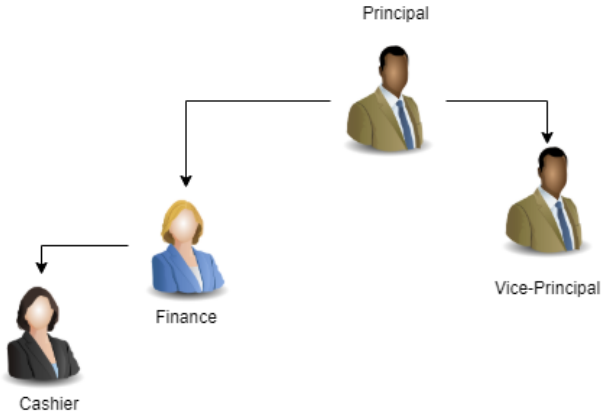


Figure 1.1

3.3 Statement of the Mission/Goal of the Organization

Mission Statement: To provide academic excellence in a Christ-filled environment that encourages the love of God, serving others, and self-respect.

Vision Statement: We believe that education should train the mind, body, and the soul of all our students. True education will make the students a better citizen for this world and the world to come.

3.4 Project Request

During the COVID-19 pandemic, CAIS student administration has a problem with registering students both old and new into the account without having to meet the parents or guardians and have them sign up the registration form. ACAS will be a system that not only benefits

the school during this pandemic crisis, but also for the further development of the web application in this school.

We are to create an online registration for enrollees in Cambodia Adventist International School, to develop an accurate and easier way of registering students, generate reports needed for enrollment, and to provide a user-friendly enrollment website in managing enrollment of old students, new student and transferees.

Below are the requirements requested by the client:

- To develop a user module to apply for registration form from an online-based website
- To develop a student's profile module to welcome him/her on their acceptance to become one of the school students and to re-apply for their new application process
- To develop a registrar module to manage user, registering student's application form, manage exam, manage classroom, manage student profile, and student enrollment
- To develop an administrator module to create, read, update, and delete users

3.5 Description of the Problem

During the initial interview with Mr. Sopheak, the current vice-principal, I have noticed the list of problems that are crucially related to the students. Without a proper centralize system, CAIS still rely on the manual log book and registration form on paper that could be lost or forget by administrator. Inefficiently, student registration is largely required a face-to-face paper-based registration or enrollment of existing students. With online registration system students are allowed to register through the internet, eliminating problems with traditional registration system, such as long lines, paper forms and troublesome wait lists.

Online student registration system is very essential in a school like CAIS, and international accredited school which based her academic system from United States of America. The school used manual system in recording and retrieving student's information. On the other hand, registrar's office also used manual system as a way of recording and retrieving student information.

The traditional enrollment process is designed in a way as tedious task filling on the application form and inaccuracies of information provided by the student are also considered. These factors cause enrollment delays, which is disadvantageous to the enrollment personnel and the enrollees. With this new online student registration, tasks will be handled effectively and efficiently.

3.6 Project Scopes and Constraints

ACAS emphasizes on gathering enrollment data from students which contains student records like basic information, contacts and addresses. This will become a credential document for a registration application form that will be done through online access that can allow student and administrator to access and view easily. It will provide enrollment history for every transaction and for every student that will be managed in an easy way without having to worry that the single data lost. ACAS is to be carried out to design an efficient and effective system when it comes to speed, reliability and accuracy reports.

Registrar user has access to the student management system, view students record that are officially enrolled, search for student profile information and viewing subjects of each level of any grade. The system does not cover computation of student's grades, class scheduling, viewing of teachers yet but enable the tuition fee payment status and method of payment. Not accepting any

online payments. It can only operate for elementary/middle/high school enrollment purposes. It can't show the schedule of time of the subjects per year level entry.

Functional Requirement:

- Guest User Management
  - Register a user account
  - Login
  - Browse Menu Page
  - Contact Us
  - Registration Form for new and transfer student
  - Receive updates to apply for entrance exam and the result of entrance exam
- Student Profile management
  - Login
  - Account Setting
    - Update profile
    - Update password
    - Logout
  - Receive Notification/Updates in Message
  - Re-apply application for next academic year
  - About Us
  - Contact Us
- Registrar Management
  - Login
  - Account Management
    - Update profile
    - Update password
    - Logout
  - Manage Enrollment Process
    - Create/List/View/Update/Delete Registration Form for new Prospect
    - Create/List/View/Update/Delete Entrance Exam and its attributes
    - Create/List/View/Update/Delete Enrollment Exam
    - Create/List/View/Update/Delete Exam Status
    - Create/List/View/Update/Delete Subject Enrollment
    - Create/List/View/Update/Delete/Assign Classes/Classrooms
    - Create/List/View/Update/Delete Teacher/Staff
    - Enroll/List/View/Update/Delete Student Enrollment into Student User
  - About Us
  - Notify users and students (Send E-Mail)
- Admin Module
  - CRUD on all user's group

Non-Functional Requirements:

- A running server at CAIS
- A running CAIS management system
- CAIS Domain name

- A minimum built server
  - UPS
  - RAM 4 GB
  - SSD 500 GB
  - Fast Ethernet cable connected to a Gigabyte switch
  - Processor – Intel Core i3/i5/i7 or Intel Xeon

3.7 **Expected Business Benefits**

The objective of developing this system is to simplify the difficulties of the registrar office administration. They will be greatly benefited from this project due to many functional operations will be given at no cost. ACAS is to be carried out to design an efficient and effective system when it comes to speed, reliability and accuracy reports. To fulfill the basic need of CAIS, ACAS is delighted to have itself managing the student online registration process. The system design is expected to be user friendly in order to help users to get acquittance when using it.

3.8 **Expected System Capabilities**

	User Management	Notify Student via E-mail	Register New Application Form	Enroll Existing Student	View Student Registration	Admit User into Student Database	View Student Registration Report
Administrator	Read & Write	None	None	None	None	None	None
Registrar	None	Read & Write	Read & Write	Read & Write	Read & Write	Read & Write	Read & Write
Student	None	Read	Read & Write	None	None	None	None
User	None	None	Read & Write	None	None	None	None

3.9 Development Environment: Development environment is the details of methodology, modelling and implementation language that the current system is expected to develop on.

3.9.1 Methodology: Software Development Life Cycle (SDLC) is my method of avoiding pitfalls and keep this project on the right track. That includes: Planning, Analysis, Design, Implementation, Testing, and Maintenance.

3.9.2 The modelling of this project is waterfall model, which is a linear, traditional method of completing each step one by one. This will keep the programmer to stay focus on the main goal.

3.10 Feasible Study: A study to evaluate feasibility of proposed project or system. It is a measure of the software product in terms of how much beneficial development will it be for the organization.

3.10.1 Technical Feasibility: are software resources that is required to develop the project. They include: Python Full stack (mainly Python Django framework, JSON, JavaScript, HTML, CSS, Bootstrap 4) and as for database, this

project work on MySQL Workbench. The system is currently hosting a Linux-based Debian server for security and developmental reason. However, in the near future it will be moved toward cloud service hosting server.

3.10.2 **Legal Feasibility:** is to analyze carefully the legality point of view ranging from data protection to social media law, project certify, licensing, copyright, etc. They include: user consent on privacy and right to store input data, data encryption through harsh password, data protection acts or social media law, user authentication and copyright.

- According to Article 11 of the Civil Code provides a person with the right to an injunction where there is a danger that an infringement of that person's personal rights may occur or there is a danger that a past unlawful infringement will continue or occur again. If personal data constitutes personal rights, the owner of the right may seek a court order to stop any unlawful infringement of his or her personal data (e.g. data collection without consent) on the basis of Article 13 of the Civil Code.
- Furthermore, Article 12 of the Civil Code states that when the effects of an infringement of a personal right continue to exist, the owner of the right may seek the elimination of such effects. In the data privacy context, this legal provision potentially means that a person can seek an order to remove, for example, any storage of his or her personal data collected unlawfully.

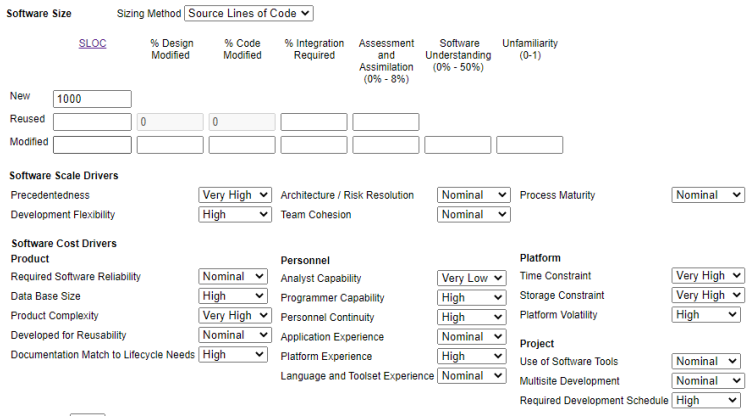
3.10.3 **Operational Feasibility:** is the degree of how much easy product will be able to operate and maintenance after deployment. Those include things like documentation (user guides or manual) given differently to developers and clients (video tutorial, or how-to-videos). Does current mode of operation provide adequate throughput and response time?

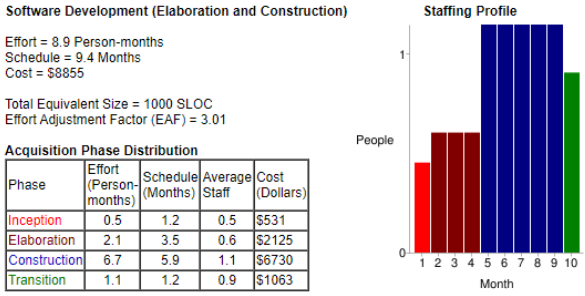
- The current mode provides end users and managers with timely, pertinent, accurate and useful formatted information.
- The current mode of operation provides cost-effective information services to the business.
- There is a reduction in cost and or an increase in benefits.
- The current mode of operation offers effective controls to protect against fraud and to guarantee accuracy and security of data and information
- The current mode of operation makes maximum use of available resources, including people, time, and flow of forms.
- The current mode of operation provides reliable services.
- The services are flexible and expandable.

3.10.4 **Schedule Feasibility:** is mainly the timelines/deadlines that is proposed at the very start of course registration. Start Time: Senior Project 1 started on January, which is the 1st semester of the project. Expected to End: Senior Project 2 should probably be ended at the end of the summer season or probably 2nd semester of the project that has been assigned

3.10.5 **Financial Feasibility:** study the cost and benefit of the project. If in accordance to COCOMO II, a constructive cost model of software development, the project cost could estimate up to about ~$8855 in the span of 9.4 months with an estimate effort of $942/month despite only 1 person is handling this project. However, in reality, the developer does not have any expenses to develop this project. There are open-source tools that are available to develop and the developer is under the contract of working for the school anyway.

- The system is cost effective
- The cost of hardware is one-time built and self-sustainability which can be used for more than 5 more years
- The cost of employee's time to study is effectively accessible by the HR/school ADCOM





Acquisition Phase Distribution

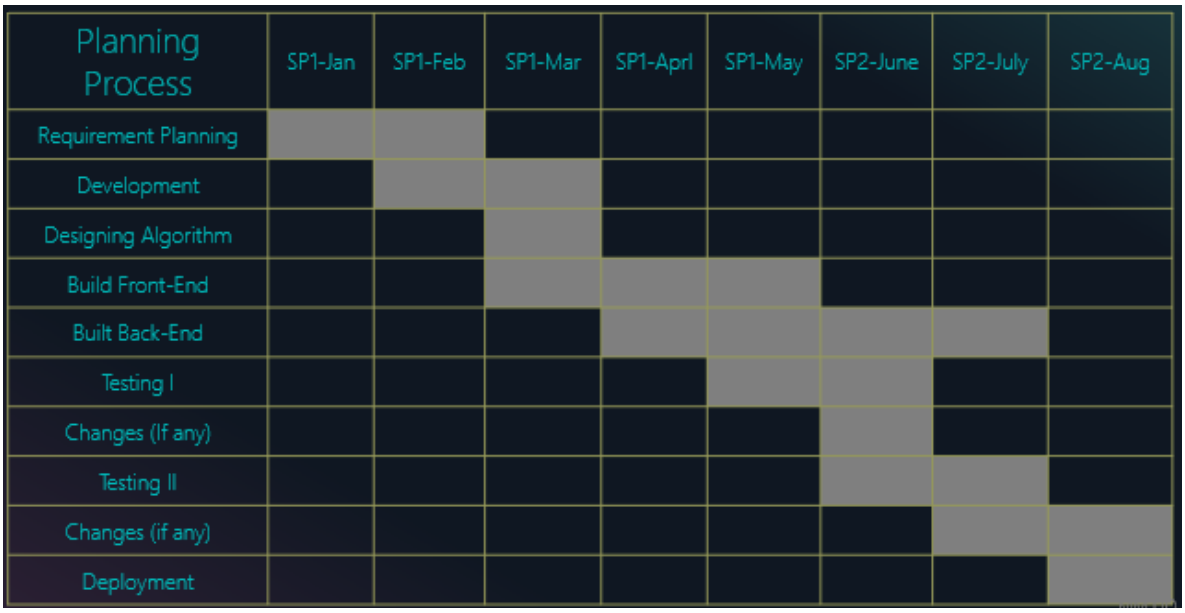
Phase	Effort (Person-months)	Schedule (Months)	Average Staff	Cost (Dollars)
Inception	0.5	1.2	0.5	$531
Elaboration	2.1	3.5	0.6	$2125
Construction	6.7	5.9	1.1	$6730
Transition	1.1	1.2	0.9	$1063

Software Effort Distribution for RUP/MBASE (Person-Months)

Phase/Activity	Inception	Elaboration	Construction	Transition
Management	0.1	0.3	0.7	0.1
Environment/CM	0.1	0.2	0.3	0.1
Requirements	0.2	0.4	0.5	0.0
Design	0.1	0.8	1.1	0.0
Implementation	0.0	0.3	2.3	0.2
Assessment	0.0	0.2	1.6	0.3
Deployment	0.0	0.1	0.2	0.3

Planning

Starting date: January 2023.



4 Analysis and Design

4.1 **Introduction:** According to the preliminary investigation of this project mentioned earlier, the customer of this project is requesting for online registration web-based application. A system that is always available for whoever, whenever, or wherever the users are as long as there's internet connectivity. Environment includes:

- Modelling is done in UML (Unified Modelling Language)
- Libraries includes: Django rest framework, Django filter, Django import export, Django extensions, JQuery, Validation
- Programming Languages: HTML, CSS, Django Python, JavaScript
- Framework used: Django Rest Framework for Web Application
- Integration module: Github

4.2 **Risk Analysis:** is a sequence of processes to identify the factors that may affect a project's success. Various kinds of risks in software development are: schedule risk, budget risk, operational risk, technical risk, and programmatic risk

Risk Table	Risk Category	Probability	Impact (1-4)	RMMM
Developer's Individual Problem	Schedule Risk	15%	2	PR01
PC crash	Technical Risk	10%	1	PR02
Change of Project's scope	Programmatic Risks	15%	2	PR03
Lose backup file	Technical Risk	10%	1	PR04

Risk information sheet			
Risk ID: PR01	Category: Schedule Risk	Probability: 15%	Impact: 2
Description: The developer might encounter some problems as such the quality of a programmer health will determine the success of his project or that he/she will encounter extra workloads while working on a certain project. The skills of a developer will also determine the success of this project.			
Mitigation/Monitoring: The developer will take care of his own health and carefully be cautious about his own safety.			
Management/contingency plan/trigger: The developer will need to learn how to be healthy physically, mentally, and emotionally so that he will remain in a good well-being.			

Risk information sheet			
Risk ID: PR02	Category: Schedule Risk	Probability: 10%	Impact: 1
Description: The developer might face severe technical problem due to the damages of computer/PC/laptop. The programmer's individual carefulness with the PC is likely impacting the development of the project.			
Mitigation/Monitoring: The developer will take care of his own computer/PC and carefully be cautious about his data safety.			
Management/contingency plan/trigger: The developer will need to learn how to backup and safely protect his PC/laptop for his security reasons.			

Risk information sheet

Risk ID: PR03	Category: Schedule Risk	Probability: 15%	Impact: 2
Description: The developer might get carried away with his personal or professional interest while working on this certain project. There are many external factors that could hinder the progress of this project development.			
Mitigation/Monitoring: The developer must be strict on his project scheduling and planning. He should've stay tune to his project deadline.			
Management/contingency plan/trigger: Try to do self-reflection once a week to follow up your project development and its progress.			

Risk information sheet			
Risk ID: PR04	Category: Operational Risk	Probability: 10%	Impact: 1
Description: The developer might be able to lose backup when there are many suspicious activities that might harm the health of the PC			
Mitigation/Monitoring: The developer will need to start taking care of his personal data, backups, and privacy more professionally			
Management/contingency plan/trigger: The developer must learn to use as much as possible about the technologies that's essentially help the current working project and developing all the possible best result at the same time.			

4.3 Business Analysis and Design:

4.3.1 Conduct of Analysis:

- The initial meeting with the client, Mr. Sopheak was actually on way back to end-June of 2021, it was then that we had discussed about the problems and what can be the solution.
- However, on January 7th of 2022, a proper meeting was conducted. The interviewed about the cases related to school registration system and how he wanted for his new feature. The presentation favors from the likes of some features related to the work from CamEd online registration system, SARRA online registration system and AIMS online registration system. We decided to start simple and grow better later.
- Below are the attach forms that were once used to handle school registration system at CAS:

KINGDOM OF CAMBODIA

NATION RELIGION KING

Cambodia Adventist School
No: ……. CAS

****

School Hours: Monday-Thursday 7:25 a.m. – 3:00 p.m.
Friday 7:25 a.m. – 11:40 a.m.

School Fee 2021-2022					
		PreK - 3rd Grades	4th - 8th Grades	9th - 12th Grades	Deposit
Registration	Old Student	$ 55.00	$ 55.00	$ 55.00	
	New Student	$ 60.00	$ 60.00	$ 60.00	
Tuition		$ 1,070.00/year $ 107.00/month	$ 1,170.00/year $117.00/month	$ 1,270.00/year $ 127.00/month	
P. E Uniform		$ 6.00	$ 6.00	$ 6.00	
Library	New Student				$ 30.00
Dormitory	Dorm Student	$ 900.00/year $ 90.00/month	$ 950.00/year $ 95.00/month	$ 1,100.00/year $ 110.00/month	$ 50.00

Registration Date 2021-2022				
	Date		Discount (5%)	Discount (10%)
Old Student	30/06 - 2/07/2021	Old student, and old student's sibling only for Prekindergarten (4 years old before August)	Pay full yearly tuition 30/06/2021	The 3rd child (only immediate sibling)
New Student	07/07/2021	Placement Test		
	09/07/2021	Result of Placement Test		
	12/07/2021	Registration From 7:00 am to 5:00 pm	Pay full yearly tuition 12/07/2021	

Note:

Parents or guardian must bring all the requirements listed below when come for registration:

- *Registration form*
- *Birth certificate*
- *Registration fee, Tuition fee, PE uniform fee, Dormitory fee (for dorm student only)*
- *4 x 6 cm photo (5)*
- *Any information or document of his/her previous school*

Address: *#419, Rada, Tum Nub, Phnom Penh Thmey, San Sok, Phnom Penh, Cambodia.*

Web Address: http://cas.edu.kh/

Contact Numbers:
012 946 041 CAS Office
012 929 234 Mr. Sopheak Meas *(Registrar/VP)*
092 406 574 Mrs. Bopha Chin *(Cashier/Accountant)*
012 648 713 Mrs. Agusta Pheng *(Treasurer)*

4.3.2 User Requirements

- **Output Requirements:**
  - Notice of entrance exam
  - Information generated from the query of the database system
  - Report of registrar's work are to be kept and maintain in the database
- **Input Requirements:**
  - Prospect's Form to register information such as personal information related, contacts of parents, contacts of emergency, and contacts of home address
  - Exam attributes such as class name, class building, time schedule, exam date, prospect name, exam type, status and score
  - Enrollment Form input such as subject, class level, classroom, class building, and homeroom teacher, teacher/staff information to be enrolled as a teacher and user
- **Performance Requirements**

- Hosting server system will be available 24h/7 every week, months, and years until further changes/notification
- The time it take to render information will not be longer than 2 seconds
- The database will require a storage of at least 500 GB and backup disk will be a duplicate of the capacity with an option to transfer to online storage with the minimum capacity of 1 TB
- The recommended browser are Microsoft Edge and Google Chrome

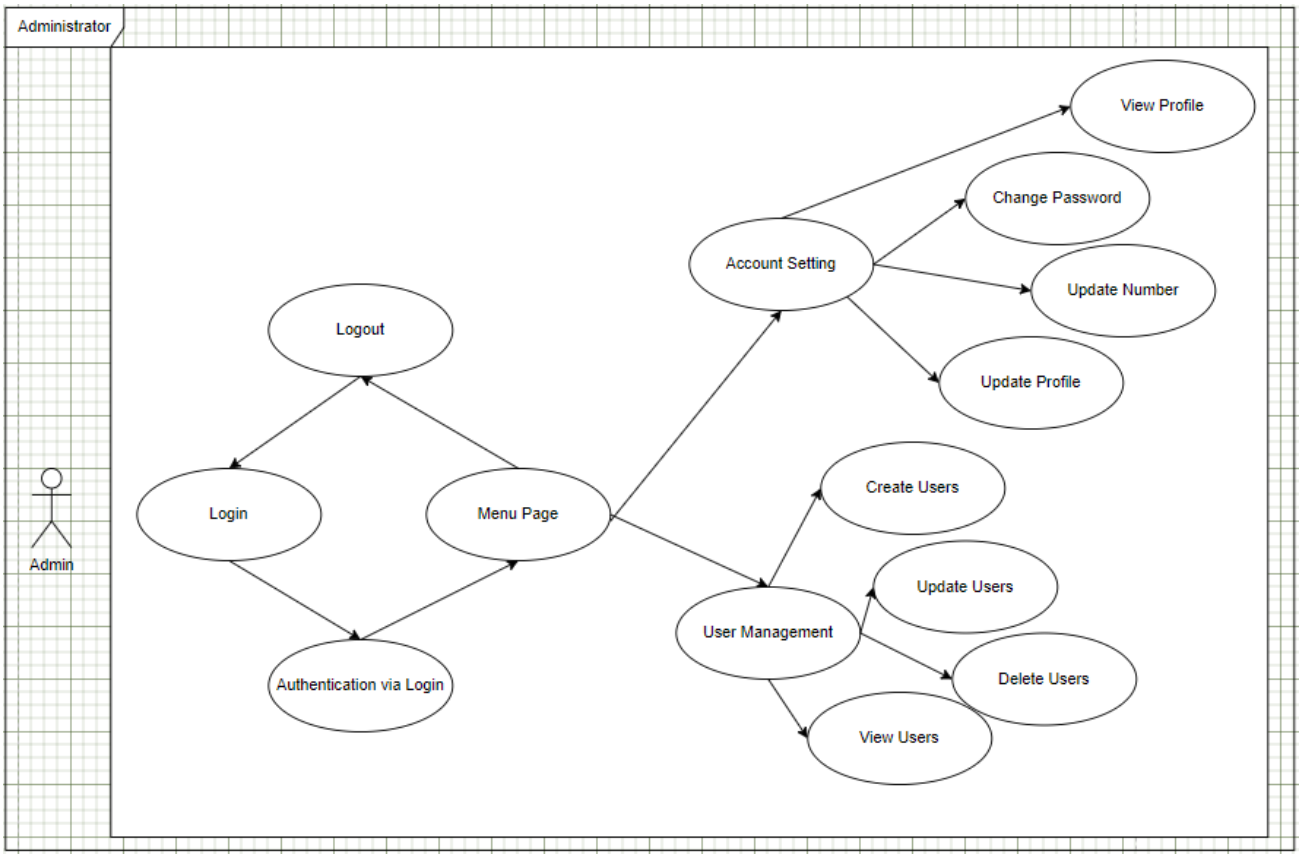
- **Control Requirements**
  - Admin User are able to view the logs activity to every user, but restricted to doing so only when the irregularity happens
  - Change logs shall be implemented to log changes to individual records
- **Training Requirements**
  - Online documentation shall provide instructions on system use and installation for both administrator and registrar
  - For user interactive activity will be provided a step-by-step guide on the webpage
  - Basic component for developers training will be provided as a ground platform for further development

The time it takes to deploy this functional project is naturally 29 months as estimated in the Planning process and estimated cost around $8855 based on COCOMO II calculation. It will take a well-designed cloud architecture to host database externally and Linux OS based locally for the webserver to fully functional with its networking and storage media for development to be properly functionally operated.

Use Case

Administrator

Admin User are able to CRUD all users in the system.



Name	Create Users
Actor	Administrator
Description	Function to create user so that he/she will be able to login into the system.
Trigger	Different types of users will be required to enroll into the system
Pre-condition	The actor is logged into the system.
Development	1. The administrator will create a new user and enroll them into the system. User's register information: a. Surname b. Email c. Passwords d. Confirmed Passwords 2. The actor provided the requested information
Post-condition	A new user is added to the system

Name	Update Users
Actor	Administrator
Description	Updating existing user in the system
Trigger	Update user is required in the system
Pre-condition	The actor is logged into the system.
Development	1. The administrator enable user editing inside the system. a. Click to view the list of users. b. Display options to edit and update c. Click update button and getting inside to update information d. Save the updating and exit
Post-condition	A user record is updated in the system.

Name	View Users
Actor	Administrator
Description	Displays a list of users and view their information
Trigger	The actor needs to view the list of user information.
Pre-condition	The actor is logged into the system.
Development	1. The administrator enable option list the numbers of users inside the system. a. Click to view the list of users. b. Display options to edit and update 2. Exit the windows
Post-condition	The actor had viewed the information.

Name	Delete Users
Actor	Administrator
Description	Displays a list of users and delete the users from the system

Trigger	The actor needs to delete or obsolete a specific number (s) of user and their information.
Pre-condition	The actor is logged into the system.
Development	1. The administrator enable option delete the number (s) of users inside the system. a. Click to list the users. b. Display options delete c. Display the confirmation dialog box to agree to remove the user from the system 2. Exit the windows
Post-condition	The actor had already removed the user the information.

Registrar

Registrar User are able to manage registration, enrollment, and notify users and students by sending messages and made contact.

Name	View Applicant
Actor	Registrar
Description	Function to view applicants who has registered into the system.
Trigger	New applicants will be required to register the into the system
Pre-condition	The actor is logged into the system.

Development	1. The registrar will view the new applicants who are applying to be enrolled into the system. User's register information: a. First name b. Last name c. Gender d. Age e. Date of Birth f. Nationality g. Religion h. Grade Level i. Academic Year j. Parent's First name k. Parent's Last name l. Parent's Occupation m. Parent's Email n. Parent's Contact o. Address p. Profile Picture q. Files/Documents (prove of report card from previous school) r. Real-time date added 2. The actor provided the requested information
Post-condition	A new user is added to the system

Name	Enroll Student
Actor	Registrar
Description	Enroll status of both new and existing student into the system
Trigger	Enrolling applicant into student is required in the system
Pre-condition	The actor is logged into the system.
Development	2. The registrar enables enrollment option inside the system. a. Click to view the list of all applicants. b. Display options to enroll the approval grade-defended students c. Assign classroom and create student user account d. Click update button and getting inside to update information e. Save the enrollment and exit
Post-condition	A student's record is updated in the system.

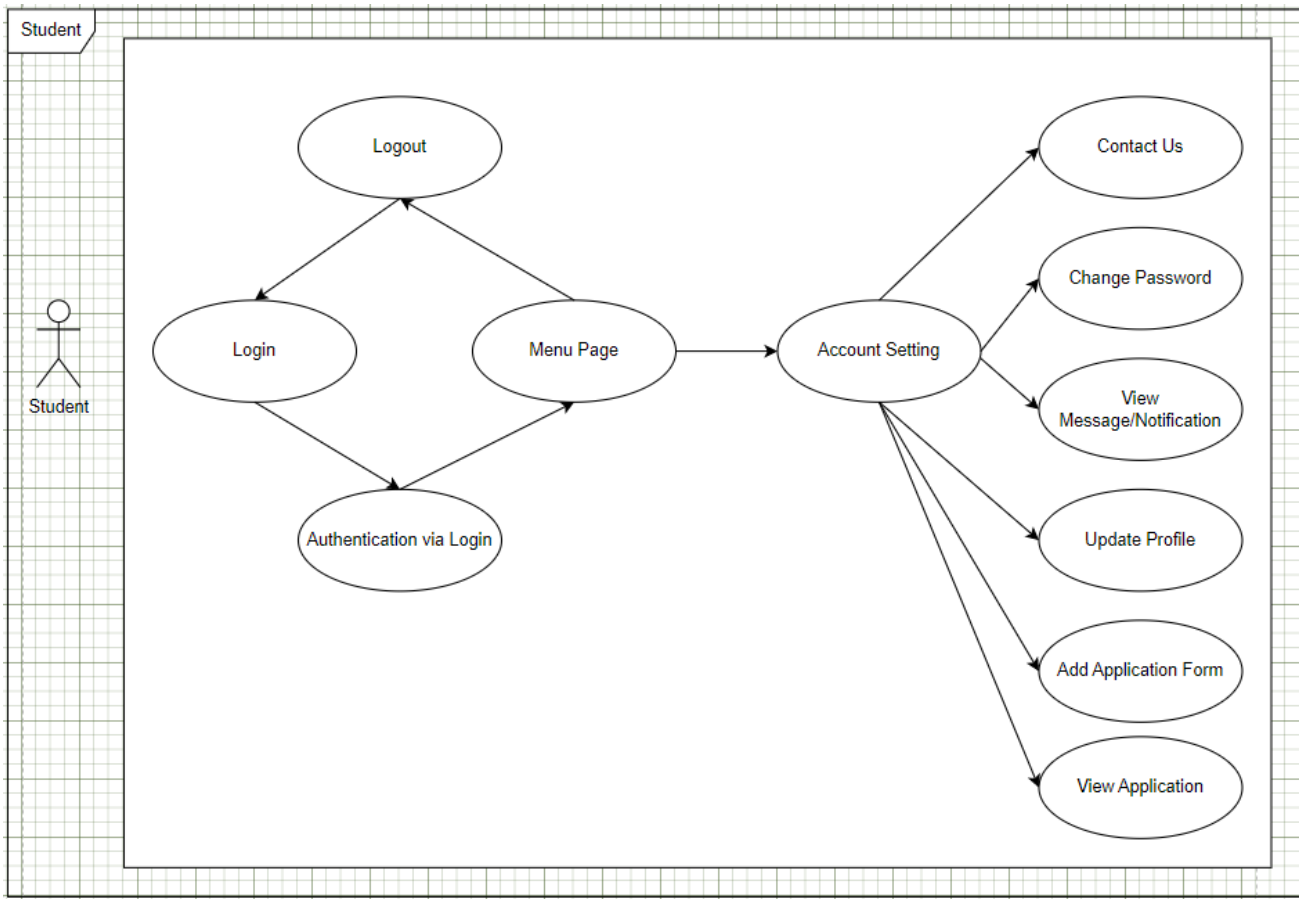
Name	Create Tuition Payment
Actor	Registrar
Description	Displays a list of students and their financial records
Trigger	The actor needs to view the list of user information.
Pre-condition	The actor is logged into the system.
Development	3. The registrar enable option list the numbers of students inside the system. a. Click to view individually the list of students. b. Add tuitions data and update payment status

	c. Display options to view the list of payment created d. View option to edit and update 4. Exit the windows
Post-condition	The actor had created the information.

Name	View Classroom
Actor	Registrar
Description	Displays a list of classrooms and its related attributes from the system
Trigger	The actor needs to view the classroom information.
Pre-condition	The actor is logged into the system.
Development	3. The registrar enables the list and view option for classroom, class, and subject inside the system. a. Click to list the classrooms. b. Display options the view 4. Exit the windows
Post-condition	The actor had already list and view the classroom information.

Student

Students User are able to view the useful information in the system.



Name	View Menu Page
Actor	Student
Description	Display the Menu Page
Trigger	The actor needs to view the user useful information.
Pre-condition	The actor is logged into the system.
Development	1. The student enables option to view useful information for the students. a. Click to view the profile and update setting. b. Enroll yourself as existing student for the next academic year c. Display the option to view notification from the administration
Post-condition	The actor had viewed the useful information.

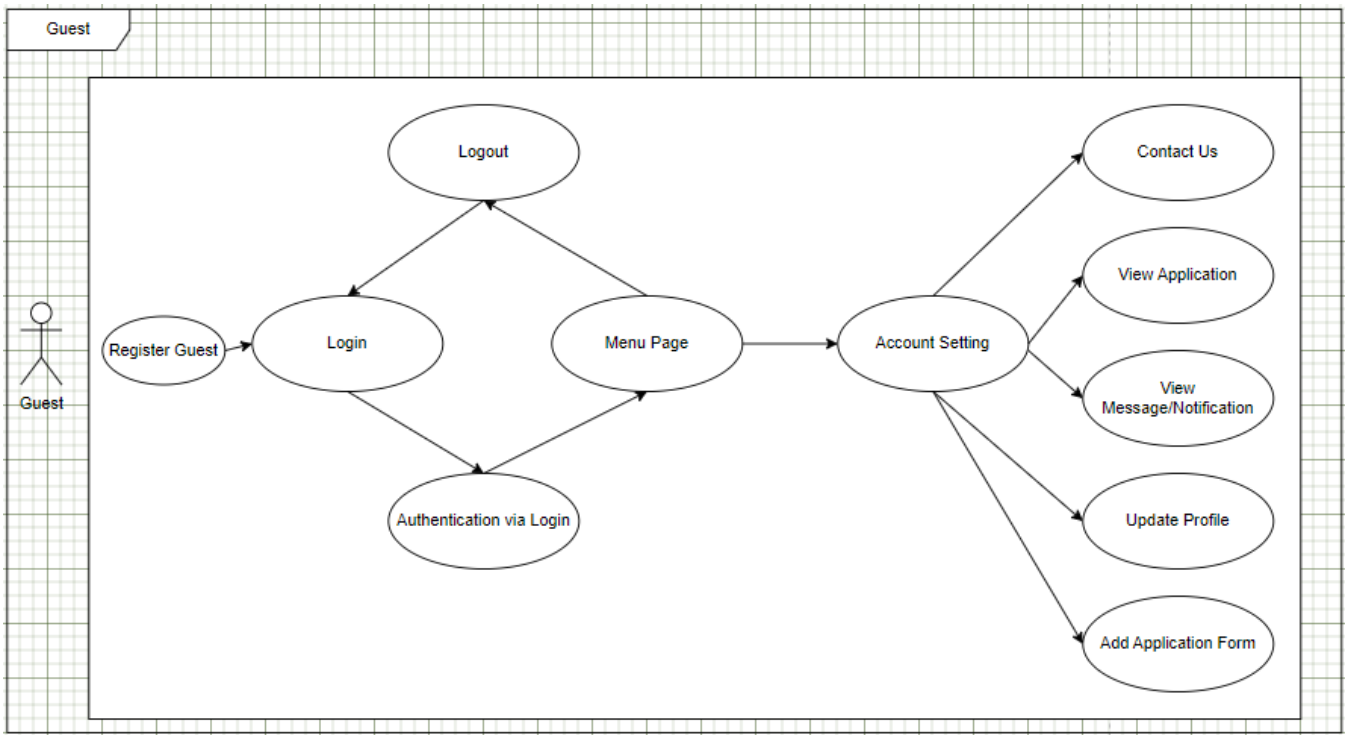
Name	Re-apply Existing Student
Actor	Student
Description	Re-enrolling yourself as an existing student into the system for the next academic year
Trigger	The actor needs to enroll themselves into the school registration system.
Pre-condition	The actor is logged into the system.
Development	1. The administrator enables option to view useful information for the students. a. Click into the menu page. b. Enroll information below into the system: a. First name b. Last name c. Gender d. Age e. Date of Birth f. Nationality g. Religion h. Grade Level i. Academic Year j. Parent's First name k. Parent's Last name l. Parent's Occupation m. Parent's Email n. Parent's Contact o. Address p. Profile Picture q. Files/Documents (prove of report card from previous school) r. Real-time date added c. Display the option to view notification from the administration

Post-condition	The actor had enrolled their information into the system

Name	View Notification
Actor	Student
Description	Display the Notification from the school administration
Trigger	The actor needs to view the user useful updates.
Pre-condition	The actor is logged into the system.
Development	1. The administrator enables option to view useful information for student's new updates. a. Click on the notification to view new updates. b. Exit from the notification
Post-condition	The actor had viewed the new updates.

Guest User

Guest User are able to view the useful information in the system.



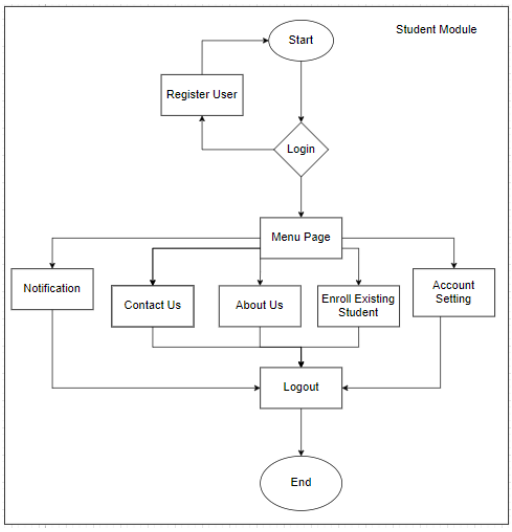
Name	View Menu Page
Actor	Guest
Description	Display the Menu Page
Trigger	The actor needs to view the user useful information.
Pre-condition	The actor is logged into the system.
Development	2. The administrator enables option to view useful information for the students. a. Click to view the profile and update setting.

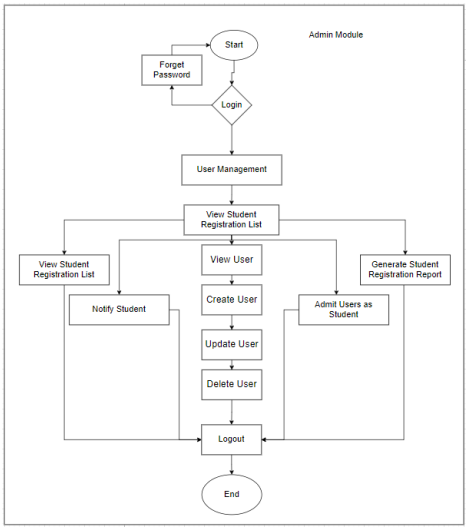
	b. Enroll yourself as a new student for the coming academic year c. Display the option to view notification from the administration
Post-condition	The actor had viewed the useful information.

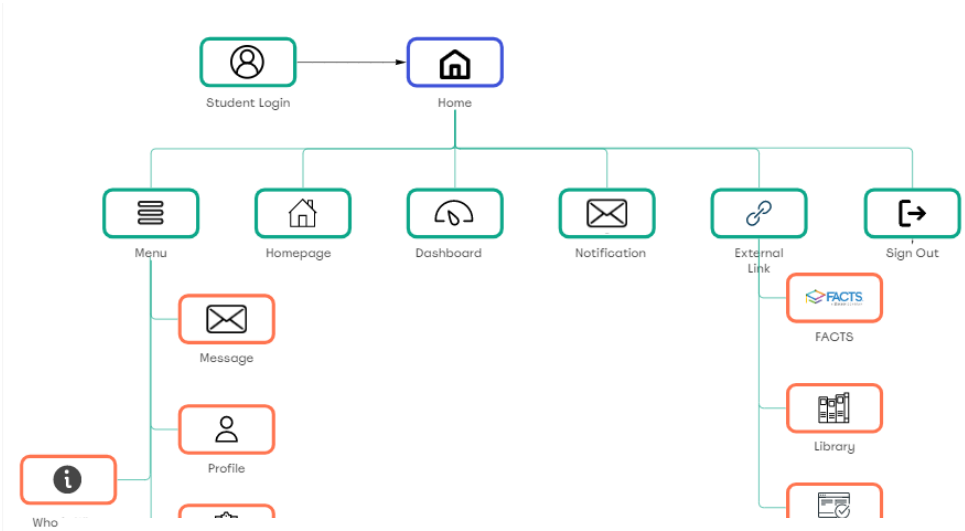
Name	Enroll New Student
Actor	Guest
Description	Enrolling new student into the system for the coming academic year
Trigger	The actor needs to enroll new student into the school registration system.
Pre-condition	The actor is logged into the system.
Development	2. The administrator enables option to view useful information for the students. a. Click into the menu page. b. Enroll information below into the system: 1. Surname 2. Given name 3. Gender 4. Date of Birth 5. Place of Birth 6. Nationality 7. Parent/Guardian First name/Last name 8. Parent/Guardian Email Address and Tel. Phone# 9. Parent/Guardian Age and Occupation 10. Current Home Address 11. Request to be enroll in 12. Portrait photos 13. Optional (prove of report card from previous school) 14. Real-time date c. Display the option to view notification from the administration
Post-condition	The actor had enrolled their information into the system

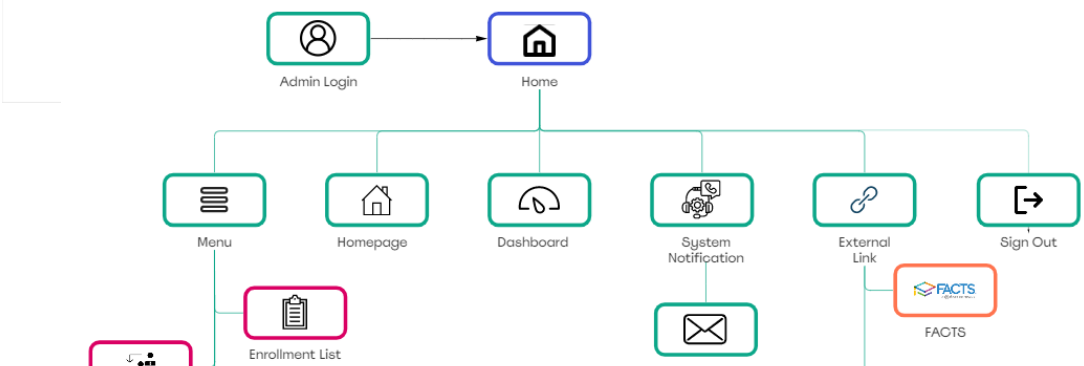
Name	View Notification
Actor	Guest
Description	Display the Notification from the school administration
Trigger	The actor needs to view the user useful updates.
Pre-condition	The actor is logged into the system.
Development	2. The administrator enables option to view useful information for student's new updates. a. Click on the notification to view new updates. b. Exit from the notification
Post-condition	The actor had viewed the new updates.

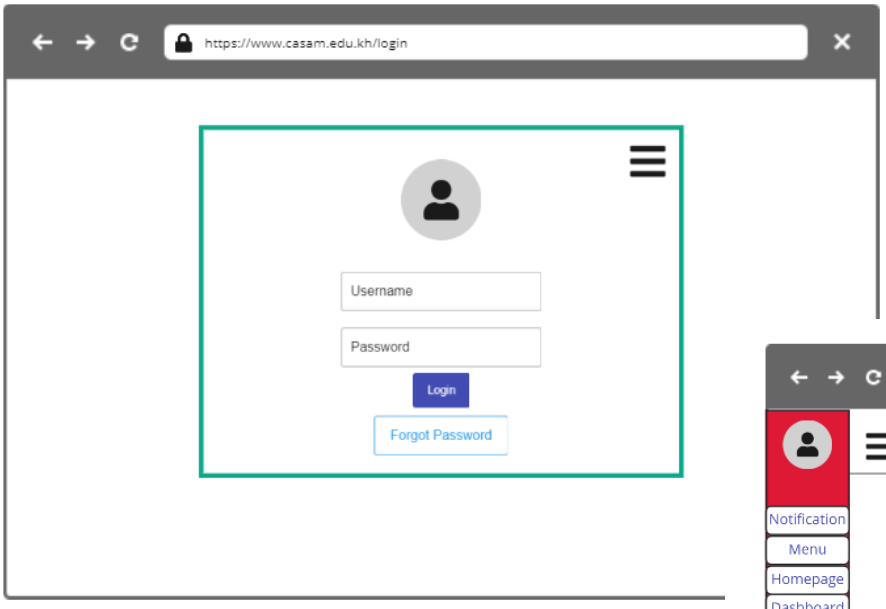
- **Performance Requirements:** The server will be hosting 24/7 throughout the weeks and month; therefore, a PC that is durable and reliable enough to handle this hosting will be at the least requirement of:
    - 1 250-V UPS
    - RAM 8 GB
    - SSD 500 GB
    - 1 Computer Screen
    - 1 domain name for Bluehost hosting server with a minimum of 1 TB cloud storage
    - 1 local hosting server using Windows 2016-2020 Server
    - Fast Ethernet cable connected to a Gigabyte switch
    - Processor – Intel Core i7/i9 or Intel Xeon
- **Control Requirements:** Below are the control requirement of user, student, and admin module.



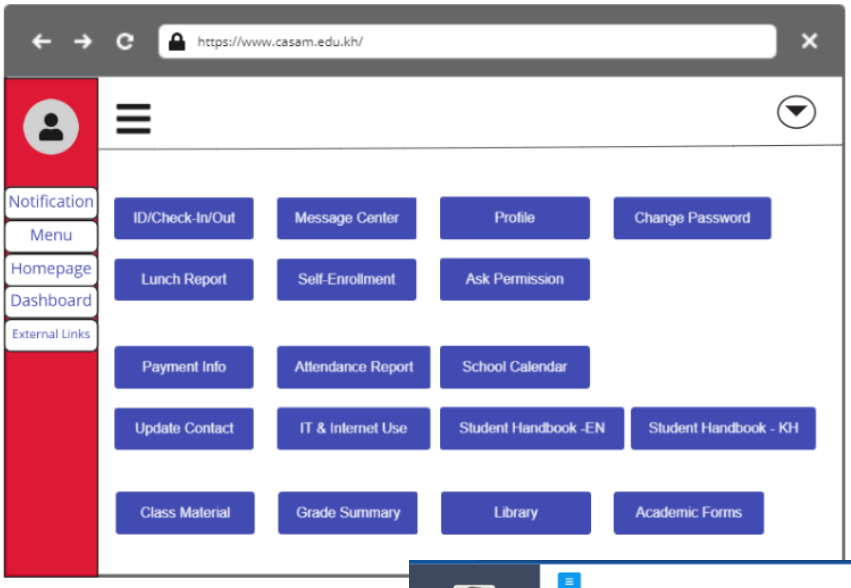


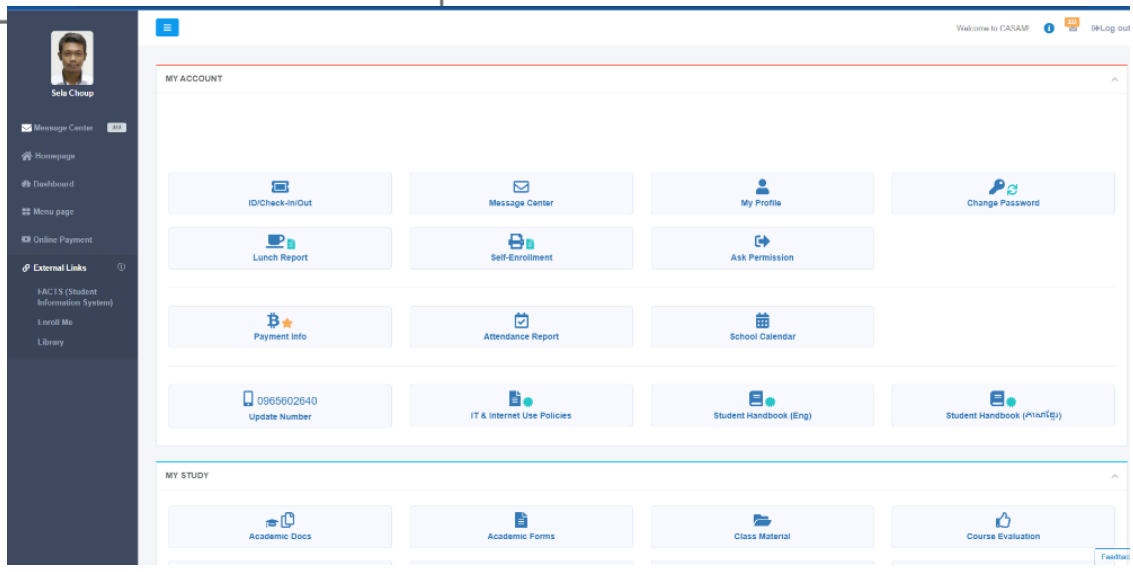




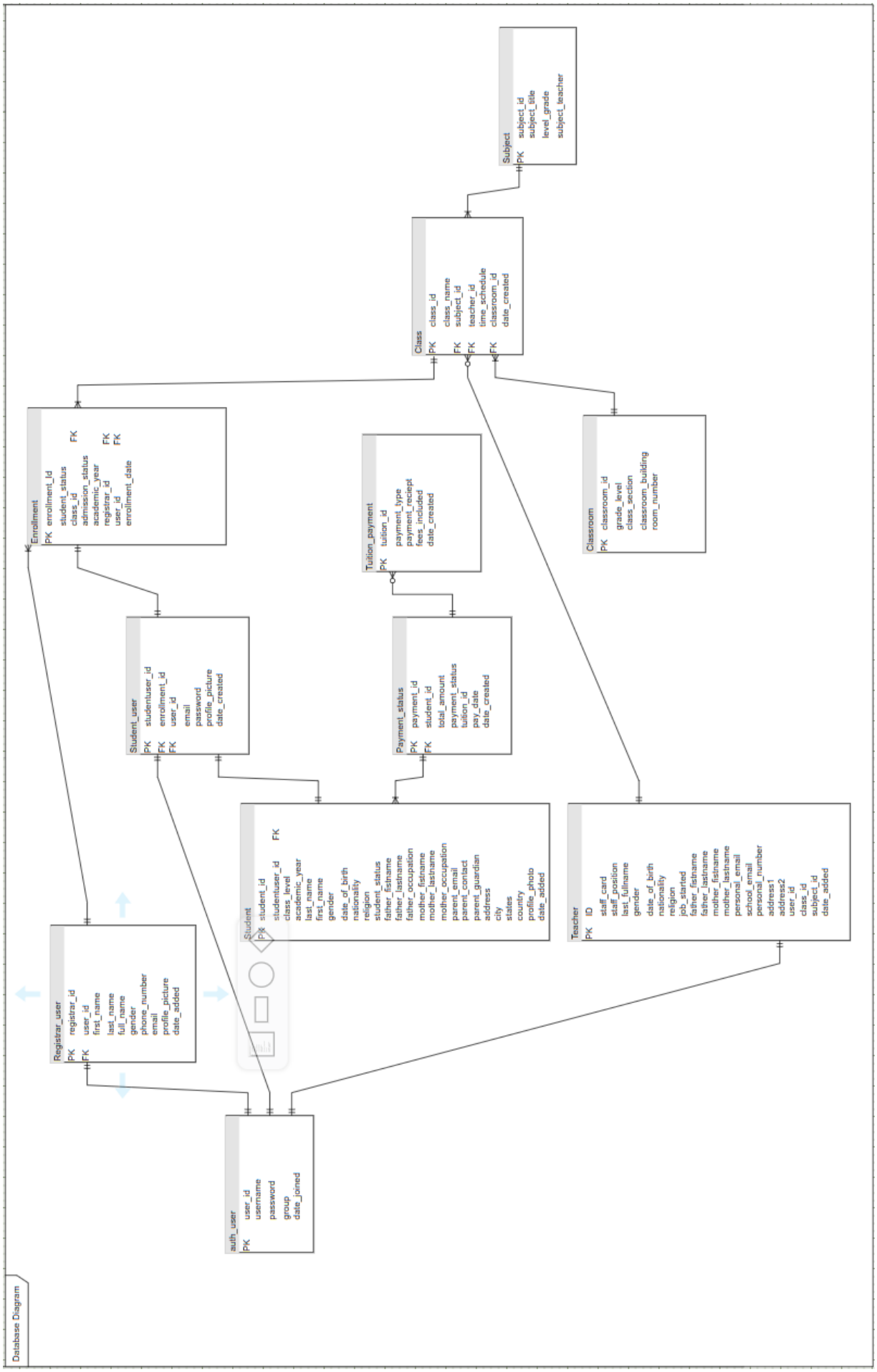

https://www.casam.edu.kh/login
Username
Password
Login
Forgot Password


https://www.casam.edu.kh/
Notification
Menu
Homepage
Dashboard
External Links
Enrollment Activity


https://www.casam.edu.kh/
Notification
Menu
Homepage
Dashboard
External Links
ID/Check-In/Out
Message Center
Profile
Change Password
Lunch Report
Self-Enrollment
Ask Permission
Payment Info
Attendance Report
School Calendar
Update Contact
IT & Internet Use
Student Handbook -EN
Student Handbook - KH
Class Material
Grade Summary
Library
Academic Forms


Sela Choup
MY ACCOUNT
ID/Check-In/Out
Message Center
My Profile
Change Password
Lunch Report
Self-Enrollment
Ask Permission
Payment Info
Attendance Report
School Calendar
0965602640
Update Number
IT & Internet Use Policies
Student Handbook (Eng)
MY STUDY
Academic Docs
Academic Forms
Class Material
Course Evaluation

- **Database Design**



Training Requirements: Documentation will be provided as a resource to aid the clients with all the necessary information given in the form of how-to-videos or tutorials. For developers, documentation of the whole-built system is what is required for further development or modification

4.3.3 Infrastructure Analysis

- **Hardware required vs Hardware available**

Hardware required	**Hardware available**
PC to host the server	PC to host the server

- **Software Required vs Software available**

Software required	**Software Available**
Apache Web Server	Apache Web Server
Django Framework	Django Framework
MySQL	MySQL
Bootstrap 5	Bootstrap 5
JavaScript, HTML, CSS	JavaScript, HTML, CSS
Visual Studio Code v1.77.3	Visual Studio Code v1.77.3

- **Network:** As long as our implementation is successful, we will start deploying our server into CAIS domain name. As of right now, the implementation and testing phase are locally run by localhost.

4.4 Testing

4.4.1 Testing Plan

The testing is to be done on a single day by the developer. The developer decided to use functional testing methodologies to make sure the application behaves as described in the use cases. The application can also be tested using automated tests however the developer decided not to, this decision was made in the interest of time.

4.4.2 Unit Test

This is a report of the unit tests that were conducted by the developer. The “Dependencies” section references “Test ID”.

Test ID	01
Test Priority	High
Module Name	User Login
Test Title	Login Test
Descriptions	The purpose of this test is to check if the User authentication login works as expected.
Pre-conditions	The user must be registered, and the browser must not have an ongoing session.
Dependencies	N/A
Test Steps	1) Navigate to URL (192.168.1.2:8000/login) 2) Enter username and password. 3) Click Login button
Test Data	1) User Login: registrar 2) Password: Asd,car15
Expected Result	User Logged in and session created

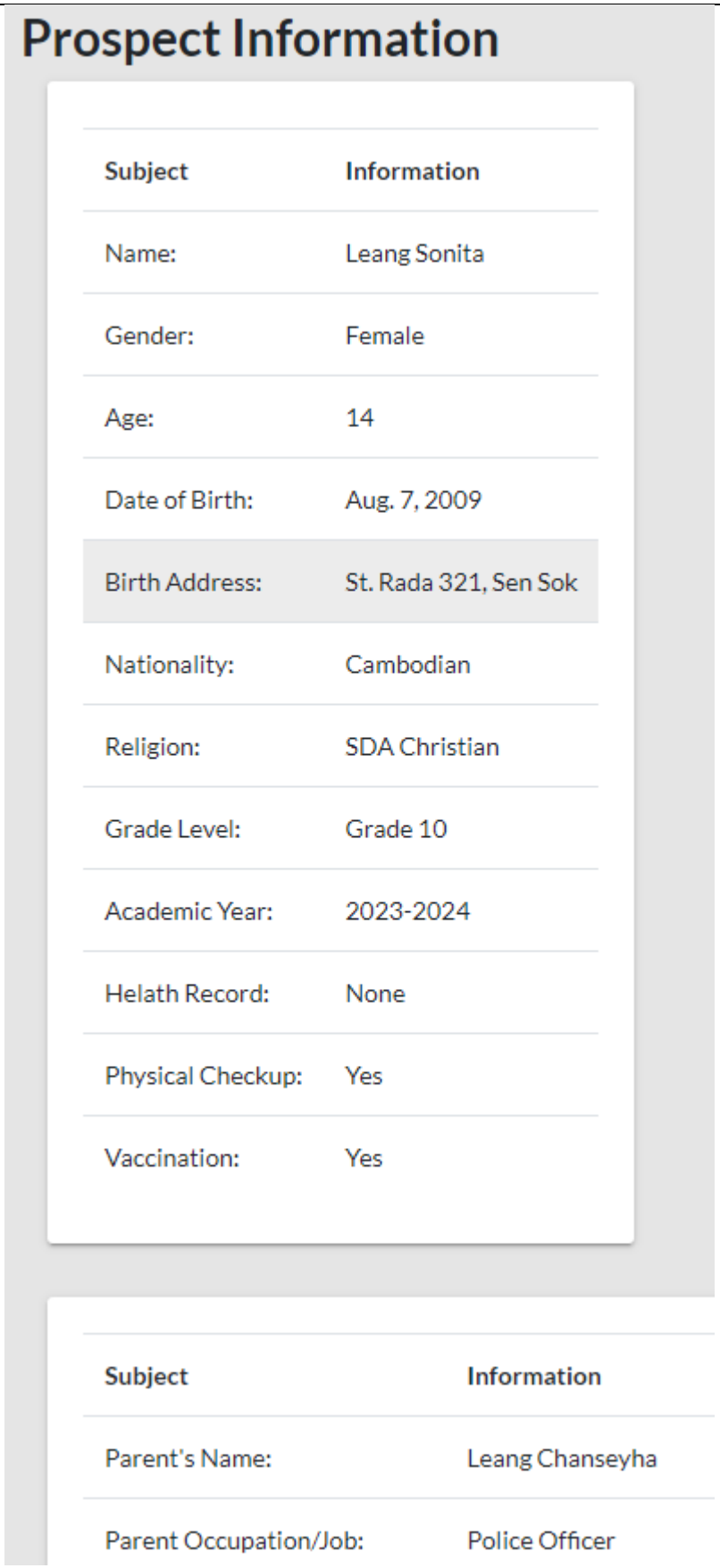
Post Conditions	Profile page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

Test ID	02
Test Priority	High
Module Name	New Student Application
Test Title	Application Form Submission Test
Descriptions	The purpose of this test is to check if the guest is able to apply new student application form and the data input are store into the school database system.
Pre-conditions	The user will be given link or visit CAIS website to apply for new student.
Dependencies	None
Test Steps	1) User does not need to login in order to apply 2) User will visit our CAIS website and browse to apply for new student registration 3) User will provide required input information to be submitted into the school system
Test Data	'first_name' : 'First Name', 'last_name' : 'Last Name', 'gender' : 'Gender', 'age' : 'Age', 'DoB' : 'Date of Birth', 'birth_address' : 'Birth Address', 'nationality' : 'Nationality', 'religion' : 'Religion', 'apply_grade_level' : 'Apply Grade Level', 'academic_year' : 'Academic Year', 'health_record' : 'Health Records', 'physical_checkup' : 'Physical Checkup', 'vaccinated' : 'Vaccinated', 'dose_vaccination' : 'Dose of Vaccine', 'id_vaccine_card' : 'ID Card of Vaccination', 'early_school' : 'Early School', 'profile_pic' : 'Profile Picture', 'parent_name' : 'Parent Name', 'parent_occupation' : 'Parent Occupation/Job', 'parent_email' : 'Parent Email', 'parent_contact' : 'Parent Phone Contact', 'emergency_cont_name' : 'Contact Name of Emergency', 'emergency_contact' : 'Emergency Contact Number', 'emergency_address' : 'Emergency Contact Address',

	'city' : 'City', 'country' : 'Country of Resident',
Expected Result	Display a pop-up that says “Successfully registered into the system!”
Post Conditions	A school website page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

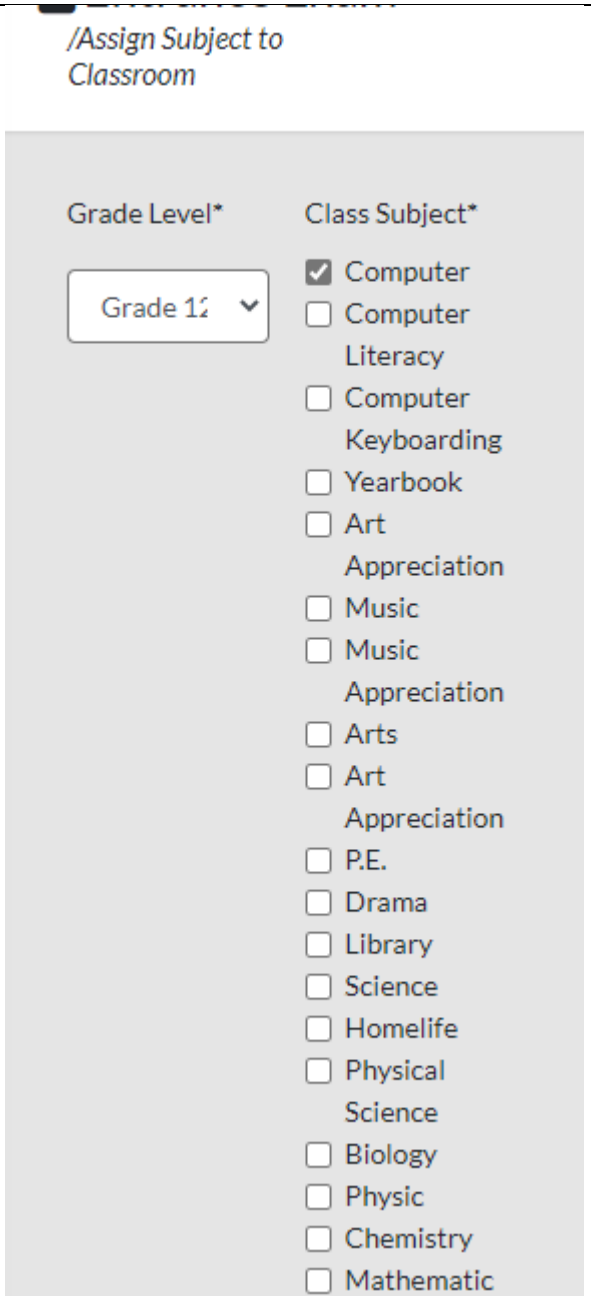
Test ID	03
Test Priority	High
Module Name	User Logout
Test Title	Logout Test
Descriptions	The purpose of this test is to check if the User authentication logout works as expected.
Pre-conditions	The user must be registered, and the browser must have an ongoing session.
Dependencies	01
Test Steps	1) Click logout at any point in the application.
Test Data	N/A
Expected Result	User Logged out and session cleared
Post Conditions	Login page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

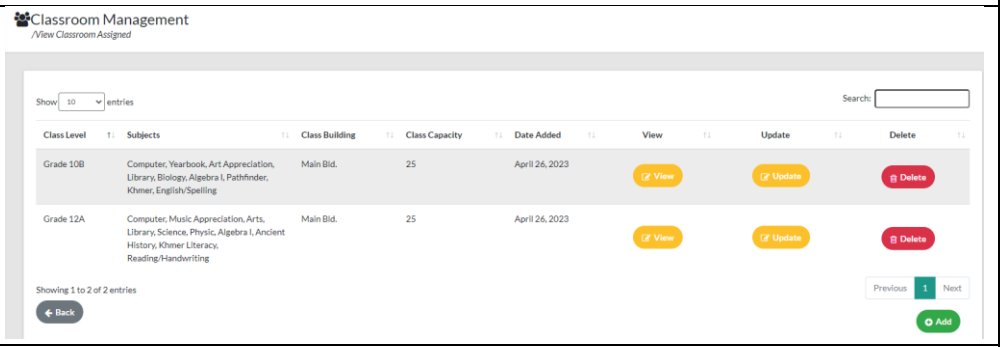
Test ID	04
Test Priority	High
Module Name	Registrar View Prospect
Test Title	Prospect View Test
Descriptions	The purpose of this test is to check if the User: registrar authenticated to view the prospects registered into the system.
Pre-conditions	1. The user must be registered 2. The browser must have an ongoing session.
Dependencies	01
Test Steps	1) Once logged in and authenticated to the registrar account, the user clicks on Registration under the context of Mange Enrollment. 2) Click the pop-up modal label “List Prospect” to show the list of prospects registered into the system 3) Click on “View” button to see all the prospect’s information

Test Data	
Expected Result	Successfully display the list of prospects registered and able to view each of the prospect's information
Post Conditions	View Prospects page rendered

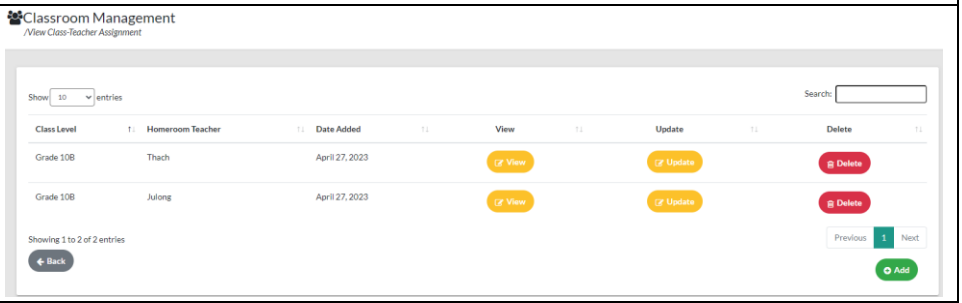
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

Test ID	05
Test Priority	High
Module Name	Registrar Enroll Subject
Test Title	Create Subject Enrollment Test
Descriptions	The purpose of this test is to check if the User: registrar authenticated to enroll subjects into the system grade level yet.
Pre-conditions	1. Registrar must be logged in 2. The browser must have an ongoing session.
Dependencies	01
Test Steps	4) Once logged in and authenticated to the registrar account. 5) the user clicks on the “Class Enrollment” button and enroll subject into each grade level 6) select the choices of grade level and match with the subjects available to its curriculum

Test Data	
Expected Result	After submitted it successfully displayed the list of grade level and class subjects with the options to view, update, and delete
Post Conditions	View Subjects page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A
Test ID	06
Test Priority	High
Module Name	Registrar View Assigned Classroom
Test Title	View Assigned Classroom Test
Descriptions	The purpose of this test is to check if the registrar has assigned the classroom into the system or not.

Pre-conditions	1. Registrar must be registered 2. The browser must have an ongoing session for registrar user 3. In the Classroom Management, click on Class Enrollment 4. Click on the Assigned Classroom to see if there any registered grade level with subject assigned to them stored in the system database yet
Dependencies	01, 05
Test Steps	7) Once logged in and authenticated to the registrar account, the user clicks on Class Enrollment under the context of Mange Enrollment. 8) Click the pop-up modal label “Assigned Classroom” to show the list of classroom assigned into the system 9) Click on “View” button to see all the prospect’s information or “Update” to update class with subjects or “Delete” to remove the data from database
Test Data	
Expected Result	Successfully display the list of classrooms assigned and able to view each of the class information
Post Conditions	View Classroom page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

Test ID	07
Test Priority	High
Module Name	View Assigned Teacher to Classroom
Test Title	Class-Teacher Assigned View Test
Descriptions	The purpose of this test is to check if the View of Classroom-teacher assigned is actually work.
Pre-conditions	1. Registrar must be registered 2. The browser must have an ongoing session for registrar user 3. In the Classroom Management, click on Class Enrollment 4. Click on the Assigned Class to see if there any teacher assigned to the classroom yet
Dependencies	01, 05, 06
Test Steps	5. Once logged in and authenticated to the registrar account, the user clicks on Class Enrollment under the context of Mange Enrollment.

	6. Click the pop-up modal label “Assigned Class” to show the list of classrooms assigned to the teacher yet 7. Click on “View” button to see all the classroom and teacher information or “Update” to update class with teacher or “Delete” to remove the data from database
Test Data	
Expected Result	Successfully display the list of classrooms assigned and able to view each of the class information
Post Conditions	View Class page rendered
Actual Result	As expected
Status (Pass/Fail)	Pass
Notes	N/A

4.4.3 Integration Test

The developer chose to use the top-down integration test method. This involves the testing from the highest-level modules and testing their subsequent lower-level modules.

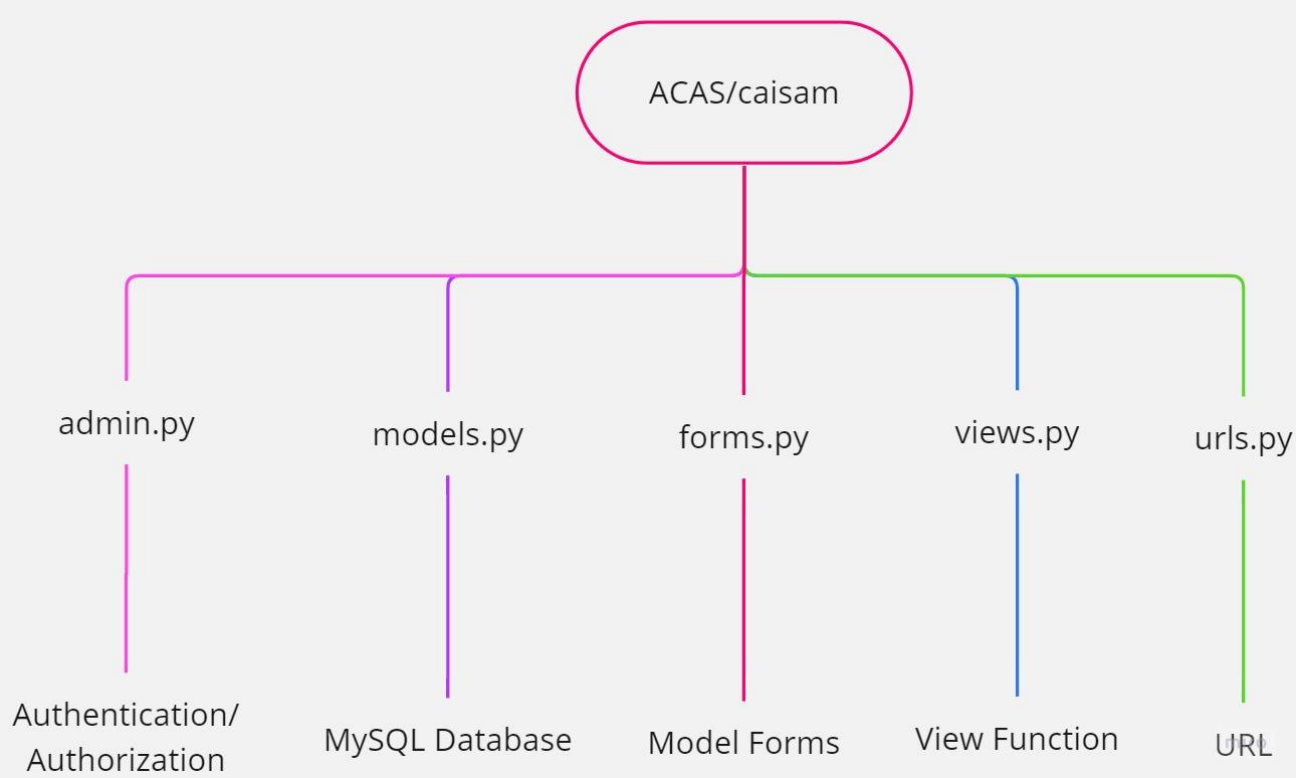


Figure 4.4.3 Integration Test

Figure 4.4.3 shows the hierarchy level of integration test combine different parts of code and functionality to simulate user behavior. It examines how the many components of the system interaction, such as URL routing, authentication, logic views, logging, and querying models. The most complicate efforts to do in this Django project is to handle views.py. In this views.py, you might end up testing a large amount of code rather than a tiny unit. Furthermore, because the test client is being utilized, you're evaluating the Django framework's mechanic that consists of URL routing, request middleware, and the response middleware, which is the views.py itself.

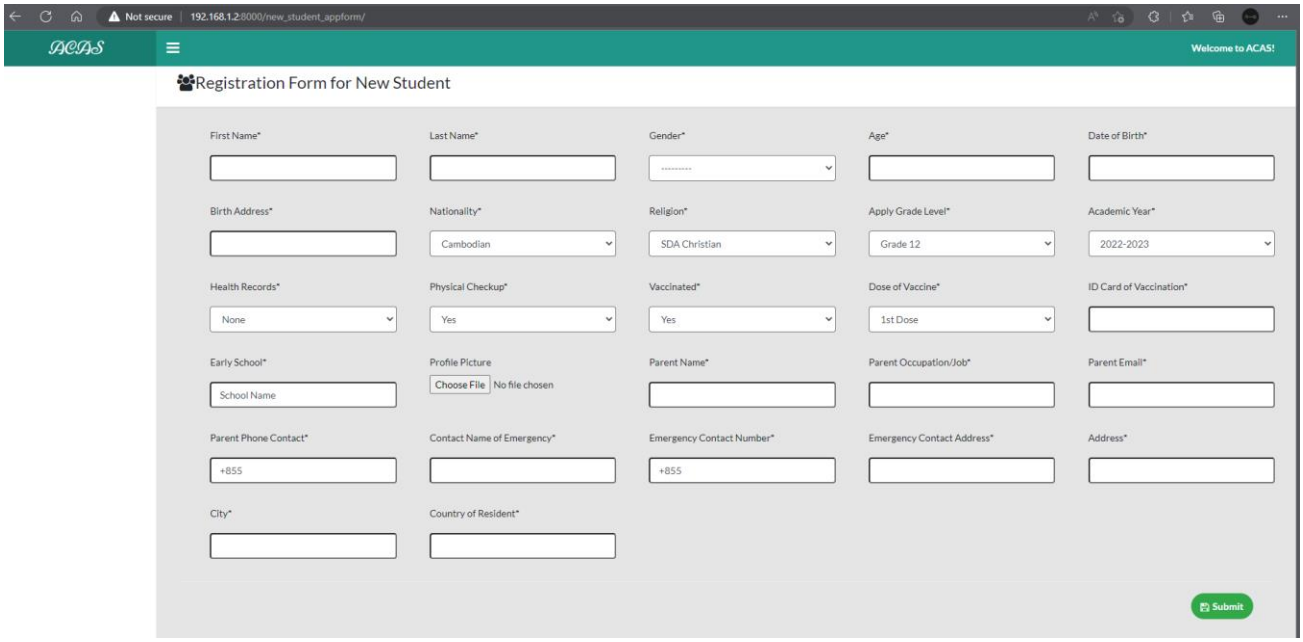


Figure 4.4.3.a Registration Form for New Student

Figure 4.4.3.a shows the new student registration form that can be accessible publicly to register into the system.

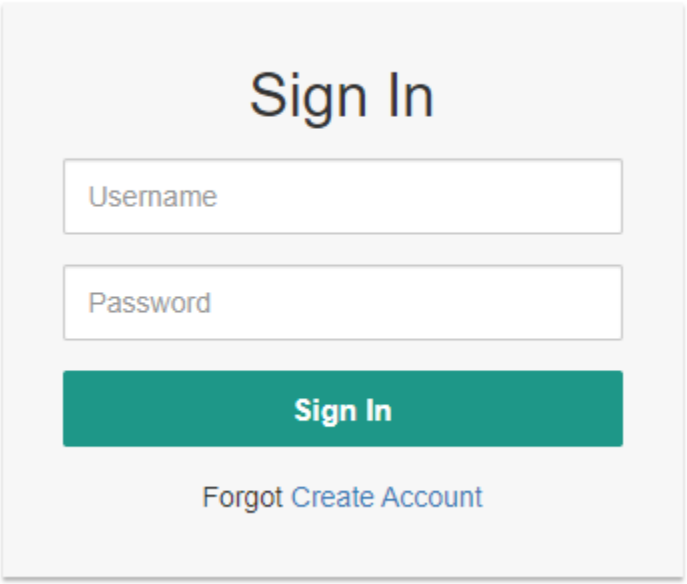


Figure 4.4.3.b Login Form for Users

Figure 4.4.3.b show the login form of a page for all users to authenticate when trying to login into the system.

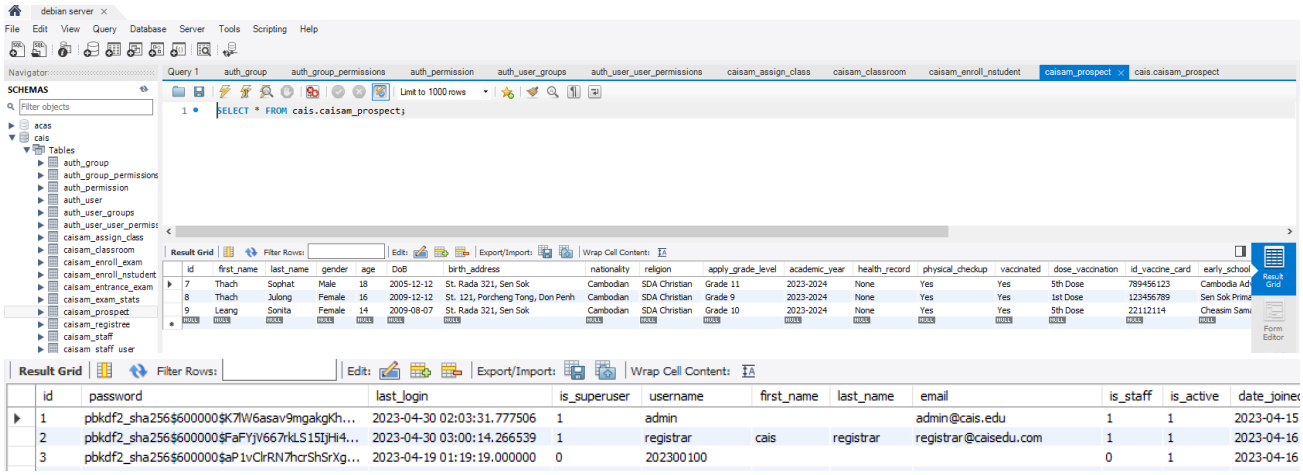


Figure 4.4.3.c auth_user

Figure 4.4.3.c shows authentication of user's password are being encrypted with PBKDF2 algorithm with a SHA256 hash a password stretching mechanism recommended by NIST and stored in the database.

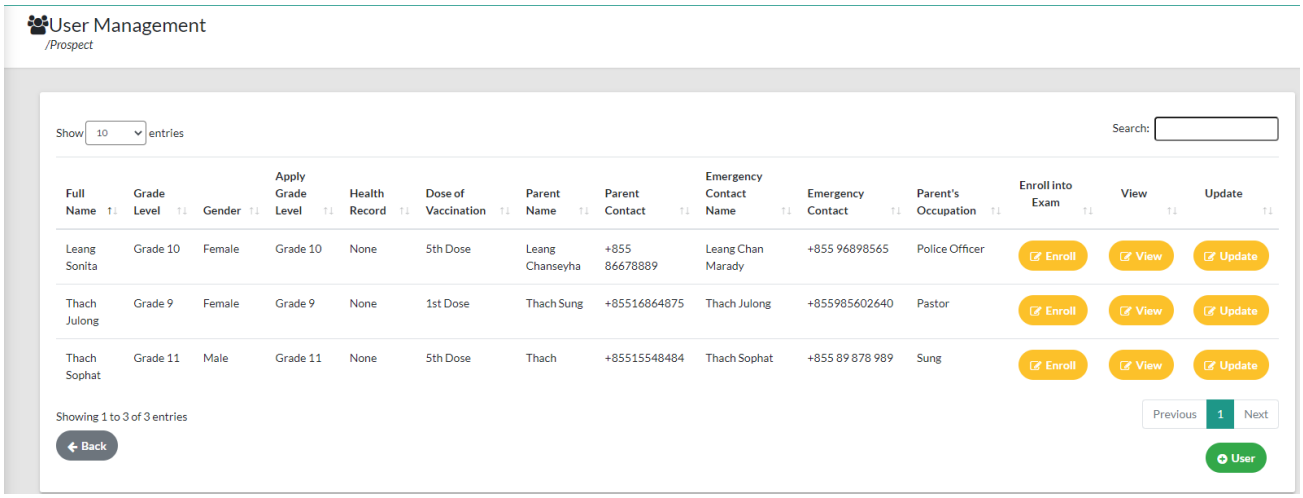


Figure 4.4.3.d List Prospect view from Registrar

Figure 4.4.3.d display the user management listing prospects who have enrolled into the system anonymously. With the given graphic design, registrar user will be able to view and update individually, hence the "enroll" button for prospect will enable the redirecting to exam enrollment.

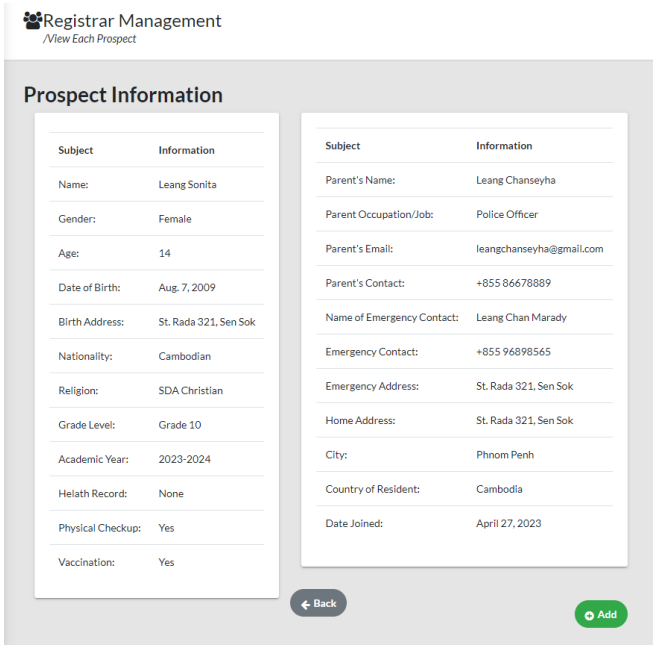


Figure 4.4.3.e View Each Prospect Information

Figure 4.4.3.e display the view of a prospect to his about information as per view function.

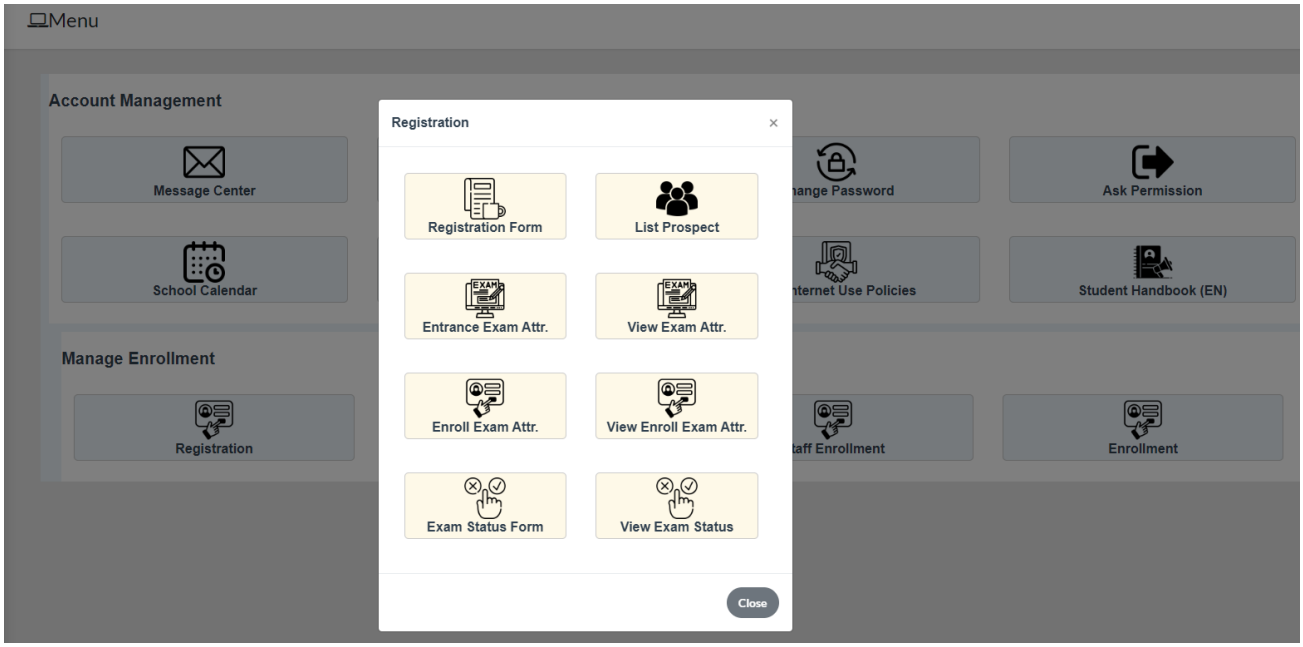


Figure 4.4.3.f Modal View for Registrar Menu

Figure 4.4.3.f display the modal view of registration process of manual prospect, entrance exam, enroll student into exam, and exam grading status. These modal views are often used in the registrar menu page.

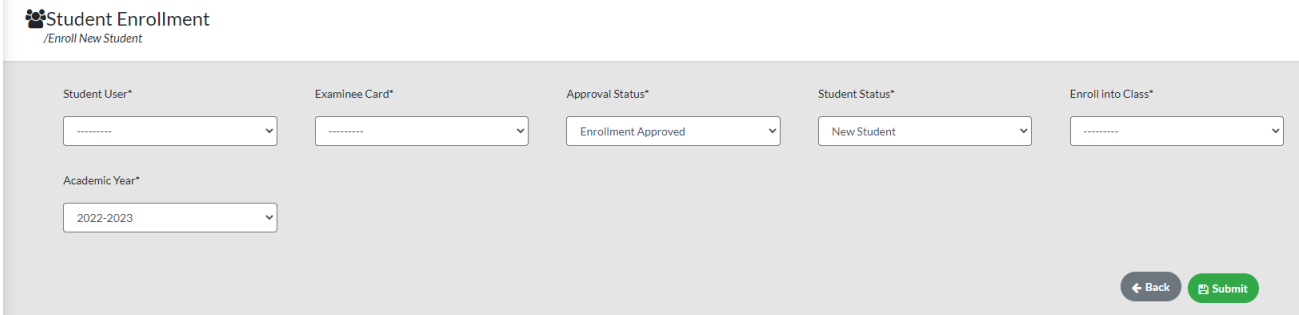


Figure 4.4.3.g Enroll Prospect into New Student

Figure 4.4.3.g display the enrollment process of prospect who passed/failed entrance exam and by the decision of the school administration to approve the prospect to be enrolled into the system as new student and student user.

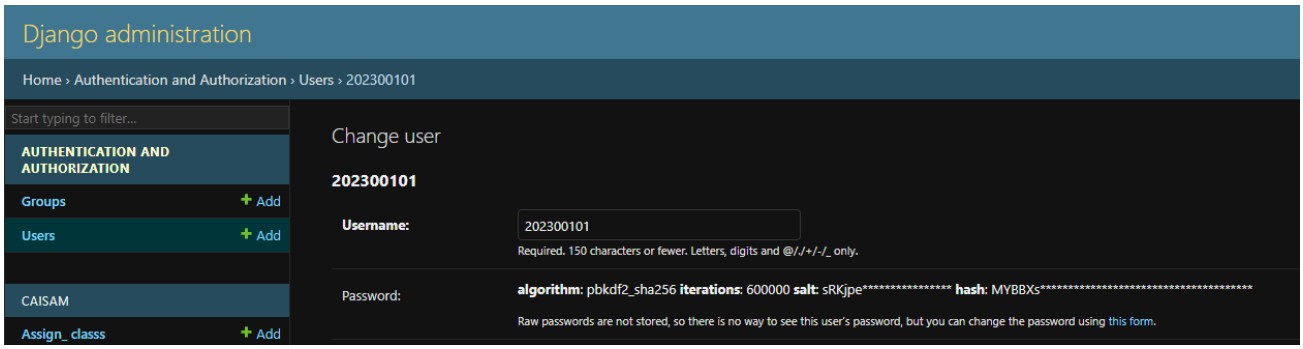


Figure 4.4.3.h

Figure 4.4.3.h display Django administration back-end for user authentication and authorization along with database control panel.

In conclusion, the modules that the system is built on, has no immediate failure yet. However, there are further improvements on the feature and higher security application apply to this project to create invulnerable penetration threats.

4.4.4 System Test

The developer gave the responsibility of doing the system test to his advisor Mr. Tola San. The results of the tests are in the Appendix at the sections Acceptance Test and Functions Checklist. The relative score given by Mr. Tola San was 80%, the user reports received the lowest score which is due to the basic design to which the developer is in agreeance.

- **Load and Stress Test**
- **Security and Performance Test**
- **Acceptance Test**

	Criteria	Score *4: Very good* *3 : Acceptable* *2 : Regular* *1 : Unacceptable*	Comments
1	Access to management options. (User management, items management, request management, etc.)		
2	Application functionality. (Does the application contain all the expected user functions?)		
3	Clarity of content, information and help.		
4	GUI design quality. (Texts, chars, pictures, component distribution, menus distribution, etc.)		
5	GUI accessibility and usability. (How friendly is the GUI?)		
6	Company brand design. (Is the application design aligned to the company brand rules/policies?).		
7	GUI simplicity. (How easy is using the application for the very first time?)		
8	Application navigability (How simple is navigate through the menus?)		
9	Report design quality. (Users report, payment report, items report, requests report, etc.)		
10	Overall application score.		
	Average score	x	
	Relative score	$a=100(\frac{x}{40})\%$	

Figure 4.4.4 Acceptance Test

	Functionality	Check
Item (*Data Object*)		
1	Add item.	
2	List items.	
3	Show item.	
4	Update item.	
5	Delete item.	
User (*Data Object*)		
1	Add user.	
2	List user.	
3	Show user.	
4	etc.	
	…	
	Total checked functions	x
	Total expected functions	n
	Relative Score	$b=100(\frac{x}{n})\%$

Figure 4.4.4 Functionality Test

4.5 Implementation Details

The framework that the developer is currently built-in is Python Django Framework for both backend and frontend server.

1. Routing

   The express framework uses routers in order to allow communication between the Users and the Data Model. Routes are used to move the data between endpoints and also transforms the data in some cases.
2. GitHub Repository
3. Project Flow

5 Conclusion

In order to develop an accurate and easier way of registering students, generate reports needed for enrollment, and to provide a user-friendly enrollment website in managing enrollment of old students, new student, there are few challenges in developing this online school admission system for CAIS enrollees. Problem mainly revolves around the debugging and code development for this project.

There are many attempts, backups, recoveries, and re-installation of these whole process just for developers to build up a familiarity with the Django framework, its relativity syntax and functional algorithms. However, those challenges have met resolve demands thanks to the resources available online like YouTube tutorials and troubleshooting techniques, Stack Overflow, GitHub community, Quora, DigitalOcean, GeeksforGeeks, and Django main page.

Education system are springing world-widely across the globe, admission system is not the first breakthrough in this case. There are many types of school system that are relatively available online including the sales of these web, mobile, desktop, and server application. However, the purpose of developing ACAS is to nurture ourselves as one of a professional with the flexibility to develop and maintain, self-govern and self-sustaining for future development.

5.1 Future Works

Our Potential Improvements for future work are such of:

- Better GUI of a much more responsive user-friendly screening, simplicity display, and the clarity of object like texts and buttons.
- Highest form of security on data encryption, account management, sensitive information, and cashflow for tuition payment that can do both local and international transaction.
- School management system that increase on the demand functionality such as grading system, attendance check-in/out, classroom management, online transaction, finance report, class materials, message center
- Looking forward to the integration of Library management system, Sun Plus, and LMS for School Learning Management System
- Further development on technology product like Mobile App, Desktop App, and the up-running VMware for cloud computing.

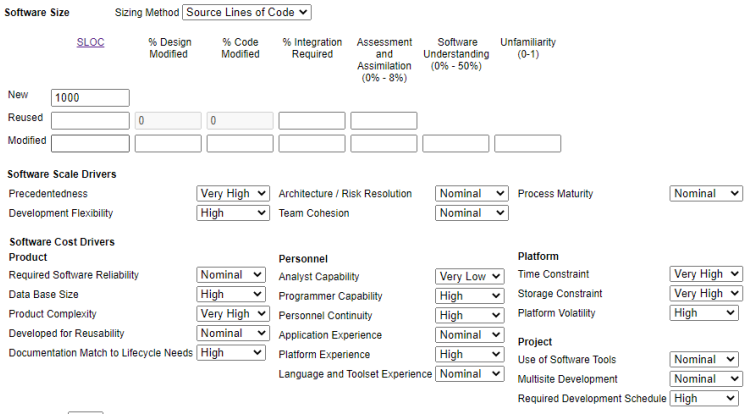
These future works will be much likely supported once the project is overseer and approved by the school administrative committee (ADCOM) for the benefits of CAIS. Another meeting for either the decision to stop or feedbacks/recommendation will be awaited with the potential future of ACAS.

6 Appendix

6.1 Software Cost Estimation

The study of the cost and benefit of the project in accordance to COCOMO II, a constructive cost model of software development, the project cost could estimate up to about ~$8855 in the span of 9.4 months with an estimate effort of $942/month despite only 1 person is handling this project. However, in reality, the developer does not have any expenses to develop this project. There are open-source tools that are available to develop and the developer is under the contract of working for the school anyway.

- The system is cost effective
- The cost of hardware is one-time built and self-sustainability which can be used for more than 5 more years
- The cost of employee’s time to study is effectively accessible by the HR/school ADCOM



Software Development (Elaboration and Construction)

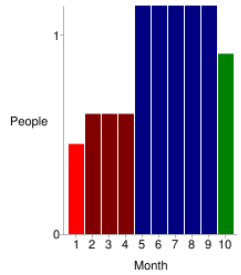
Effort = 8.9 Person-months
Schedule = 9.4 Months
Cost = $8855

Total Equivalent Size = 1000 SLOC
Effort Adjustment Factor (EAF) = 3.01

Acquisition Phase Distribution

Phase	Effort (Person-months)	Schedule (Months)	Average Staff	Cost (Dollars)
Inception	0.5	1.2	0.5	$531
Elaboration	2.1	3.5	0.6	$2125
Construction	6.7	5.9	1.1	$6730
Transition	1.1	1.2	0.9	$1063

Staffing Profile



Software Effort Distribution for RUP/MBASE (Person-Months)

Phase/Activity	Inception	Elaboration	Construction	Transition
Management	0.1	0.3	0.7	0.1
Environment/CM	0.1	0.2	0.3	0.1
Requirements	0.2	0.4	0.5	0.0
Design	0.1	0.8	1.1	0.0
Implementation	0.0	0.3	2.3	0.2
Assessment	0.0	0.2	1.6	0.3
Deployment	0.0	0.1	0.2	0.3

6.2 Documentation

6.2.1 Program Documentation

Program Documentation includes the following:

- Data Dictionary
- DFD and Object Models
- Source Documents,
- System Request

6.2.2 Operations Documentations

Operation Documentation includes the following:

- Installation process of the system
- Identification of users' roles
- Scheduling information for printed output and inputs
- Special instruction or forms

6.2.3 User Documentations

User Documentation includes the following:

- Manuals for Guest, Student, Admin, and Registrar Users
- Tutorials videos and FAQ (10 Questions)

References:

References

CamEd. (2021). *CamEd Business School*. Retrieved from https://cam-ed.com/online-portal/: https://cam-ed.com/online-portal/