AITCS

A Mobile-Based Counselling Application to Evaluate SMK Putrajaya Presint 9(2) Students

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Abstract: In educational pedagogy, counselling is very important for students. They remain in contact with the counsellor to figure out their personality traits for future taking. Nowadays, schools use papers in order to take student information and for counsellor to evaluate traits, monitor progress and personality each student. This engagement students and counsellor only happen during students in school session. Current system maintains every student data in hard copies which takes possibility of data duplication and chances of human mistakes is high and also may cause easy security breach. Therefore, to overcome data duplication, human error handling and secure every data, Sekolah Menengah Kebangsaan Putrajaya Presint 9(2) (SMKPP9(2)) Counselling Application is developed. This project intention is to make a computerized based system also via mobile application and support counsellor in managing self-esteem questionnaire in effective way. Object-oriented methodology is used to assist development of the application. Java language is used to develop this system and Firebase as a database software. This system contains nine modules which are login, add student account, view student list, self-esteem test, view result, book appointment, manage appointment and generate report. The testing result shows 28 over 30 test cases pass the testing. In conclusion, this system is expected to be easy for counselor to use an application where they can manage data and store student counselling process in automated computerized system.

Keywords: Counselling, Mobile application, Self-esteem, Android Studio

1. Introduction

Counseling is meant to encourage the success of students, enhance student performance and participation and help students improve socially. School counsellors are mainly important for fostering career development. They also known as guidance counsellors. Today, depending on the criteria of both the state and each individual school, the position of the school counsellor is multifaceted and can varies greatly. The streamlining of admissions is one of the essential criteria to ensure the quality teaching-learning process in school, right from the student entry to performance.

Students and educators are expected to have an inseparable connectivity connection to facilitate the learning process in academic learning, particularly when using digital devices such as cell phones or smartphones [1]. This system has been designed to enhance the counselling unit system in SMK Putrajaya Presint 9(2). The current school counselling process are manual-based, in which humans and paper are tremendously involved. Apart from counseling session management, students are asked to answer a set of questionnaires to evaluate their overall sense of self-worth and decide whether they need to improve on self-image. In order to fill out the questionnaire, students need to wait in the support desk line to fill in the specifics before continuing counselling session. The documentation is in hard copies, as well as in the form of digital papers from Microsoft Word or Excel.

The aim of this project is to make answering questionnaire set for counsellors and students an easier and faster process. The objectives are to design, develop and test the developed application. There will be two users involved in this application which are the counsellor and the students of designated school.

A mobile-based application for counselling is built and distributed to the target users at the end of the project according to the objectives of project. This application is easy for admin to use since the counsellor can manage data and store student counselling process in automated computerized system.

Section two of this paper presents the definition and business process of current existing counselling system. The comparison of three selected existing counselling management systems also have been discussed in next section. The third section discussed the methodology used to develop SMKPP9(2) counselling application. Next, section four is analyzing the result and discussion on implementation and testing. Lastly, section five concludes this paper.

2.   Literature Review

2.1   Existing system of Counselling in SMKPP9(2)

Currently, the counselling process use a manual system to record and manage its counsel operations. A student see counselor to understand their self-esteem and underwent a counselling session if their gain low result of self-esteem questionnaire. Students who want to meet the counsellor for counselling need to go to the counter of the counselling office and fill the appointment form. Then they need to hands the form to the counsellor and wait for the counsellor to respond to their appointment date and time. Here, the appointment confirmation is informed verbally and students will receive a small paper of the appointment detail. On the appointment time, student needs to answer a set of questionnaire and counsellor need to count after they finished it and make a copy of the result. The counsellor records the student information on a paper and kept in a file manually, including their appointment details. Counsellor needs to find file by file to find the recorded information in the shelves. In addition, for this counselling process to maintain its case studies, this manual method offers a clear process. Figure 1 shows the existing process through the As-Is model.
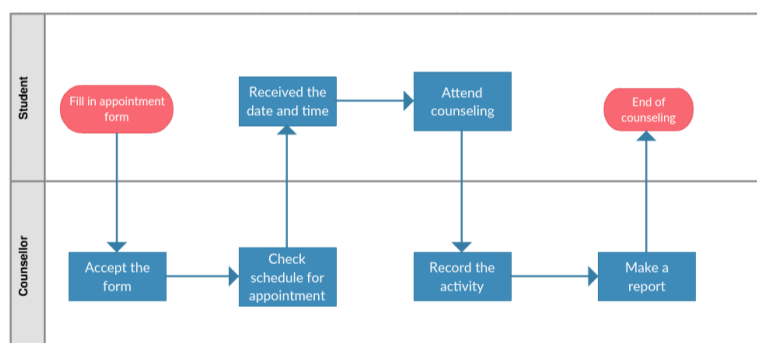

Figure 1: As-Is Model Diagram

2.2   Technology Approach

The aim of this section is to define the technology and techniques used in the developed system. Mobile apps are an increasingly growing part of the global mobile industry in the developing field of technology [2]. Software design of Android app is intended to work on an Android device or emulator. The language of writing Android apps are Kotlin, Java and C++ and run inside Android Studio which is their official the development. The Android SDK tools compile the code along app code, resources and meta information into Android Package (APK) which is Android package an archive file. There are four layers of Android architecture: Linux Kernel, Libraries and Android runtime, Application framework and Applications [3]. Android Software Development Kit is used to developed android application using Java language.

2.3   Comparison of Existing Related Systems

In the development of SMKPP9(2) Counselling Application, three of the systems were chosen as the guide. The papers that been studied are Academic Cyber Counselling Application (ACCA) [1], Unisza Counselling Management System (UCMS) [4] and Student Counselling Management System (SCMS) [5]. There are similarities and differences in each of these systems. Hence, the analysis carried out the latest idea in SMKPP9(2) counselling application development. Table 1 shows the comparison between the existing system and the new system that is being developed.

Table 1: Comparison of Existing System Specifications

Features/System	ACCA	UCMS	SCMS	SMKPP9(2)CA
Platform	Mobile-based	Web-based	Web based	Mobile-based
Login	Supervisor, Student	Administrator, Counsellor, User	Counsellor, Coordinator counselor	Student, Counsellor
User Profile	Each user can manage profile	Each user can manage profile	Each user can manage profile	Each user can manage profile
Self-Esteem Questionnaire	Do not have questionnaire	Have questionnaire	Do not have questionnaire	Have questionnaire
Appointment Booking	Do not provide appointment	By system	Do not provide appointment	By application
Notification	Do not provide notification	Do not provide notification	Provide notification	Provide notification
Record the session	By manual	Do not provide	Do not provide	By application
Generate Report	Provide report	Provide user, counsellor and appointment report	Provide report of counselee details	Provide report on total of student for each level self-esteem questionnaire

Based on the table comparison, there are eight features chosen to compared, which are Login, User Profile, Career Questionnaire, Appointment Booking, Notification, Counselling Slot, Record the session and Generate Report. Firstly, ACCA and SCMS do not provide self-esteem questionnaire for students to answer and booking appointment in the system. Secondly, ACCA and UCMS do not have the notification to the user while SCMS only interact with parents with the student university result. Next, only ACCA will record the progress of the counselling. UCMS and SCMS do not provide this

feature. In the developed system, counsellor can record the activity and the detail of the counselling session in the system. All systems above had the generated report. ACCA only provide academic report, UCMS provide user report, admin report and appointment report whilst this system will provide report of questionnaire result in graph by category. Lastly, all three existing related systems and built system have similar features such as user login and user profile.

3.   Methodology

The method of developing SMKPP9(2) Counselling is Object-Oriented Methodology. In this project, the sequences and tasks will also be worked out in more detail, including the workflow procedure, the hardware and the software equipment used. For the timeline of this project, Gantt chart has been created and is located in Appendix A.

3.1   System Development Workflow

Each software process model phase has its own task and product that must be produced during the entire development of the project. Table 2 shows the development workflow for each phase, task and output obtained.

Table 2: Software Development Activities and Task

Phase	Task	Output
Planning	• Identify and proposed the title of the project • Identify objective and problem statement. • Determine the system scope and project significance.	• Project proposal • Objectives, problem statement, project scope and project significance.
Analysis	• Collecting information and identify the user requirements. • Review on the related technology • Review the current existing system. • Identify system requirement. • Identify hardware and software requirement. • Draw the use case diagram, sequence diagram, activity diagram and class diagram.	• Use case diagram, sequence diagram, activity diagram and class diagram. • System flow model • Hardware and software specifications.
Design	• Create the user interface of application. • Design the database.	• User interface of SMKPP9(2) Counselling Application. • Data dictionary

Table 3: (cont)

Phase	Task	Output
Implementation	• Identify the programming language in system development. • Code implementation. • Setup android emulator.	• The coding of system. • Ensure the function of the system run. • Setup emulator with proxy.
Testing	• Testing the system function	• Test case • Modify the error

3.2   System Requirement Analysis

Requirement Analysis covers all activities that evaluate the demands or criteria to be met for a new system, taking into account the different parties' potentially contradictory requirements, evaluating, recording, validating and handling software or system requirements. Table 3 and 4 shows Functional Requirement and Non-Functional Requirement respectively.

Table 4: Functional Requirement

No.	Module	Functionality
1.	Login	1. System shall allow user to enter email and password 2. System shall allow user to click login button 3. System shall verify the entered email and password.
2.	Answer Questionnaire	1. System shall allow user to answer the questionnaire. 2. System shall allow user to receive result immediately after answering.
3.	View Result	1. System shall display the questionnaire result in the student and counsellor account.
4.	Manage Profile	1. System shall allow user to edit the personal information.
5.	Book an Appointment	1. System shall provide a calendar view for user to choose date for appointment. 2. System shall provide a time for user to choose for appointment. 3. System shall allow user to view the detail information of the appointment.
6.	Manage Appointment	1. System shall allow counsellor to accept or decline the appointment. 2. System shall allow to send notification to user for the appointment confirmation.

Table 5: (cont)

No.	Module	Functionality
7.	Add Student Account	1. System shall allow counsellor to add student information to make an account. 2. System shall allow to submit the information to the email of user.
8.	View Student List	1. System shall allow counsellor to view the student information. 2. System shall allow counsellor to edit the student information. 3. System shall allow counsellor to delete the student information.
9.	Generate Report	1. System shall allow display the report as in chart regarding to the questionnaire.

Table 6: Non-Functional Requirement

No.	Type	Functionality
1	Operational	1. System should be able run-on Android smart phone.
2.	Performance	1. System should be available to use 24 hours.
3.	Security	1. System can be login by entering the email and password.

There are 10 use cases as attach in Appendix B generated. The four use cases are for the student and the other seven are for counsellor. While based on Appendix C, it shows the sequence diagram of main activity of counsellor and student. Counsellor and student need to enter email and password to enter the system. Appendix D shows the activity diagram of student and counsellor. It shows the activities flow inside the user. There are 11 main classes in the developed system can be refer to Appendix E.

3.3   System Design

System design is an essential which it is an information for the system to be applied in the implementation phase. To-be model is an output of the system design where a few updates have been made from the as-is diagram as shown in Figure 2. In to-be model, there are improvements from the as-is model such as students are registered by the counsellor in the system, do the questionnaires and can view the result immediately. Students also can book for appointment in the system instead fill the appointment form by the counter.
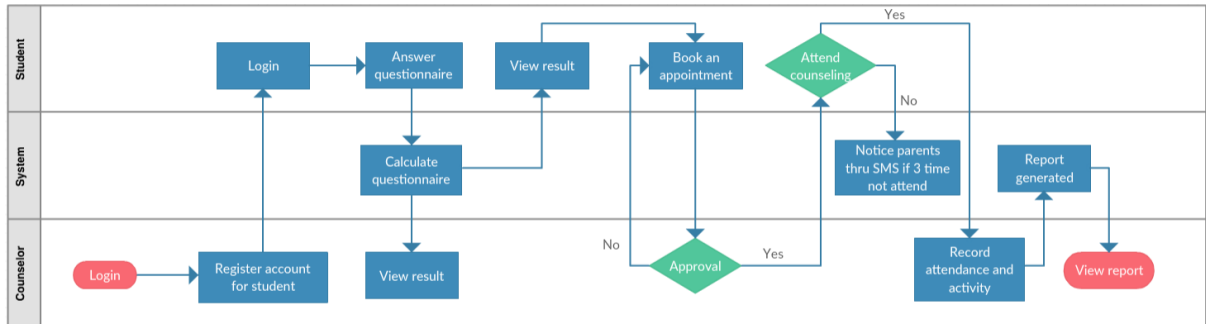
Figure 2: To-Be Model

4.   Results and Discussion

This section is to discuss about implementation and testing. The process of designing the system according to the specifications, requirements, and designs specified. The aim of the testing is to ensure that the system is built in accordance with the specified goals. The results of the testing are described and shown in the test plans.

4.1   Implementation

Application is primarily developed in Java, with Extensible Markup Language (XML) utilized for the designs and layouts of each module. To connect with the suggested application, the Firebase tool is chosen and used. Figure 3 shows the interface of application which is the Login page and when they click button login they will redirect to the main page according to their level user, Counsellor or Students.
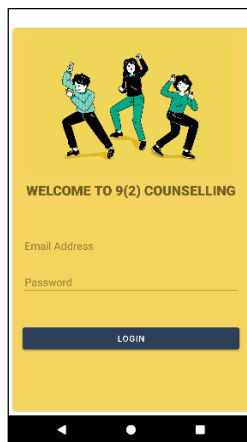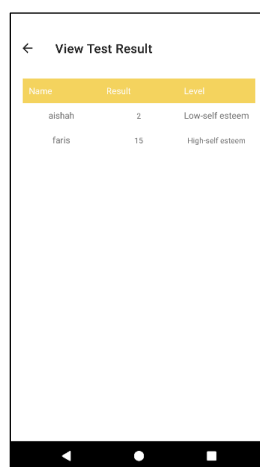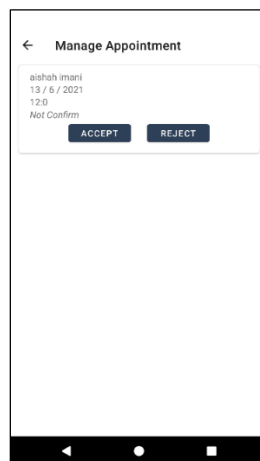

Figure 3: Login Interface

Figure 4 shows the interface of add questions for self-esteem questionnaire in counsellor apps. While in Figure 5 depicts the interface of list result of questionnaire. Counsellor manage booked appointment interface in Figure 6
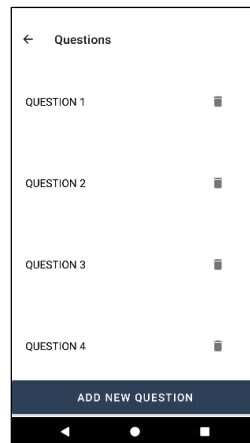
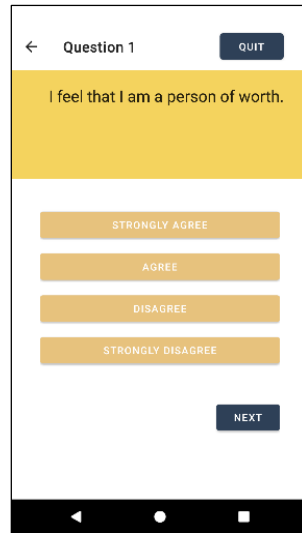**Figure 4: Add Question for Questionnaire**
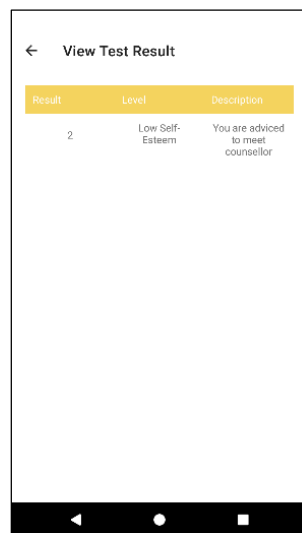

Figure 5: View List Result

Figure 6: Manage Appointment

Figure 7 shows the interface of questionnaire in student apps with button next for next question and quit to quit form the questionnaire and the result is shown in Figure 8 with total, level of self-esteem and description to meet counsellor.

Figure 7: Questionnaire Interface

Figure 8: Questionnaire result

4.2   System Functionality Testing

The purpose of functional testing is to ensure that all of the application's components and features work properly. This is done to guarantee that the system performs and functions as it should. The testing elements are incorporated into the test plans depending on each module's various test cases. There are 10 test cases with total of 30 test cases with 28 total case passes. Appendix D depicts the summarize of test cases.

5.   Conclusion

To conclude, this application is well-implemented and satisfies all of the objectives and scopes set during the system's previous development phase. Furthermore, this application help to provide the school counsellor simplest way of counselling session. All of the information of students is stored in the system systematically and be retrieved it anytime. Although the system has certain flaws, such as the questionnaire is only for one set, it can be enhanced by putting in more initiative to overcome the flaws and improve other aspects so that they can perform better for the user and community in future. The significance of the study is that it will provide an automated system for counselling system for

SMKPP9(2) counselling unit. It will help in counsellor to record the data in efficient way. At the same time this system is develop for future interest

Acknowledgement

Appendix A Gantt Chart

| ID	Task Mode	Task Name	Duration	Start	Finish
1	✈	**SMKPP9(2) Counselling Application**	**188 days**	Mon 5/10/2(	Wed 23/6/21
2	✈	**1.0 Planning**	**12 days**	Mon 5/10/2(	Tue 20/10/2(
3	✈	Study existing system	2 days	Mon 5/10/2(	Tue 6/10/20
4	✈	Study background	2 days	Wed 7/10/2(	Thu 8/10/20
5	✈	Identify problem and objective of study	2 days	Fri 9/10/20	Mon 12/10/2
6	✈	Prepare proposal	4 days	Tue 13/10/2(	Fri 16/10/20
7	✈	Submit proposal for Supervision	1 day	Mon 19/10/2	Mon 19/10/2
8	✈	Proposal presentation	1 day	Tue 20/10/2(	Tue 20/10/2(
9	✈	**2.0 Analysis**	**20 days**	Thu 22/10/2(	Wed 18/11/2
10	✈	Intervie counsellor	1 day	Thu 22/10/2(	Thu 22/10/2(
11	✈	Analysis requirement	3 days	Fri 23/10/20	Tue 27/10/2(
12	✈	Analysis input and output	3 days	Wed 28/10/2	Fri 30/10/20
13	✈	Find data from internet and various sources	3 days	Mon 2/11/2(	Wed 4/11/20
14	✈	Record and update information	3 days	Thu 5/11/20	Mon 9/11/20
15	✈	Analyze information	3 days	Tue 10/11/2(	Thu 12/11/2(
16	✈	**3.0 Design**	**15 days**	Thu 19/11/2(	Wed 9/12/20
17	✈	Desing use case, class diagram, activity diagram, sequence diagram	4 days	Thu 19/11/20	Tue 24/11/20
18	✈	Design process specification	2 days	Wed 25/11/2	Thu 26/11/2(
19	✈	Design the database	2 days	Fri 27/11/20	Mon 30/11/2
20	✈	Design interface and other modules	7 days	Tue 1/12/20	Wed 9/12/20
21	✈	**4.0 Implementation**	**125 days**	Thu 10/12/2(	Wed 2/6/21
22	✈	Developing user interface and other module	22 days	Thu 10/12/2(	Fri 8/1/21
23	✈	Seminar 1 Presentation	1 day	Mon 11/1/21	Mon 11/1/21
24	✈	Continue developing other modules	97 days	Tue 12/1/21	Wed 26/5/21
25	✈	**5.0 Testing**	**15 days**	Thu 3/6/21	Wed 23/6/21
26	✈	System testing with users for feedback and evaluation	1 day	Thu 3/6/21	Thu 3/6/21
27	✈	Improve system	4 days	Fri 4/6/21	Wed 9/6/21
28	✈	Project documentation and presentation	10 days	Thu 10/6/21	Wed 23/6/21

Appendix B Use Case Diagram
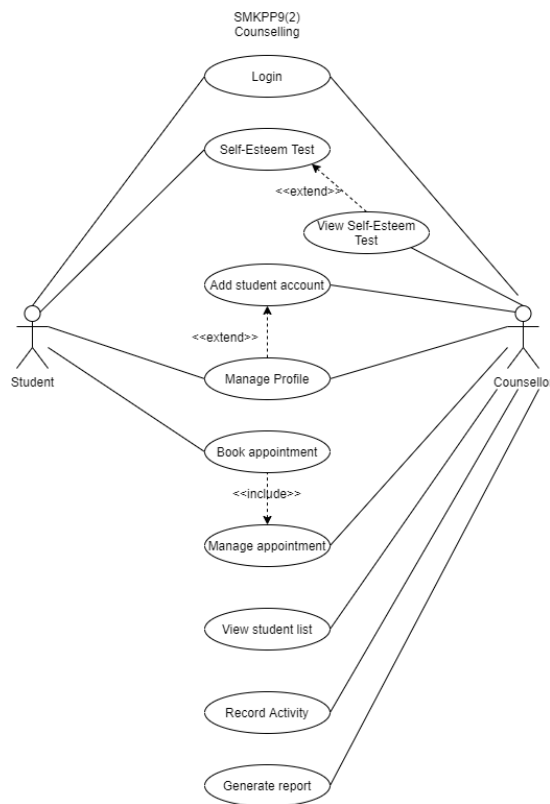
Appendix C Sequence diagram
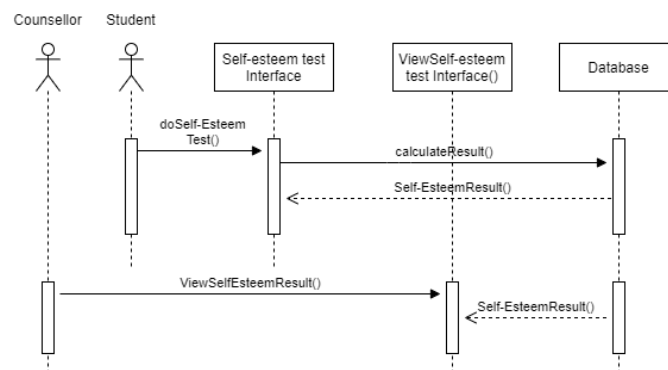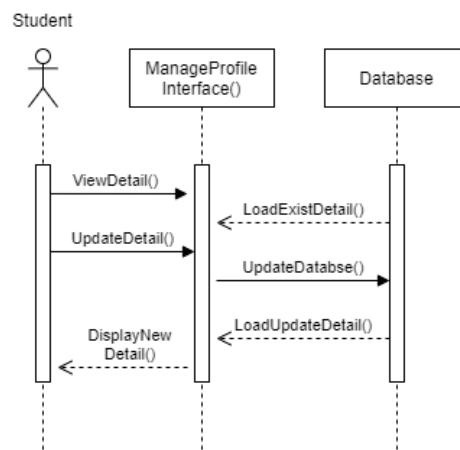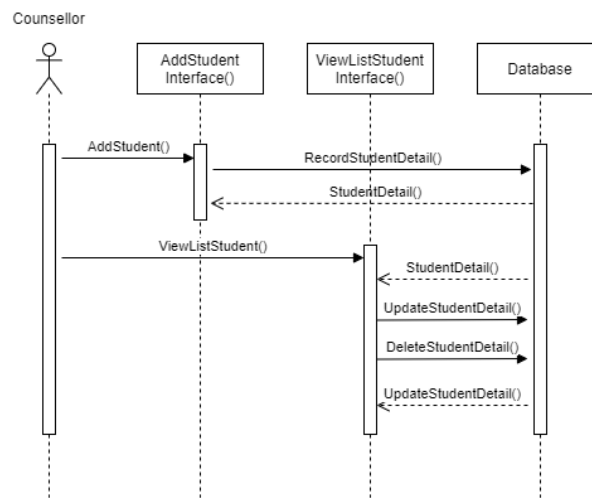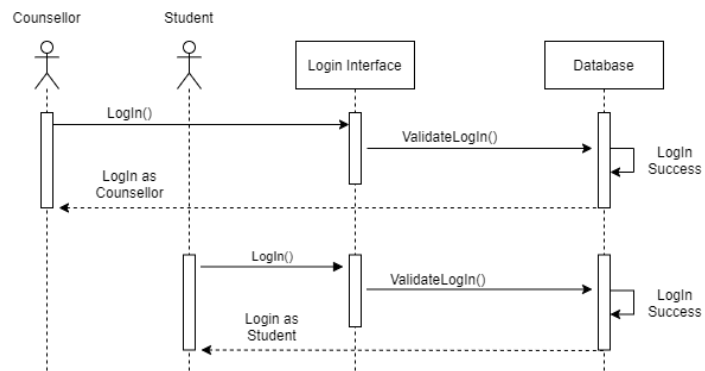
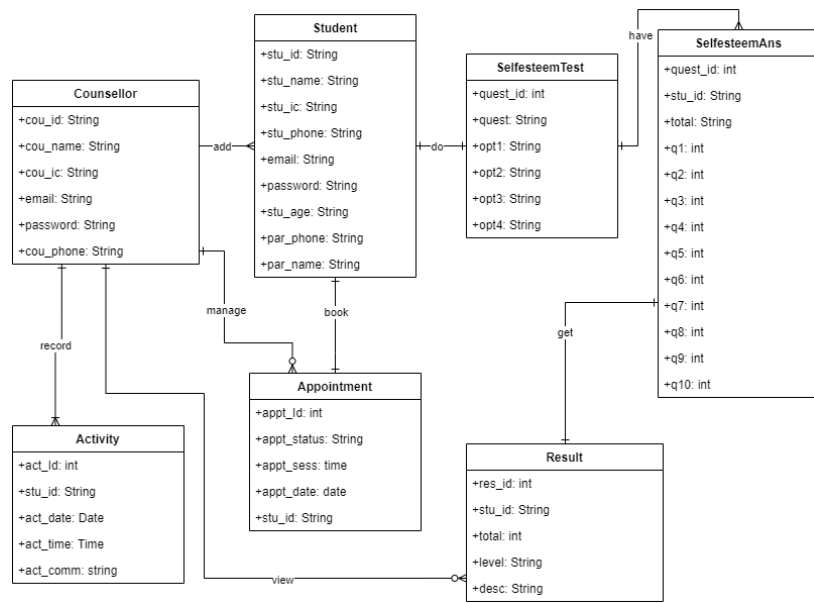**Appendix D Activity Diagram**
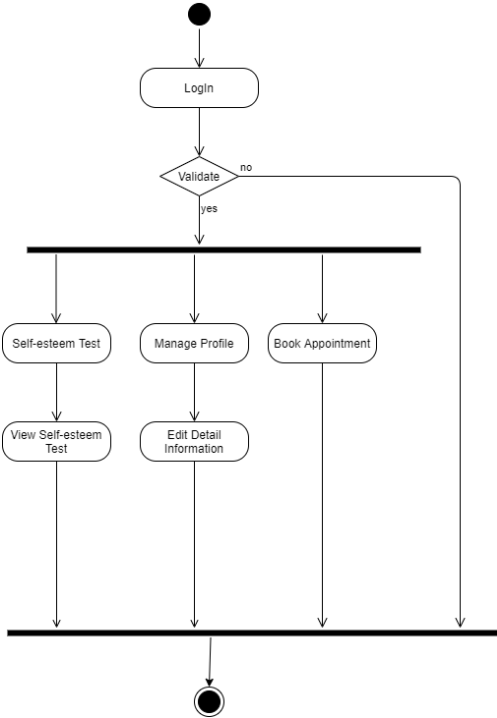
Student activity diagram
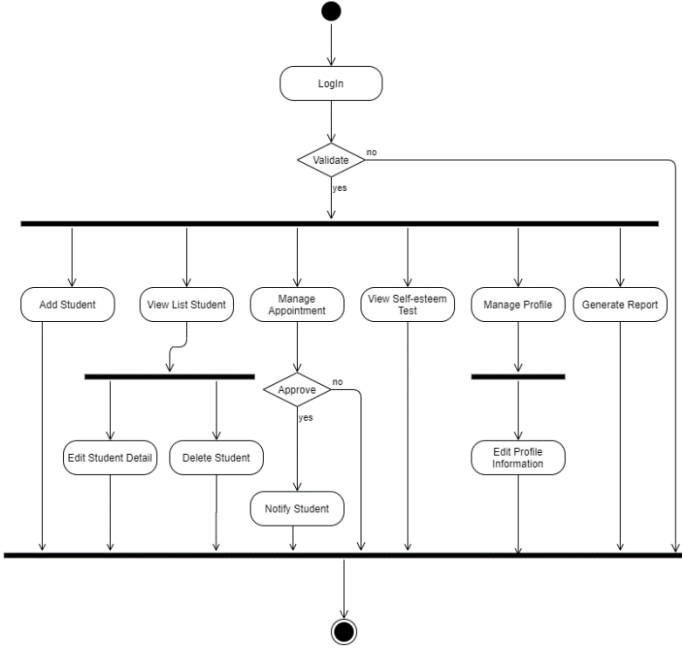
Counsellor activity diagram

Appendix E Class diagram

Appendix D System Functionality Testing

No.	Functionality	Expected Result	Testing Outcome
1.	Login and Add student Module		
	Students and counsellor enter email and password	Textbox display in login page	SUCCESS
	Students and counsellor click Login button	Login button display in login page	SUCCESS
	Verify user email and password	The system verifies the user's email address and password. If it is not validated, a prompt warning notice will appear.	SUCCESS
	Counsellor add new account registration	Add student page display while user clicks Add button	SUCCESS
	Counsellor enter full name, email, mobile phone, password, parents full name and parents phone number while registration	System provide textbox for counsellor to enter full name, email, mobile phone, password, parents full name and parents phone in add student page	SUCCESS
2.	Manage Profile Module		
	Student and counsellor edit personal information	EditText will be showed when user pressed on any section from the list in personal info page	SUCCESS
3.	Self-Esteem Test		
	Student need to answer 10 questions.	Each question will have 4 button options, Strongly Agree, Agree, Disagree, Strongly Disagree with button Next for next question.	SUCCESS
	Student can view result of self-esteem test.	TextView of total score, level of self-esteem and description.	SUCCESS
4.	View Self-Esteem Test		
	Counsellor can view the result of self-esteem test	List of student name with their self-esteem result.	FAIL

No.	Functionality	Expected Result	Testing Outcome
5.	Book Appointment		
	Student needs to select date and session for appointment.	Calendar and time will be showed in book appointment page	SUCCESS
	Student confirm the appointment date and time	A dialog will pop-up for the confirmation	SUCCESS
6.	Manage Appointment		
	Counsellor view the manage appointment for the pending request of the booking appointment.	List of appointment booked by student will be showed.	SUCCESS
	Counsellor choose to Accept or Reject appointment.	Two buttons Accept and Reject in each appointment made.	FAIL
7.	View student list		
	Counsellor view list of registered students.	A list of students of will be shown in recycler view.	SUCCESS
8.	Generate Report		
	Counsellor can view report of questionnaire in type of chart	A pie chart will be shown according to the 3 level of self esteem	FAIL

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