
Software Design Description to Academic Advisor Website

SDD

Prepared by:

Arwa Almrzoqi

441212001

Hissah Almousa

441211996

Munirah Aldaosari

441211997

Qassim University
Software Engineering and Knowledge Engineering
CSC606.

Instructor:

Dr. Faisal Alhwikem.

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1. INTRODUCTION

1.1 Purpose

The software design description SDD is used to document and tracks the necessary information needed to define the architecture and system design effectively in order to guide the development team, to understand the system architecture easily. Consequently, this document intended to give a detailed technical description of the Academic Advisor website project.

1.2 Scope

The Academic Advisor website, the target group of the proposed system is the students and advisors at Qassim University, where the system provides the services only to them. The proposed system will added as a tool service on both the student and advisor MyQU page to benefit from it.

The Academic Advisor website project has three main objectives:

1. To investigate the requirements for building the proposed system.
2. To facilitate the access of academic advisors to their students during office hours by knowing the students who have booked an appointment with him.
3. To develop the proposed academic advisor website in order to facilitate communication between students and their academic advisors.

In addition, The Academic Advisor website designed considering the following design goals:

1. Multiple Users:

The system should support tasks performed by multiple users and provide everyone with the information they need at the right time.

2. Portability:

The users should be able to access the Academic Advisor system wherever they need it.

3. Usability:

The system should be intuitive and easy to use.

4. Scalability:

The system must be scalable to support many users communicating or retrieving information simultaneously.

5. Reusability of Code

In order to minimize implementation time and improve efficiency, each part of the system has designed as a component.

Nevertheless, the Academic Advisor website will be beneficial to both students and advisors at Qassim University as well, besides saving time for both of them; it will help the student to get in touch with the advisor without actually annoying him by sending messages back and forth for any purpose. In addition, that contributes to a great benefit in order to minimize physical meetings. However, it works efficiently with the difficulties of arranging an appropriate time to meet the academic advisor for any reason.

1.3 Structure

This document starts with an introduction to the architecture and the design, also it addresses the goals, objectives, and benefits of the project, and as well, it describes an overview of the proposed system. Then it presents the proposed system architecture by describing the component's design considerations leading to the system architecture. The data design defined and the design details explained. Finally, human interface design presented.

2. SYSTEM OVERVIEW

The main goal of the system was to provide a simple way for communication between students and their academic advisors. Whereas this was not implemented in MyQU as a separate service.

The proposed system will simply add additional features and functionality to the MyQU website, without major changes to the original scope. These features will extend to both students' and academic advisors' MyQU pages. Since the Academic Advisor website serve the students and advisors, there are two major aspects of the system:

- Student: The student has an opportunity to contact an AI Chabot and benefit from its contribution and if he faced some difficulties with it, or the AI Chabot could not help him as expected, the student can view the advisor's availability and make an appointment with him as needed.
- Advisor: The advisor can post the available office hours, view the student's appointments, and manage them as well by accepting, refusing, or rescheduling. Moreover, the advisor can update his schedule constantly to receive new coming students, the new office hours, or the new appointments availability.

3. SYSTEM PROCESS ACTIVITIES AND MODELS

In our academic advising system we have selected the reused-oriented (component-based) development model cause there are some applications in general provide some functionality as our approach but academic advising website approach provides more unique functionalities such as students can contact with chatbot and get the advising service in a quick manner without contact with advisor, also can check the advisor schedule and ask for an appointment in the other hand advisor can manage the students as well as appointments. Our approach provide an academic service in an advantage way for both students and advisors.

4. SYSTEM ARCHITECTURE

4.1 Architectural Design

Key points that relate to the design and architecture of the proposed system.

- 1) No major changes to MyQU system architecture, only linked the proposed system with MyQU pages.
- 2) A few changes to the MyQU pages system design.

- 3) Extension of the same operational functions on MyQU pages, with the additional feature supposed by the proposed system.
- 4) Major direct communication with the AI chatbot.
- 5) Effective management by the availability of days, dates, and office hours.
- 6) Major positive impact on the user community.

A high-level system architectural design for the proposed system is divided into two subsection, components and interactions as described below:

- **Components:**

1. User Interface (UI): This component will provide a user-friendly interface for both students and advisors to interact with the system.
2. Appointment Management: This component will handle the scheduling, confirmation, and rescheduling of appointments between students and advisors. It will store appointment information and make it accessible to both parties.
3. AI Chatbot: This component will provide an AI-powered chatbot to assist students with their inquiries. The chatbot will use natural language processing and machine learning algorithms to answer questions and provide relevant information to the students.
4. Availability Management: This component will manage the availability of the advisors and provide students with the option to view the available slots for appointments.
5. Database: This component will store all the relevant data for the system, including appointment information, availability schedules, and chatbot responses.

- **Interactions:**

1. Students will interact with the UI to view the availability of advisors, schedule appointments, and communicate with the AI chatbot.
2. Advisors will interact with the UI to view their appointments, confirm or reschedule them.
3. The AI chatbot will use the database to retrieve relevant information and respond to student inquiries.
4. The Appointment Management component will interact with the Availability Management component to ensure that appointments are scheduled only during the available slots.

4.2 Decomposition Description

The decomposition of the system in the architectural design is as follows:

1. **User Interface (UI):**

- Login page: This page will allow students and advisors to log into the software using their credentials via MyQU page.
- Student dashboard: This page will display the available slots for appointments with advisors, provide the option to schedule an appointment, and allow students to communicate with the AI chatbot at any time.

- Advisor dashboard: This page will display the advisor's appointments, provide the option to confirm or reschedule appointments, and allow advisors to communicate with students if necessary.

2. Appointment Management:

- Scheduling: This module will allow students to schedule appointments with advisors. It will validate the student's request against the advisor's availability and schedule the appointment if the slot is available.
- Confirmation: This module will allow advisors to confirm or reschedule appointments. If an appointment is confirmed, it will be added to the advisor's schedule, and the student will be notified. If an appointment is rescheduled, the new slot will be selected, and the student will be notified.

3. AI Chatbot:

- Natural Language Processing (NLP): This module will analyze student inquiries and determine the intent behind the question.
- Knowledge Base: This module will store a large database of information that the chatbot can use to answer student inquiries.
- Machine Learning: This module will use machine learning algorithms to improve the accuracy and relevance of the chatbot's responses over time.

4. Availability Management:

- Availability Schedule: This module will store the availability schedules for the advisors and make them accessible to the system.
- Validation: This module will validate the student's request for an appointment against the advisor's availability schedule and ensure that appointments are scheduled only during the available slots.

5. Database:

- Appointment Information: This database will store information about the appointments scheduled between students and advisors, including the date, time, and location of the appointment.
- Chatbot Responses: This database will store the responses generated by the AI chatbot.

4.3 Design Rationale

The intent behind this software is to provide significant benefits for the users. The rationale of each component is discussed as follows:

1. User Interface: The UI was designed for ease of use, accessibility, and responsiveness, with separate dashboards for students and advisors to meet their specific needs.
2. Appointment Management: A separate component was created to handle scheduling, confirmation, and rescheduling of appointments, with validation against the availability schedule.

3. AI Chatbot: An AI chatbot was included to reduce the need for student-advisor meetings, improve response time, and increase accessibility, using NLP, a knowledge base, and machine learning algorithms.
4. Availability Management: A separate component was created to store and manage the availability schedules of the advisors, with validation of appointment requests.
5. Database: A database was designed to store appointment information and chatbot responses, with appropriate data structures and relationships.

5. DATA DESIGN

5.1 Data Description

The Data Design for the proposed software outlines the structure and organization of the data used in the system. It includes the following points:

1. Data Entities: Students, advisors, appointments, availability schedules, chatbot responses.
2. Data Relationships: Relationships between students, advisors, appointments, and availability schedules.
3. Data Attributes: Student and advisor names, appointment date and time, availability schedule, chatbot response, etc.
4. Data Types: String, integer, date, time, etc.
5. Data Constraints: Required fields, unique constraints, maximum string length, etc.
6. Data Storage: Stored in a relational database management system (RDBMS) or NoSQL database.

5.2 Data Dictionary

This section outlines the key information for each data element used in the proposed system, as shown in Table 1.

Table 1: A list of data elements and its description

| Data Element | Data Type | Description |
|--------------------------|-----------|--|
| Student ID * | integer | Required field at "Log in" using student's credential |
| Student password | string | Required field using student's credential |
| Student major | string | Major of student stored in the database |
| Advisor ID * | integer | Required field at "Log in" using advisor's credential |
| Advisor password | string | Required field using advisor's credential |
| Department | string | Advisor's department |
| Booking status | Boolean | The status of the "date and time" slot whether booked or not |
| Booking number | integer | Unique number stored for each booked appointment |
| Date of appointment | date | Date of booked appointment |
| Time of appointment | time | time of booked appointment |
| Add appointment () | function | Add a new appointment |
| View schedule () | function | View schedule for both parties |
| Check booking status () | function | Check booking status whether booked or available |
| Change booking status () | function | Change the status of appointment to booked or vice versa. |
| Add new schedule () | function | Add new schedule for advisor |
| Update schedule () | function | Update schedule for advisor |

6. DESIGN DETAILS

In this section we describe the design of academic advising web to reflect all the major requirements that we documented in the SRS by using the following diagrams:

- Sequence Diagrams.
- Use case Diagram.
- Class Diagram.
- State Diagram.

6.1. Sequence Diagrams

6.1.1. Login Sequence Diagram

Sequence diagrams show the process flow mechanism and the interaction of the system internally between the various system factors. In the following figure, we show the sequence diagram of login process and how system interacts with (advisor - student) from the beginning of the process to the end

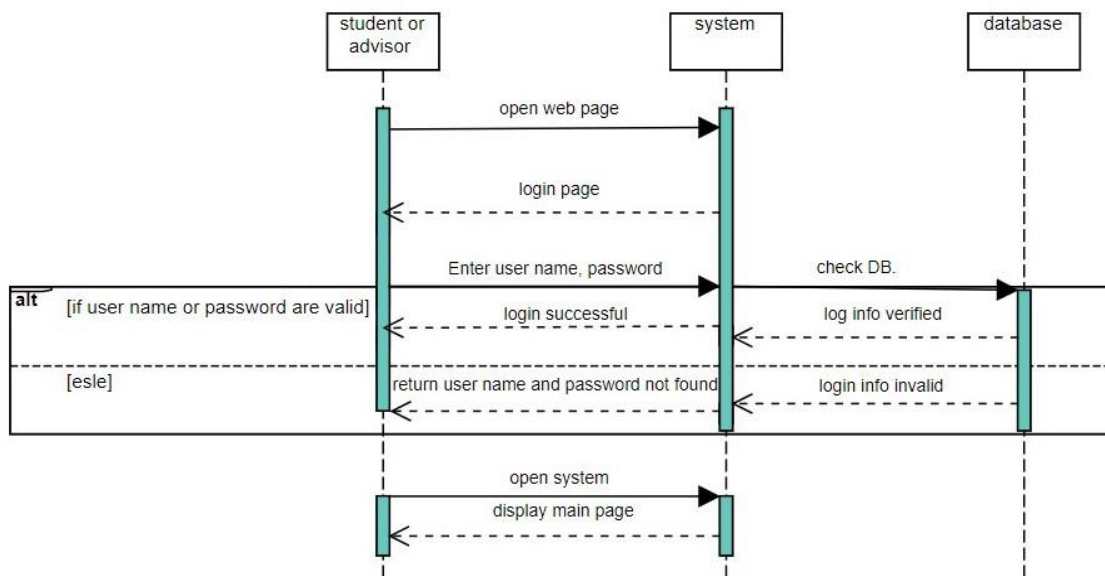


Figure 1: Login sequence diagram

In the first step users (students or advisors) will be required to enter user name and password then the system will verifies the database, if information is valid the system will display the main menu else system will display "username or password not found".

6.1.2. Student Sequence Diagram

The figure below shows the sequence diagram of student. Firstly student will open the web page then enter the system after that students will be required to enter user name and password then the data registered in database will be checked if information valid the system will display the main page else system will display "username or password not found". After entering the system, student can communicate with chatbot or check the advisor time table and book an appointment then system will save the appointment in the database, system will send all request to the advisor finally student can check if the request is accepted or rejected.

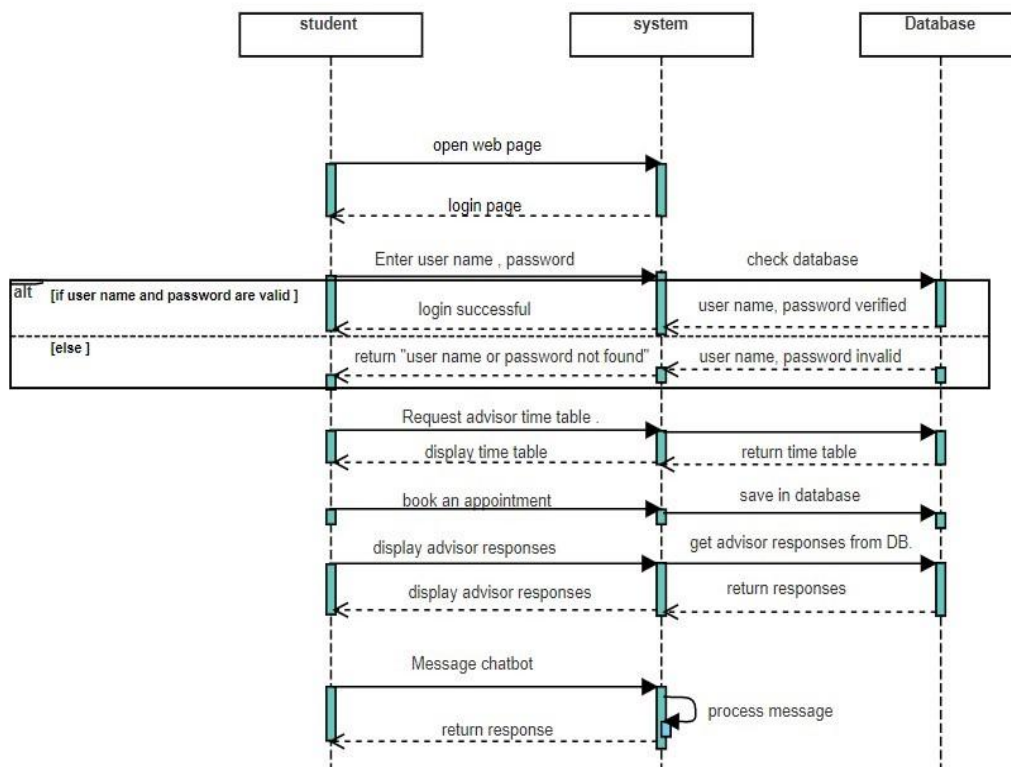


Figure 2: Student sequence diagram

6.1.3. Advisor Sequence Diagram:

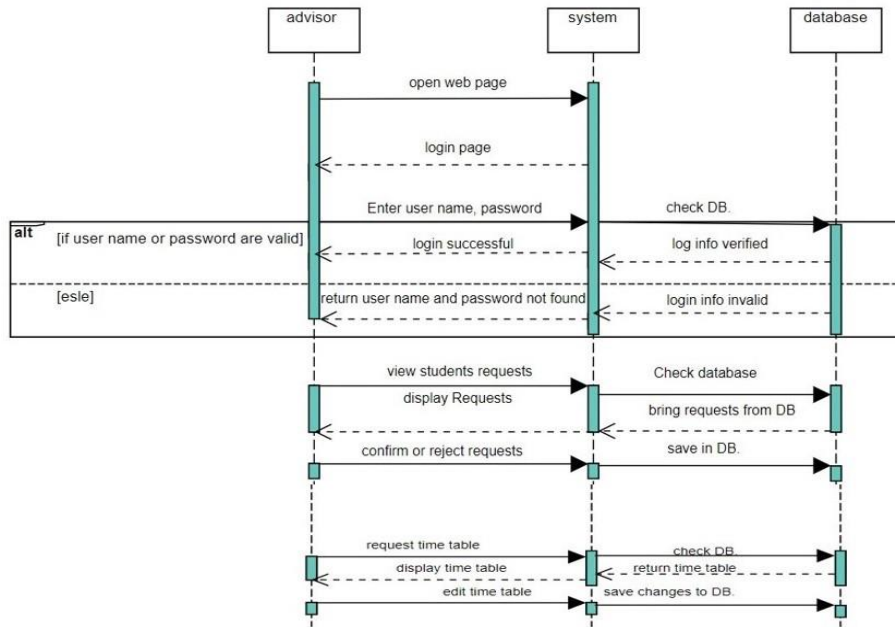


Figure 3: Advisor sequence diagram

Advisor opens the web page and enters the system, then advisor will be required to enter user name and password after that the data registered in database is checked if information valid the system will display the main page else system will display "username or password not found". After entering the system, advisor will check booking requests then will confirm or reject the request then system save it in database. Advisor can also edit the time table then the system will save changes into database

6.2. Use Case Diagrams

This type of diagram is used to describe the tasks and functions performed by each components in the system, as well as the relationships between these functions.

The figure below shows use case diagram for academic advising system.

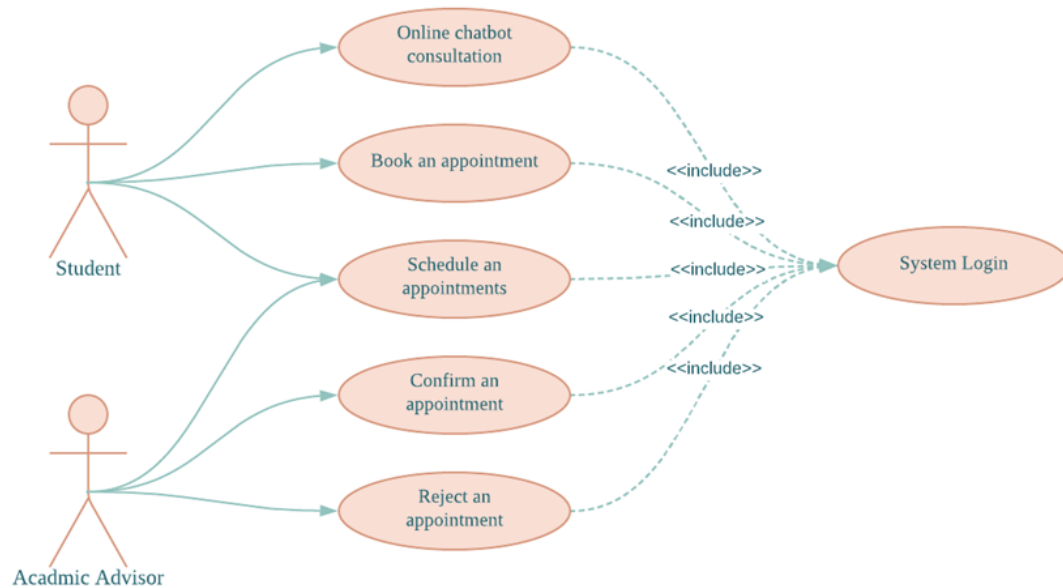


Figure 4: Use case Diagram

6.3. Class Diagrams

Class diagram is considered one of the most famous diagrams in systems analysis, as this diagram contains all the categories that will be programmed. It is used to model objects that make up the system and display the relationships between objects and describe the services they provide.

The following figure shows Class diagram for our academic advising system.

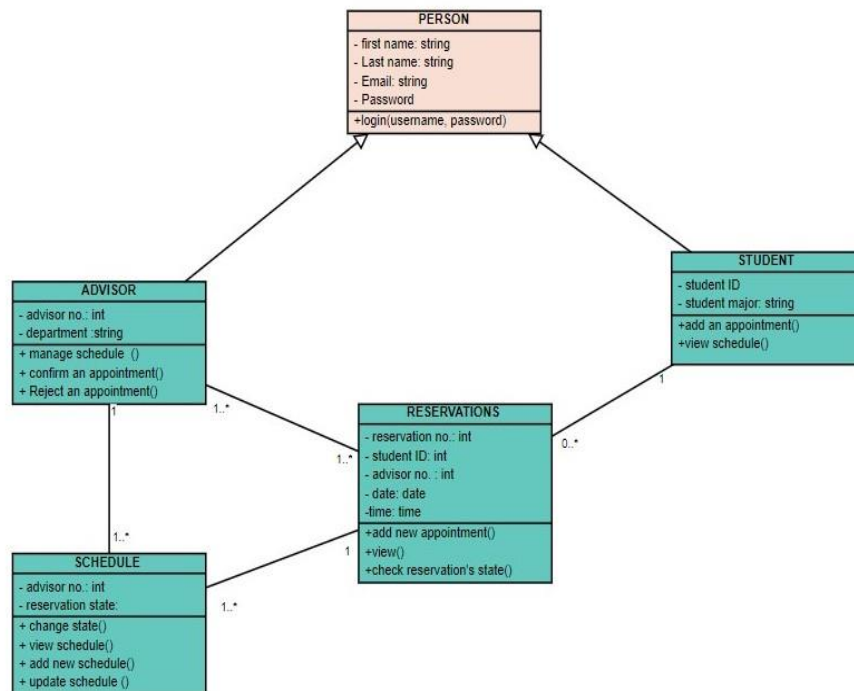


Figure 5: Class Diagram

6.4. State Diagrams

A state diagram is used to represent the condition of the system or part of the system at finite instances of time the figure below represents the state diagram of academic advising system.

6.4.1. Student State Diagram:

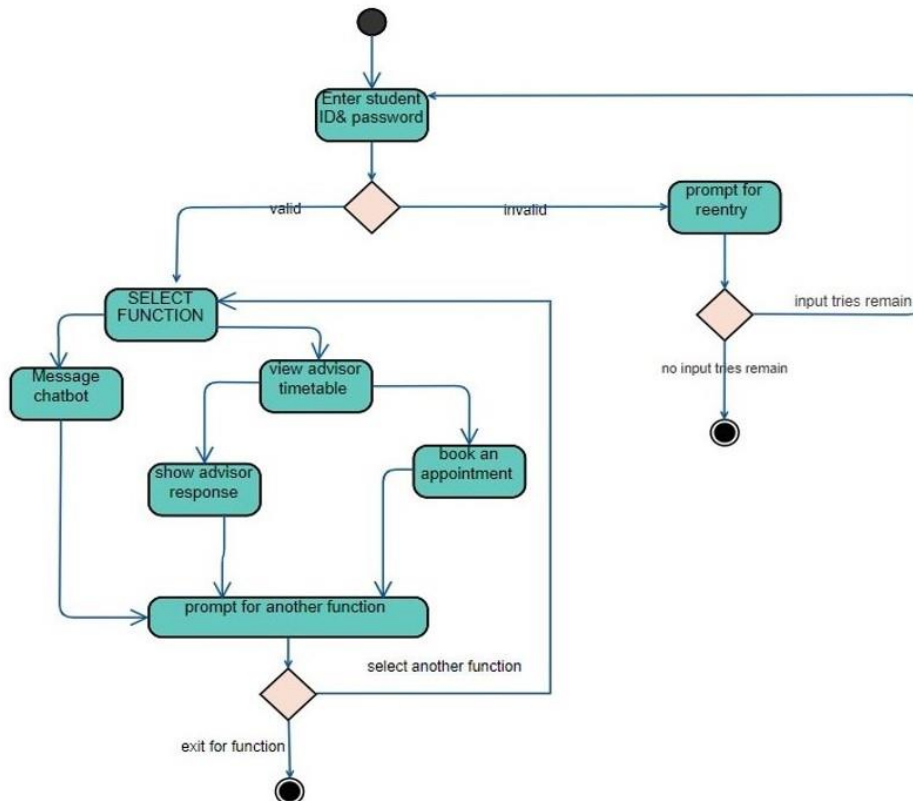


Figure 6: Student State Diagram

6.4.2. Advisor State Diagram:

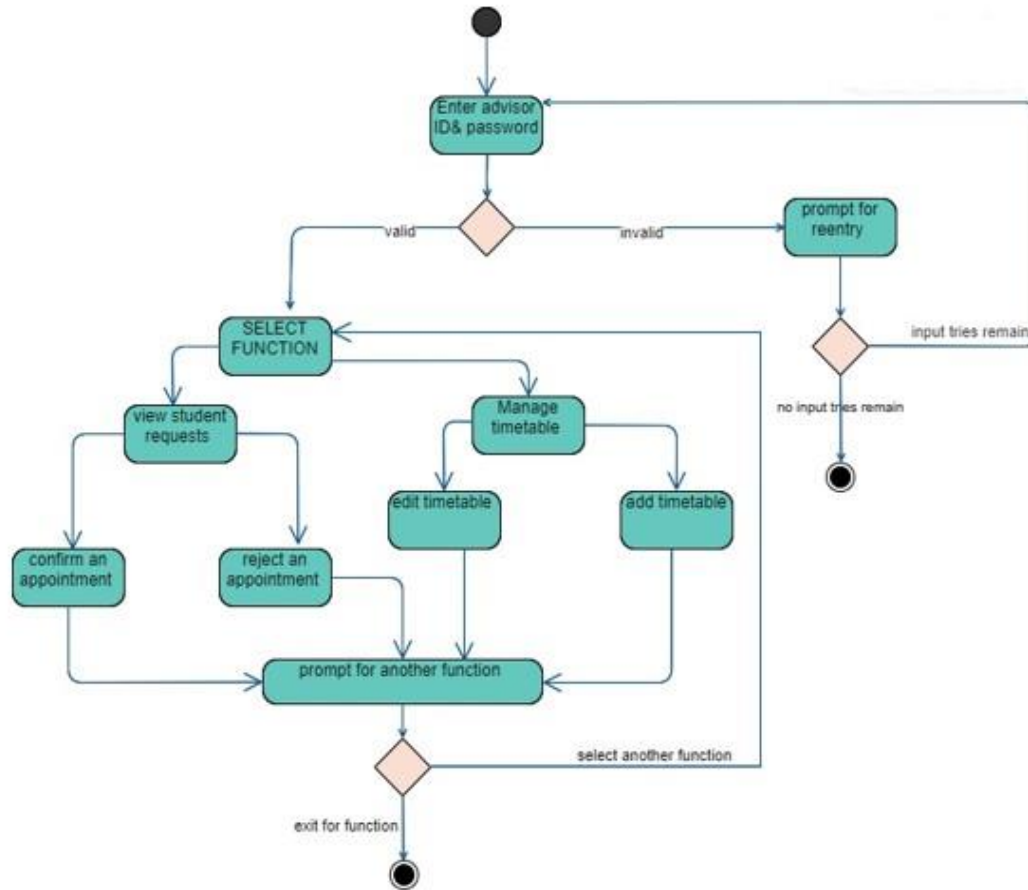


Figure 7 advisor state diagram

7. HUMAN INTERFACE DESIGN

7.1 Overview of User Interface

In academic advising system we have two main pages one for the advisors and the other for the students, after login successfully Students can click on academic advising icon to show the function they can do including (booking an appointment and Interact with the chatbot). For advisors they can manage students as well as appointments in advisor page after login successfully.

7.2 Detail Design of the User Interface:

We divided this section into two sections one to show the main pages for students and the other to presents the main pages for advisors.

7.2.1 Main Pages for Students

The image displays three screenshots of the MyQU student portal interface.

Top Screenshot: Login Page

Header: MyQU
 بوابة الدخول الموحدة للأنظمة والخدمات الإلكترونية بجامعة القصيم

تسجيل الدخول

اسم المستخدم
 كلمة المرور
☐ تذكرني
 نسيت كلمة المرور؟
 تسجيل الدخول

هل تواجه مشكلة؟

Middle Screenshot: Dashboard

MyQU

مساعد - اطلب
 بوابة الطالب
 البريد الإلكتروني
 UpToDate
 الخدمات التعليمية
 حساب المفضل
 الإشعار الأكاديمي
 إدراج الرسائل التعليمية بالخطبة
 مستشارك القانوني
 التراجع التعليمية

Bottom Screenshot: AI Assistant Interface

المساعد الآلي (AI)

أهلاً، معك المساعد الآلي. أستطيع مساعدتك بالإجابة على الأسئلة الشائعة والمتكررة عن خدمة الإرشاد الأكاديمي، الرجاء النظر على أحد الأسئلة التالية

هل تريد معرفة المزيد عن الإرشاد؟
 كم عدد المقررات المطلوبة في الخطة؟
 كم عدد الإمتحانات والإعطاءات للمساعدة المشقة لكل ترم؟

Bottom Screenshot: AI Assistant Interface (Continued)

المساعد الآلي (AI)

أهلاً، معك المساعد الآلي. أستطيع مساعدتك بالإجابة على الأسئلة الشائعة والمتكررة عن خدمة الإرشاد الأكاديمي، الرجاء النظر على أحد الأسئلة التالية

هل تريد معرفة المزيد عن الإرشاد؟
 كم عدد المقررات المطلوبة في الخطة؟
 كم عدد الإمتحانات والإعطاءات للمساعدة المشقة لكل ترم؟

Bottom Screenshot: AI Assistant Interface (Continued)

المساعد الآلي (AI)

أهلاً، معك المساعد الآلي. أستطيع مساعدتك بالإجابة على الأسئلة الشائعة والمتكررة عن خدمة الإرشاد الأكاديمي، الرجاء النظر على أحد الأسئلة التالية

هل تريد معرفة المزيد عن الإرشاد؟
 كم عدد المقررات المطلوبة في الخطة؟
 كم عدد الإمتحانات والإعطاءات للمساعدة المشقة لكل ترم؟

Figure 8 main pages for students

7.2.1 Main pages for Advisors

MyQU
بوابة الدخول الموحد للأنظمة والخدمات الإلكترونية بجامعة القصيم

تسجيل دخول
الموظفين وأعضاء هيئة التدريس
يجب إدخال اسم المستخدم وكلمة المرور
مضب ما هو مضمّن في النظام الأكاديمي

اسم المستخدم
كلمة المرور
تسببت كلمة المرور؟
تذكرني ☐

تسجيل الدخول

هل تواجه مشكلة؟ <

VISION رؤية 2030 وزارة التعليم Qassim University جامعة القصيم

الإرشاد الأكاديمي

إدارة المواعيد إدارة الطلبة جدولة الأوقات المتاحة

VISION رؤية 2030 وزارة التعليم Qassim University جامعة القصيم

إدارة الطلبة

| حالة الطلب | القسم | الايمل الجامعي | الاسم |
|------------|-----------------------|---------------------|---------------|
| منتهي | العلوم في علوم الحاسب | 44121200@qu.edu.sa | أروى المرزوقي |
| قبول | العلوم في علوم الحاسب | 441211996@qu.edu.sa | حصة الموسى |
| إزالة | العلوم في علوم الحاسب | 441211997@qu.edu.sa | منيرة النوسري |

تأكيد وإرسال

VISION رؤية 2030 وزارة التعليم Qassim University جامعة القصيم

إدارة جدول المرشد

| اليوم / الوقت | الأربعاء | الخميس | الجمعة | الأحد | الاثنين | الثلاثاء |
|---------------|----------|--------|--------|-------|---------|----------|
| 8:10 | متاح | متاح | متاح | متاح | متاح | متاح |
| 10:15 | متاح | متاح | متاح | متاح | متاح | متاح |
| 12:30 | متاح | متاح | متاح | متاح | متاح | متاح |

تأكيد وإرسال

Figure 9 main pages for advisors