

UNIVERSITY OF
CALGARY

WELLNESS CENTER MULTI-AGENT SYSTEM

(Assignment 2: Detailed Development Document)

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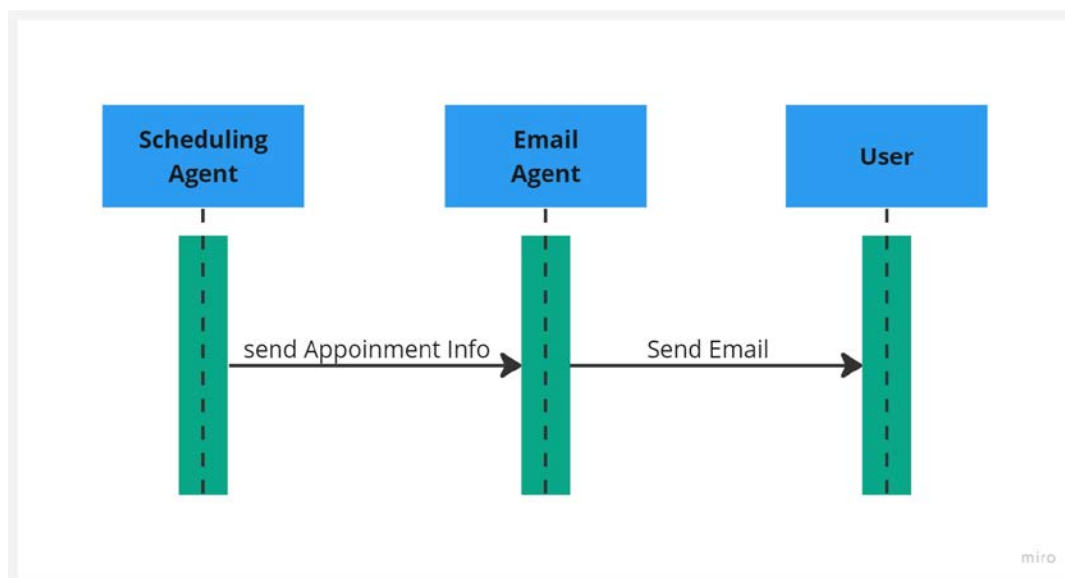
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1. Use Cases

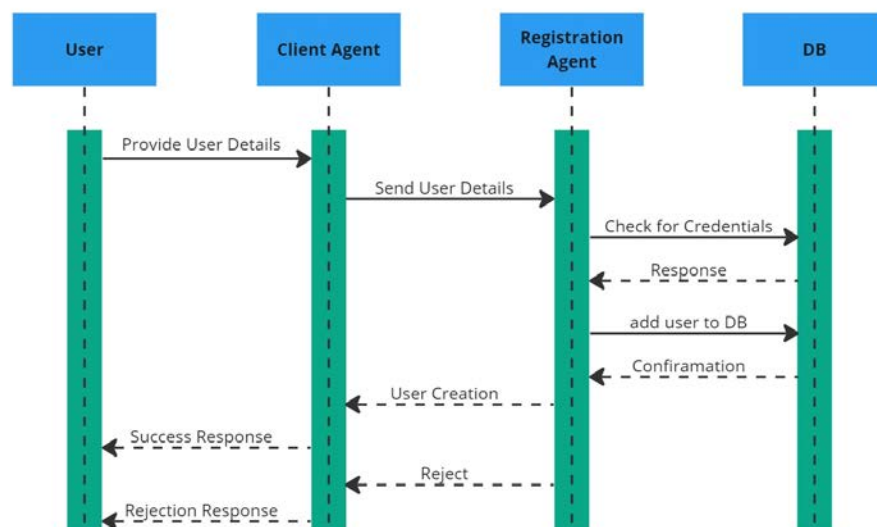
1.1. Email Service

Brief description	The system uses user information to send a confirmation and reminder email with the appointment details.	
Precondition(s)	The user is already registered and booked an appointment	
Postcondition(s)	If preconditions are met, an automated email with the appointment details will be sent to the user	
Process Steps		
1	The Email agent receives the user information and appointment information once the appointment is booked and when is 24 hours before appointment	
2	The Email agent packs all the information into a structured email format and sends the email to the user.	
Exceptions:		
1a	The system is not reachable at this moment	Ignore exception
Relationships:		
Initiating	Scheduling Agent	
Collaborating	Email Agent	
Data Requirements:		
Data Required	User's email Appointment info	



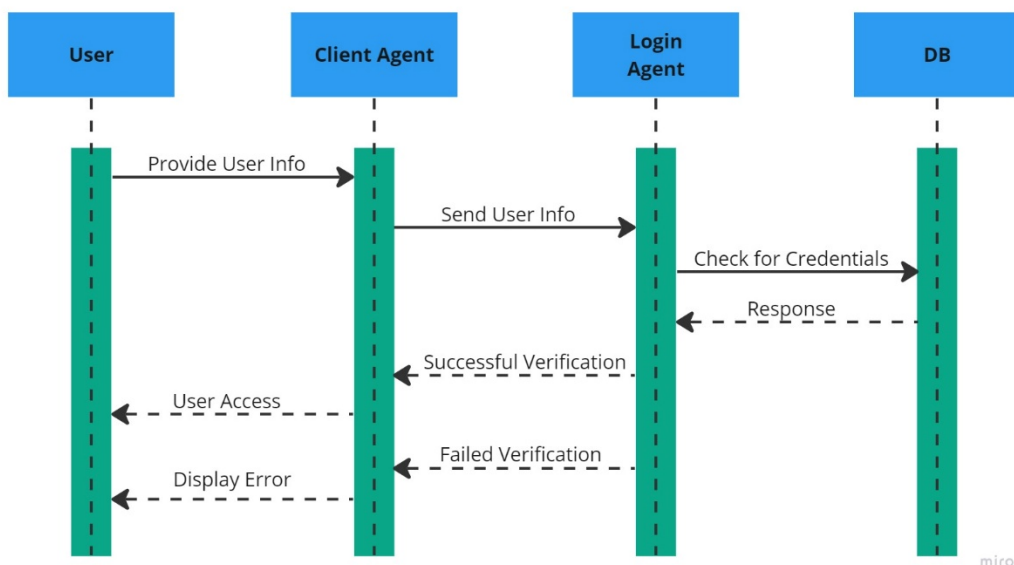
1.2. Register

Brief description	The system necessitates user registration for accessing both the system and its services.	
Precondition(s)	The user's credentials must be distinct and not already existing within the database.	
Postcondition(s)	If preconditions are met the database should create a new record for the user	
Process Steps		
1	The user puts the required information like "name", "email", "password" "phone", ...etc. on the portal	
2	By submitting the information, the Client agent will wrap the information and sends it to the Register agent	
3	The Registration agent will verify the uniqueness of user information by communicating with the Users database.	
4(a)	If the email is unique, the Registration agent will create a record for the user in the database	
5(a)	The Registration agent will send a "success" message to Client agent	
6(a)	The Client agent will display a "success" message to the user	
4(b)	If the email exists, in the database the Registration agent will send a "failure" message to Client agent	
5(b)	The Client agent will display a "failure" message to the user	
Exceptions:		
1a	The system is not reachable at this moment	The system shows an error message to the user
4(a)a	The system cannot allocate a record due to already existing user	The system shows "There is a user with this email, please log in"
Relationships:		
Initiating	User	
Collaborating	Client Agent	
Other Diagrams:		
Data Requirements:		
Data Required	First Name Last Name Email Address Phone Password	



1.3. Login

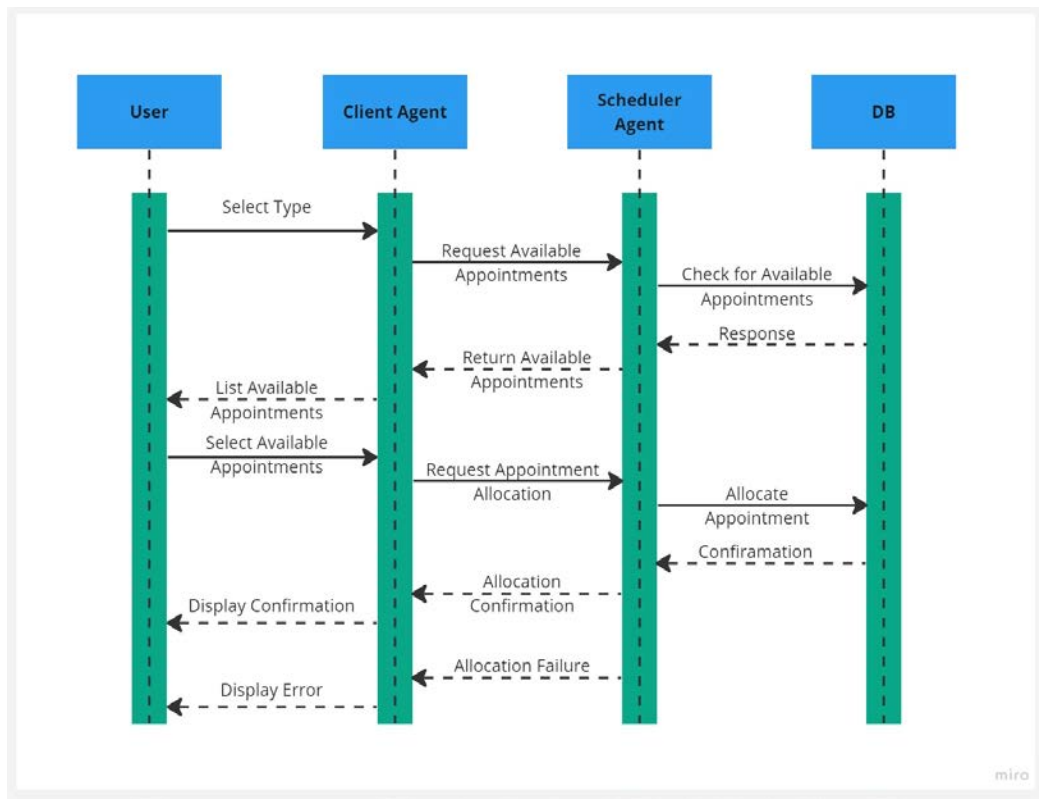
Brief description	The system requires the user's details to be able to use the system.	
Precondition(s)	The user must be registered before using the system	
Postcondition(s)	If preconditions are met access to the services should be given	
Process Steps		
1	The user submits necessary details such as an "email" and "password" for authentication purposes.	
2	Upon submission of the information, the Client agent will bundle the data and forward it to the Login agent for processing.	
3	The Login agent will interact with the Users database to verify if the provided information corresponds to any pre-existing records within the database.	
4(a)	If the credentials exist, the Register agent will send "success" feedback to the Client agent	
5(b)	The Client agent will grant the user entry or access to the system.	
4(b)	If the details are not found, the Register agent will transmit a "failure" message to the Client agent.	
5(b)	The Client agent will display a "failure" message to the user	
Exceptions:		
1a	The system is not reachable at this moment	The system shows an error message to users
4(a)a	The system cannot allow logging in because the password is wrong	The system shows "Entered password is incorrect, please try again"
4(a)b	The system cannot find the user with the given credentials	The system shows "User cannot be found, please sign up"
Relationships:		
Initiating	User	
Collaborating	Client Agent, Registration Agent	
Other Diagrams:		
Data Requirements:		
Data Required	Email (Username) Password	



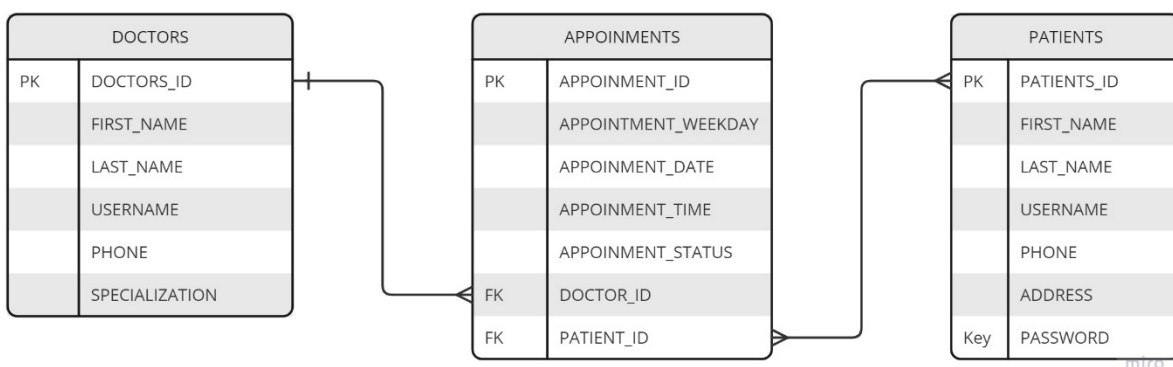
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1.4. Scheduler

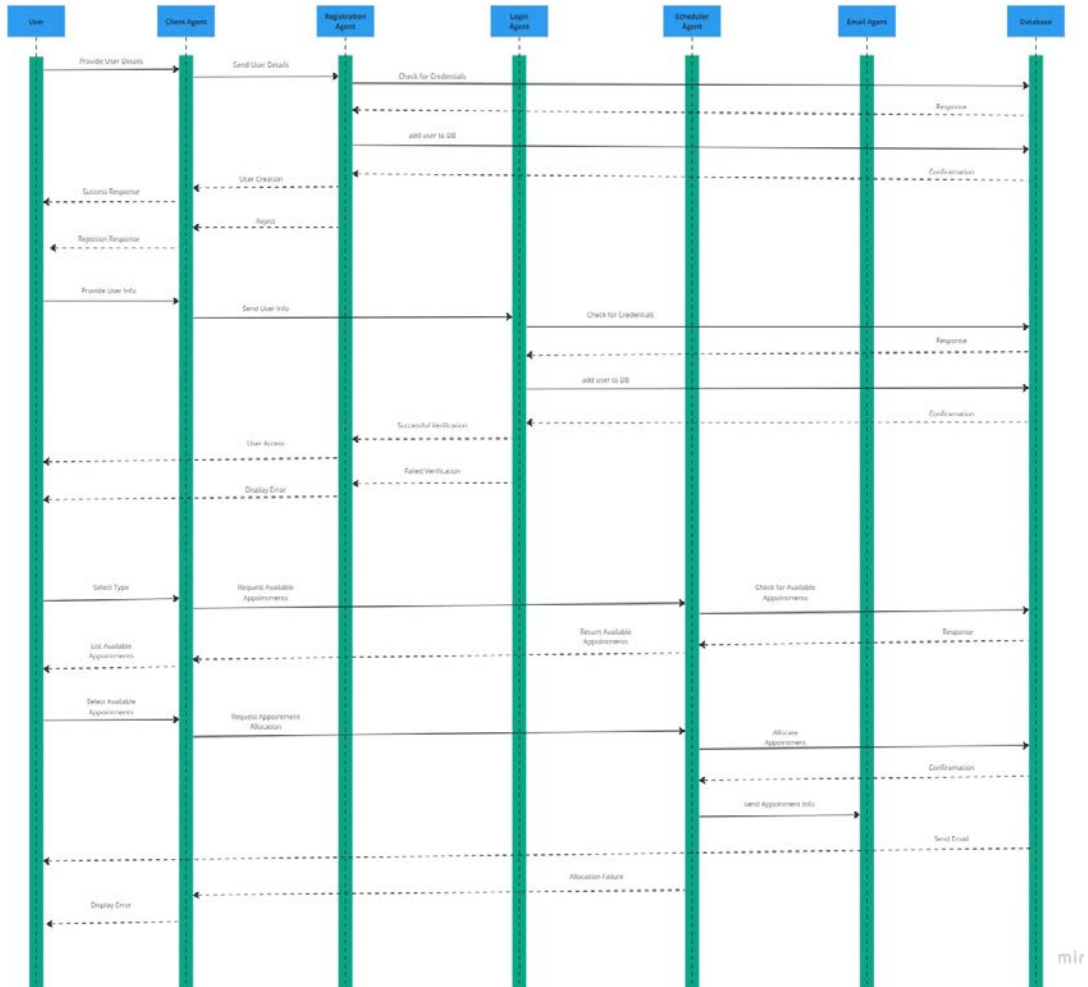
Brief description	Users have the option to make appointments according to their personal preferences, such as their chosen time, doctor, and specialization.	
Precondition(s)	the user is already registered	
Postcondition(s)	if preconditions are met the preferred appointment can be booked.	
Process Steps		
1	The user selects the required appointment type	
2	By submitting the information, the Portal agent will package the information and sends it to the Scheduling agent	
3	The Scheduler agent interacts with the database to retrieve all available appointments that correspond to the specified type.	
4	The Scheduler agent wraps the information and returns it to the Client agent	
5	The Client agent will display the available information to the user	
6	The user selects the desired appointment time	
7	By submitting the information, the Client agent will wrap the information and sends it to the Scheduling agent	
8	The Scheduler agent communicates with the database and allocates/update the selected appointment	
9(a)	If the appointment is successfully allocated, the Scheduler agent will send “success” message to the Client agent	
10(a)	The Client agent will give the user access to the system	
9(b)	If the appointment could not be allocated, the Scheduler agent will send “failure” message to the Client agent	
10(b)	The Client agent will display a “failure” message to the user	
Exceptions:		
1a	System is not reachable at this moment	Error message
9(a)a	System tries to book an already filled Appointment	System shows "please select another appointment. appointment is no longer available"
Relationships:		
Initiating	User	
Collaborating	Client Agent, Scheduler Agent	
Data Requirements:		
Data Required	DOCTOR_ID USER_ID AVAILABE_TIME EMAIL	



2. E-R Diagram



3. Message Sequence Diagram



4. Data Definition

4.1. User_DB

Table Name	Attributes	Type	Notes
Patients	SN	INT	Primary, Auto_Increment
	FIRST_NAME	VARCHAR(100)	
	LAST_NAME	VARCHAR(100)	
	EMAIL	VARCHAR(50)	Unique
	PHONE	CHAR(10)	
	ADDRESS	VARCHAR(100)	
	PASSWORD	VARCHAR(16)	

4.2. Doctors_DB

Table Name	Attributes	Type	Notes
Doctors	SN	INT	Primary, Auto_Increment
	NAME	VARCHAR(100)	Unique

4.3. Appointments_DB

Table Name	Attributes	Type	Notes
SPECIALIZATIONS	SN	INT	Primary, Auto_Increment
	NAME	VARCHAR(100)	Unique

Table Name	Attributes	Type	Notes
APPOINTMENTS	SN	INT	Primary, Auto_Increment
	APPOINTMENT_DATE	DATE	
	APPOINTMENT_TIME	TIME	
	DOCTOR_ID	VARCHAR(10)	Foreign Key
	PATIENT_ID	VARCHAR(10)	Foreign Key

Table Name	Attributes	Type	Notes
Calander	Date - Time	DATE	Primary

5. Inter-Agents Messages

As discussed in the Design document, SOAP will be used as a protocol of communication between agents and between agents and Web services.

The input and output parameters of each function introduced below has an XML format. These XML documents map the data structure defined in the Data Dictionary document.

5.1. Login Request

Input Parameters	Description
<pre><message to=LoginAgent@domain.postfix from=PortalAgent@domain.postfix { "Email": String (email), "Password": String (hexadecimal) } </message></pre>	user's information for Login

Output Parameters	Description
<pre><message to= PortalAgent @domain.postfix from= LoginAgent @domain.postfix { "SN": Integer, } </message></pre>	user's information for Login and user ID return

5.2. Register User

Input Parameters	Description
<pre><message to=RegistrationAgent@domain.postfix from=PortalAgent@domain.postfix { "FirstName": String, "LastName": String, "Email": String (email), "Phone": String (Numbers), "Address":</pre>	user's information for registration

<pre> String, "Password": String (hexadecimal) } </message> </pre>	
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Output Parameters	Description
<pre> <message from=RegistrationAgent@domain.postfix to=PortalAgent@domain.postfix { STAT_CODE } </message> </pre>	Status of Registration

5.3. Fetch Appointment

Input Parameters	Description
<pre> <message to=SchdeulingAgent@domain.postfix from=PortalAgent@domain.postfix { "Doctor_ID": Interger } </message> </pre>	doctor's ID to fetch the available appointment

Output Parameters	Description
<pre> <message to=SchdeulingAgent@domain.postfix from=PortalAgent@domain.postfix { "SN": Interger, "APPOINTMENT_DATE": Date, "APPOINTMENT_TIME": Time, "APPOINTMENT_STATUS": CHAR, }, </pre>	A list of available appointments' information like date, time and status are fetched and sent back to user

<pre>{ "SN": Interger, "APPOINTMENT_DATE": Date, "APPOINTMENT_TIME": Time, "APPOINTMENT_STATUS": CHAR, }, </message></pre>	
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5.4. Book Appoinment

Input Parmeters	Description
<pre><message to=SchdeulingAgent@domain.postfix from=PortalAgent@domain.postfix { "Appointment_ID": Interger, "USER_ID": Interger, "USER_EMAIL": String (email), } </message></pre>	ID of the selected appointment and the selecting user

Output Parmeters	Description
<pre><message from=RegistrationAgent@domain.postfix to=PortalAgent@domain.postfix { STAT_CODE } </message></pre>	Output is a reply that is reflected in the performative header with either confirm or failure.

5.5. Sending Invoice

Input Parmeters	Description
<pre><message to=SchdeulingAgent@domain.postfix from=PortalAgent@domain.postfix { "USER_EMAIL": String (email), "APPOINTMENT_DATE": Date, "APPOINTMENT_TIME": Time, "DOCTOR_FIRST_NAME": String, "DOCTOR_LAST_NAME": String, } </message></pre>	ID of the selected appointment and the selecting user

Output Parmeters	Description
<pre><message from=RegistrationAgent@domain.postfix to=PortalAgent@domain.postfix { STAT_CODE } </message></pre>	Indicated that sending was successful or not.

6. Class Diagram

