191071902
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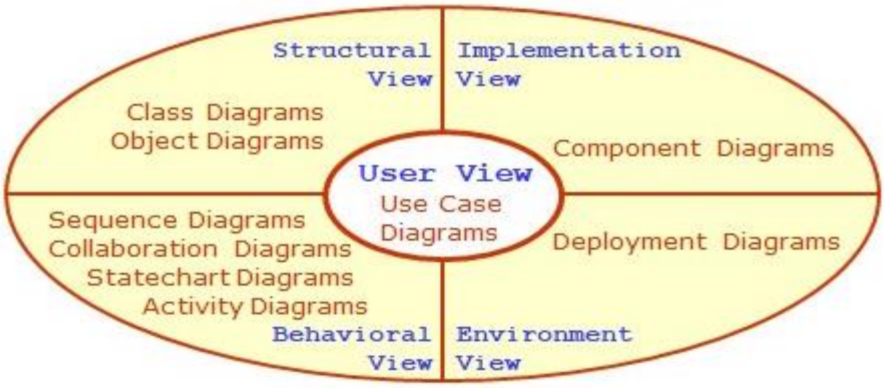
Software Engineering II

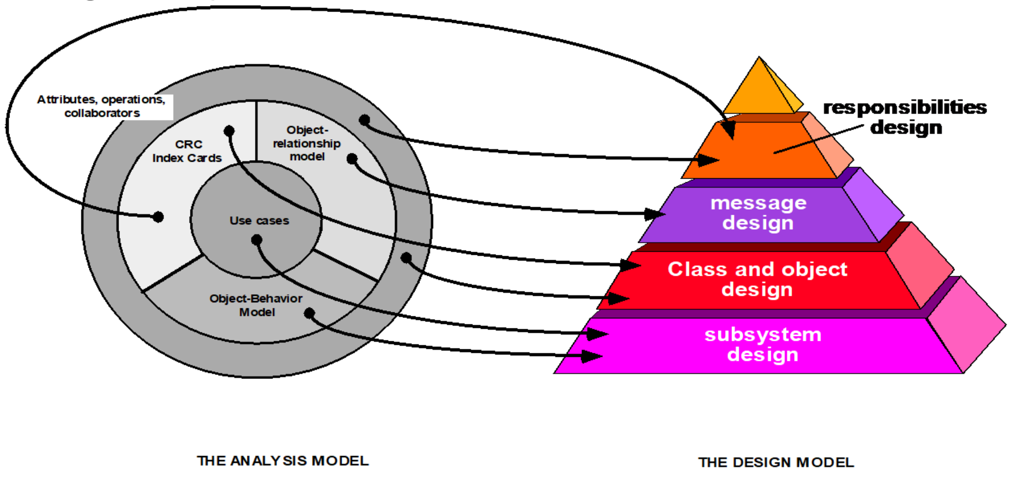
TA Assignment

QUESTION
OOAD USING UML
(i) Give structural view and Behavioural view.
(iii) Implement the project and illustrate implementation view.
(iii) Illustrate the environmental view with specifications.

Use the following dimensions for answering your experiment.



Map the analysis Model with design Model. Use the following dimensions for the design of object-oriented software.

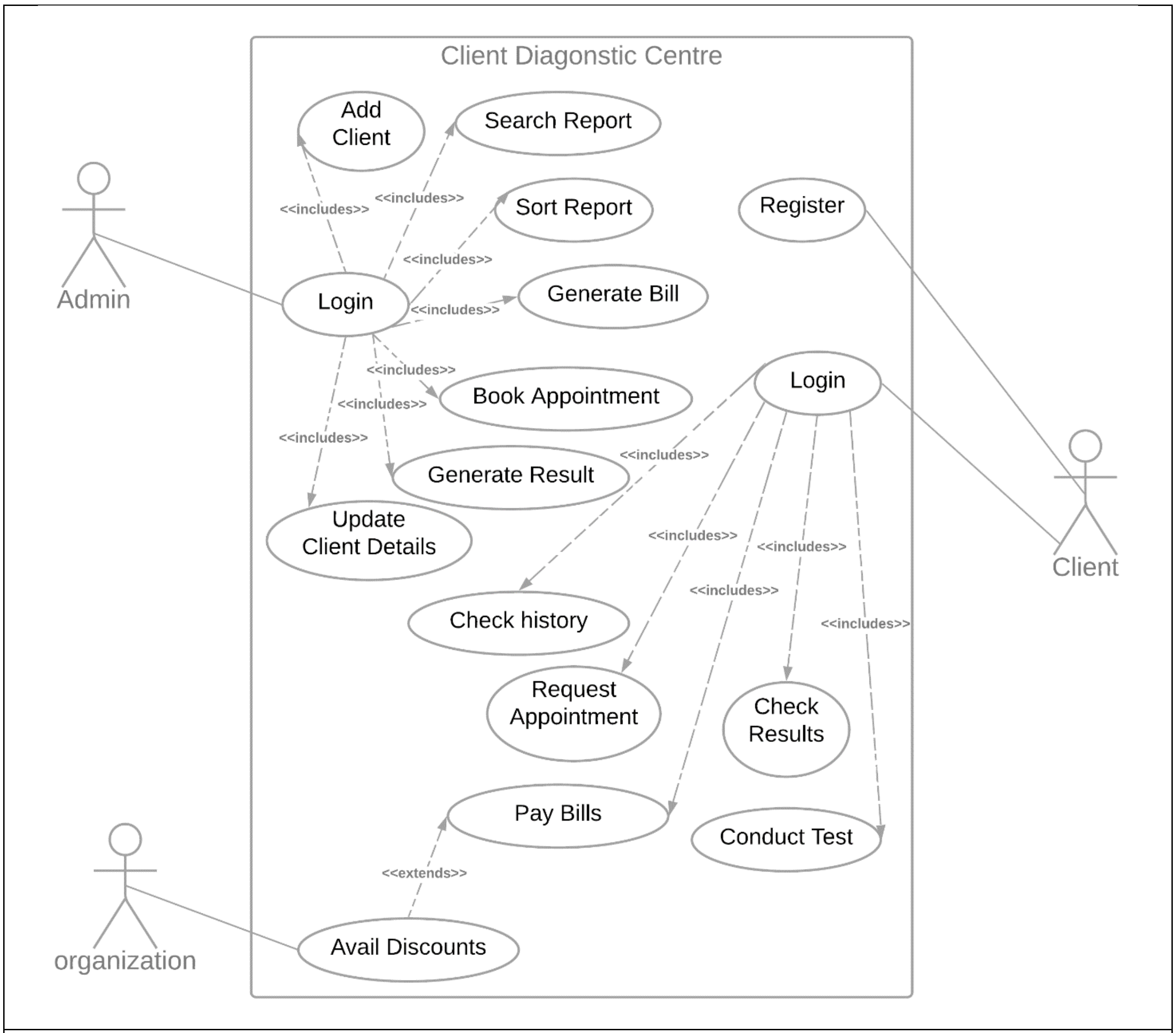


Design the software architecture, algorithm and data structure design and authoring system for the given project.

CASE STUDY
Diagnostic Client Co-ordination System

Diagnosis centres need to maintain good relations with their clients. There is always a database of clients maintained in every diagnostics centre. The database includes client contact details as well as his tests done. It includes data like contact numbers, name, address, email etc. Clients may conduct various tests at the diagnostic centre including blood test, urine test as well as cholesterol, liver and kidney tests. The system must be capable of evaluating patient bills and providing them in printable format. The system also allows admin to store and update patient data for existing and new patients. Since every client must be working for some or the other organization and many organizations have contracts with diagnostics centre to provide discounts to their employees, the system tracks this information too. Now the system also keeps count of the number of tests undergone by a patient in a year. After 10 tests in a year the system provides 5% discount to the patient from the 11th test in a particular year. The system also allows admin to sort out tests frequency and search particular patient records. Company wise discount rates are fed in to the system.

User View



USE CASE DIAGRAM: Client Diagnostic Centre

USE CASE TEMPLATE

1. Register Client on System

Name	Register
Summary	A new user (a user which doesn’t have an account) should first register into the system to use it. This feature will allow the user to enroll into the system if the user is a new user and doesn’t already have an existing account.
Rationale	The user can access the system
Actor	Client
Pre-Condition	None
Basic course of Event	1. User opens the desired module of the system. 2. The system displays GUI the registration. 3. User enters the valid details required to join the system 4. Submits the form
Post- Condition	User is registered
Alternate Flow	1. User goes back to the Home Page

2. Login

Name	Login
Summary	The user can use the features of the system
Rationale	After registration of the user, the valid user can login into the system
Actor	Admin, Client
Pre-Condition	The login name and password should match with the login name and password provided while registering. If the username and or password do not match, the user cannot login successfully into the system.
Basic course of Event	1. User opens the desired module of the system. 2. The system displays GUI the login form 3. The user writes its username, password and type 4. If valid, user can login into the system. If the username and or password do not match, the user cannot login successfully into the system.
Post- Condition	User goes to his/her dashboard
Alternate Flow	1. The username and password are blank 2. The type of user is not specified 3. The username and password do not match

3. ***Book Test Appointment***

Name	Book Test Appointment
Summary	The patient requests to book test and admin assigns a slot
Rationale	The appointment is booked
Actor	Client and Admin
Pre-Condition	1. The client is a valid user 2. The slot he asks for is free
Basic course of Event	1. The client (patient) logs into the system 2. The patient requests for an appointment using test name, preferrable date and time 3. The admin checks if the slot is available 4. The admin assigns the slot if free to the patient (client)
Post- Condition	The client is given the free slot for test
Alternate Flow	1. The admin denies the appointment as he finds the user malicious
Alternate Flow 2	1. The slot is not available a. The admin sends a message to request for another slot b. The admin assigns a nearby time slot
Exceptions	**1.** The appointment is marked as urgent The admin adjusts the time slot given to someone else **2.** System fails to given appointment Patient has to request again

4. ***Generate Bill***

Name	Generate Bill
Summary	The client is has to pay the bill for the corresponding test/s
Rationale	The amount to be payed is generated
Actor	Client and Admin
Pre-Condition	The appointment is booked
Basic course of Event	1. The appointment for a particular test is booked 2. The system generated the Amount of the test to be paid by client as stored in its database
Post- Condition	The bill is printed and given to the client
Alternate Flow	1. If number_of_test of patient is 11 a. Provide 5% discount b. Calculate the final amount
Alternate Flow 2	1. The client belongs to a organization who has a contract with the system 2. Provide corresponding discount to the client 3. Calculate Total

5. ***Generate Test Report***

Name	Generate Test Report
Summary	After giving the test, the client can check the report of the test
Actor	Client
Pre-Condition	The test is conducted
Basic course of Event	1. Go to the Test section 2. Check the report of the test you want
Post- Condition	The list of report is given.

6. *Search Patient History*

Name	Search Patient History
Summary	The administrator can check the search and check the record of patient
Actor	Admin
Pre-Condition	The list of record is displayed
Basic course of Event	1. The admin logs into the system 2. The admin goes to the search tab 3. Enters the name of patient/patient ID 4. The details and history of the patient are displayed
Post- Condition	The patient history is displayed
Alternate Flow	1. There is no patient with the given patient name/ID 2. No results displayed

7. *Store/Update Patient Details*

Name	Store/Update Patient History
Summary	The administrator can store or update the record of patient
Actor	Admin
Pre-Condition	The patient/client is added to the system
Basic course of Event	1. The admin logs into the system 2. The admin searches for the patient using patient ID/name 3. The patient is selected 4. The option to add/update the details is given 5. The details are entered/edited 6. The data is stored/updated into the database
Post- Condition	The database is updated
Alternate Flow	1. There is no patient with the given patient name/ID 2. No results dispalyed 3. A new patient is added

7. ***Sort the tests and manage frequency***

Name	Manage frequency
Summary	The client when completed a test it is added to his list
Actor	Client
Pre-Condition	The client is registered to the system
Basic course of Event	1. The test appointment is given to client 2. Client finishes the test 3. Update the no_of_tests in the database
Post- Condition	The database is updated

Structural View

CLASS DIAGRAM

1. Identify the Classes
   → Admin
   → Client
   → Organization
   → Test
   → Bill
   → Report
2. Identify Attributes

→ Admin

+ username:String
- password :String
+ email:String
+gender: Gender
-phone_no: int
+designation: string
+created_on: Date

→ Client

+ name:String
+ patientID:int
- password :String
+ email:String
+gender: Gender
-phone_no: int
+DOB: Date /age:int
-address:String
+email: String
+organizationID: int
+no_of_test: int

→ Organization

+ name:String
+ oraganiztionID:int
+category:String

→ Test

+testID:int
+testName: String
+createdOn:Date
+conductedOn:Date
+type: String

+patientID:int
+cost: float
+sample_id:int
+test_result:String
+comments:String
+ conductedBy:text

→ Bill

+patientID: int
+testID:int
+billID: int
+paymentDate: Date
+dueAmount: float
+paidAmount: float
+TotalCost: float
-paymentMethod: String
+createdOn:Date
+discountpercent: int

→ Report

+TestID: int
+PatientID: int
+MainReport: String
+Detailes: String
+Comments: String

3. Identify functions
   a. Admin

      +login(username, password): Boolean
      +addclient(client):Client -storedata()
      -updatedata()
      +generateBill(Client): Bill
      +sort_data()
      -searchPatient(Client):Client
      +givediscount()
      +bookAppointment(Test, Client)

   b. Client

      +register(name, password)
      +login(patientID, password): Boolean
      +bookAppointment(Test, PatientID)
      +givetest() -PayBill(Bill)
      +checktestresult()

   c. Organization

      +availdiscount(Bill)

+addClient(Client)

d. Test
    +Test(testID)
    +addReport()
    +addBill(): Bill
e. Bill
    +Bill(patientID, testID)
    +addPayment()
    +updatePayment()
    +discount()
    +PrintBill()
f. Report
    + Report(TestID, PatientID)
    -updateData()

4. Identify relationships

   1:1 Relationships

   a. Admin adds Client
   b. Client belongs to a Organization
   c. Test gets a Bill
   d. Each test generate a report

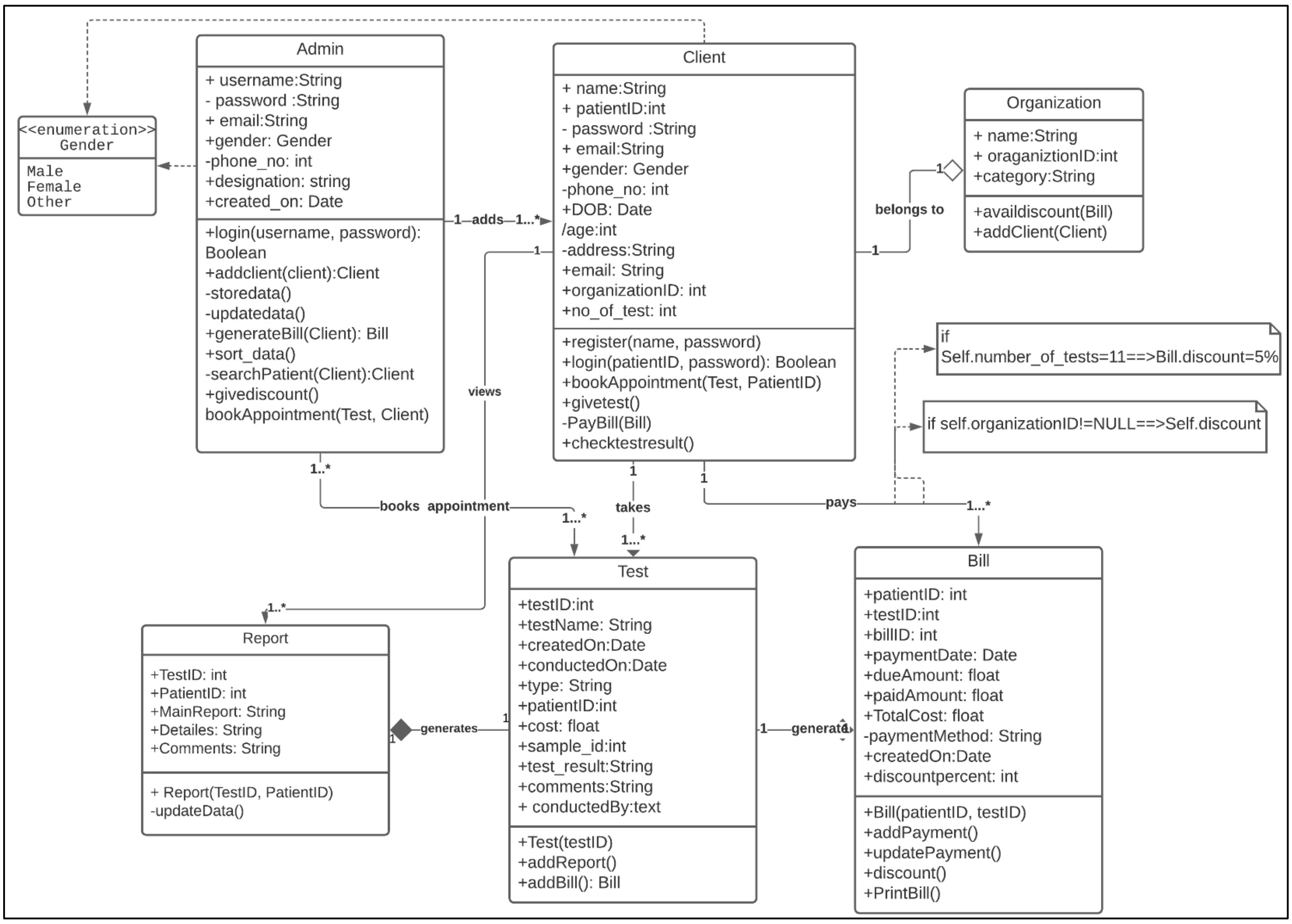
   1:n

   a. Client takes one or more tests
   b. Client has to pay one or more bills
   c. Client can view his reports

   n:n

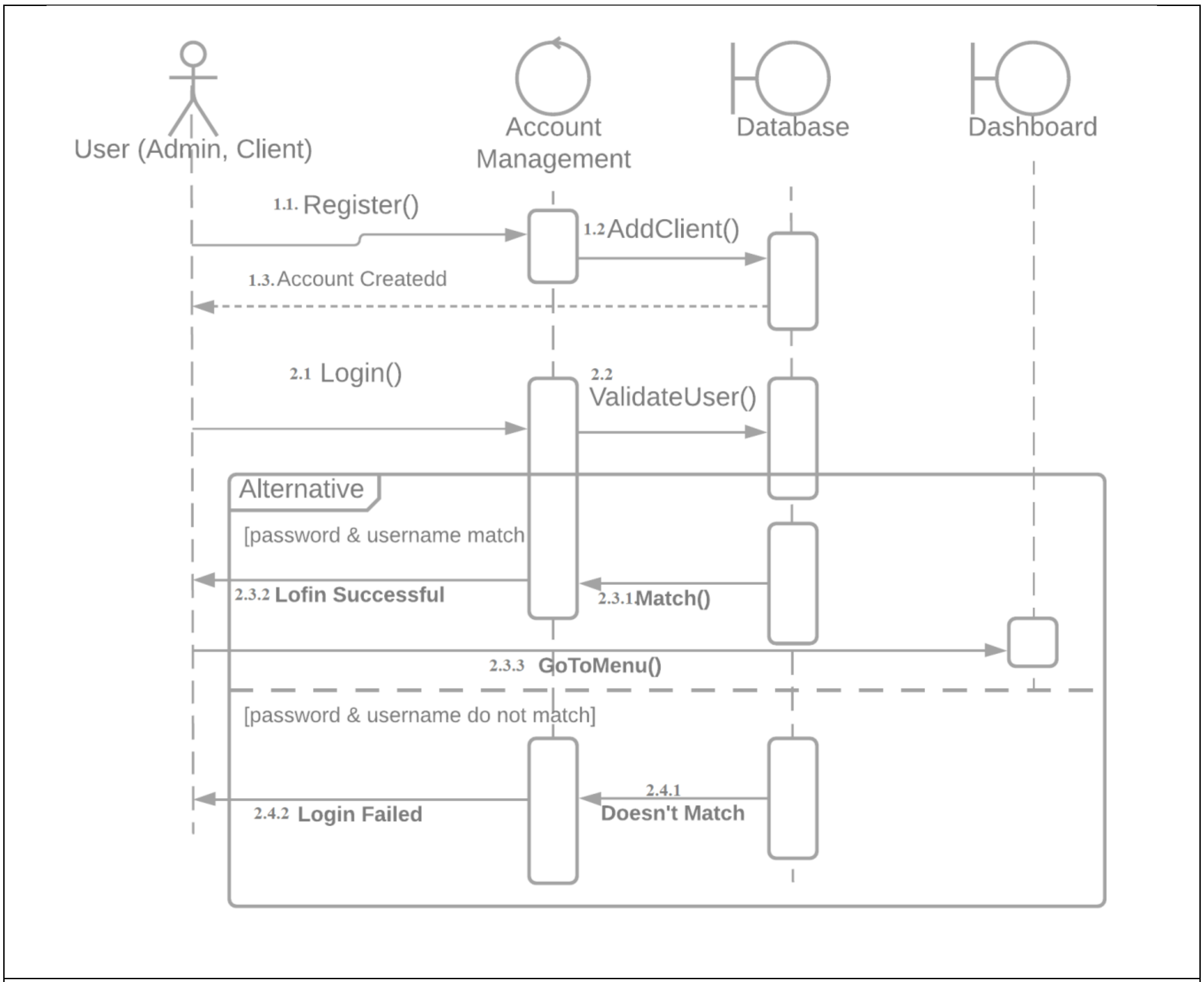
   a. Admins book appointments
5. Constraints
   a. if no_of_tests ==11 client gets 5% discount
   b. Client belonging to an organizations gets discount accordingly

Class Diagram: Client Diagnostic Centre

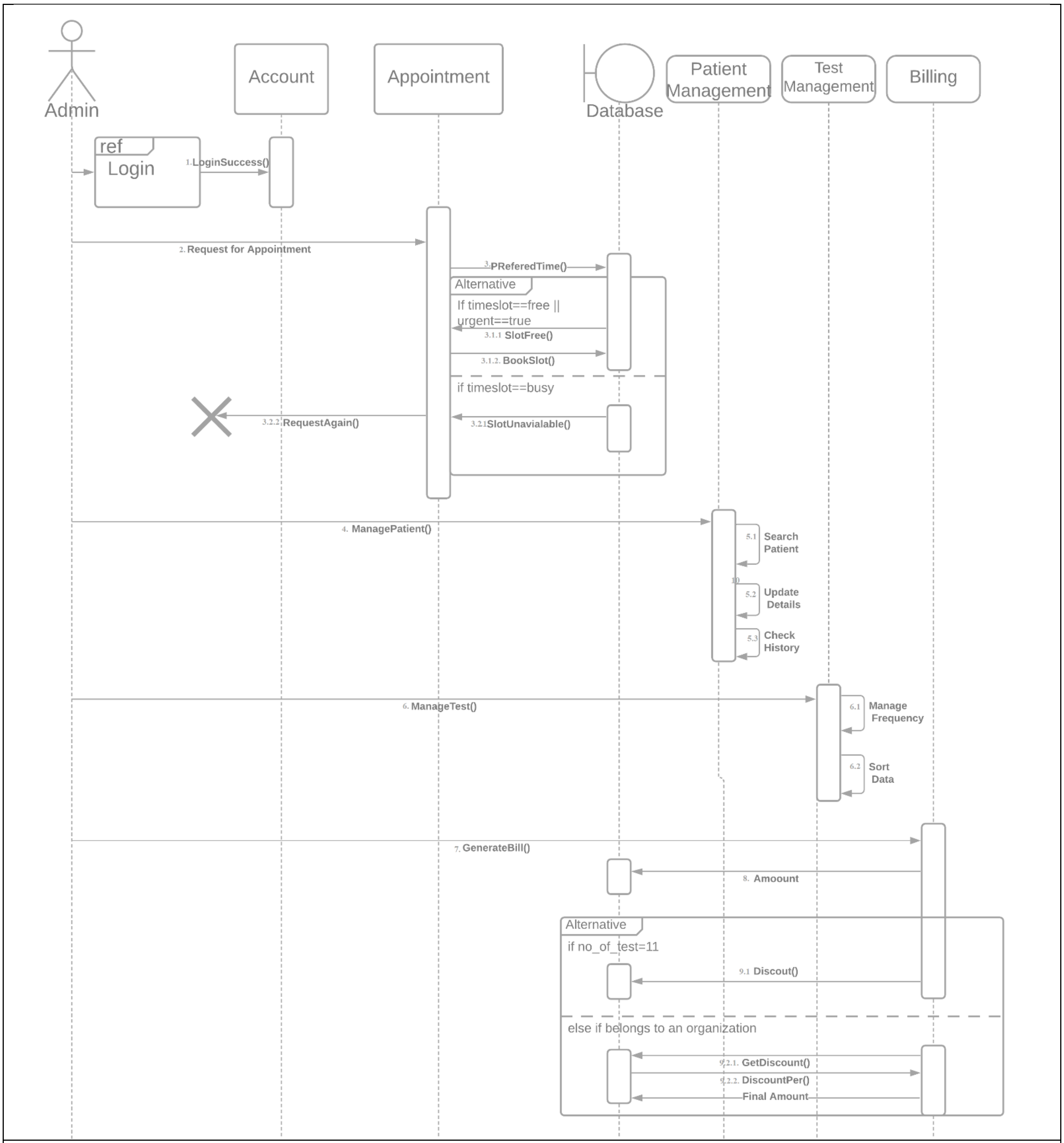


Behavioural View

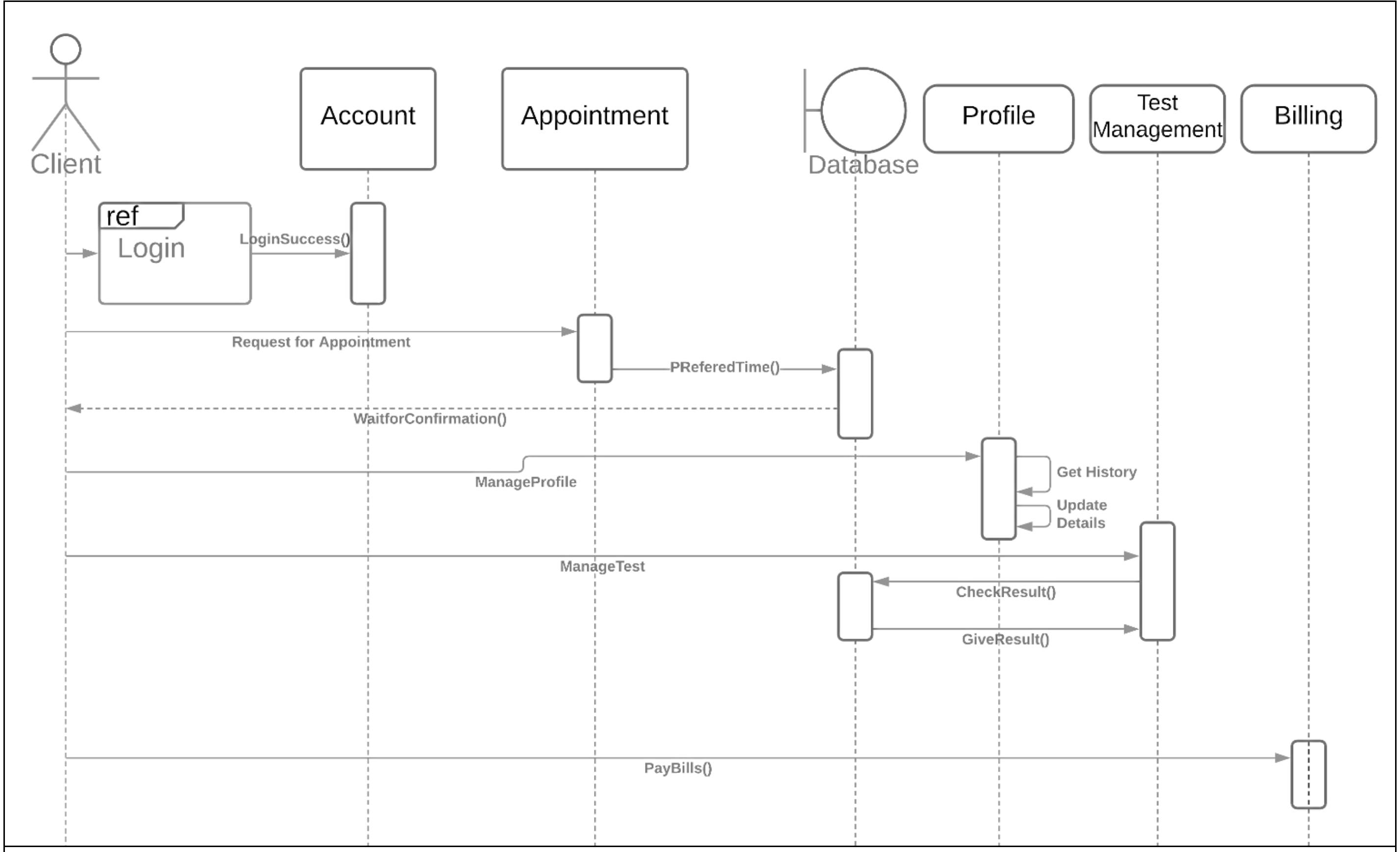
Sequence Diagram



Sequence Diagram: User Login & Register

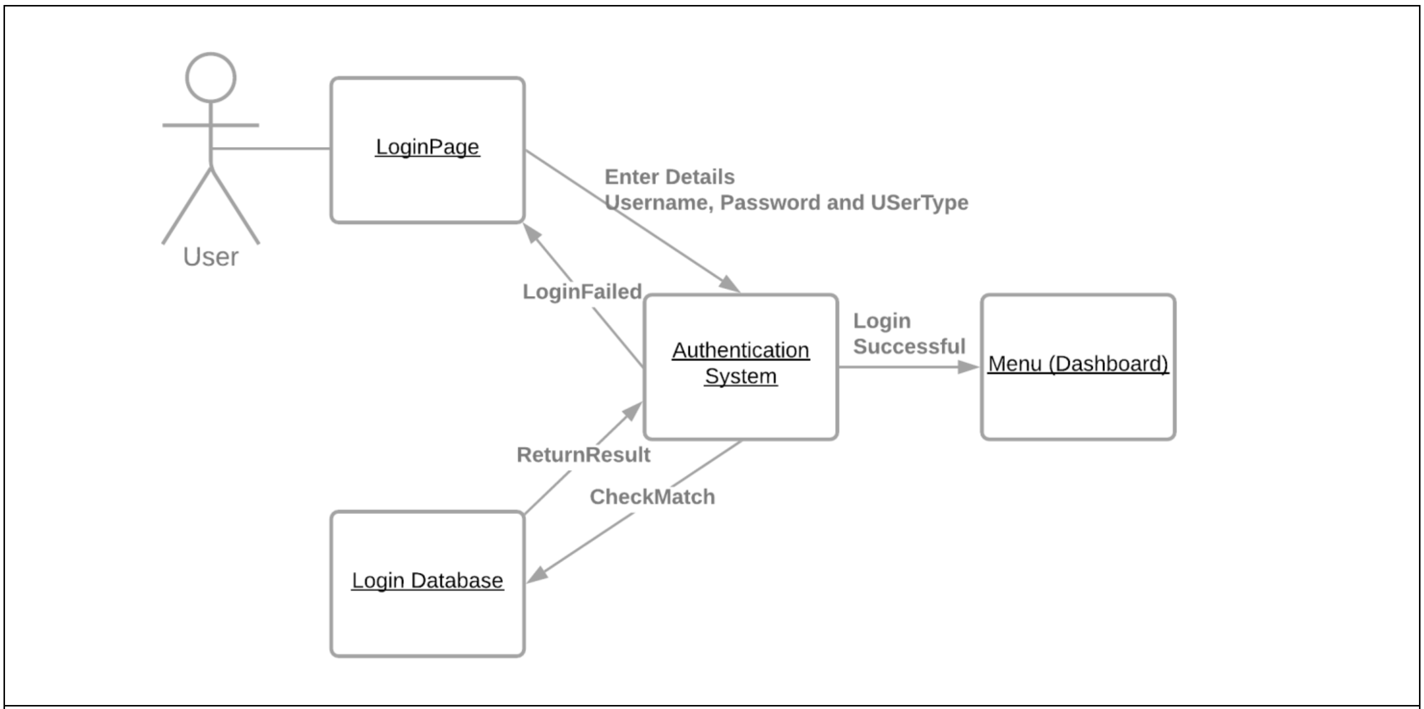


Sequence Diagram: Admin

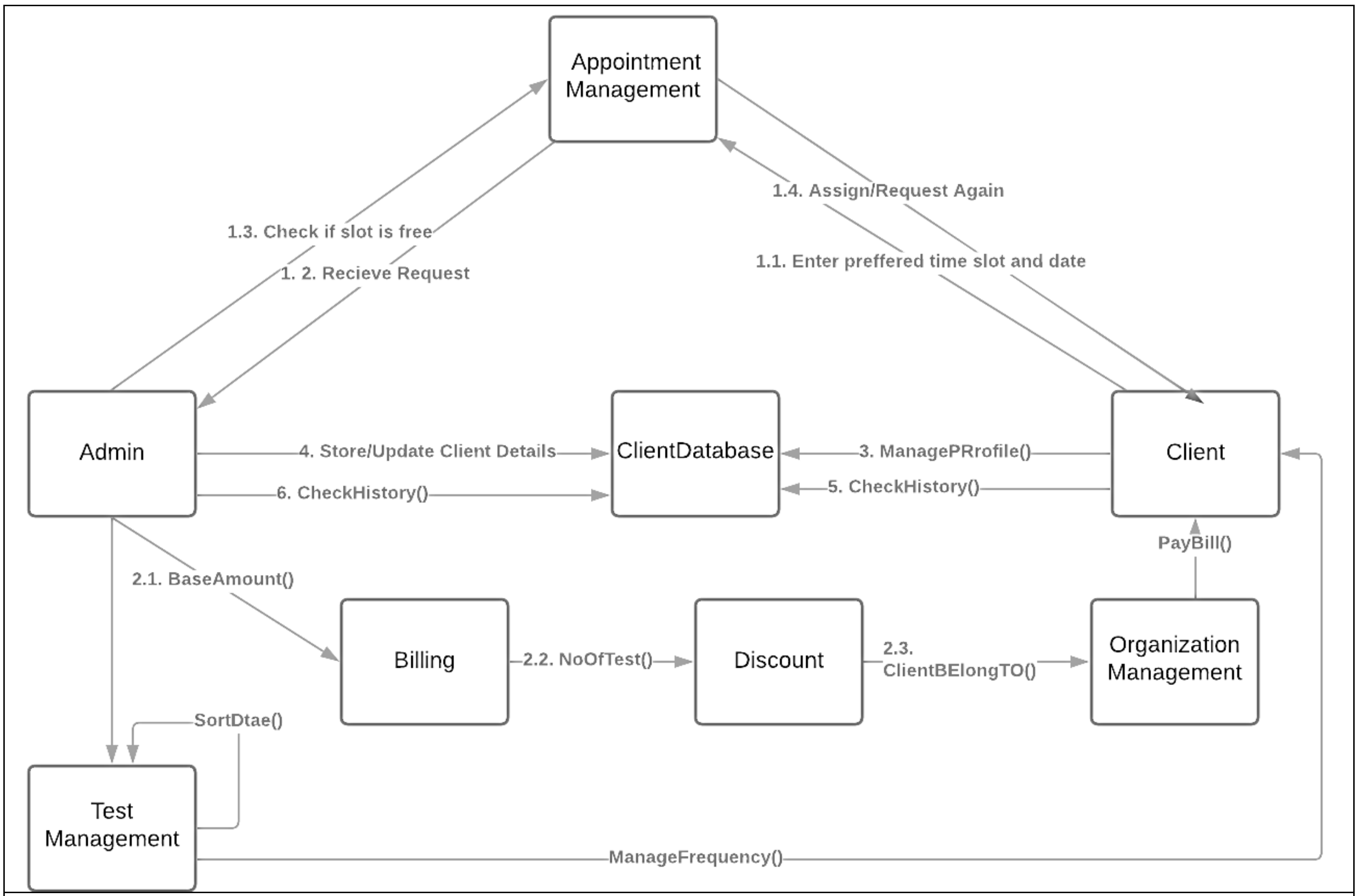


Sequence Diagram: Client

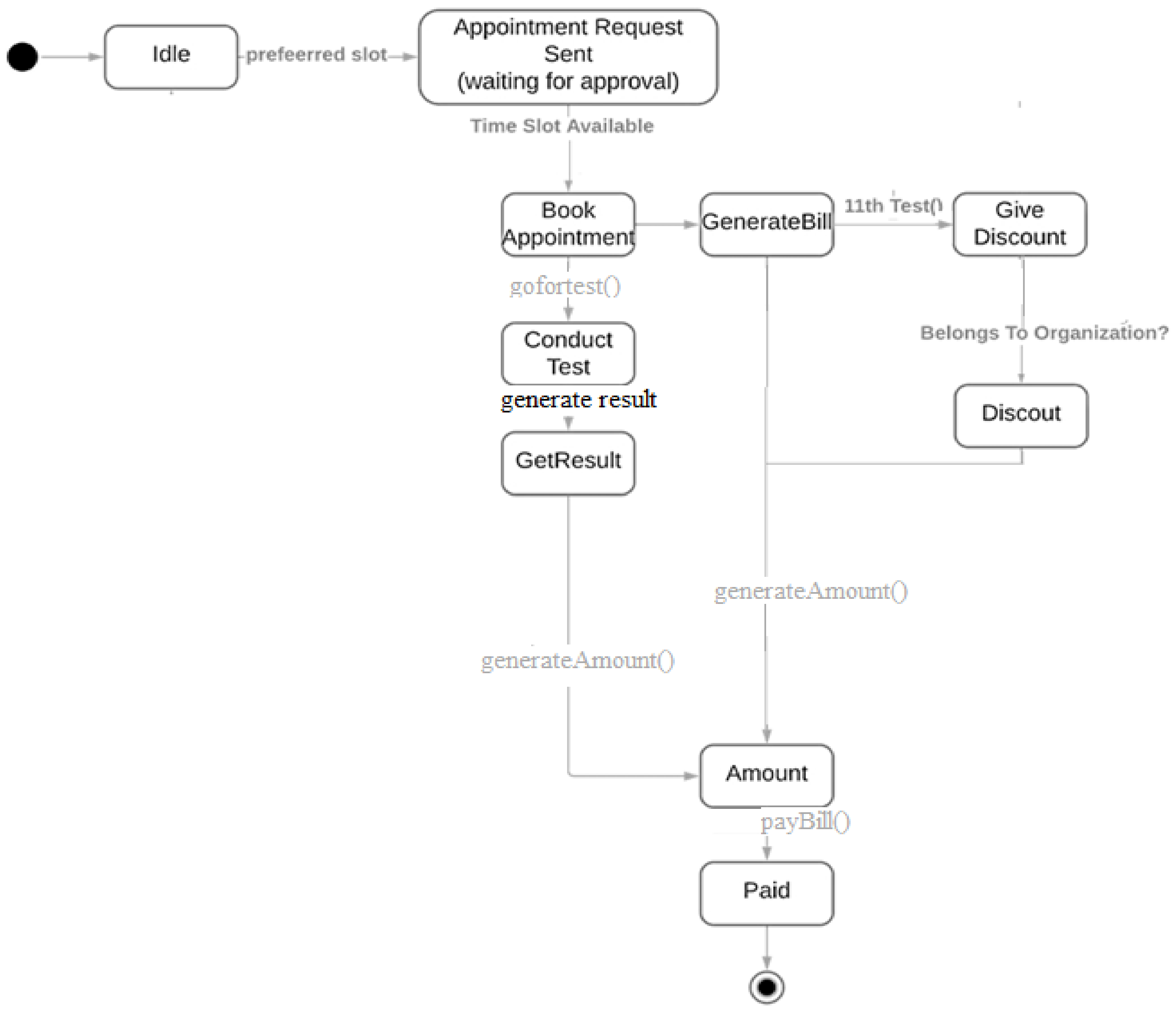
Collaboration Diagram



Collaboration Diagram: Login

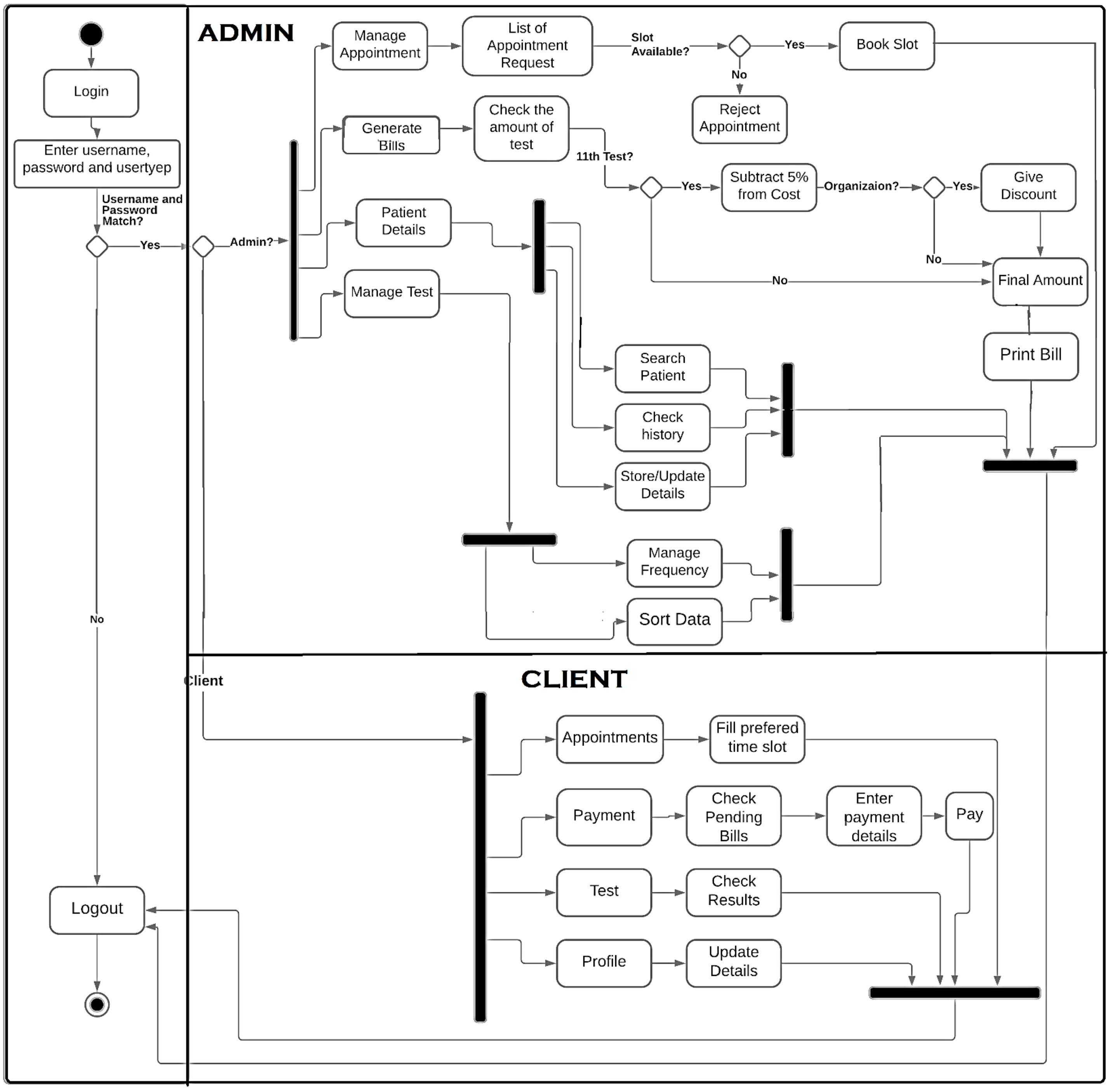


Collaboration Diagram: Client Coordination



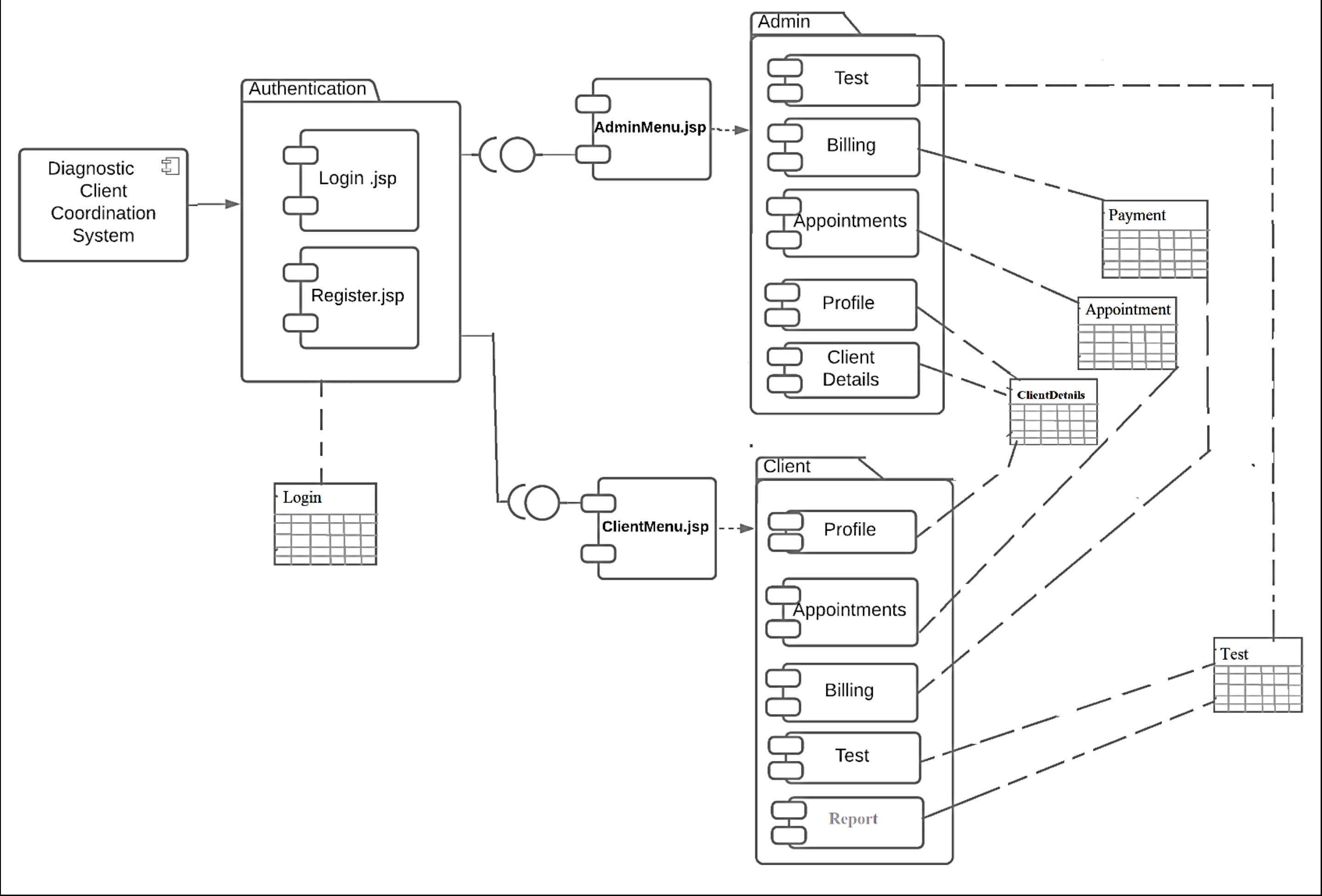
State Chart Diagram: Diagnostic Client Coordination System (Appointment, Test, Bill)

Activity Diagram



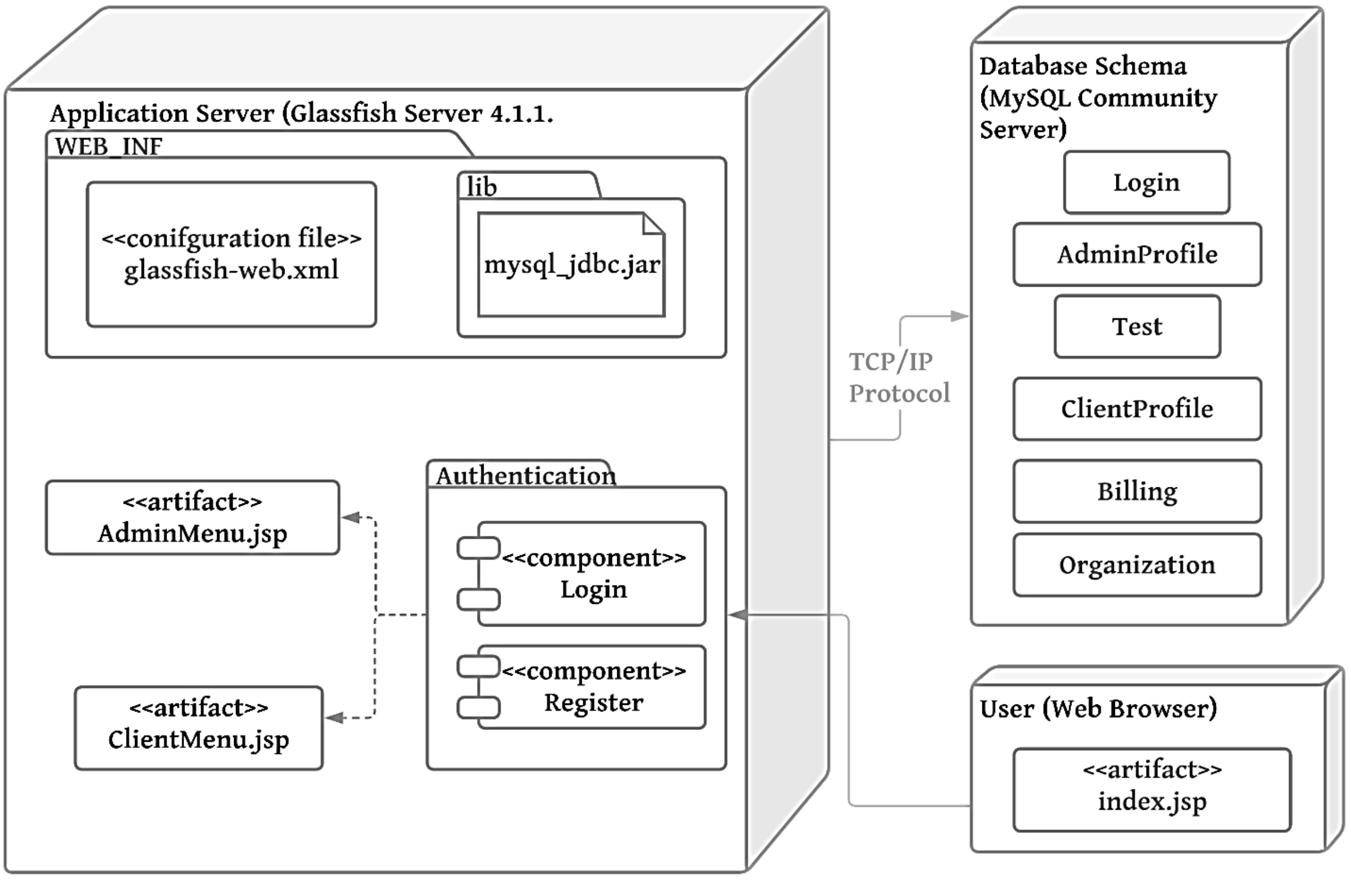
Activity Diagram: Diagnostic Client Co-ordiantion System

Implementation View



Component Diagram Diagnostic Client Co-ordination System

Deployment Diagram

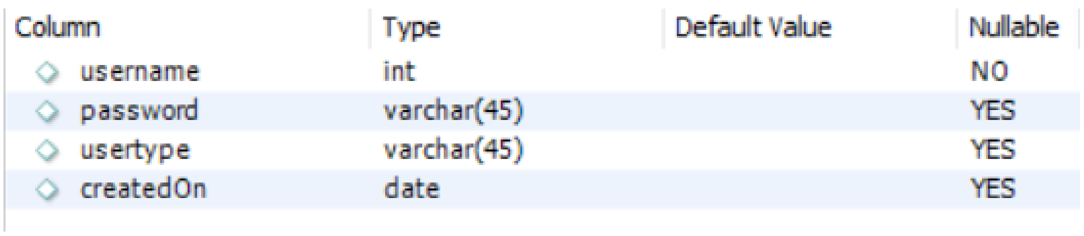


Deployment Diagram: Diagnostic Client Co-ordiantion System

Machine	**Software Configuration**	**Hardware Configuration**	**Operatin g System**	**Compi ler**	**Any other software**	**Software Modules and path**
Client	Google Chrome /Internet Explorer/ any browser with JSP Support		Windows 7 and after	Java	NetBeans,	GUI
Applicati on Server	Sun GlassFish 4.1.1. Server	Sun GlassFish Enterprise Server: 35 MB minimum SDK: 250 MB minimum 1GB Memory	Windows 7 and after, Red Hat, MacOS	HTML , Java, JSP, SQL	Internet Explorer, Chrome, Mozilla, Safari	
Database Server	MySQL Connector/J Driver 5.1		Windows 7 & after, Ubuntu			tables

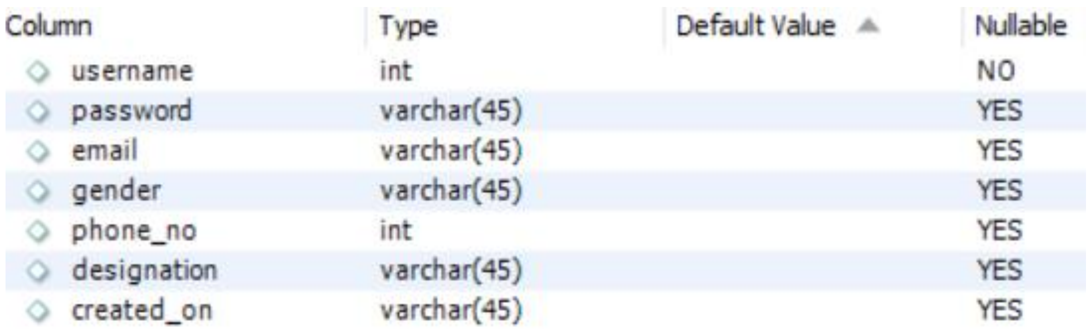
Data Strcuture

Login



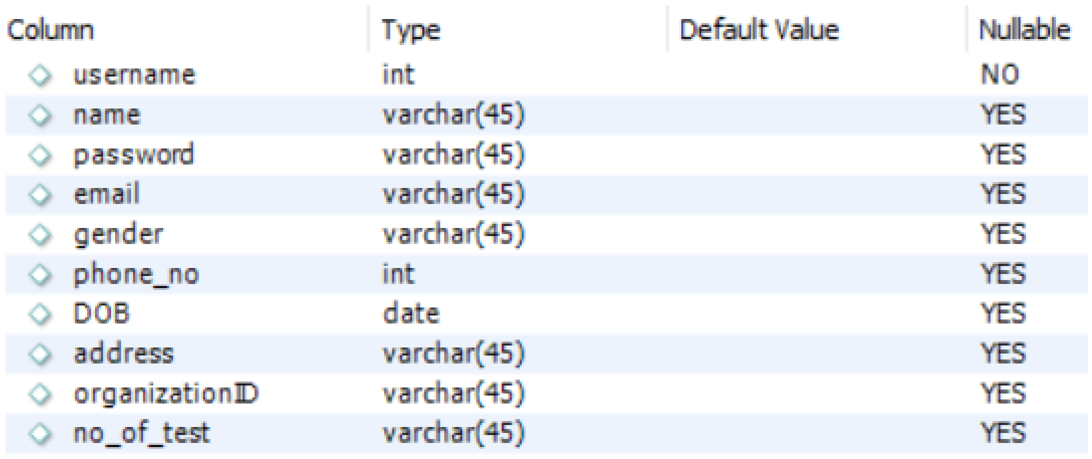
Column	Type	Default Value	Nullable
username	int		NO
password	varchar(45)		YES
usertype	varchar(45)		YES
createdOn	date		YES

Admin Profile



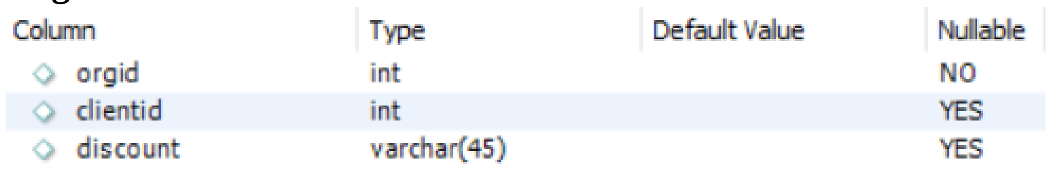
Column	Type	Default Value	Nullable
username	int		NO
password	varchar(45)		YES
email	varchar(45)		YES
gender	varchar(45)		YES
phone_no	int		YES
designation	varchar(45)		YES
created_on	varchar(45)		YES

ClientProfile



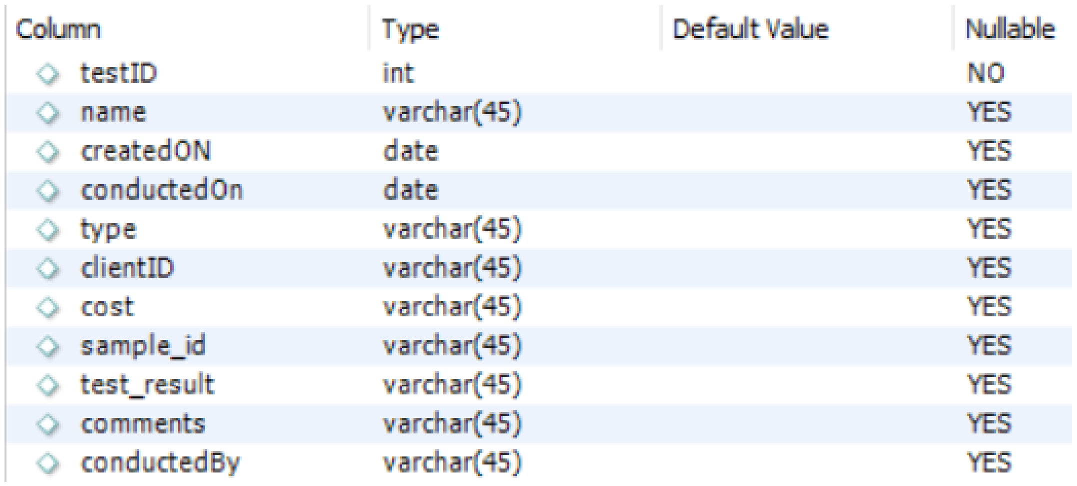
Column	Type	Default Value	Nullable
username	int		NO
name	varchar(45)		YES
password	varchar(45)		YES
email	varchar(45)		YES
gender	varchar(45)		YES
phone_no	int		YES
DOB	date		YES
address	varchar(45)		YES
organizationID	varchar(45)		YES
no_of_test	varchar(45)		YES

OrganizationDiscount



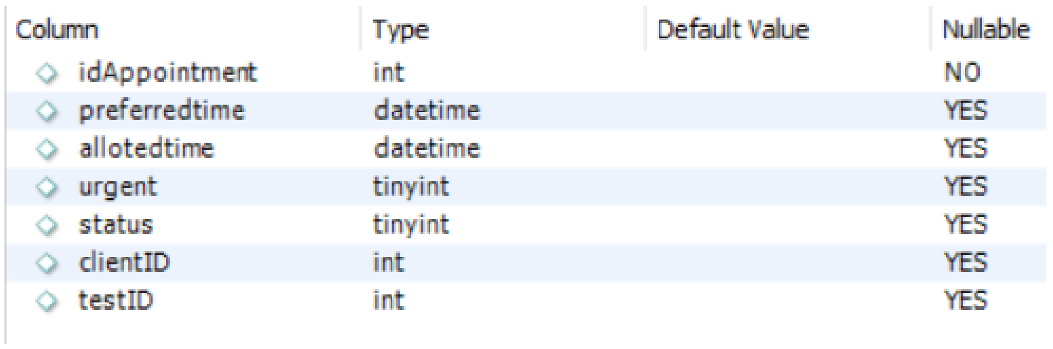
Column	Type	Default Value	Nullable
orgid	int		NO
clientid	int		YES
discount	varchar(45)		YES

Test



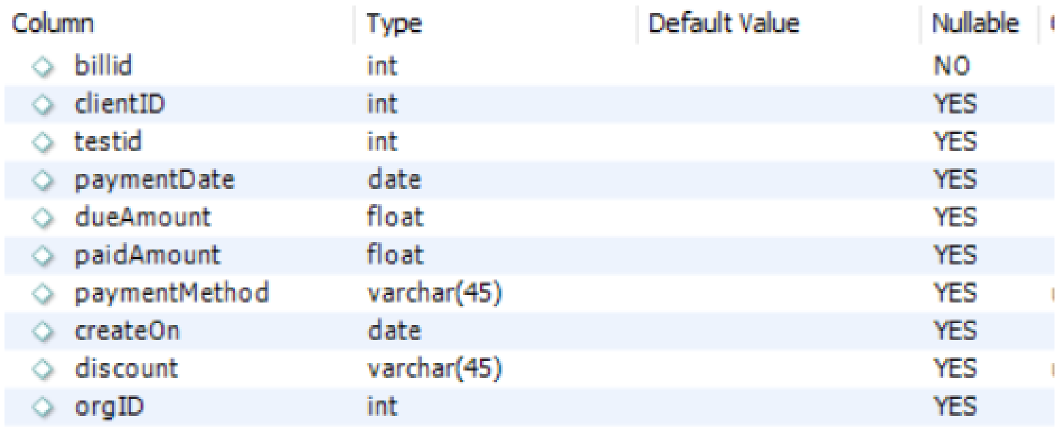
Column	Type	Default Value	Nullable
testID	int		NO
name	varchar(45)		YES
createdON	date		YES
conductedOn	date		YES
type	varchar(45)		YES
clientID	varchar(45)		YES
cost	varchar(45)		YES
sample_id	varchar(45)		YES
test_result	varchar(45)		YES
comments	varchar(45)		YES
conductedBy	varchar(45)		YES

Appointment



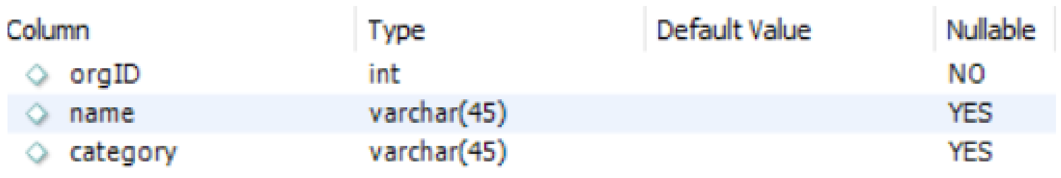
Column	Type	Default Value	Nullable
idAppointment	int		NO
preferredtime	datetime		YES
allotedtime	datetime		YES
urgent	tinyint		YES
status	tinyint		YES
clientID	int		YES
testID	int		YES

Blling



Column	Type	Default Value	Nullable
billid	int		NO
clientID	int		YES
testid	int		YES
paymentDate	date		YES
dueAmount	float		YES
paidAmount	float		YES
paymentMethod	varchar(45)		YES
createOn	date		YES
discount	varchar(45)		YES
orgID	int		YES

Organization



Column	Type	Default Value	Nullable
orgID	int		NO
name	varchar(45)		YES
category	varchar(45)		YES

ALGORITHM DESIGN

1. ***Register Client on System***

Name	Register
Summary	A new user (a user which doesn't have an account) should first register into the system to use it. This feature will allow the user to enroll into the system if the user is a new user and doesn't already have an existing account.
Rationale	The user can access the system
Actor	Client
Pre-Condition	None
Basic course of Event	1. User opens the desired module of the system. 2. The system displays GUI the registration. 3. User enters the valid details required to join the system 4. Submits the form
Post- Condition	User is registered
Alternate Flow	2. User goes back to the Home Page

Algorithm:

Input: username, password, usertype;

Output: user added to the system

Pseudo Code:

```
1. Start
2. Go to Registration Page
3. Enter the username and usertype
4. Enter password and confirm password
5. If username!=NULL && usertype!=NULL &&password!=NULL &&
   confirm_password!=NULL then
     i. If password==confirm_password
          1. If username already exists in table then enter another username
          2. Else: Enter the entry into login table of database
     i. Else
            a. Alert: Password and confirm password do not match
            b. Try again
6. Else:
     a. The field is required, do not leave it empty
```

2. <u>Login</u>

Name	Login
Summary	The user can use the features of the system
Rationale	After registration of the user, the valid user can login into the system
Actor	Admin, Client
Pre-Condition	The login name and password should match with the login name and password provided while registering. If the username and or password do not match, the user cannot login successfully into the system.
Basic course of Event	1. User opens the desired module of the system. 2. The system displays GUI the login form 3. The user writes its username, password and type 4. If valid, user can login into the system. If the username and or password do not match, the user cannot login successfully into the system.
Post- Condition	User goes to his/her dashboard
Alternate Flow	1. The username and password are blank 2. The type of user is not specified 3. The username and password do not match

Algorithm:

Input: username, password, usertype;

Output: allow/denied access to home page

Pseudo Code:

```
1. Start
2. Login Page open
3. Enter the username, password, type input
4. If password==NULL | username==NULL|| type==NULL
   a. The field is required
5. Retrieve the entry from database for the given username
   a. If username=username(database) && password=password(database)&&
      type=usertype
   b. Go to Dashboard
6. Else
   a. Alert: Invalid entry, please try again
7. End
```

3. ***Book Test Appointment***

Name	Book Test Appointment
Summary	The patient requests to book test and admin assigns a slot
Rationale	The appointment is booked
Actor	Client and Admin
Pre-Condition	1. The client is a valid user 2. The slot he asks for is free
Basic course of Event	1. The client (patient) logs into the system 2. The patient requests for an appointment using test name, preferrable date and time 3. The admin checks if the slot is available 4. The admin assigns the slot if free to the patient (client)
Post- Condition	The client is given the free slot for test
Alternate Flow	2. The admin denies the appointment as he finds the user malicious
Alternate Flow 2	1. The slot is not available a. The admin sends a message to request for another slot b. The admin assigns a nearby time slot
Exceptions	1. The appointment is marked as urgent The admin adjusts the time slot given to someone else 2. System fails to given appointment Patient has to request again

Algorithm:

Input: test name, preferrable date and time

Output: appointment

Steps: (Procedure)

1. ClientRequestAppointment()
    a. The client goes to the Appointment Section
    b. Choose the test
    c. Choose preferred time and fate
    d. Wait for confirmation from Admin

2. BookAppointment()
    a. Check requests from Client
    b. If the time slot==free
        i. Confirm the appointment for the particular test
        ii. Enter in test database
    c. Else if urgent==true
        i. Give the time slot and adjust the previous appoinment
    d. Else
        i. The admin asks client for another slot

4. ***Generate Bill***

Name	Generate Bill
Summary	The client is has to pay the bill for the corresponding test/s
Rationale	The amount to be payed is generated
Actor	Client and Admin
Pre-Condition	The appointment is booked
Basic course of Event	1. The appointment for a particular test is booked 2. The system generated the Amount of the test to be paid by client as stored in its database
Post- Condition	The bill is printed and given to the client
Alternate Flow	1. If number_of_test of patient is 11 a. Provide 5% discount b. Calculate the final amount
Alternate Flow 2	1. The client belongs to a organization who has a contract with the system 2. Provide corresponding discount to the client 3. Calculate Total

Algorithm:

Input: testID, patientID

Output: printable bill

Pseudo Code:

```
1. Start
2. Go to Billing section of Admin
3. Enter the testID and patientID
4. If testID==NULL || patientID==NULL
        i. Please enter valid data
       ii. Go to step 3
5. Generate the Base Amount
6. If no_of_test=11: then Amount:=Base Amount-5%of Base Amount
7. If client belongs to a organization
   a. Adjust amount accordingly
8. PrintBill()
9. Return Amount
```

5. ***Generate Test Report***

Name	Generate Test Report
Summary	After giving the test, the client can check the report of the test
Actor	Client
Pre-Condition	The test is conducted
Basic course of Event	1. Go to the Test section 2. Check the report of the test you want
Post- Condition	The list of report is given.

Algorithm

Input: *TestID*

Output*: Report*

Steps

1. Start
2. Go to the test section of Job Seeker
3. Check the result in the Report column
4. End

6. ***Search Patient History***

Name	Search Patient History
Summary	The administrator can check the search and check the record of patient
Actor	Admin
Pre-Condition	The list of record is displayed
Basic course of Event	1. The admin logs into the system 2. The admin goes to the search tab 3. Enters the name of patient/patient ID 4. The details and history of the patient are displayed
Post- Condition	The patient history is displayed
Alternate Flow	1. There is no patient with the given patient name/ID 2. No results displayed

Algorithm:

Input: patientID, name, testTaken

Output: details of patient

Pseudo Code:

```
1. Start
2. Go to the Patient Tab of Admin
3. Enter the name of client or the patientID
4. If client name or patientID is not found
   a. Print invalid ID, try again
5. Display the details of the patient
6. End
```

7. ***Store/Update Patient Details***

Name	Store/Update Patient History
Summary	The administrator can store or update the record of patient
Actor	Admin
Pre-Condition	The patient/client is added to the system
Basic course of Event	1. The admin logs into the system 2. The admin searches for the patient using patient ID/name 3. The patient is selected 4. The option to add/update the details is given 5. The details are entered/edited 6. The data is stored/updated into the database
Post- Condition	The database is updated
Alternate Flow	1. There is no patient with the given patient name/ID 2. No results dispalyed 3. A new patient is added

Algorithm:

Input: patientID, name,

Output: details of patient

Pseudo Code:

```
1. Start
2. Go to the Patient Tab of Admin
3. Enter the name of client or the patientID
4. If client name or patientID is not found
   a. Print invalid ID, try again
5. Display the details of the patient
6. Click on Edit
   a. Update the fields you want
   b. Apply the changes to update the database
7. End
```

8. ***Sort the tests and manage frequency***

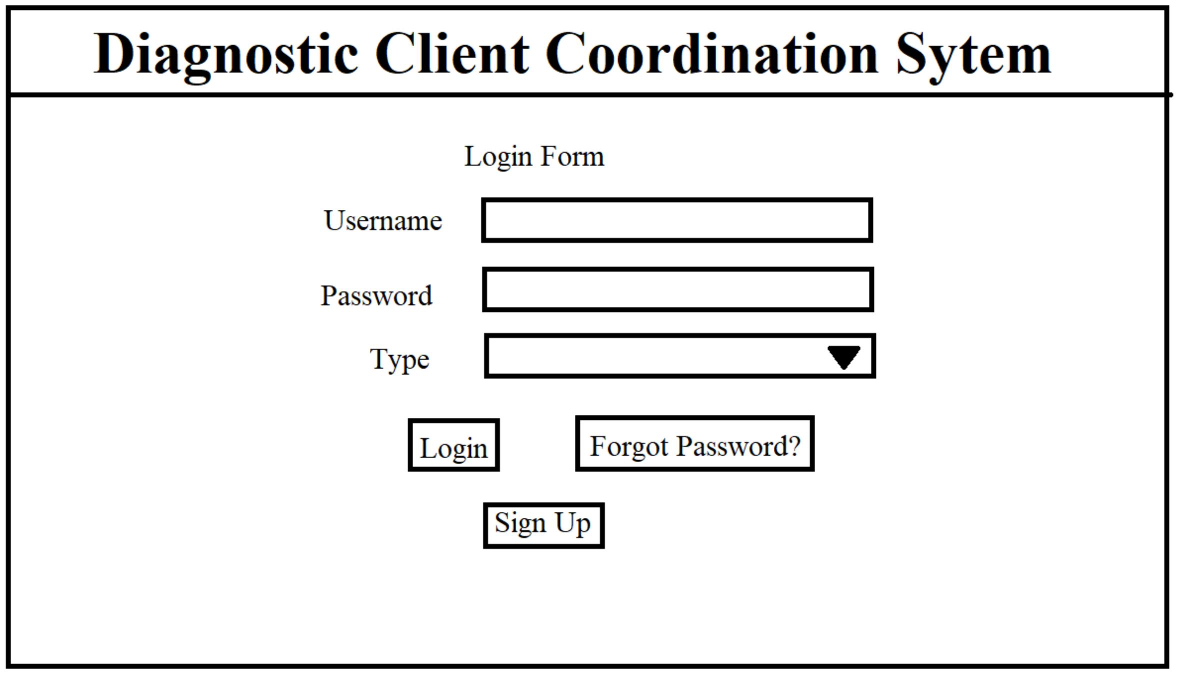
Name	Manage frequency
Summary	The client when completed a test it is added to his list
Actor	Client
Pre-Condition	The client is registered to the system
Basic course of Event	1. The test appointment is given to client 2. Client finishes the test 3. Update the no_of_tests in the database
Post- Condition	The database is updated

Algorithm:

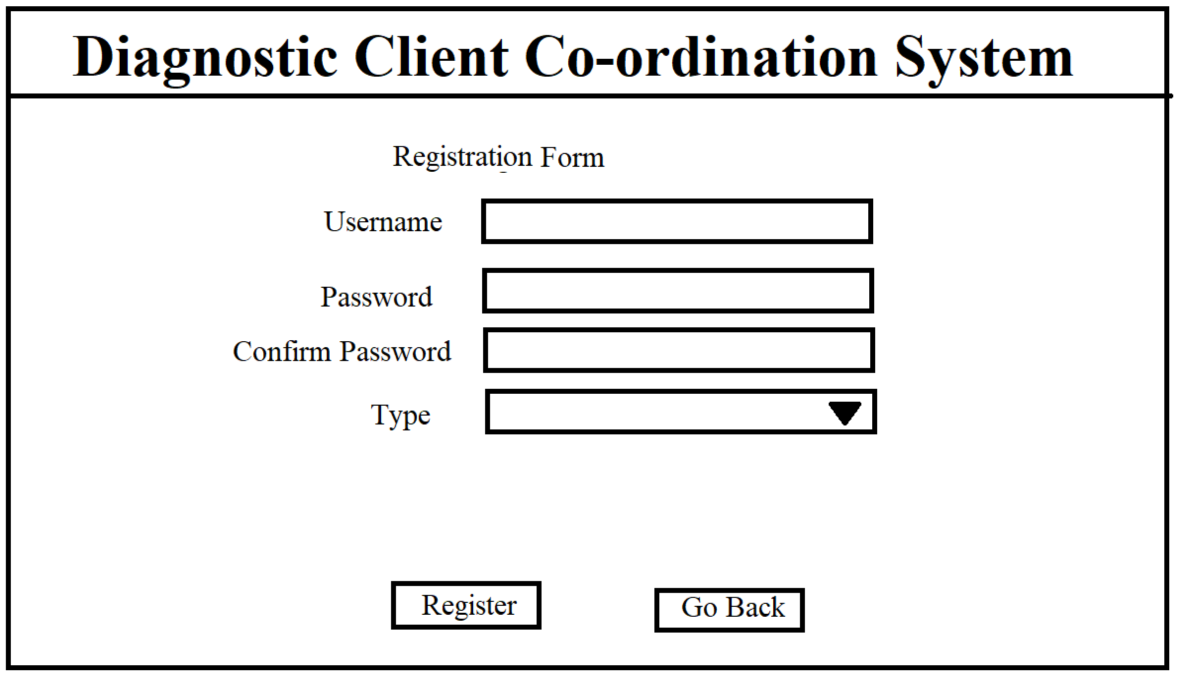
Pseudo Code:

```
1. Start
2. Go to the Test tab
3. Once, the test is done update the no_of_test=no_of_tests+1
4. Sort the test and view details
5. End
```

GUI Design

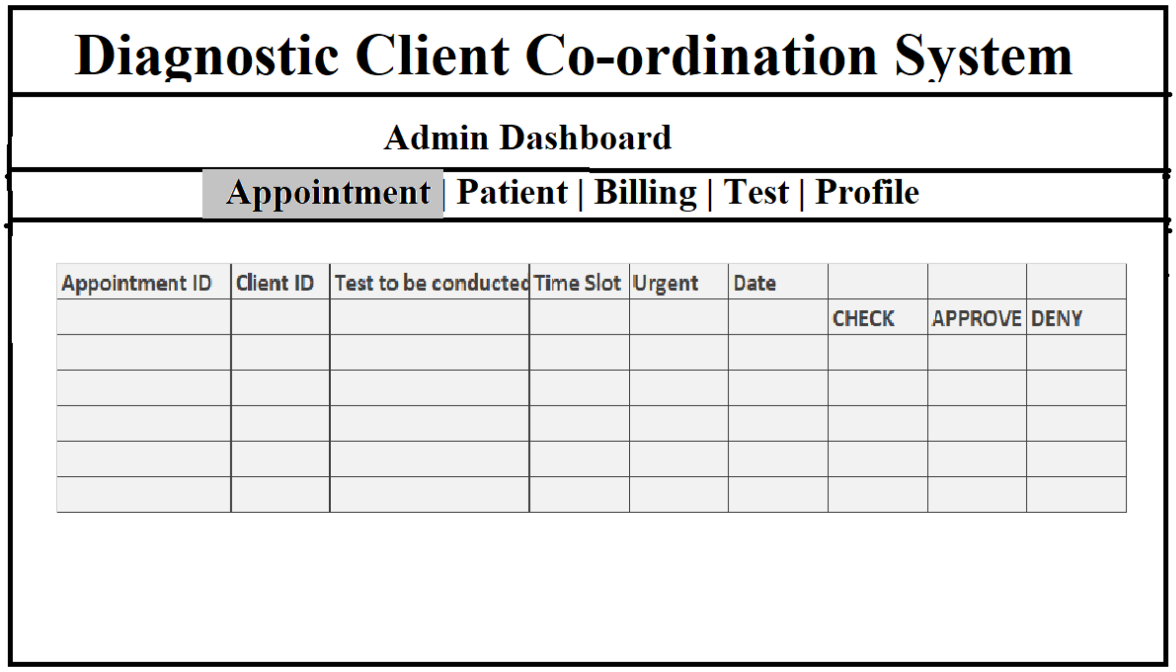


1. Login



2. Register

3. **Admin Dashboard**



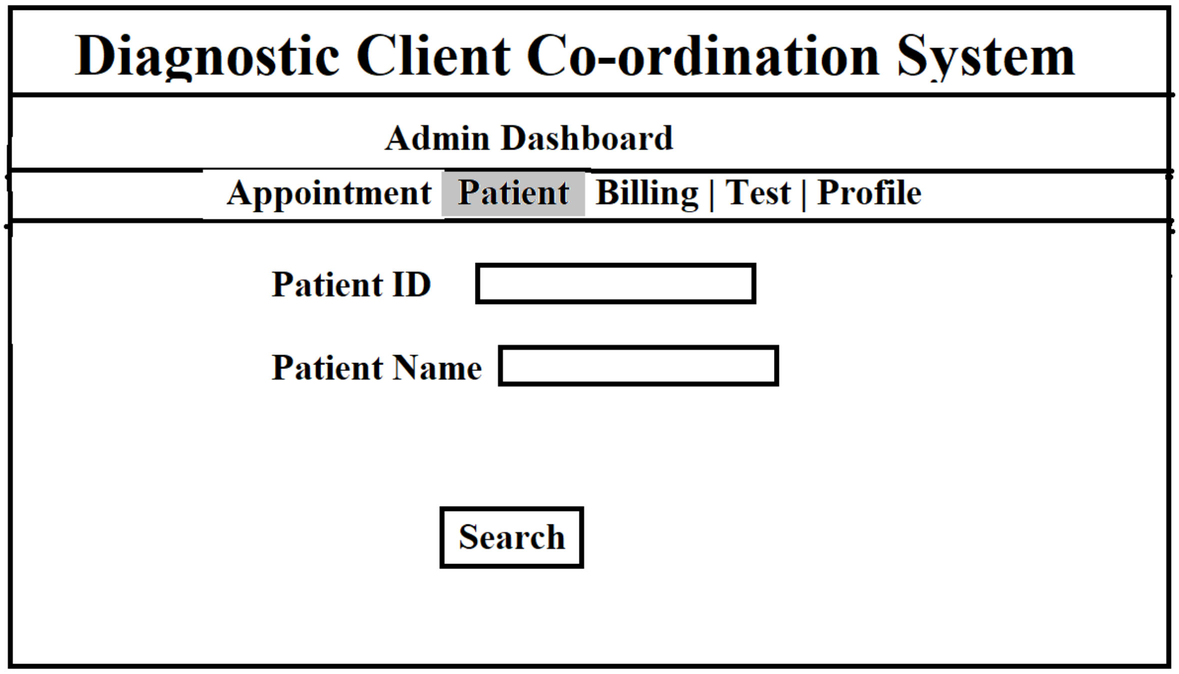
Diagnostic Client Co-ordination System

Admin Dashboard

Appointment | Patient | Billing | Test | Profile

Appointment ID	Client ID	Test to be conducted	Time Slot	Urgent	Date			
						CHECK	APPROVE	DENY

a. Book Appointment



Diagnostic Client Co-ordination System

Admin Dashboard

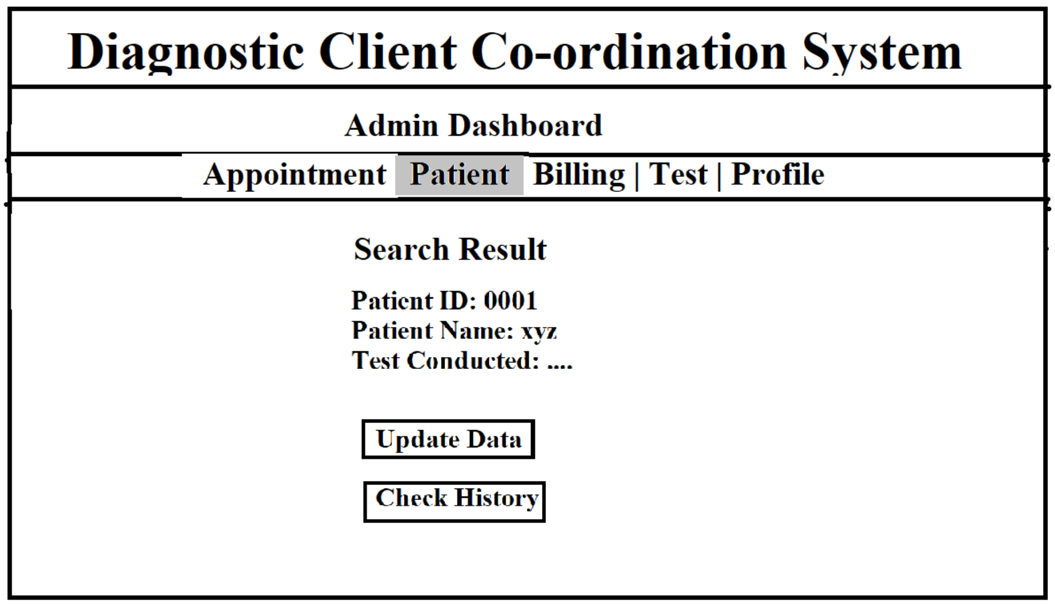
Appointment | Patient | Billing | Test | Profile

Patient ID

Patient Name

Search

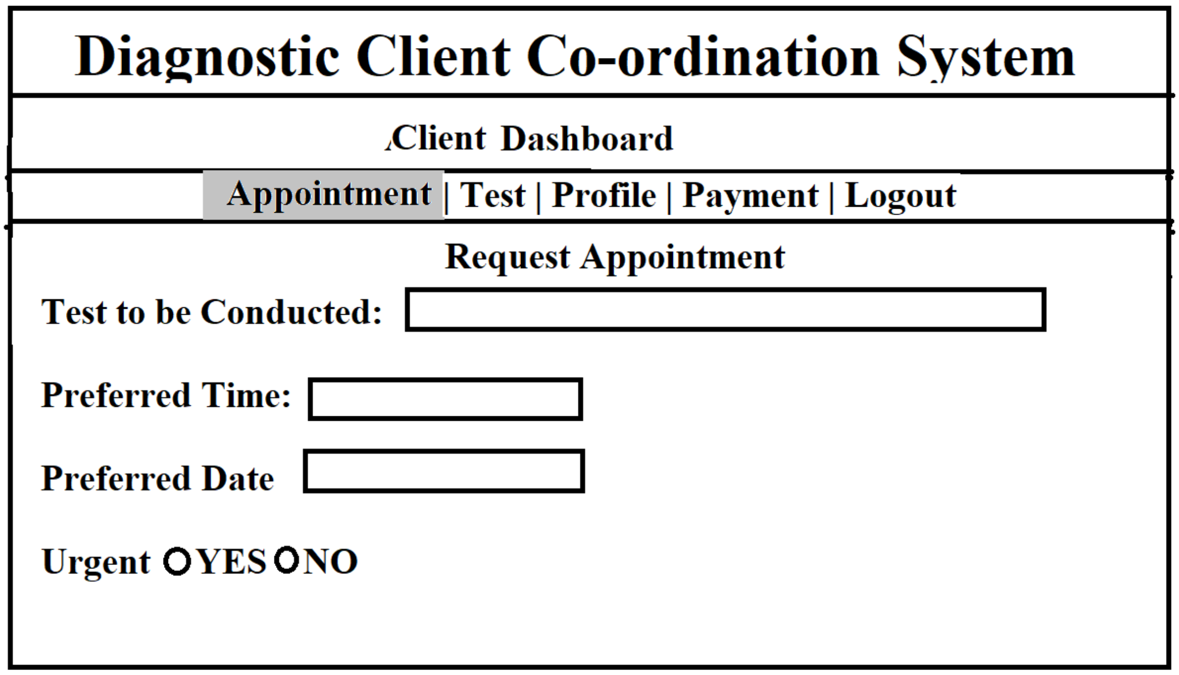
b. Search patient



Patient ID: 0001
Patient Name: xyz
Test Conducted: ....

c. Search Result/Update/Store/Check history

4. **Client Dashboard**



Diagnostic Client Co-ordination System

Client Dashboard

Appointment | Test | Profile | Payment | Logout

Request Appointment

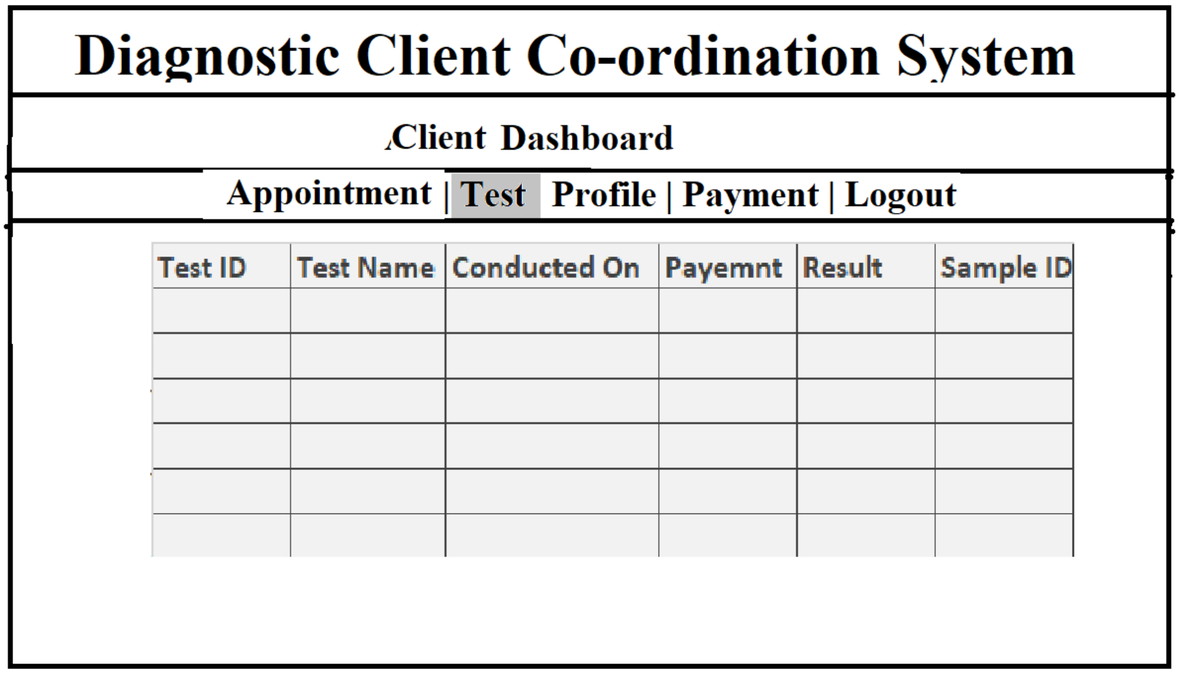
Test to be Conducted:

Preferred Time:

Preferred Date

Urgent ○YES ○NO

a. Request Appointment



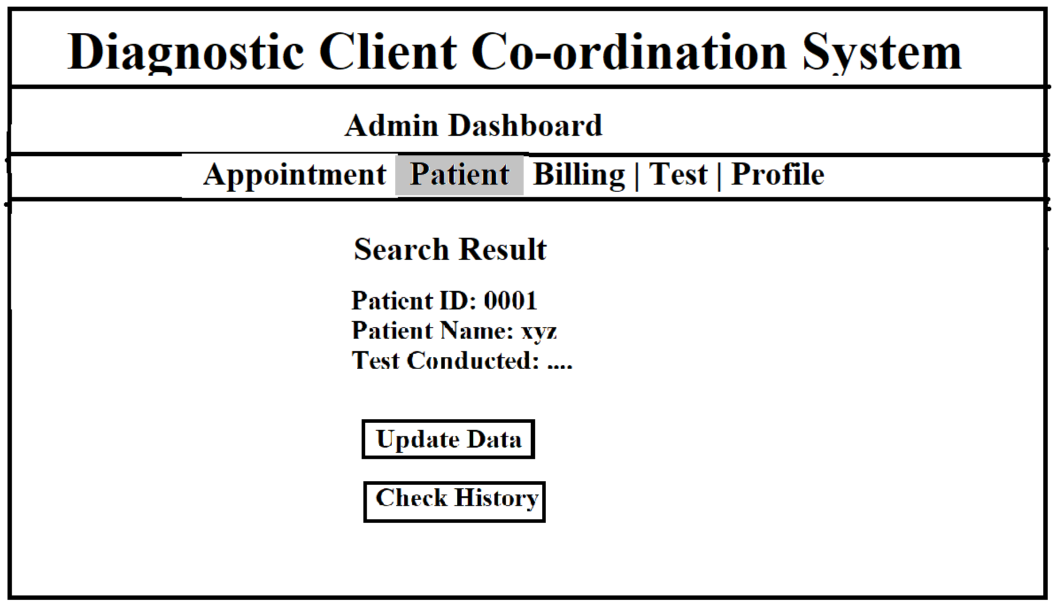
Diagnostic Client Co-ordination System

Client Dashboard

Appointment | Test | Profile | Payment | Logout

Test ID	Test Name	Conducted On	Payemnt	Result	Sample ID

b. Test Details



Diagnostic Client Co-ordination System

Admin Dashboard

Search Result

Patient ID: 0001
Patient Name: xyz
Test Conducted: ....

c. Payment