School of Computer Science and Engineering

Team ID: 4A10

Proposal Phase Report

Category: Application Development

Title: Primary Health Care Center Patient Database

List of Team Members: Apoorva Surendra Malemath

Team Leader: Apoorva Surendra Malemath

Responsibilities: [express the initial responsibilities of each team member for the proposal phase]

What is the role of each project member in this phase of project? (Be specific)

- Communicating with the client.
- Interpreting the problem statement.
- Brainstorming the possible solutions for the problem statement.
- Implementing the ER model.
- Deriving the relational schema.
- Attaining Data Dictionary.

Problem Description: [give a detailed description of what is the real time problem that you came across which motivated you in proposing this as your course project]

The task of saving the lives and ensuring good health of the citizens throughout the state lies in the hand of the government. The most important asset of a country is the good health of its citizens. Thus, primary health care center is made accessible to all the individuals and the family in the community.

But the primary health care centers do not have any formal records of detailed patient records. Monitoring of patient record is mandatory as the government can properly plan about how to minimize the casualties of any disease.

Recording all the details of an individual is crucial as it helps the doctors to understand the patient's health conditions perfectly and act accordingly. It is a common scenario that usually the patient is unaware of the intricate details of his chronic illness, wherein if there is no previously stored data, then there are chances that the doctor might not get the complete detail of the patient's medical status leading to inefficient prescription of medicines.

Also depending on the cases registered, it will be easy for the government to properly plan how to reach out to the public in the most efficient way.

Requirements: [list out the issues that you will be addressing]

What are the application functional specifications (i.e., what functionality will your completed system provide)? You will have to account for each one of the functionality in your demo.

The Primary health care center patient database system is a database management system that uses database technology to construct, maintain and manipulate various kinds of data about a person's medical history and care across time. The DBMS can track and update all the information of registered patients in the primary care center.

Medical records are created when a patient receive treatment from a government health professional. Records include the patients:

- Personal information
- Medical history
- Laboratory test results
- Medications prescribed
- Reports that indicate the results of operations and other medical procedures
- Disabilities
- Allergies
- Insurance
- Eligibility for government programs.
- Analysis of trends in common diseases.

The medical record serves a variety of purposes and is essential to the proper functioning of the medical practice. Especially in today's complicated health care environment. The medical record is a key instrument used in planning, evaluating, and coordinating patient care.

Design Questions to be answered

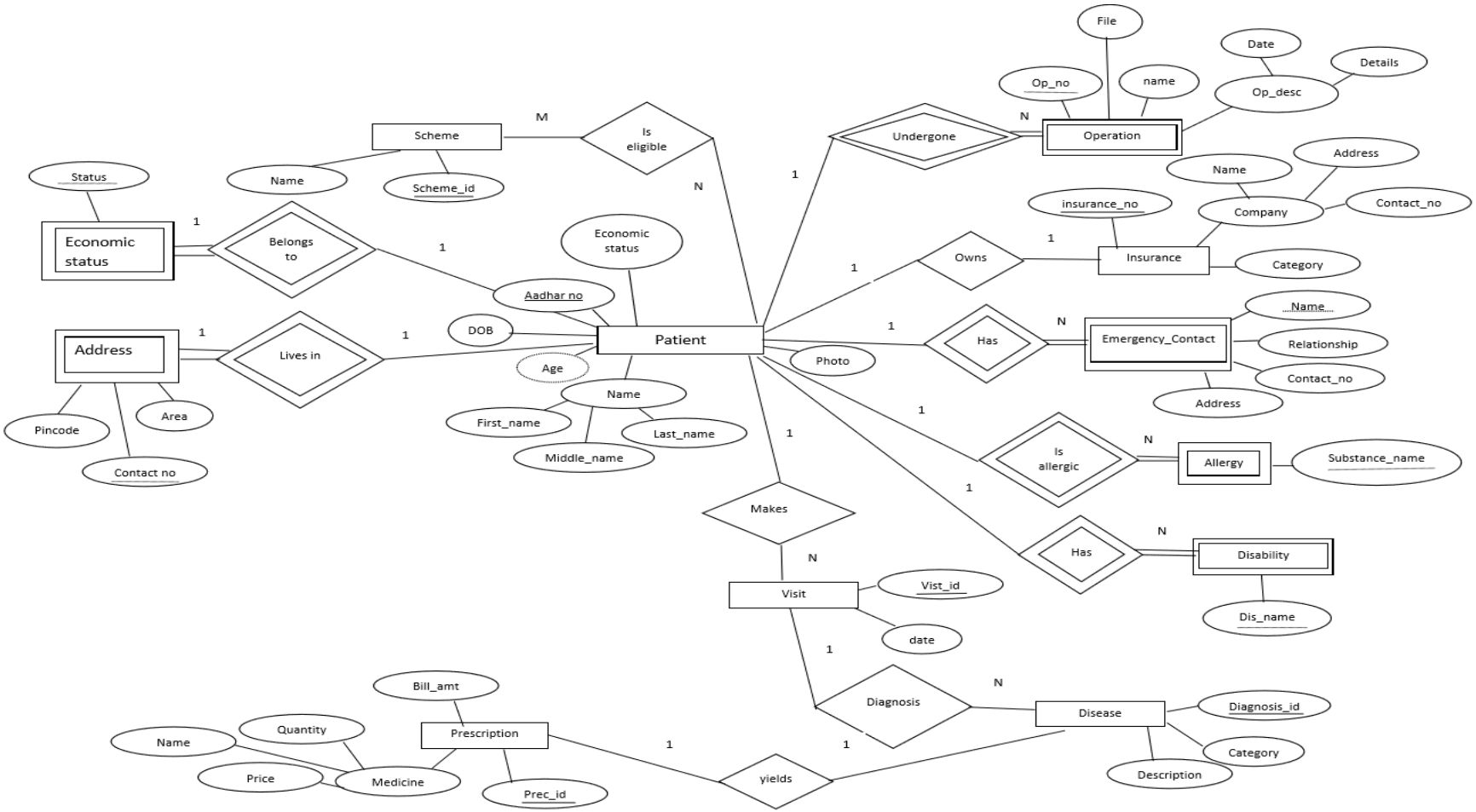
[Note: *Complete a logical design of a database. This section of the course project involves designing a database schema based on problem specification stated. Here, you need to submit a report summarizing your design which includes Entity-Relationship Model, ER to Relational mapping, data dictionary. (You need to design using any of the designing tools that you have access to such as UML, ER Modeling, etc.)****]***

Question 1: From the problem description, identify the entities that need to be represented in the database, the attributes of each entity, the relationships between the entities, and the cardinality ratios of each relationship.

Entity	**Attributes**
Patient	Aadhar_no, First_Name, Middle_Name, Last_Name, DOB, Age, Pin_code, Contact_no, Economic_status, Photo
Emergency_Contact	Name, Relationship, Contact_no, Address
Allergy	Substance_name
Disability	Disability_name
Insurance	Insurance_no, Name, Address, Contact_no, Category
Operation	Op_no, Name, Date, Details, File
Diagnosis	Visit_id, Date, Description
Disease	Disease_ID, Category
Prescription	Prec_id, Med_name, Quantity, Price, Bill_Amt
Test_Reports	Rep_ID, Rep_name, file
Scheme	Scheme_ID, Name

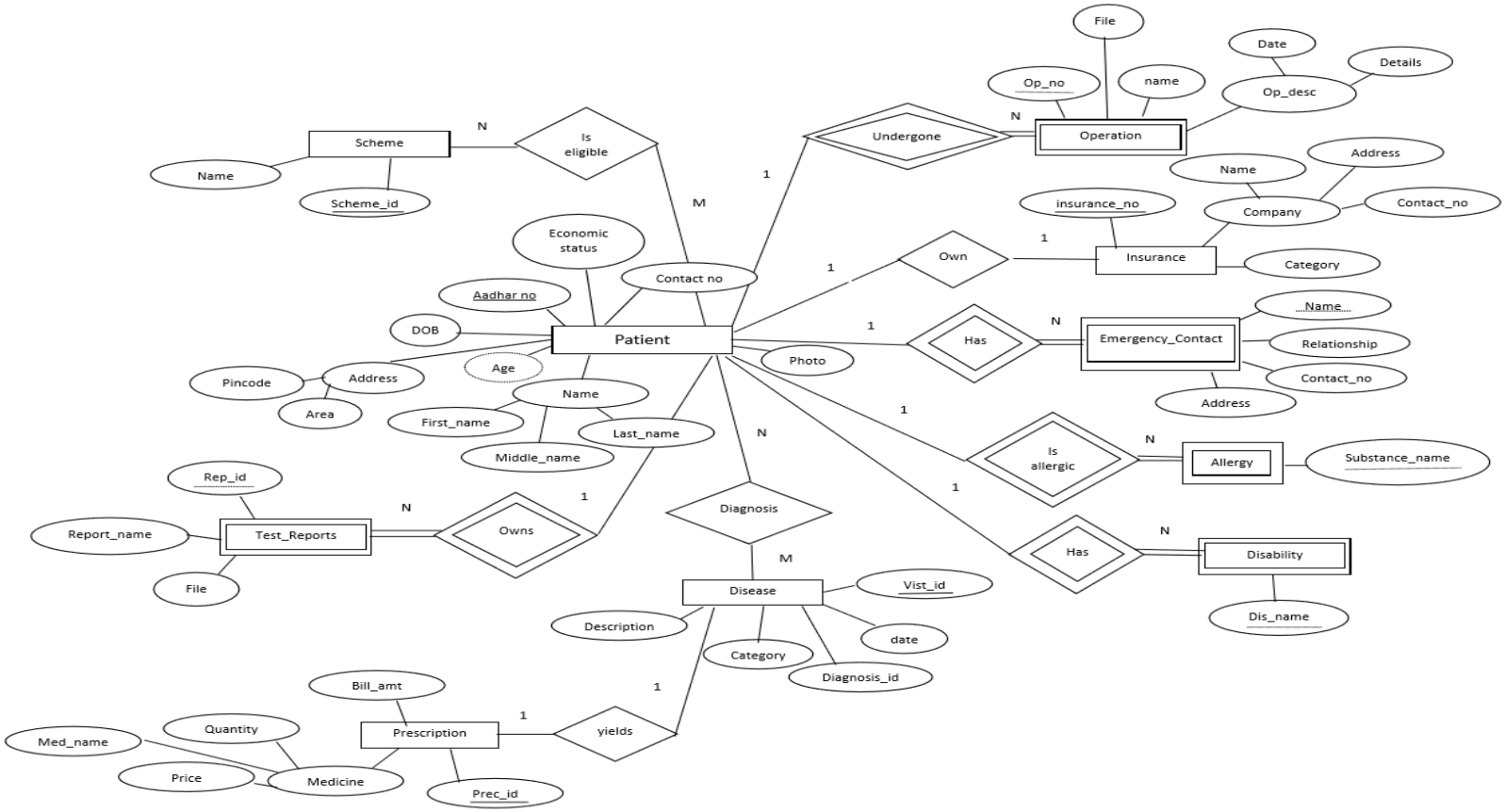
Entity Name	Entity Type	Relationship	Entity Name	Entity Type	Cardinality ratio
Patient	Strong Entity	Has	Emergency_contact	Weak Entity	1:N
Patient	Strong Entity	Owns	Insurance	Strong Entity	1:1
Patient	Strong Entity	Undergone	Operation	Weak Entity	1:N
Patient	Strong Entity	Is Allergic	Allergy	Weak Entity	1:N
Patient	Strong Entity	Has	Disability	Weak Entity	1:N
Patient	Strong Entity	Undergoes	Diagnosis	Strong Entity	N:M
Patient	Strong Entity	Owns	Test_reports	Weak Entity	1:N
Patient	Strong Entity	Is Eligible	Scheme	Strong Entity	M:N
Diagnosis	Strong Entity	Yields	Prescription	Strong Entity	1:1
Diagnosis	Strong Entity	Determines	Disease	Strong Entity	1:1

Question 2: Draw an Entity-Relationship Diagram illustrating the information you have identified in Question 1.

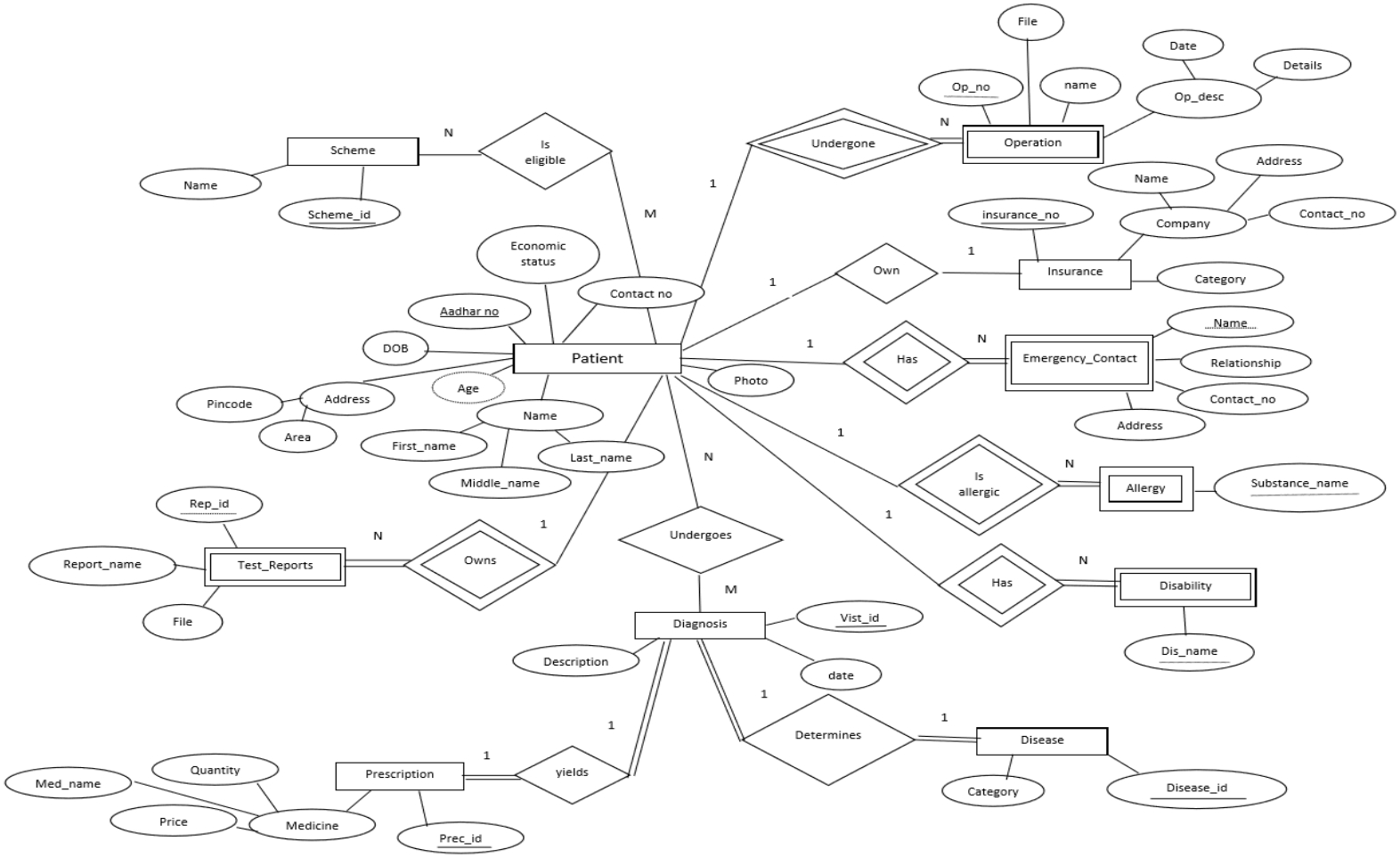


ER diagram 1

Question 3: Draw **alternate** Entity-Relationship Diagram illustrating the information you have identified in Question 1 that you think are most likely to occur.



ER diagram 2


Patient
Aadhar no
DOB
Age
Address
Pincode
Area
Name
First_name
Middle_name
Last_name
Contact no
Economic status
Photo
Scheme
Name
Scheme_id
Is eligible
Undergone
Operation
File
Date
Details
Op_no
name
Op_desc
Own
Insurance
insurance_no
Company
Address
Contact_no
Category
Has
Emergency_Contact
Name
Relationship
Contact_no
Address
Is allergic
Allergy
Substance_name
Has
Disability
Dis_name
Undergoes
Diagnosis
Vist_id
Description
date
Determines
Disease
Category
Disease_id
yields
Prescription
Med_name
Quantity
Price
Medicine
Prec_id
Owns
Test_Reports
Rep_id
Report_name
File
1
N
M

ER diagram 3

Repeat Question 3 if you have many alternate ER designs.

Question 4: Choose the **optimal** Entity-Relationship Diagram from the designs provided above and justify why you think this is an optimal solution for your identified problem specification.

ER diagram 3 provides an optimal solution because:

- Designing is an iterative process and the shortcomings in the ER diagram 1 haven been given focus to and rectified.

  Two weak entities namely Economic_status and Address in ER diagram 1 have been removed and have been put under Patient entity in ER diagram 3 as this prevents unnecessary existence of two extra tables with the attributes which can be used under patient entity, thus customizes it.

- It provides new entity named Test_Reports.

  On further brain storming over ER diagram 1 and communicating with the client, new perspective towards the problem statement has been included. i.e. The system must provide an option to store files such as x-rays, test reports, etc.

- It is an improvement over the previously made model as it increased the understanding of data flow and relationship.

  There is ineffecient use of diagnosis_id under the entity named diagnosis in ER diagram 2, which has been replaced and optimized by making use of two entities namely diagnosis and disease in ER diagram 3, thus establishes better relationship among the entities.

- The attributed named bill_amt in prescription entity of ER diagram 1 has been removed as it is inappropriate to use it. Because it will be present for each tupple. Instead the bill amount can be exernally calculated through on simple calculations.

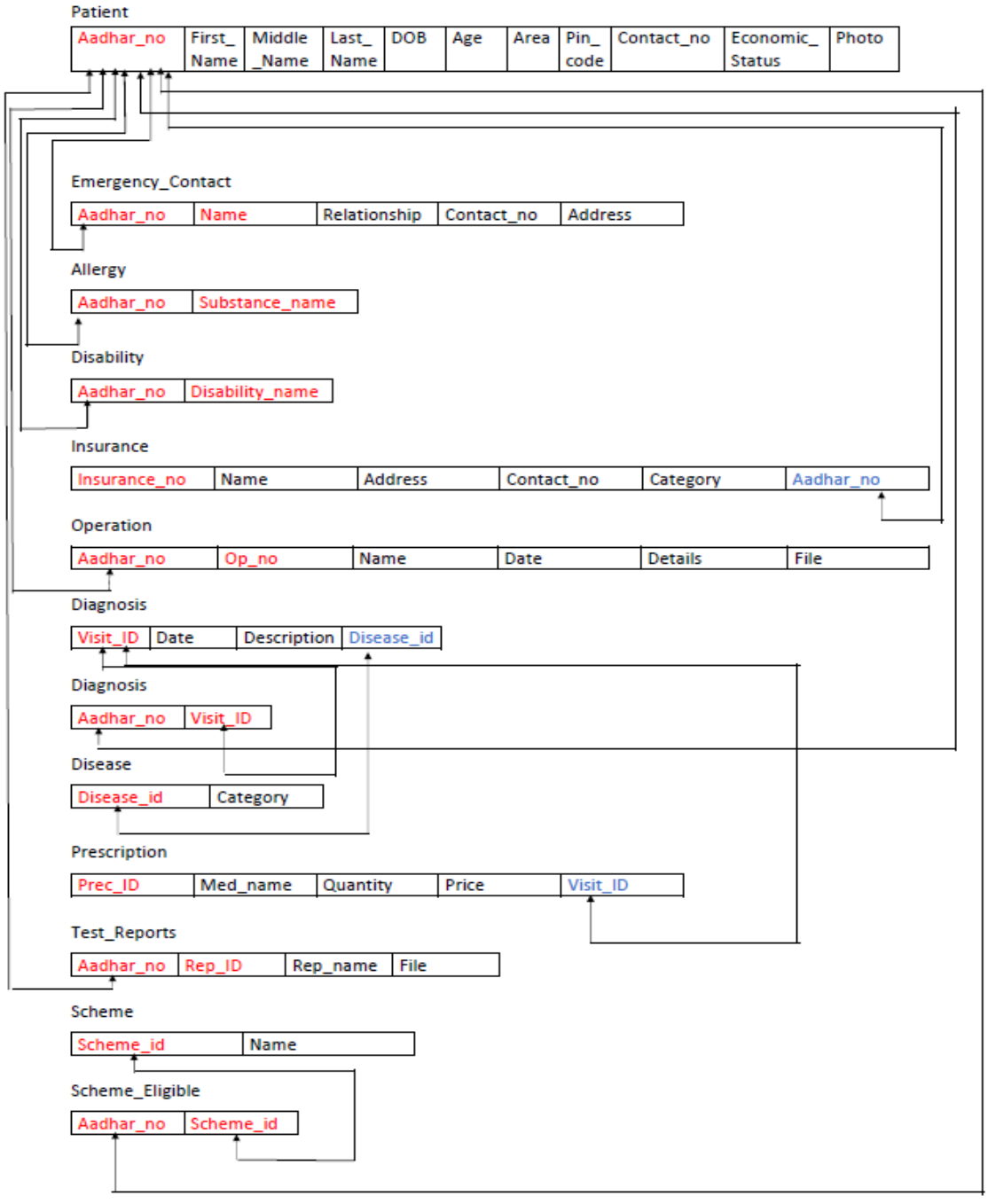
- It provides an additional attribute to store the image of the patient on client's demand.

  Thus, The ER diagram 3 is optimized and has a better approach towards solving the problem, and provides better relationships among entities.

[Optional] Question 5: Draw an Object Model illustrating the information you have identified in Question 2.

DRAW YOUR OBJECT MODEL DIAGRAM HERE

Question 6: Draw an ER to Relation Mapping illustrating the information you have identified in Question



Question 7: Draw a Data Dictionary illustrating the information you have identified in Question 6.

DRAW YOUR DATA DICTONARY DIAGRAM HERE

Format for data dictionary is as follows:

Object (Entity)	**Name (Attribute)**	**Type (Data type)**	**Description**	**Primary Key**	**Foreign Key**
Patient	Aadhar_no	String	Unique Identification number for the patient.	Yes	No
Patient	Frist _Name	Integer	First name of the patient.	No	No
Patient	Middle_Name	String	Middle name of the patient.	No	No
Patient	Last_Name	String	Last name of the patient.	No	No
Patient	DOB	Date	Date of birth of the patient.	No	No
Patient	Age	Integer	Current age of the patient.	No	No
Patient	Area	String	Residential address of the patient.	No	No
Patient	Pin_code	String	Pin code of the area that the patient resides.	No	No
Patient	Contact_no	String	Contact number of the patient.	No	No
Patient	Economic_Status	String	Economic status of	No	No

			the patient i.e APL or BPL.		
Patient	Photo	File attachment	Image of the patient.	No	No
Emergency_Contact	Aadhar_no	String	Unique Identification number for the patients.	No	Yes
Emergency_Contact	Name	String	The name of the emergency contact (Family/Guardian).	No	No
Emergency_Contact	Aadhar_no, Name	String, String	Together they act as a primary key.	Yes	No
Emergency_Contact	Relationship	String	Relationship of the patient with the given emergency contact.	No	No
Emergency_Contact	Contact_no	String	Contact number of the emergency contact.	No	No
Emergency_Contact	Address	String	Residential address of the emergency contact.	No	No
Allergy	Aadhar_no	String	Unique Identification number for the patient.	No	Yes
Allergy	Substance_name	String	Stores the name of the substance that the patient is allergic to.	No	No

Allergy	Aadhar_no, Substance_name	String, String	Together they act as a primary key.	Yes	No
Disability	Aadhar_no	String	Unique Identification number for the patient.	No	Yes
Disability	Disability_name	String	Records disability, if exists.	No	No
Disability	Asdhar_no, Disability_name	String, String	Together they act as a primary key.	Yes	No
Insurance	Insurance_no	String	The insurance number.	Yes	No
Insurance	Name	String	The name of the insurance company.	No	No
Insurance	Address	String	Address of the insurance company.	No	No
Insurance	Contact_no	String	Contact number of the insurance company.	No	No
Insurance	Category	String	Type of the insurance i.e. the category	No	No
Insurance	Aadhar_no	String	Unique Identification number for the patient	No	Yes
Operation	Aadhar_no	String	Unique Identification number for the	No	Yes

			patient.		
Operation	Op_no	String	Unique identification number for each operation performed on the patient.	No	No
Operation	Aadhar_no, Op_no	String, String	Together they act as a primary key.	Yes	No
Operation	Name	String	Name of the operation performed on the patient.	No	No
Operation	Date	Date	Operation date	No	No
Operation	Details	String	Details related to the operation.	No	No
Operation	File	File attachment	Files including reports and operation details.	No	No
Diagnosis	Visit_id	String	Unique Identification for each visit that any patient makes.	Yes	No
Diagnosis	Date	Date	Date of the visit.	No	No
Diagnosis	Description	String	Brief description of the disease	No	No
Diagnosis	Disease_id	String	Unique Identification number for the disease diagnosed`.	No	Yes

Disease	Disease_id	String	Unique Identification number for the disease diagnosed`.	Yes	No
Disease	Category	String	The predefined category that the disease belongs to.	No	No
Prescription	Prec_id	String	Unique Identification number for each prescription.	Yes	No
Prescription	Med_name	String	Name of the medicine that has been prescribed.	No	No
Prescription	Quantity	Integer	Quantity of medicine prescribed.	No	No
Prescription	Price	Float	Price of each medicine prescribed.	No	No
Prescription	Bill_Amt	Float	Total bill amount of the prescription.	No	No
Prescription	Visit_ID	String	Unique Identification for each visit that any patient makes.	No	Yes
Test_Reports	Aadhar_no	String	Unique Identification number for the patient.	No	Yes
Test_Reports	Rep_ID	String	Unique Identification	No	No

			number of each report that belongs to a patient.		
Test_Reports	Aadhar_no, Rep_ID	String, String	Together they act as a primary key.	Yes	No
Test_Reports	Rep_name	String	Name of the report.	No	No
Test_Reports	File	File attachment	Files such as x-rays, reports stored as attachment.	No	No
Scheme	Scheme_id	String	Unique Identification number of each scheme available from the government.	Yes	No
Scheme	Name	String	The name of the scheme.	No	No
Scheme_Eligible	Aadhar_no	String	Unique Identification number for the patient.	No	Yes
Scheme_Eligible	Scheme_id	String	Unique Identification number of each scheme available from the government.	No	No
Scheme_Eligible	Aadhar_no, Scheme_id	String, String	Together they act as a primary key.	Yes	No

References:

Cite all the reference documents, books, websites, design tools, etc adopted in your work.

[Note: Use design tools for drawing all diagrams expected above]

http://www.karnataka.gov.in/hfwsecretariat/Pages/Primary-Health-Centres.aspx

https://docs.oracle.com/cd/E11882_01/gateways.112/e12072/c_examples.htm#IMSUG242

http://apolloahd.com/patient_registration_form.php

https://creately.com/diagram/example/i1q1hvlv2/Patient%20Registration%20System

https://www.academia.edu/5702596/ROLE_OF_PRIMARY_HEALTH_CARE_CENTRES_IN_KARNATAKA

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