EDGE BU CSE DIGITAL SKILLS TRAINING

Project on Telemedicine Management System

.

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Telemedicine Management System(TMS)

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1. Designing (Entity Relationship) ER Diagram

Steps of Drawing ERD:

- STEP-1: Identify the Entities Required:

I. **Patients:** Stores basic information for each patient.

II. **Doctors:** Contains details of doctors available on the platform, including specialties and availability.

III. **Appointments:** Manages appointments, connecting patients with doctors for virtual or in-person consultations.

IV. **Consultations:** Stores detailed records of consultations, including diagnosis and prescribed treatments.

V. **Prescriptions:** Contains medication details prescribed during consultations.

VI. **Medical Records:** A record of all medical history details, such as previous diagnoses, surgeries, allergies, etc.

VII. **Billing:** Manages billing information, tracking charges for consultations and other services.

VIII. **Insurance:** Manages patient insurance information, including coverage limits and expiry.

IX. **Video Sessions:** Stores information on virtual sessions, including session links and timestamps.

X. **System Users:** Basic table for storing login credentials and user roles

XI. **Notifications:** Tracks notifications sent to users, such as appointment reminders.

XII. **Teletherapy Sessions:** Manages teletherapy sessions for mental health support.

- STEP-2: Identify the Attributes and Primary key for each Entity:

    - **Patients:** patient_id (PK), name, dob, gender, contact_info, address
    - **Doctors:** doctor_id (PK), name, specialization, license_no, contact_info, availability_schedule
    - **Appointments**: appointment_id (PK), patient_id (FK), doctor_id (FK), appointment_date, status, consultation_type
    - **Consultations:** consultation_id (PK), appointment_id (FK), prescription, follow_up_date
    - **Prescriptions:** prescription_id (PK), consultation_id (FK), medication_name, dosage, frequency, duration
    - **Medical Records:** record_id (PK), patient_id (FK), record_date, description, type
    - **Billing:** billing_id (PK), appointment_id (FK), amount, payment_status, payment_date, payment_method
    - **Insurance:** insurance_id (PK), patient_id (FK), provider_name, policy_number, coverage_details, expiry_date
    - **Video Sessions:** session_id (PK), appointment_id (FK), session_link, duration, timestamp
    - **System Users:** user_id (PK), username, password_hash, role, associated_doctor_id (FK)
    - **Notifications:** notification_id (PK), user_id (FK), message, timestamp, status
    - **Teletherapy Sessions:** teletherapy_id (PK), patient_id (FK), therapist_id (FK), session_date, session_notes

- STEP-3: Identify the Relationship needed:

    - Patients **have** Appointments: One-to-Many
    - Appointments **involves** Doctors: Many-to-One
    - Appointments **corresponds** to Video Sessions: One-to-One
    - Appointments **associated_with** Billing: One-to-One
    - Doctors **conduct** Consultations: One-to-Many
    - Doctors **issue** Prescriptions: One-to-Many
    - Patients **have** Consultations: One-to-Many
    - Consultations **result_in** Prescriptions: One-to-Many
    - Patients **receive** Prescriptions: One-to-Many
    - Patients **have** Billing: One-to-Many
    - Billing **covered_by** Insurance: Many-to-One

- Patients **attend** Teletherapy Sessions: One-to-Many
- Users **receive** Notifications: One-to-Many
- Patients **have** Medical Records: One-to-Many

STEP-4: Identify the Cardinality Ratio and Participation:

- Patients- **have-** Appointments: One-to-Many

- Appointments- **involves** -Doctors: Many-to-One

- Appointments -**corresponds_to-** Video Sessions: One-to-One

- Appointments- **associated_with-** Billing: One-to-One

- Doctors- **conduct-** Consultations: One-to-Many

- Doctors- **issue** -Prescriptions: One-to-Many

- Patients- **have** -Consultations: One-to-Many

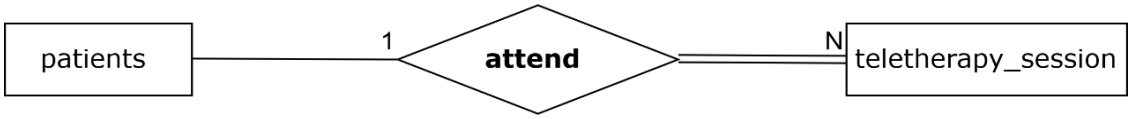
- Consultations- **result_in-** Prescriptions: One-to-Many

- Patients- **receive-** Prescriptions: One-to-Many

- Patients -**have** -Billing: One-to-Many

- Billing -**covered_by-** Insurance: Many-to-One

- Patients -**attend-** Teletherapy Sessions: One-to-Many



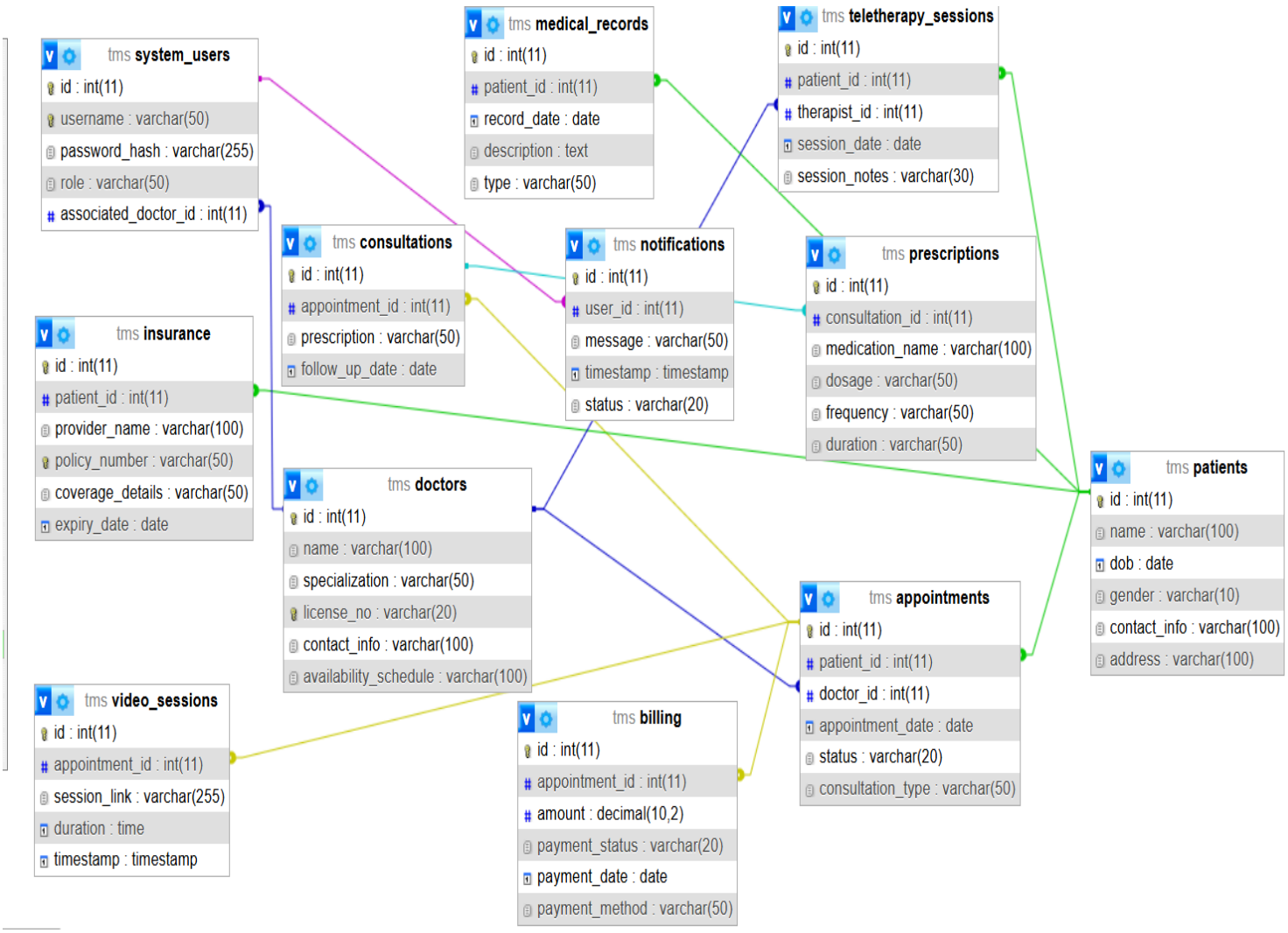
- Users -**receive-** Notifications: One-to-Many

- Patients -**have-** Medical Records: One-to-Many

- STEP-5: Draw the Diagram:

2. Reduction to database schema:

- **Patients:** patient_id (PK), name, dob, gender, contact_info, address
- **Doctors:** doctor_id (PK), name, specialization, license_no, contact_info, availability_schedule
- **Appointments**: appointment_id (PK), patient_id (FK), doctor_id (FK), appointment_date, status, consultation_type
- **Consultations:** consultation_id (PK), appointment_id (FK), prescription, follow_up_date
- **Prescriptions:** prescription_id (PK), consultation_id (FK), medication_name, dosage, frequency, duration
- **Medical Records:** record_id (PK), patient_id (FK), record_date, description, type
- **Billing:** billing_id (PK), appointment_id (FK), amount, payment_status, payment_date, payment_method
- **Insurance:** insurance_id (PK), patient_id (FK), provider_name, policy_number, coverage_details, expiry_date
- **Video Sessions:** session_id (PK), appointment_id (FK), session_link, duration, timestamp
- **System Users:** user_id (PK), username, password_hash, role, associated_doctor_id (FK)
- **Notifications:** notification_id (PK), user_id (FK), message, timestamp, status
- **Teletherapy Sessions:** teletherapy_id (PK), patient_id (FK), therapist_id (FK), session_date, session_notes


tms system_users
id : int(11)
username : varchar(50)
password_hash : varchar(255)
role : varchar(50)
associated_doctor_id : int(11)
tms medical_records
id : int(11)
patient_id : int(11)
record_date : date
description : text
type : varchar(50)
tms teletherapy_sessions
id : int(11)
patient_id : int(11)
therapist_id : int(11)
session_date : date
session_notes : varchar(30)
tms consultations
id : int(11)
appointment_id : int(11)
prescription : varchar(50)
follow_up_date : date
tms notifications
id : int(11)
user_id : int(11)
message : varchar(50)
timestamp : timestamp
status : varchar(20)
tms prescriptions
id : int(11)
consultation_id : int(11)
medication_name : varchar(100)
dosage : varchar(50)
frequency : varchar(50)
duration : varchar(50)
tms insurance
id : int(11)
patient_id : int(11)
provider_name : varchar(100)
policy_number : varchar(50)
coverage_details : varchar(50)
expiry_date : date
tms doctors
id : int(11)
name : varchar(100)
specialization : varchar(50)
license_no : varchar(20)
contact_info : varchar(100)
availability_schedule : varchar(100)
tms patients
id : int(11)
name : varchar(100)
dob : date
gender : varchar(10)
contact_info : varchar(100)
address : varchar(100)
tms appointments
id : int(11)
patient_id : int(11)
doctor_id : int(11)
appointment_date : date
status : varchar(20)
consultation_type : varchar(50)
tms video_sessions
id : int(11)
appointment_id : int(11)
session_link : varchar(255)
duration : time
timestamp : timestamp
tms billing
id : int(11)
appointment_id : int(11)
amount : decimal(10,2)
payment_status : varchar(20)
payment_date : date
payment_method : varchar(50)

3. Implementing the database in MySQL:

All tables with sample data:

Patients: patient_id (PK), name, dob, gender, contact_info, address

	id	name	dob	gender	contact_info	address
Edit Copy Delete	1	Fahmida	2001-11-24	Female	01716909950	Barishal
Edit Copy Delete	2	Md.Rakibullah	1988-09-09	Male	01673829453	Rajshahi
Edit Copy Delete	3	Misses Rahima	1880-04-12	Female	01954344542	Chittagong
Edit Copy Delete	4	Halima	2001-12-26	Female	01567890987	Khulna

Doctors: doctor_id (PK), name, specialization, license_no, contact_info, availability_schedule

	id	name	specialization	license_no	contact_info	availability_schedule
Edit Copy Delete	1	Dr.Md.Sahadutullah	Neurosurgeon	nrs-081123	+05267321	Mon-Fri, 9:00-12:00
Edit Copy Delete	2	Dr. Garcian	Dermatology	drm-34546	+8823455	Mon-Fri, 6:00-9:00
Edit Copy Delete	3	Dr. Zhirul Alam	cardiology	card-87423917	+80022822	sun-wed,3.00-9.00
Edit Copy Delete	4	Dr.Nilima Chowdhury	psychiatrist	phyc345356	+8801221213	Tuesday, 9:00-9:00

Appointments: appointment_id (PK), patient_id (FK), doctor_id (FK), appointment_date, status, consultation_type

	id	patient_id	doctor_id	appointment_date	status	consultation_type
Edit Copy Delete	1	1	1	2024-11-01	available	telemedicine
Edit Copy Delete	2	2	2	2024-12-03	on leave	phone consultation
Edit Copy Delete	3	3	3	2024-12-10	Rescheduled	In-person
Edit Copy Delete	4	4	4	2024-09-04	available	telemedicine

Consultations: consultation_id (PK), appointment_id (FK), prescription, follow_up_date

	id	appointment_id	prescription	follow_up_date
Edit Copy Delete	1	1	Cyclobenzaprine	2024-12-28
Edit Copy Delete	2	2		0000-00-00
Edit Copy Delete	3	3		0000-00-00
Edit Copy Delete	4	2		0000-00-00

Prescriptions: prescription_id (PK), consultation_id (FK), medication_name, dosage, frequency, duration

	id	consultation_id	medication_name	dosage	frequency	duration
Edit Copy Delete	111	1	Cyclobenzaprine	5 mg	three times a day	2 to 3 weeks
Edit Copy Delete	222	2	*NULL*	*NULL*	*NULL*	*NULL*
Edit Copy Delete	333	4	Serotonin-Norepinephrine Reuptake Inhibitors	10 mg	one time a day	1 month

Medical Records: record_id (PK), patient_id (FK), record_date, description, type

	id	patient_id	record_date	description	type
Edit Copy Delete	123	1	2023-09-09	No prior neurological issues	*NULL*
Edit Copy Delete	124	2	2023-08-12	History of eczema	Contact Dermatitis
Edit Copy Delete	125	3	2022-04-03	no problrm in heart	

Billing: billing_id (PK), appointment_id (FK), amount, payment_status, payment_date, payment_method

	id	appointment_id	amount	payment_status	payment_date	payment_method
Edit Copy Delete	1	1	600.00	paid	2024-11-05	Mobile banking
Edit Copy Delete	2	2	700.00	unpaid	0000-00-00	
Edit Copy Delete	3	3	0.00		0000-00-00	

Insurance: insurance_id (PK), patient_id (FK), provider_name, policy_number, coverage_details, expiry_date

	id	patient_id	provider_name	policy_number	coverage_details	expiry_date
Edit Copy Delete	1001	1	United Health care	POL1234567890	Covers 80% of services after deductible; no referr	2032-09-01
Edit Copy Delete	1002	2	Good Life Insurance	edef432523	Covers urgent care and hospital services; no out-o	2030-01-01
Edit Copy Delete	1003	3	Better Health Inc.	bttr235466	Covers 90% of services; requires referrals	2034-05-01

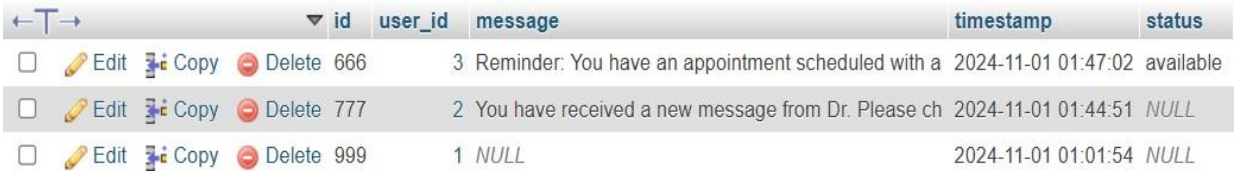
Video Sessions: session_id (PK), appointment_id (FK), session_link, duration, timestamp

	id	appointment_id	session_link	duration	timestamp
Edit Copy Delete	1	1	www.zoom32435.com	00:00:45	2024-11-01 01:07:09
Edit Copy Delete	2	3	www.google_meet674123767/.com	00:00:30	2024-11-01 01:07:09
Edit Copy Delete	3	4	www.google_meet//jeuh900//.com	00:00:01	2024-11-01 01:38:59

System Users: user_id (PK), username, password_hash, role, associated_doctor_id (FK)

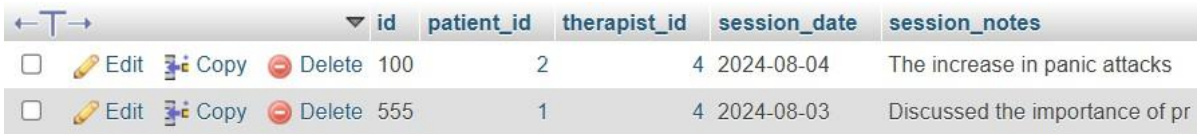
	id	username	password_hash	role	associated_doctor_id
Edit Copy Delete	1	mahirull.iuu	213446@#	assistant	1
Edit Copy Delete	2	shithhy.aktr	124rsdfert	nurse	2
Edit Copy Delete	3	nilimaaa.chdhryy	erw45346y	doctor	4

Notifications: notification_id (PK), user_id (FK), message, timestamp, status



	id	user_id	message	timestamp	status
Edit Copy Delete	666	3	Reminder: You have an appointment scheduled with a	2024-11-01 01:47:02	available
Edit Copy Delete	777	2	You have received a new message from Dr. Please ch	2024-11-01 01:44:51	*NULL*
Edit Copy Delete	999	1	*NULL*	2024-11-01 01:01:54	*NULL*

Teletherapy Sessions: teletherapy_id (PK), patient_id (FK), therapist_id (FK), session_date, session_notes



	id	patient_id	therapist_id	session_date	session_notes
Edit Copy Delete	100	2	4	2024-08-04	The increase in panic attacks
Edit Copy Delete	555	1	4	2024-08-03	Discussed the importance of pr

THANK YOU