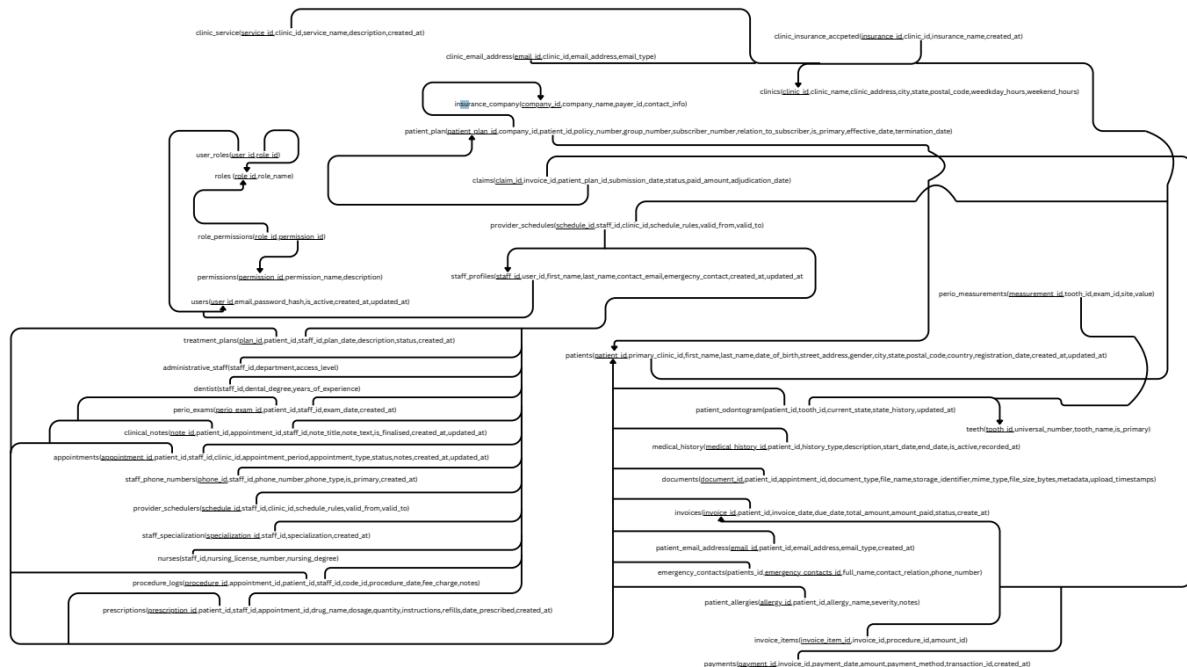


DBMS PROJECT PHASE - 3

NORMALIZATION

PATIENT MANAGEMENT SYSTEM FOR DENTAL HOSPITALS

GROUP - 8	
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https://www.canva.com/design/DAG4xYyrku8/3xMgym4FQzVdAOPQD_P3Tw/edit?utm_content=DAG4xYyrku8&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

ASSIGNMENT - 3

Potential Primary Keys :-

[appointment_id, clinic_id, code_id, company_id, exam_id, invoice_id, patient_id, patient_plan_id, payer_id, permission_id, plan_id, policy_number, primary_clinic_id, procedure_id, ref_id, role_id, staff_id, storage_identifier, subscriber_id, tooth_id, transaction_id, user_id]

Non-primary Keys :-

[access_level, address, amount, adjudication_date, amount_paid, city, contact_email, contact_info, country, current_state, date, date_of_birth, date_prescribed, degree, dental_degree, department, description, dosage, drug_name, due_date, effective_date, email, emergency_contact, end_date, exam_date, fee_charged, fee_quoted, file_name, file_size_bytes, first_name, full_name, gender, group_number, instructions, is_active, is_finalized, is_primary, last_name, licence_number, meta_data, method, mime_type, name, note, number, paid_amount, password_hash, period, phone_number, postal_code, proficiency_level, quantity, recorded_at, referral_network, refills, registration_date, relationship, relationship_to_subscriber, rules, severity, site, speciality_area, standard_fee, start_date, state, state_history, status, street_address, submission_date, system, termination_date, text, title, total_amount, type, upload_timestamps, valid_from, valid_to, value, weekend_hours, weekday_hours, years_experience]

FD

1) Patient - Related Fields

patient-id : [first-name, last-name, full-name, date-of-birth,
(primary key) gender, email, phone-number, emergency-contact,
relationship, street-address, city, state, country,
postal-code, registration-date]

2] Staff, Clinic . and Role fields :

- staff-id : [first-name, last-name, email, phone-number, degree,
(primary key) licence-number, dental-degree, speciality-area,
years-experience, proficiency-level, is-active,
role-id (FK) , primary-clinic-id (FK)]
- clinic-id : [name, street-address, phone-number, contact-email,
(PK) weekday-hours, weekend-hours, site, referral-network]
- role-id : [name, description, access-level, rules]
(PK)

3] Appointment & Record Fields

- appointment-id : [date, start-date, end-date, status, notes, type,
(PK) patient-id (FK) , staff-id (FK) , clinic-id (FK)]
- exam-id : [exam-date, notes, description, severity,
(PK) patient-id (FK) , staff-id (FK) , procedure-id (FK)]
- procedure-id : [name, description, standard-fee]
(PK)
- prescription-id : [date-prescribed, drug-name, dosage, quantity,
(PK) refills, instructions, patient-id (FK) , staff-id (FK)]
- tooth-id : [universal-number, name, description]
(PK)

4) Billing & Insurance Fields

- invoice_id : [date, due_date, total_amount, paid_amount, status, (PK) submission_date, fee_charged, fee_quoted, patient_id (FK), appointment_id (FK)]
- transaction_id : [date, amount, amount_paid, method, type, (PK) invoice_id, (FK)]
- plan_id : [name, payer_id, group_number, company_id (FK)] (PK)
- company_id : [name, address, phone_number, contact_info] (PK)
- (patient_id, plan_id) : [subscriber_id, policy_number, is_primary, (Composite key) subscriber_relation, effective_date, termination_date]

5) System User & File Fields

- user_id : [email, password_hash, is_active, staffid (FK), (PK) patient_id (FK)]
- storage_identifier : [file_name, mime_type, file_size_bytes, (PK) upload_timestamps_metadata, user_id (FK), patient_id (FK)]
- permission_id : [name, description] (PK)
- (role_id, permission_id) : [rules] (PK) (composite PK)

1-NF

- There are no composite attributes present.
- For multivalued attributes:
 - In case of phone numbers we create a new one to many relation to 'Entity-phone' and for emails 'Entity-emails'; and for (degree, dental-degree, speciality-area) we use 'Staff-Degree'.
 - For state-history we use 'EntityStateHistory'

2-NF

- For patientInsurance, it uses composite key (patient-id, plan-id).
- If patient-id is being partially dependent on by patient-name and similarly plan-name partially depends on plan-id.
- Policy-number full dependence on (plan-id, patient-id)
- Patients:
 - PK \rightarrow patient-id
 - Attributes :- patient-name, date-of-birth, gender etc.
- Insurance Plans:
 - PK \rightarrow plan-id
 - Attributes :- plan-name, payer-id, group-number etc..
- Patient Plans
 - PK \rightarrow (patient-id, plan-id)
 - Attributes \rightarrow policy-number, subscriber-id etc..

2NF → 3NF :

- Remove transitive dependencies
- Each non-key attribute must depend only on the key, not on another non key field.

Final 3NF Relations :

Patients [patient_id (PK), first_name, last_name, date_of_birth, gender, registration_date, street_address, postal_code (PK)]

PostalCodes [postal_code (PK), city, state, country]

Staff [staff_id (PK), first_name, last_name, license_number, years_experience, proficiency_level, department, role_id (FK), primary_clinic_id (FK)]

Roles [role_id, name, access_level]

Clinics [clinic_id, name, street_address, weekday_hours, weekend_hours, site, referral_network, postal_code (FK)]

Appointments [appointment_id ^(PK), date, start_date, end_date, status, notes, type, patient_id (FK), staff_id (FK), clinic_id (FK)]

Procedures [procedure_id (PK), name, standard_fee, code_id (FK)]

BillingCodes [code_id (PK), description, type]

Exams [exam_id, exam_date, notes, severity, patient_id (PK), staff_id (FK)]

ExamProcedures [(exam_id, procedure_id) PK, fee_charged, fee_quoted, status, tooth_id (PK)]

Teeth [tooth_id (PK), universal_number, name]

• Prescription [prescription_id (PK), drug-name, dosage, quantity, refills, instructions, date-prescribed, patient-id (FK), staff-id (FK)]

• Invoices [invoice_id (PK), date, due_date, total_amount, amount_paid, status, submission_date, adjudication_date, patient_id (FK), appointment_id (FK)]

Transactions [transaction_id (PK), date, amount, method, type, invoice_id (FK)]

InsuranceCompany [company_id (PK), name, payer_id]

InsurancePlan [plan_id (PK), name, group_number, valid_from, valid_to, company_id (FK)]

PatientPlans [patient_plan_id (PK), policy_number, subscriber_id, relation_to_subscriber, is_primary, effectiv_date, termination_date, patient_id (FK), plan_id (FK)]

Users [user_id (PK), email, password_hash, is_active, email, staff_id (FK), patient_id (FK)]

Files [~~storage_id~~ storage_identifier (PK), file_name, mime_type, file_size_bytes, user_id (PK)]

Permissions [permission_id (PK), name, description]

Role-permission [role_id, permission_id] (PK)