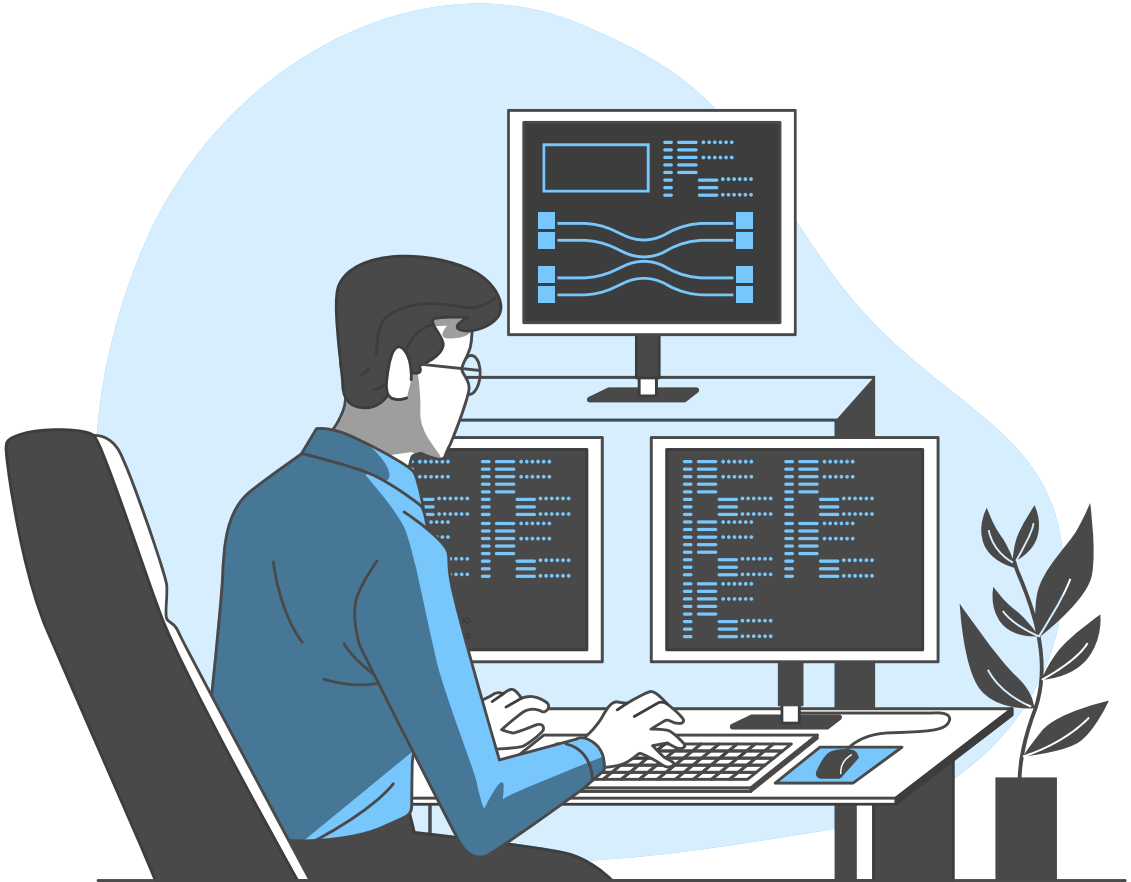

BTA 415 Final

Dr. Holmes' Office - Business Case Study

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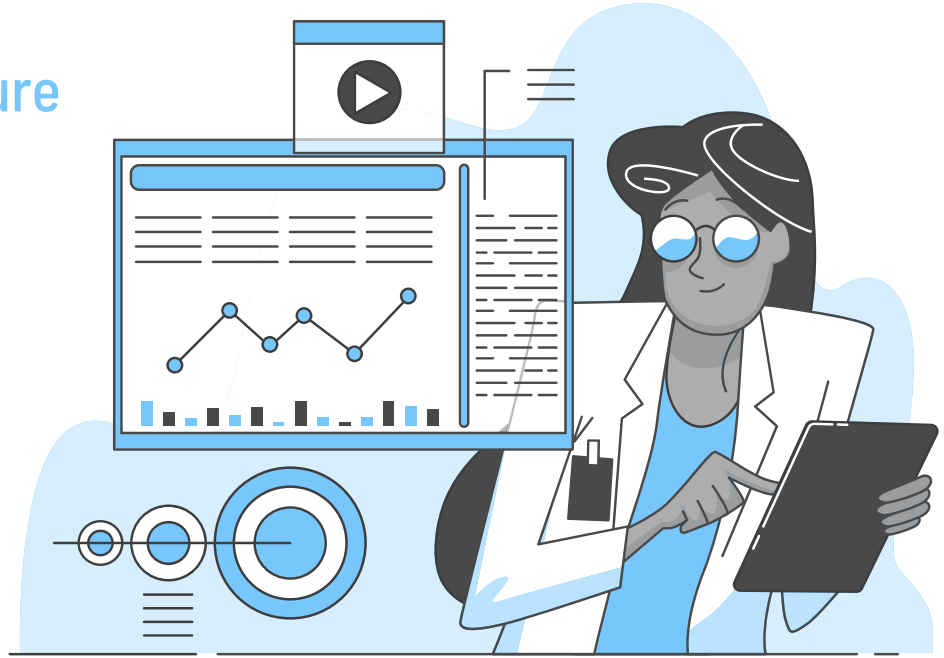
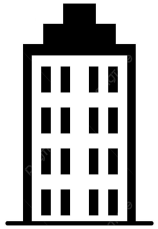


01
Background



Background

For 8 years, Dr. Holmes has been running a small dental practice. While she focuses on the dental services, her staff handles administrative + operational tasks.

Problem

Dr. Holmes' practice struggles with inefficient record-keeping and billing systems. Doing everything manually has caused major operational setbacks.

Problems

- Patient record management
- Billing system inefficiency
- Administrative overload
- Lack of system integration

What now?

This problem highlights the need for a computerized system to streamline records, improve billing accuracy, and integrate operations, making information easy to access and helping the clinic run smoothly.

02

Organizational Structure

Dr. Margaret Holmes (Owner/Dentist)

Responsibilities:

- (Dentist) Provide dental care to patient
- (Dentist) Record service details and appointments details
- (Owner) Oversees dental office operations and order dental and office supplies

Reporting needs:

- (Dentist) Patient records
- (Dentist) Record for patient appointment information
- (Owner) Financial summaries

Debra (Dental Assistant/Technician)

Responsibilities:

- Assist Dr. Holmes in procedure and perform treatments
- Update patient folders with treatment details

Reporting needs:

- Requires a clear and accessible patient detail
- Appointment history record
- Needs a record to log treatment information

Susan Holmes (Accountant)

Responsibilities:

- Manage financial records
- Track payable account, and billing statements
- Manage patient billing records

Reporting needs:

- Reports on any payment received and pending from patient/insurance
- Systems for tracking billing data from patient
- Patient account status

Rebecca (Receptionist)

Responsibilities:

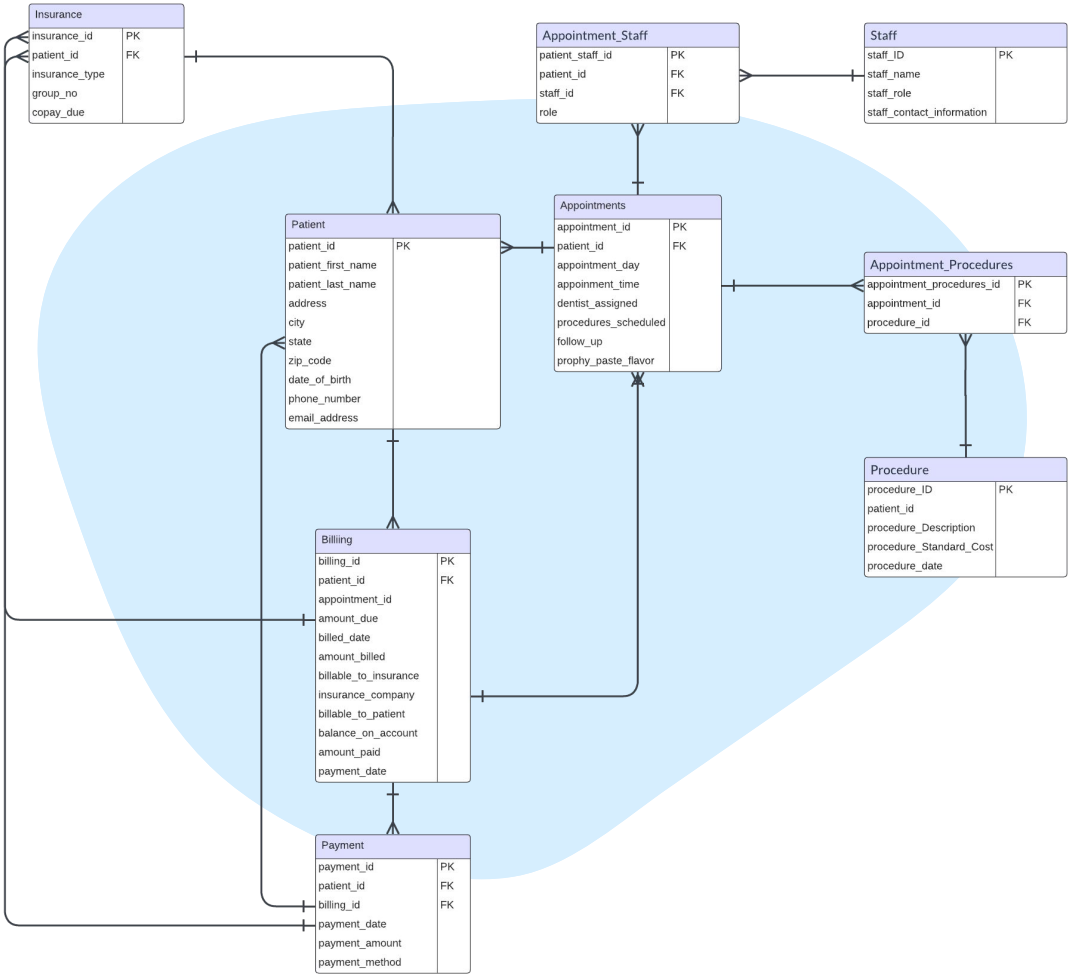
- Manage patient appointments and scheduling
- Maintains patient folders, logging medical and billing information
- Records payments and any mail billing information

Reporting needs:

- Appointment scheduling record
- Payment and billing

03

ER Diagram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copay_due
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Staff
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staff_name
staff_role
staff_contact_information
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patient_last_name
address
city
state
zip_code
date_of_birth
phone_number
email_address
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dentist_assigned
procedures_scheduled
follow_up
prophy_paste_flavor
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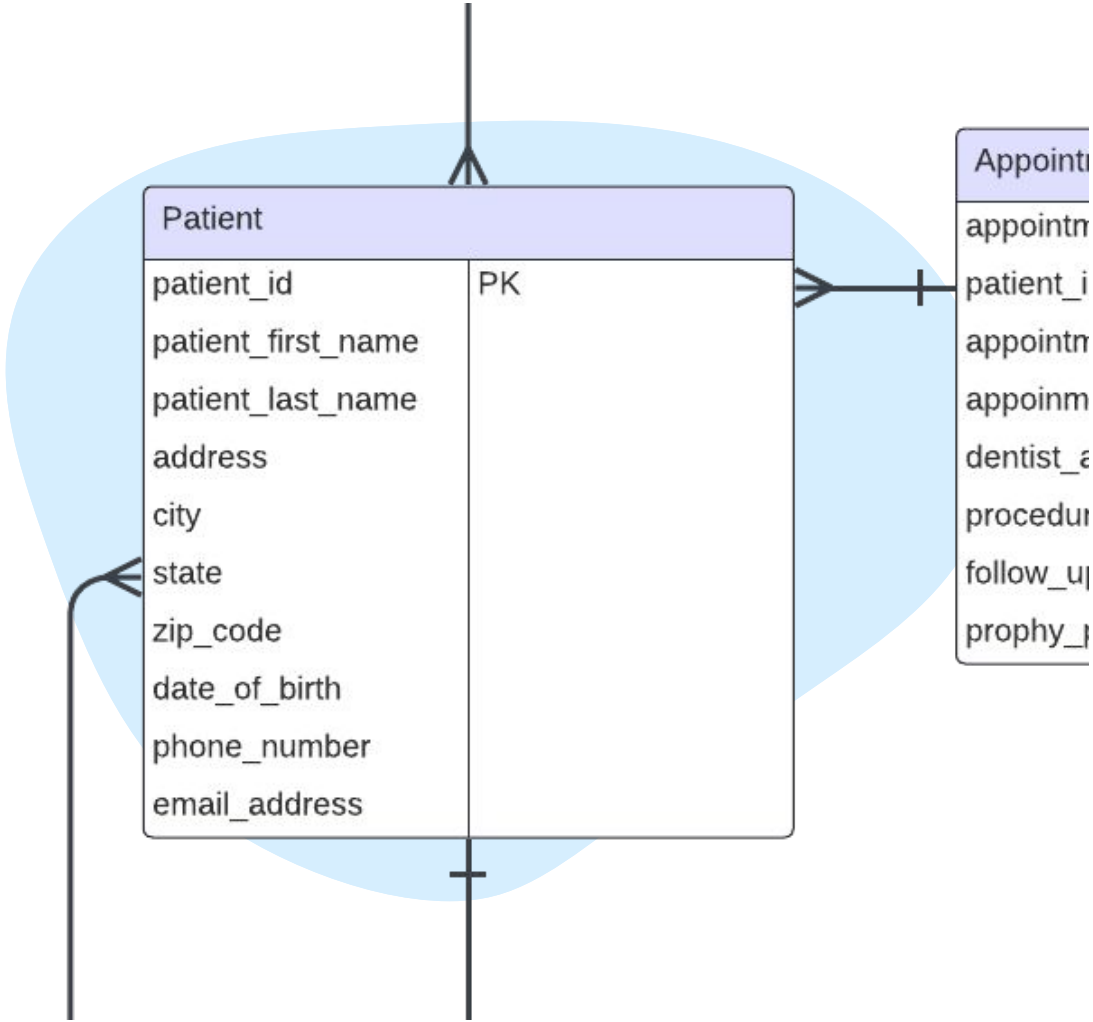
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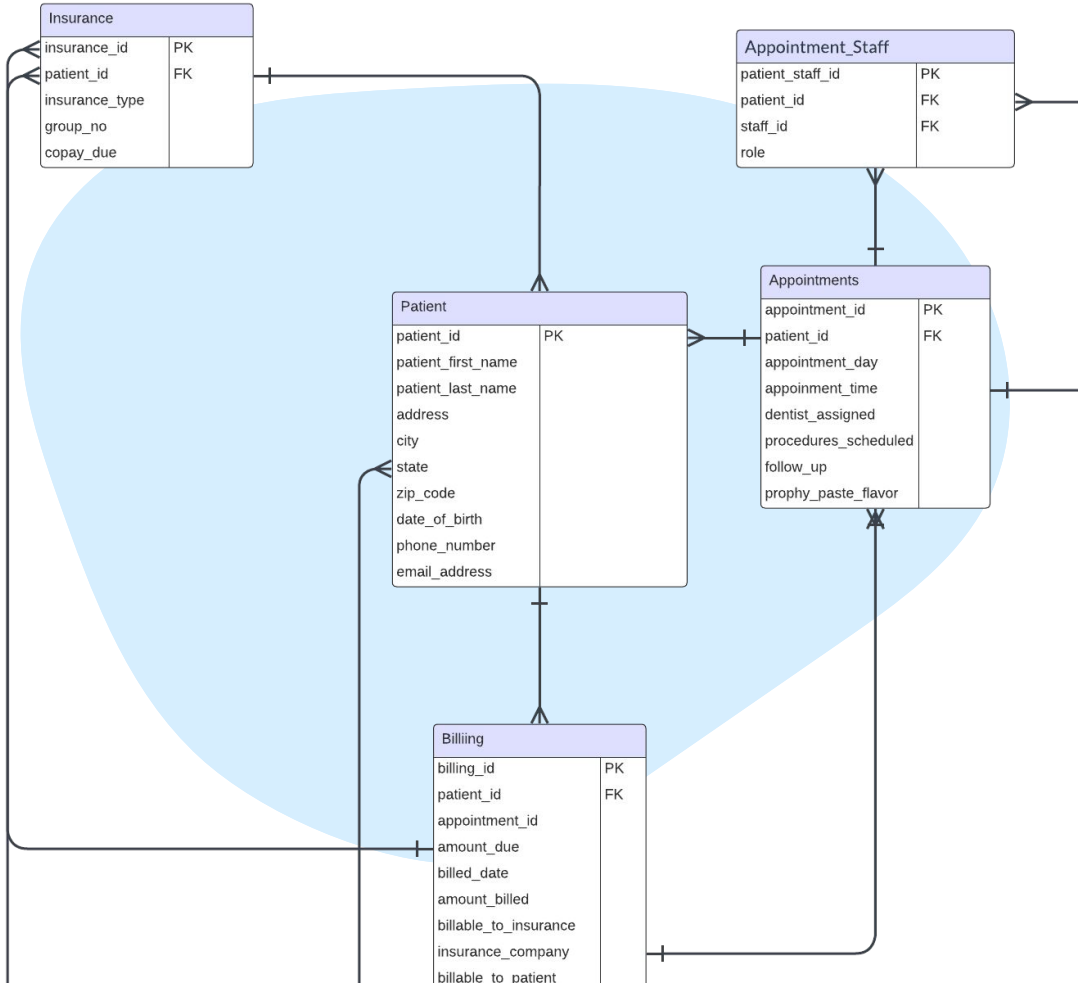
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patient_last_name
address
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state
zip_code
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phone_number
email_address
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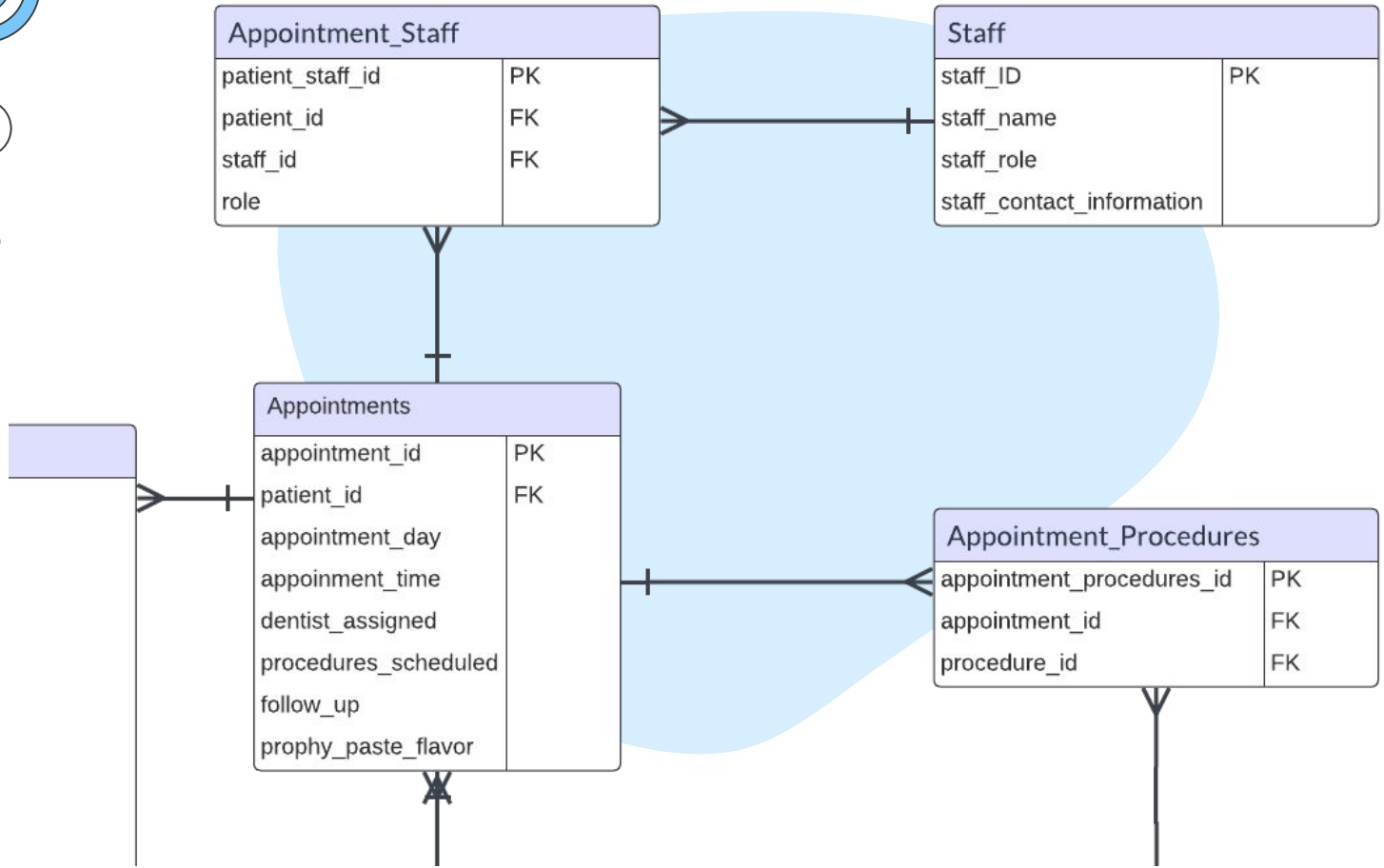
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patient_id
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appoinment_time
dentist_assigned
procedures_scheduled
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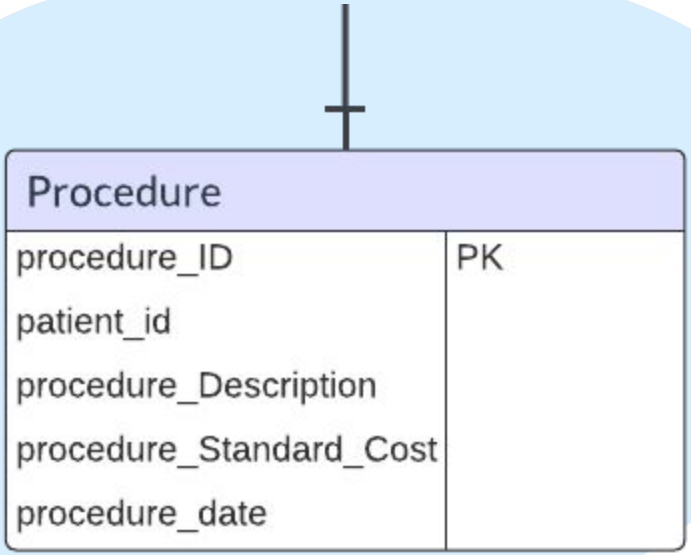
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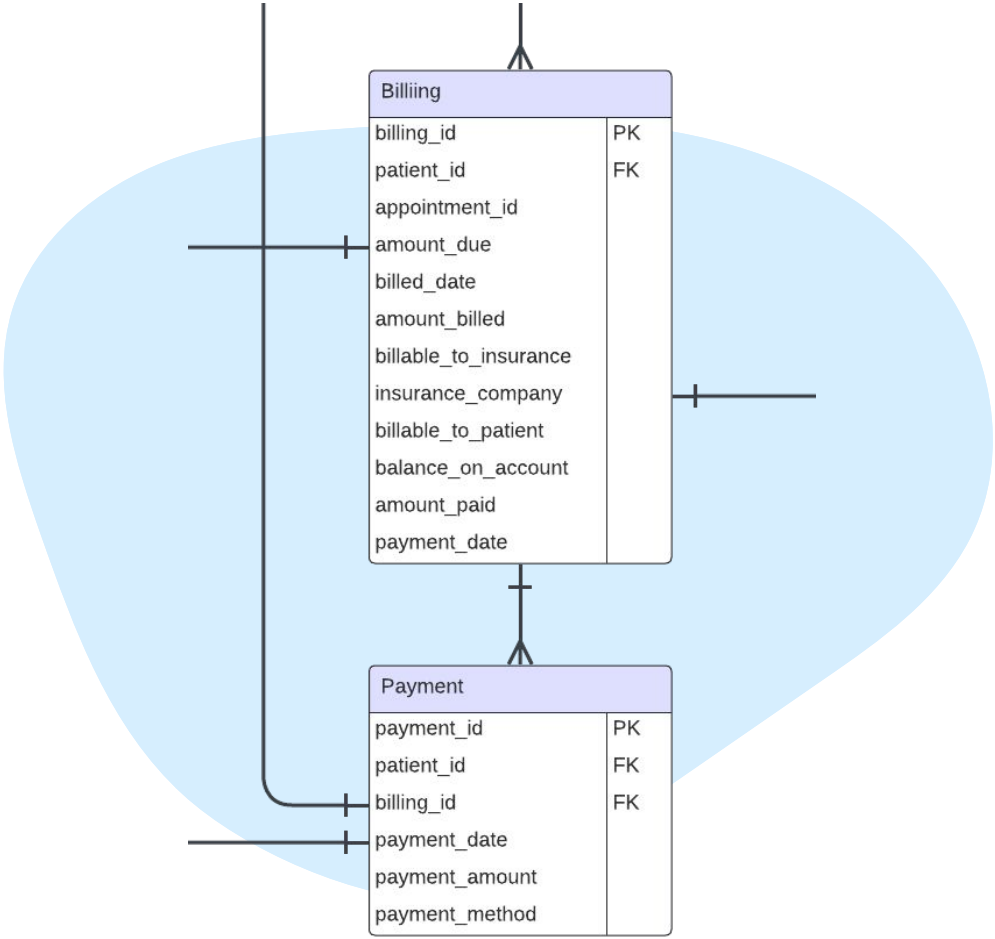
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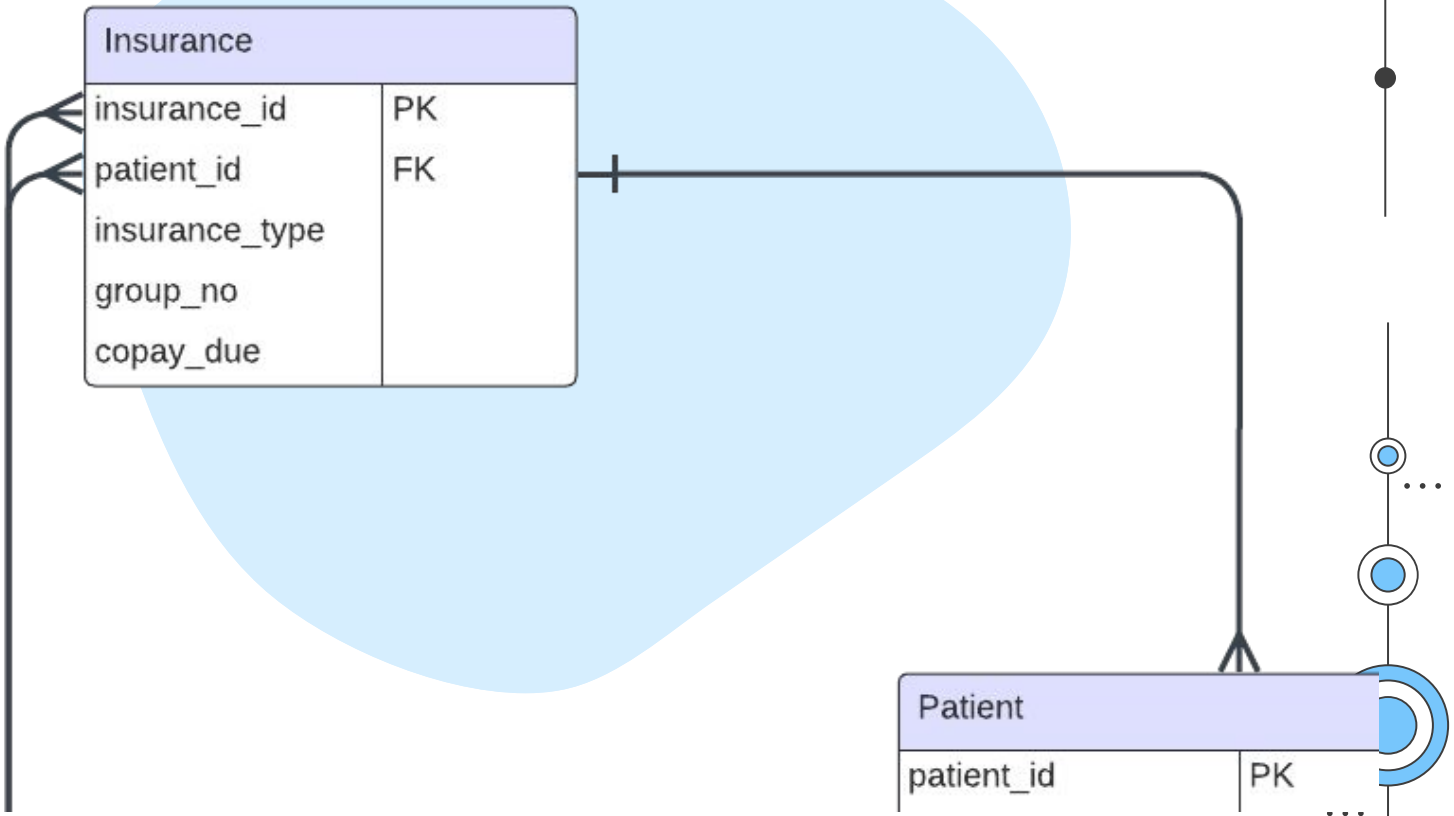
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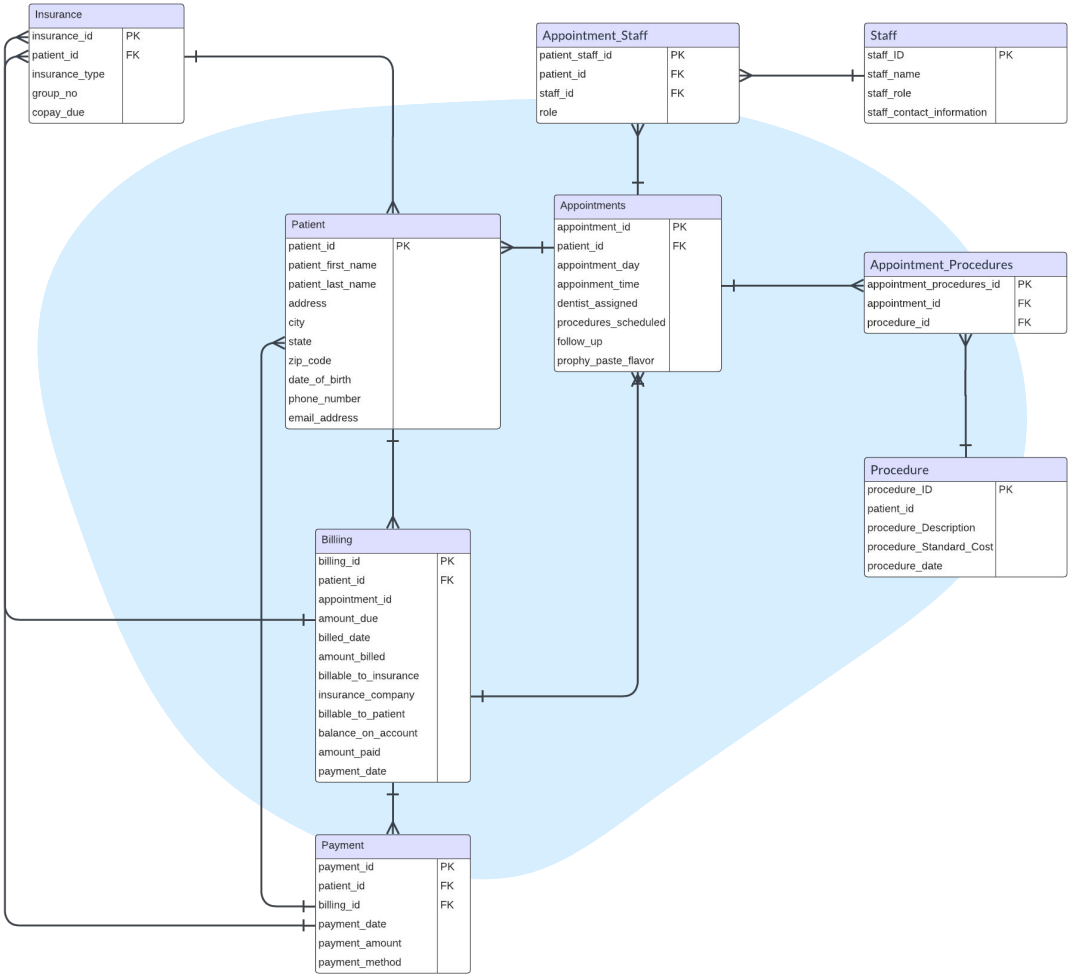
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insurance_type
group_no
copay_due
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staff_id FK
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staff_name
staff_role
staff_contact_information
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patient_last_name
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state
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date_of_birth
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Appointments
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patient_id FK
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appoinment_time
dentist_assigned
procedures_scheduled
follow_up
prophy_paste_flavor
Appointment_Procedures
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appointment_id FK
procedure_id FK
Procedure
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patient_id
procedure_Description
procedure_Standard_Cost
procedure_date
Billiing
billing_id PK
patient_id FK
appointment_id
amount_due
billed_date
amount_billed
billable_to_insurance
insurance_company
billable_to_patient
balance_on_account
amount_paid
payment_date
Payment
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patient_id FK
billing_id FK
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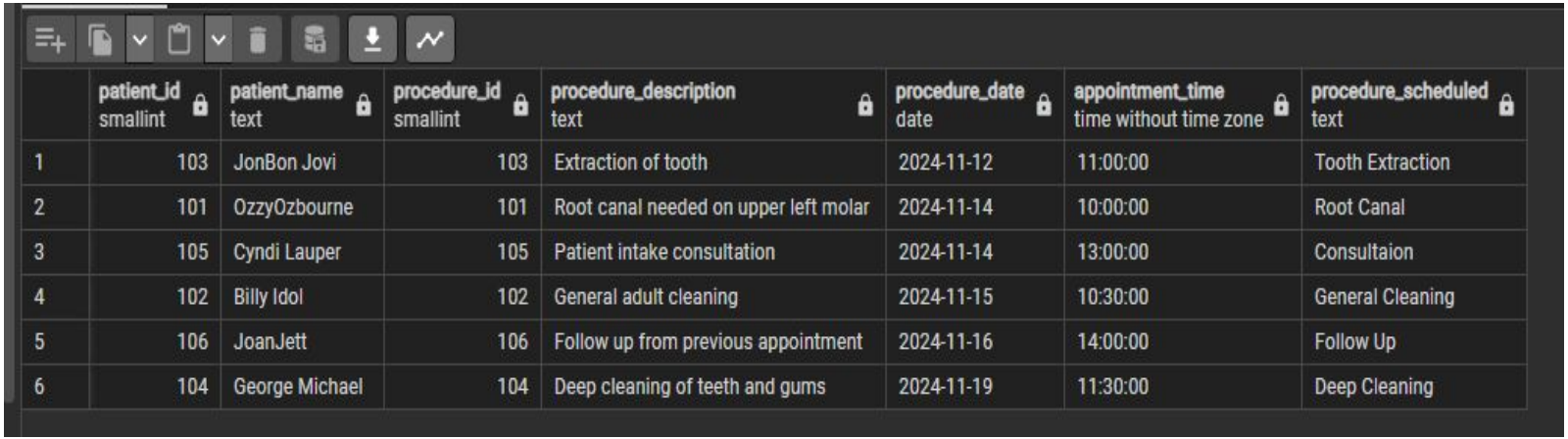
payment_amount
payment_method

04

Report outputs & SQL Code

Appointment Schedule for Receptionist



	patient_id smallint	patient_name text	procedure_id smallint	procedure_description text	procedure_date date	appointment_time time without time zone	procedure_scheduled text
1	103	JonBon Jovi	103	Extraction of tooth	2024-11-12	11:00:00	Tooth Extraction
2	101	OzzyOzbourne	101	Root canal needed on upper left molar	2024-11-14	10:00:00	Root Canal
3	105	Cyndi Lauper	105	Patient intake consultation	2024-11-14	13:00:00	Consultaion
4	102	Billy Idol	102	General adult cleaning	2024-11-15	10:30:00	General Cleaning
5	106	JoanJett	106	Follow up from previous appointment	2024-11-16	14:00:00	Follow Up
6	104	George Michael	104	Deep cleaning of teeth and gums	2024-11-19	11:30:00	Deep Cleaning

Billing Report for Susan Holmes

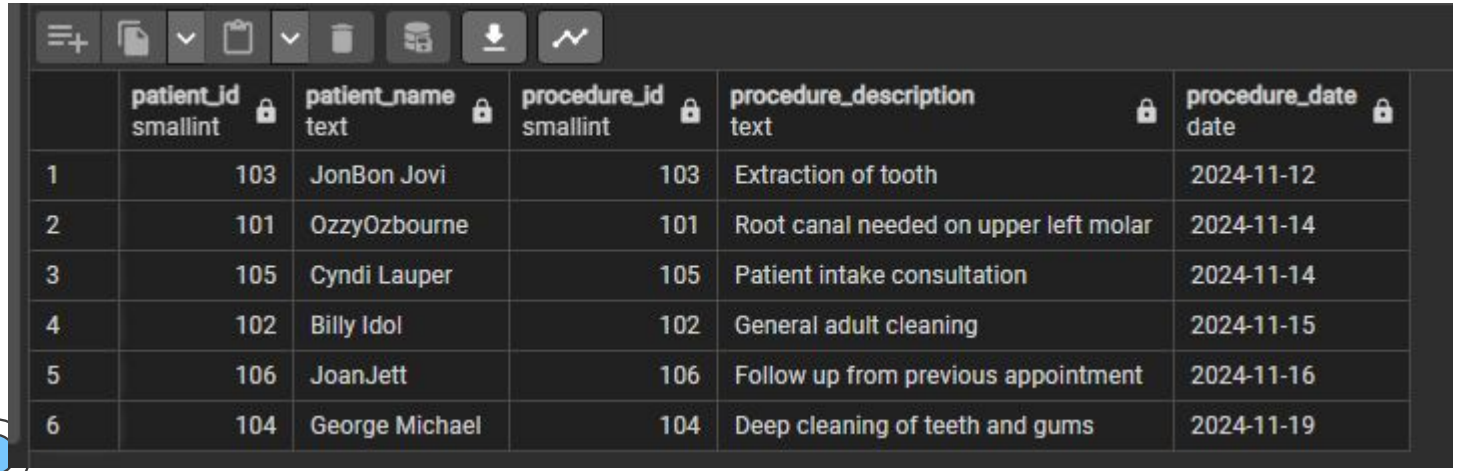
Data Output | Messages | Notifications

	patient_id smallint	patient_name text	procedure_id smallint	procedure_description text	procedure_date date	billed_date date	amount_billed numeric	insurance_type text	group_no text	copay_due numeric
1	103	JonBon Jovi	103	Extraction of tooth	2024-11-12	2024-11-12	1000	Delta	DELT125	0
2	101	OzzyOzbourne	101	Root canal needed on upper left molar	2024-11-14	2024-11-14	850	Dental	DENT123	20
3	105	Cyndi Lauper	105	Patient intake consultation	2024-11-14	2024-11-14	200	Kaiser Dental	DENT186	20
4	102	Billy Idol	102	General adult cleaning	2024-11-15	2024-11-15	350	Kaiser Dental	DENT125	20
5	106	JoanJett	106	Follow up from previous appointment	2024-11-16	2024-11-16	100	Humana	HUMA165	35
6	104	George Michael	104	Deep cleaning of teeth and gums	2024-11-19	2024-11-19	500	Delta	DELT185	0

Dental History Report for Dental Tech.

	patient_id smallint	patient_name text	procedure_id smallint	procedure_description text	procedure_date date	staff_name character varying (50)	staff_role character varying (20)
1	103	JonBon Jovi	103	Extraction of tooth	2024-11-12	Rebecca Sinclair	Receptionist
2	101	OzzyOzbourne	101	Root canal needed on upper left molar	2024-11-14	Dr. Holmes	Dentist
3	105	Cyndi Lauper	105	Patient intake consultation	2024-11-14	Becky Goodhair	Dental Assistant
4	106	JoanJett	106	Follow up from previous appointment	2024-11-16	Taylor Abraham	Dental Assistant
5	104	George Michael	104	Deep cleaning of teeth and gums	2024-11-19	Debra Smith	Dental Technician

Procedure Report for Dr. Holmes



	patient_id smallint	patient_name text	procedure_id smallint	procedure_description text	procedure_date date
1	103	JonBon Jovi	103	Extraction of tooth	2024-11-12
2	101	OzzyOzbourne	101	Root canal needed on upper left molar	2024-11-14
3	105	Cyndi Lauper	105	Patient intake consultation	2024-11-14
4	102	Billy Idol	102	General adult cleaning	2024-11-15
5	106	JoanJett	106	Follow up from previous appointment	2024-11-16
6	104	George Michael	104	Deep cleaning of teeth and gums	2024-11-19

Payment Report for Dr. Holmes

	patient_id smallint	patient_name text	procedure_id smallint	procedure_description text	procedure_date date	billed_date date	amount_billed numeric	balance_on_account numeric
1	103	JonBon Jovi	103	Extraction of tooth	2024-11-12	2024-11-12	1000	200
2	101	OzzyOzbourne	101	Root canal needed on upper left molar	2024-11-14	2024-11-14	850	170
3	105	Cyndi Lauper	105	Patient intake consultation	2024-11-14	2024-11-14	200	40
4	102	Billy Idol	102	General adult cleaning	2024-11-15	2024-11-15	350	70
5	106	JoanJett	106	Follow up from previous appointment	2024-11-16	2024-11-16	100	20
6	104	George Michael	104	Deep cleaning of teeth and gums	2024-11-19	2024-11-19	500	100

Thank you!

Appendix – Codes used to query reports

```sql
--Payment information for Dr. Holmes
--Inner Joining Patient, Billing, and Procedure tables
SELECT p.patient_id,
       CONCAT(p.patient_first_name, '', p.patient_last_name) AS Patient_Name,
       pr.procedure_id,
       pr.procedure_description,
       pr.procedure_date,
       b.billed_date,
       b.amount_billed,
       b.balance_on_account
FROM patient AS p
INNER JOIN procedure as pr
ON p.patient_id = pr.patient_id
INNER JOIN billing as b
ON pr.patient_id = b.billing_id
ORDER BY billed_date;
```

```sql
-- Had to update procedure date on procedure table
UPDATE procedure
SET procedure_date = '2024-11-12'
WHERE patient_id = 103
```

Appendix Cont.

```sql
--Getting procedure information for Dr. Holmes by joining patient and procedure tables
SELECT p.patient_id,
       CONCAT(p.patient_first_name, '', p.patient_last_name) AS Patient_Name,
       pr.procedure_id,
       pr.procedure_description,
       pr.procedure_date
FROM patient AS p
INNER JOIN procedure as pr
ON p.patient_id = pr.patient_id
ORDER BY procedure_date;
```

```sql
/*Producing an appointment schedule for the receptionist by inter joining
patinent, procedure, and apointments tables */
SELECT p.patient_id,
       CONCAT(p.patient_first_name, '', p.patient_last_name) AS Patient_Name,
       pr.procedure_id,
       pr.procedure_description,
       pr.procedure_date,
       a.appointment_time,
       a.procedure_scheduled
FROM patient AS p
INNER JOIN procedure as pr
ON p.patient_id = pr.patient_id
INNER JOIN appointments as a
ON pr.patient_id = a.patient_id
ORDER BY pr.procedure_date;
```

Appendix Cont.

```sql
/* Dental history for Dental Tech by
joining patient, procedure, staff, and appointment staff */
SELECT p.patient_id,
       CONCAT(p.patient_first_name, '', p.patient_last_name) AS Patient_Name,
       pr.procedure_id,
       pr.procedure_description,
       pr.procedure_date,
       s.staff_name,
       s.staff_role
FROM patient AS p
INNER JOIN procedure as pr
ON p.patient_id = pr.patient_id
INNER JOIN appointment_staff AS apps
ON pr.patient_id = apps.patient_id
INNER JOIN staff as s
ON apps.staff_id = s.staff_id
ORDER BY pr.procedure_date;
```

Appendix Cont.

```sql
/* Insurance and Billing Information for the Accountant had to join
patient, procedure, billing, and insurance tables */
SELECT p.patient_id,
       CONCAT(p.patient_first_name, '', p.patient_last_name) AS Patient_Name,
       pr.procedure_id,
       pr.procedure_description,
       pr.procedure_date,
       b.billed_date,
       b.amount_billed,
       i.insurance_type,
       i.group_no,
       i.copay_due
FROM patient AS p
INNER JOIN procedure as pr
ON p.patient_id = pr.patient_id
INNER JOIN billing as b
ON pr.patient_id = b.patient_id
INNER JOIN insurance AS i
ON b.patient_id = i.insurance_id
ORDER BY billed_date;
```