SQL Data Engineer Assessment (Module 2)

CONCEPTUAL, LOGICAL AND PHYSICAL DATABASE DESIGN

Entities & Attributes

Properties:

- Types
- Representative
- Area
- Regulations

Representatives/Employees:

- Properties
- Supervisor
- Customers
- Areas
- Whether supervisor or not
- Whether chief salesperson or not

Customers:

- Buying or selling
- Name
- Info
- Representative

Area:

- Customers
- Representative
- Chief salesperson
- Performance

Attributes & Datatypes:

Property:

- Prop_id CHAR(4) PK
- Prop_type_id CHAR(2) FK
- Prop_info
- Area_id CHAR(4) FK
- sales rep_no INT FK (one-to-one)

Employees:

- emp_no PK
- emp_info (one-to-one)

Teams:

- team_id PK
- emp_no (many-to-one)

Area:

- area_id PK
- area_name
- emp_id FK (area chief)
- performance

Customers:

- Cust_id PK
- Cust_name
- Cust_info
- Salesrep_no FK

Supervisor: (Lookup Table)

- Super_id PK
- supervisor_emp_no FK
- team_id
- from_date

- Target
- service_type (buy/sell)
- to_date

Lookup Table:

Regulations (Lookup Table)

- reg_id VARCHAR(6)
- reg_name VARCHAR(40) (one-to-one)

Safety first: the role of health and safety in property managemen
t

Commercial: Guide to commercial landlord laws and regulations
| Alan Boswell Group

Health and Safety - Leasehold Information Sheet

Bridge Table:

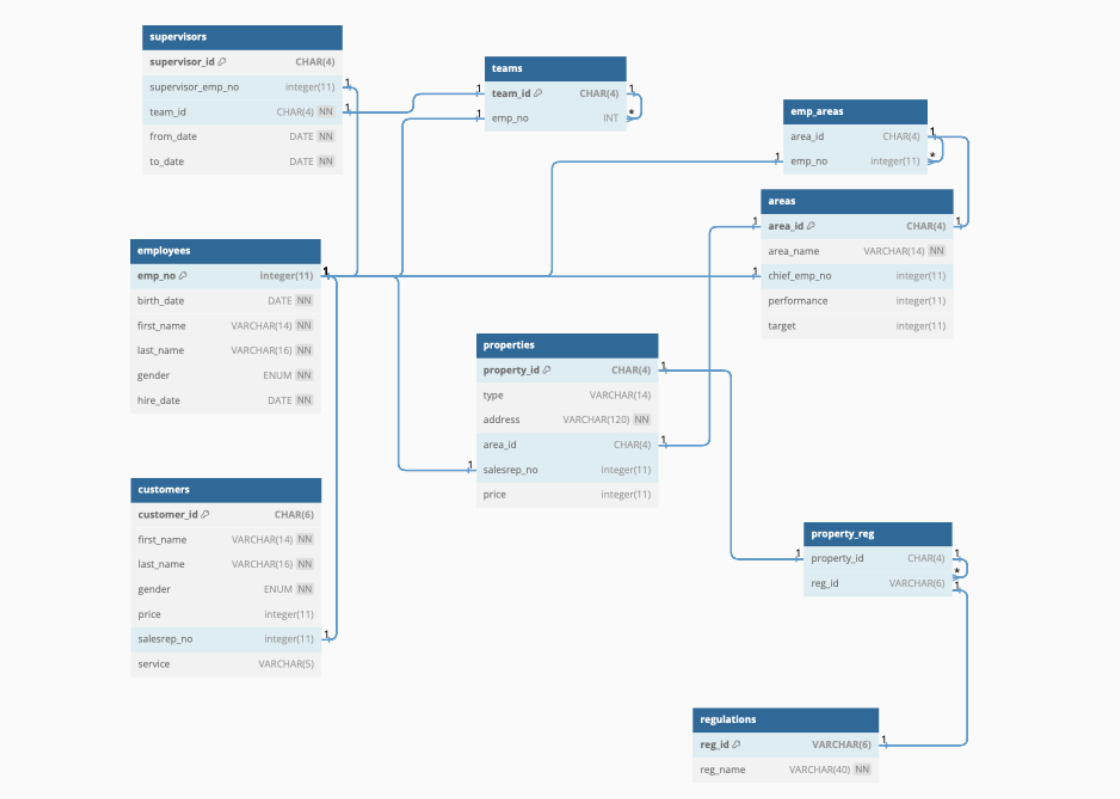
Emp_areas

- area_id FK
- emp_no FK (many-to-one)

Property_reg

- property_id FK
- reg_id FK (many-to-one)

Physical Data Model



The key symbol represents the primary key.


Data_Engineer… t-2.pdf

CREATE DATABASE SCRIPT FOR MYHOMES DATABASE

```sql
DROP DATABASE IF EXISTS myhomes;
CREATE DATABASE IF NOT EXISTS myhomes;
USE myhomes;
SELECT 'CREATING DATABASE STRUCTURE' as 'INFO'; DROP TABLE IF EXISTS
employees,
teams,
supervisors,
areas,
emp_areas,
properties,
customers,
regulations,
property_reg;

CREATE TABLE employees (
  emp_no INT NOT NULL,
  birth_date DATE NOT NULL,
  first_name VARCHAR(14) NOT NULL,
  last_name VARCHAR(16) NOT NULL,
  gender ENUM ('M','F') NOT NULL,
  hire_date DATE NOT NULL,
  PRIMARY KEY (emp_no)
);

CREATE TABLE teams (
  team_id CHAR(4),
  emp_no INT NOT NULL,
  PRIMARY KEY (team_id, emp_no)
);

CREATE TABLE supervisors (
  super_id CHAR(4),
  super_emp_no INT NOT NULL,
  team_id CHAR(4) NOT NULL,
  from_date DATE NOT NULL,
  to_date DATE NOT NULL,
  PRIMARY KEY (super_id, super_emp_no, team_id)
);

CREATE TABLE areas (
  area_id CHAR(4) NOT NULL,
  area_name VARCHAR(14) NOT NULL,
  chief_emp_no INT NOT NULL,
  performance INT NOT NULL,
  target INT NOT NULL,
  PRIMARY KEY (area_id, chief_emp_no)
);

CREATE Table emp_areas (
  area_id CHAR(4),
  emp_no INT,
```

```sql
  PRIMARY KEY (area_id, emp_no)
);

CREATE TABLE properties (
  property_id CHAR(4) NOT NULL,
  type VARCHAR(20),
  address VARCHAR(120) NOT NULL,
  area_id CHAR(4) NOT NULL,
  salesrep_no INT NOT NULL,
  property_price INT,
  PRIMARY KEY (property_id, salesrep_no, area_id),
  UNIQUE KEY (address)
);

CREATE TABLE customers (
  customer_id CHAR(6) NOT NULL,
  first_name VARCHAR(14) NOT NULL,
  last_name VARCHAR(16) NOT NULL,
  gender ENUM ('M','F') NOT NULL,
  price INT,
  salesrep_no INT NOT NULL,
  service VARCHAR(5) NOT NULL,
  PRIMARY KEY (customer_id, salesrep_no)
);

CREATE TABLE regulations (
  reg_id VARCHAR(6) NOT NULL,
  reg_name VARCHAR(50) NOT NULL,
  PRIMARY KEY (reg_id),
  UNIQUE KEY (reg_name)
);

CREATE TABLE property_reg (
  property_id CHAR(4),
  reg_id VARCHAR(6),
  PRIMARY KEY (property_id, reg_id)
);

ALTER TABLE teams ADD FOREIGN KEY (emp_no) REFERENCES employees (emp_no);

ALTER TABLE supervisors ADD FOREIGN KEY (team_id) REFERENCES teams (team_id);

ALTER TABLE supervisors ADD FOREIGN KEY (super_emp_no) REFERENCES employees (emp_no);

ALTER TABLE areas ADD FOREIGN KEY (chief_emp_no) REFERENCES employees (emp_no);

ALTER TABLE emp_areas ADD FOREIGN KEY (area_id) REFERENCES areas (area_id);

ALTER TABLE emp_areas ADD FOREIGN KEY (emp_no) REFERENCES employees (emp_no);

ALTER TABLE properties ADD FOREIGN KEY (area_id) REFERENCES areas (area_id);

ALTER TABLE properties ADD FOREIGN KEY (salesrep_no) REFERENCES employees (emp_no);

ALTER TABLE customers ADD FOREIGN KEY (salesrep_no) REFERENCES employees (emp_no);

ALTER TABLE property_reg ADD FOREIGN KEY (property_id) REFERENCES properties (property_id);
```

```
109
110 ALTER TABLE property_reg ADD FOREIGN KEY (reg_id) REFERENCES regulations (reg_id);
```

INSERT INTO SCRIPT FOR MYHOMES DATABASE

```
1  INSERT INTO employees VALUES (10001, '1988-06-28', 'Oscar', 'Smith', 'M', '2008-01-02'),
2  (10002, '1990-10-10', 'Angela', 'James', 'F', '2018-12-01'),
3  (10003, '1983-06-06', 'Aidah', 'McMit', 'F', '1998-12-01'),
4  (10004, '1998-07-01', 'Sarah', 'Williams', 'F', '2019-09-21'),
5  (10005, '1992-05-12', 'Emma', 'Khan', 'F', '2013-10-04'),
6  (10006, '1989-01-08', 'Paul', 'Waters', 'M', '2004-09-16'),
7  (10007, '1991-09-14', 'Teddy', 'Do', 'F', '2009-06-28'),
8  (10008, '1997-07-08', 'Carlos', 'Santana', 'M', '2016-09-12'),
9  (10009, '1985-11-11', 'Salvatore', 'Gotti', 'M', '2000-03-10'),
10 (10010, '1999-02-14', 'Daire', "O'Conner", 'F', '2020-09-16');
11
12 INSERT INTO teams VALUES ('t001', 10001),
13 ('t001', 10004),
14 ('t002', 10005),
15 ('t002', 10007),
16 ('t002', 10008),
17 ('t003', 10002),
18 ('t003', 10010);
19
20 INSERT INTO supervisors VALUES ('s001', 10003, 't001', '2011-12-01', '9999-01-01'),
21 ('s002', 10006, 't002', '2012-12-10', '2015-10-10'),
22 ('s003', 10009, 't003', '2009-07-01', '2022-12-10');
23
24 INSERT INTO areas VALUES ('a001', 'Rotherhithe', 10003, 5000000, 6000000),
25 ('a002', 'Peckham', 10001, 2500000, 2000000),
26 ('a003', 'Deptford', 10004, 2000000, 3500000),
27 ('a004', 'Lewisham', 10007, 3500000, 2000000),
28 ('a005', 'Bermondsey', 10010, 500000, 300000),
29 ('a006', 'Surrey Quays', 10005, 6000000, 6000000),
30 ('a007', 'New Cross', 10008, 4550000, 6000000),
31 ('a008', 'East Dulwich', 10002, 6000000, 4000000);
32
33 INSERT INTO emp_areas VALUES ('a001', 10002),
34 ('a001', 10003),
35 ('a002', 10001),
36 ('a003', 10004),
37 ('a004', 10007),
38 ('a004', 10010),
39 ('a005', 10010),
40 ('a005', 10006),
41 ('a005', 10002),
42 ('a006', 10005),
43 ('a007', 10009),
44 ('a007', 10008),
45 ('a008', 10002);
46
47 INSERT INTO properties VALUES ('p001', 'house', 'Eleanor Close, SE16 7JE','a001', 10002, 550000),
48 ('p002', 'flat', 'Flat 12 Amber House, SE16 4RT', 'a005', 10010, 450000),
49 ('p003', 'bunglow', 'Silvester Road, SE22 9PF', 'a008', 10002, 700000),
50 ('p004', 'land', '70-72 Pentonville Road, SE14 5AG', 'a007', 10009, 1500000),
51 ('p005', 'commercial_property','Unit 6, Elizabeth Industrial Estate, SE14 5RW' , 'a006', 10005, 1000000),
```

```
('p006', 'house', 'Pepys Road, SE14 5SE', 'a007', 10009, 650000),
('p007', 'flat', 'Elm Grove, SE15 5DE', 'a002', 10001, 475000),
('p008', 'commercial_property', '901-903 Upland Road, SE22 0DP' , 'a008', 10002, 1200000);

INSERT INTO customers VALUES
('c0001', 'Beyonce', 'Knowles', 'F', 450000, 10002, 'buy'),
('c0002', 'Rihanna', 'Fenty', 'F', NULL, 10006, 'sell'),
('c0003', 'Lebron', 'James', 'M', NULL, 10004, 'sell'),
('c0004', 'Cristiano', 'Ronaldo', 'M', 1000000, 10008, 'buy'),
('c0005', 'Kylian', 'Mbappe', 'M', 3000000, 10005, 'buy'),
('c0006', 'Bukayo', 'Saka', 'M', NULL, 10010, 'sell'),
('c0007', 'Ed', 'Sheeran', 'M', NULL, 10007, 'sell'),
('c0008', 'Zayn', 'Malik', 'M', NULL, 10009, 'sell');

INSERT INTO regulations VALUES ('BS22', 'Building Safety Act'),
('FS22', 'Fire Safety Act'),
('WS', 'Water Safety'),
('ES', 'Electrical Safety'),
('GSIU', 'Gas Safety (Installation & Use) Regulation 1998'),
('MEES', 'Minimum Energy Efficiency Standard'),
('RRFS', 'Regulatory Reform (Fire Safety) Order 2005');

INSERT INTO property_reg VALUES ('p001', 'BS22'),
('p001', 'FS22'),
('p002', 'FS22'),
('p002', 'WS'),
('p002', 'ES'),
('p003', 'BS22'),
('p003', 'FS22'),
('p003', 'WS'),
('p005', 'ES'),
('p005', 'MEES'),
('p005', 'RRFS'),
('p005', 'GSIU'),
('p007', 'BS22'),
('p007', 'GSIU'),
('p007', 'ES'),
('p008', 'MEES'),
('p008', 'RRFS'),
('p008', 'GSIU');

```

Questions

1. Display names of representatives, details of the properties they represent, and names of their supervisors.

```
WITH emp_prop AS
(SELECT CONCAT(e.first_name, ' ', e.last_name) AS full_name, p.*
FROM employees e
LEFT JOIN properties p ON p.salesrep_no = e.emp_no),
super_name AS
(SELECT s.super_id, CONCAT(e.first_name, ' ', e.last_name) AS full_name, s.team_id
FROM supervisors s
INNER JOIN employees e ON e.emp_no = s.super_emp_no),
team_details AS
(SELECT sn.super_id, sn.full_name AS supervisor_name, CONCAT(e.first_name, ' ', e.last_name) AS team_full_name
```

```
FROM super_name sn
INNER JOIN teams t ON t.team_id= sn.team_id
INNER JOIN employees e ON e.emp_no = t.emp_no)

SELECT ep.*, td.supervisor_name FROM emp_prop ep
LEFT JOIN team_details td ON td.team_full_name = ep.full_name
ORDER BY full_name;
```

```
WITH emp_properties AS
(SELECT CONCAT(e.first_name, ' ', e.last_name) as employee_name, p.*, t.team_id
FROM employees e
LEFT JOIN properties p ON p.salesrep_no = e.emp_no
LEFT JOIN teams t ON t.emp_no = e.emp_no),
super_info AS
(SELECT *
FROM supervisors s
INNER JOIN employees e ON e.emp_no = s.super_emp_no)

SELECT ep.*, CONCAT(si.first_name, ' ', si.last_name) as supervisor_name
FROM emp_properties ep
LEFT JOIN super_info si ON si.team_id = ep.team_id
ORDER BY employee_name;
```

```
WITH emp_properties AS
(SELECT CONCAT(e.first_name, ' ', e.last_name) as employee_name, p.*, t.team_id
FROM employees e
LEFT JOIN properties p ON p.salesrep_no = e.emp_no
LEFT JOIN teams t ON t.emp_no = e.emp_no),
super_info AS
(SELECT *
FROM supervisors s
INNER JOIN employees e ON e.emp_no = s.super_emp_no),
emp_prop_super AS
(SELECT ep.*, CONCAT(si.first_name, ' ', si.last_name) as supervisor_name
FROM emp_properties ep
LEFT JOIN super_info si ON si.team_id = ep.team_id)

SELECT * FROM emp_prop_super
ORDER BY employee_name;
```

full_name	property_id	type	address	area_id	salesrep_no	price	supervisor_name
Aidah McMit	NULL	NULL	NULL	NULL	NULL	NULL	NULL
Angela James	p001	house	Eleanor Close, SE16 7JE	a001	10002	550000	Salvatore Gotti
Angela James	p003	bunglow	Silvester Road, SE22 9PF	a008	10002	700000	Salvatore Gotti
Angela James	p008	commercial_property	901-903 Upland Road, SE22 0DP	a008	10002	1200000	Salvatore Gotti
Carlos Santana	NULL	NULL	NULL	NULL	NULL	NULL	Paul Waters
Daire O'Conner	p002	flat	Flat 12 Amber House, SE16 4RT	a005	10010	450000	Salvatore Gotti
Emma Khan	p005	commercial_property	Unit 6, Elizabeth Industrial Estate, SE14 5RW	a006	10005	1000000	Paul Waters
Oscar Smith	p007	flat	Elm Grove, SE15 5DE	a002	10001	475000	Aidah McMit
Paul Waters	NULL	NULL	NULL	NULL	NULL	NULL	NULL
Salvatore Gotti	p004	land	70-72 Pentonville Road, SE14 5AG	a007	10009	1500000	NULL
Salvatore Gotti	p006	house	Pepys Road, SE14 5SE	a007	10009	650000	NULL
Sarah Williams	NULL	NULL	NULL	NULL	NULL	NULL	Aidah McMit
Teddy Do	NULL	NULL	NULL	NULL	NULL	NULL	Paul Waters

13 rows in set (0.025 sec)

2. Display details of customers together with details of their areas and names of the managers of their areas.

```sql
WITH area_info AS
(SELECT c.*, a.*
FROM customers c
LEFT JOIN employees e ON e.emp_no = c.salesrep_no
INNER JOIN emp_areas ea ON ea.emp_no = e.emp_no
INNER JOIN areas a ON a.area_id = ea.area_id)

SELECT ai.*, CONCAT(e.first_name, ' ', e.last_name) AS chief_full_name
FROM area_info ai
INNER JOIN employees e ON e.emp_no = ai.chief_emp_no;
```

customer_id	first_name	last_name	gender	price	salesrep_no	service	area_id	area_name	chief_emp_no	performance	target	chief_full_name
c0001	Beyonce	Knowles	F	450000	10002	buy	a001	Rotherhithe	10003	5000000	6000000	Aidah McMit
c0001	Beyonce	Knowles	F	450000	10002	buy	a005	Bermondsey	10010	500000	300000	Daire O'Conner
c0001	Beyonce	Knowles	F	450000	10002	buy	a008	East Dulwich	10002	6000000	4000000	Angela James
c0002	Rihanna	Fenty	F	NULL	10006	sell	a005	Bermondsey	10010	500000	300000	Daire O'Conner
c0003	Lebron	James	M	NULL	10004	sell	a003	Deptford	10004	2000000	3500000	Sarah Williams
c0004	Cristiano	Ronaldo	M	1000000	10008	buy	a007	New Cross	10008	4550000	6000000	Carlos Santana
c0005	Kylian	Mbappe	F	3000000	10005	buy	a006	Surrey Quays	10005	6000000	6000000	Emma Khan
c0006	Bukayo	Saka	M	NULL	10010	sell	a004	Lewisham	10007	3500000	2000000	Teddy Do
c0006	Bukayo	Saka	M	NULL	10010	sell	a005	Bermondsey	10010	500000	300000	Daire O'Conner
c0007	Ed	Sheeran	M	NULL	10007	sell	a004	Lewisham	10007	3500000	2000000	Teddy Do
c0008	Zayn	Malik	F	NULL	10009	sell	a007	New Cross	10008	4550000	6000000	Carlos Santana

3. Display all the customers who are buying a house and the details of their sale representative.

```
WITH cte AS
(SELECT c.*, CONCAT(e.first_name, ' ', e.last_name) as salesrep_full_name, e.gender as salesrep_gender, e.birth_d
INNER JOIN employees e ON e.emp_no = c.salesrep_no)

SELECT * FROM cte
WHERE service = 'buy';
```

4. Display all properties that are in budget for each customer that's buying a house.

```
WITH buy_customers AS
(SELECT * FROM customers
WHERE service = 'buy')

SELECT bc.*, p.* FROM properties p
INNER JOIN buy_customers bc ON bc.price = p.property_price;
```

5. Display all the customers with properties on sale.

Can't find this because the price for customers looking to buy is null, but if it wasn't the following query would work.

```
SELECT c.*, p.* FROM customers c
INNER JOIN employees e ON e.emp_no = c.salesrep_no
INNER JOIN properties p ON p.salesrep_no = e.emp_no
WHERE c.service = 'buy' AND c.price = p.property_price;
```

WITH CTE:

```
WITH cte AS
(SELECT c.*, p.property_id, p.type, p.address, p.area_id, p.price as property_price FROM customers c
INNER JOIN employees e ON e.emp_no = c.salesrep_no
INNER JOIN properties p ON p.salesrep_no = e.emp_no)
```

```
5
6  SELECT * FROM cte
7  WHERE service = 'buy' AND price = property_price;
```

6. For each area, display how many sales representatives cover that area.

```
1  SELECT a.area_name, COUNT(ea.emp_no) AS total_salesreps
2  FROM areas a
3  INNER JOIN emp_areas ea ON ea.area_id = a.area_id
4  GROUP BY a.area_name;
```

7. Display the name of all chief salespeople that met or beat their sales targets.

```
1  SELECT CONCAT(e.first_name, ' ', e.last_name) AS full_name, a.area_name
2  FROM employees e
3  INNER JOIN areas a ON a.chief_emp_no = e.emp_no
4  WHERE a.performance >= a.target;
```

8. Display all the regulations that each property has to abide by.

```
1  SELECT p.address, p.type, GROUP_CONCAT(r.reg_name)
2  FROM properties p
3  INNER JOIN property_reg pr ON pr.property_id = p.property_id
4  INNER JOIN regulations r ON r.reg_id = pr.reg_id
5  GROUP BY p.address;
```