

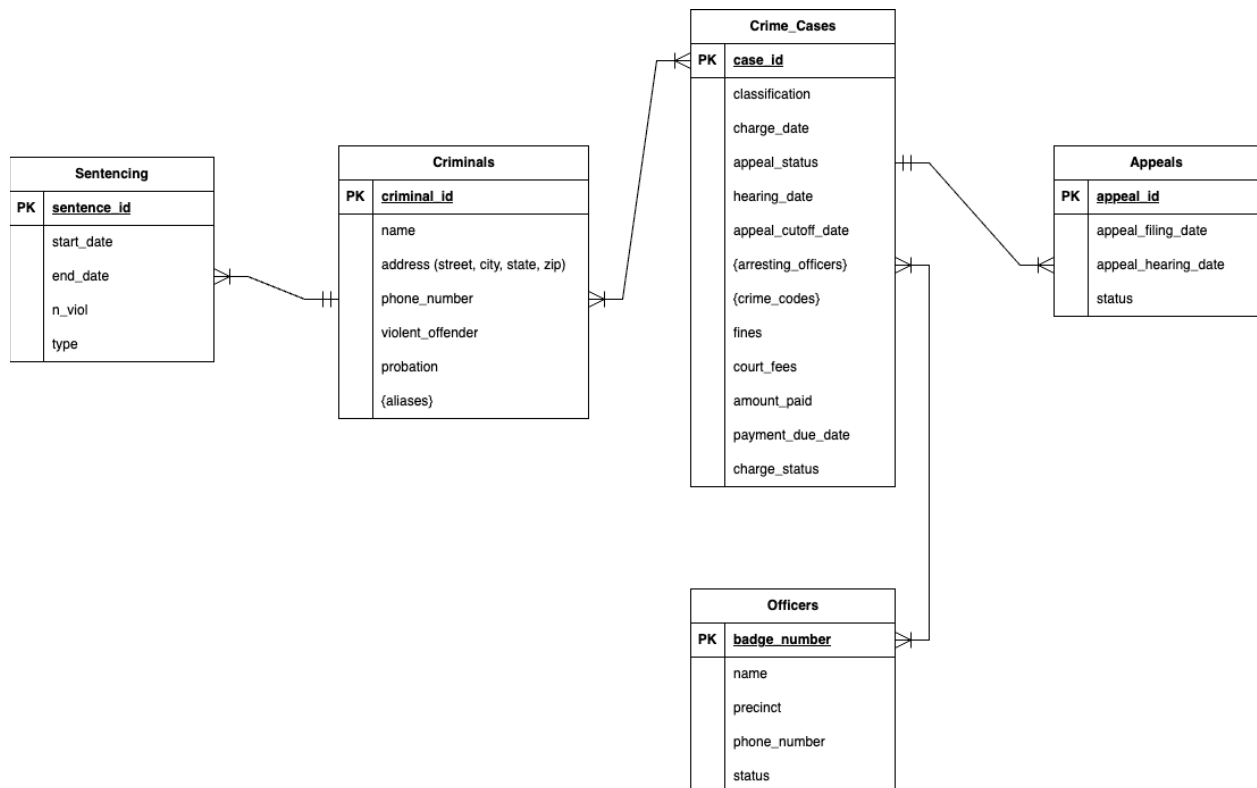
Your company receives the following memo. First, based on the memo, create an initial database design (**E-R model**) for the City Jail that indicates entities, attributes (columns), primary keys, and relationships. In developing your design, consider the columns needed to build relationships between the entities. Use only the entities identified in the memo to develop the E-R model. Second, create a list of additional entities or attributes not identified in the memo that might be applicable to a crime-tracking database.

Keep in mind that the memo is written from an end-user perspective—not by a database developer!

Part 1:

When making the ERDs, we realized that the attributes listed in the memo did not contain any valid primary key candidates for most tables. So, for the “sentencing,” “criminals,” “crime_cases,” and “appeals” tables, we created “id” attribute to use as primary keys. For the “officers” table, we were able to use the “badge_number” attribute as the primary key.

Original Memo Entities:



(10Pts) — Part1: Entity relationship Diagram (ERD)

In this deliverable, you will work **as a team** to develop a high-level conceptual depiction of your database. You will transform the given requirement specification into an **E-R Diagram**, resulting in entity sets and relationship sets. Indicate cardinality on all relationships; identify any mandatory relationships; specify any simple attributes, composite attributes, multi-valued attributes, and weak entities.

You are required to model everything in your database. Do not leave out stuff. Be sure to include any assumptions you may have made and make sure to justify your design decision.

You are required to create a digital illustration of your E-R diagrams. You may use any software to draw your diagrams. — No hand-drawing on paper. No digital hand-drawing. No hand-drawing through any software. There are several easy-to-use web-based software (some are free, some offer a free trial) that you can use to draw an E-R diagram:

- [Draw.io](#) (Recommended)
- [Excalidraw](#)
- [Lucidchart](#)
- [yEd](#)
- [Dia](#)
- [Visual Paradiagm](#)

After you have finalized the ERD, convert it to a **Relational Data Model** (Schema statements).

What to submit:

PART1.pdf:

- (5pts) E-R-Diagram with all the necessary details
- (5pts) Relational Schema Statements

To this ERD, we added 5 tables:

1. “criminal_aliases” weak entity for the “{aliases}” multivalued attribute in “criminals”
2. “crime_codes” entity to hold all of the possible valid crime codes and their corresponding descriptions.
3. “criminal_charges” associative entity for the many-to-many relationship between “criminals” and “crime_cases”
4. “case_codes” associative entity for the many-to-many relationship between “crime_codes” and “crime_cases”
5. “arresting_officers” associative entity for the many-to-many relationship between “case_id” and “arresting_officers”

We also adjusted several attributes:

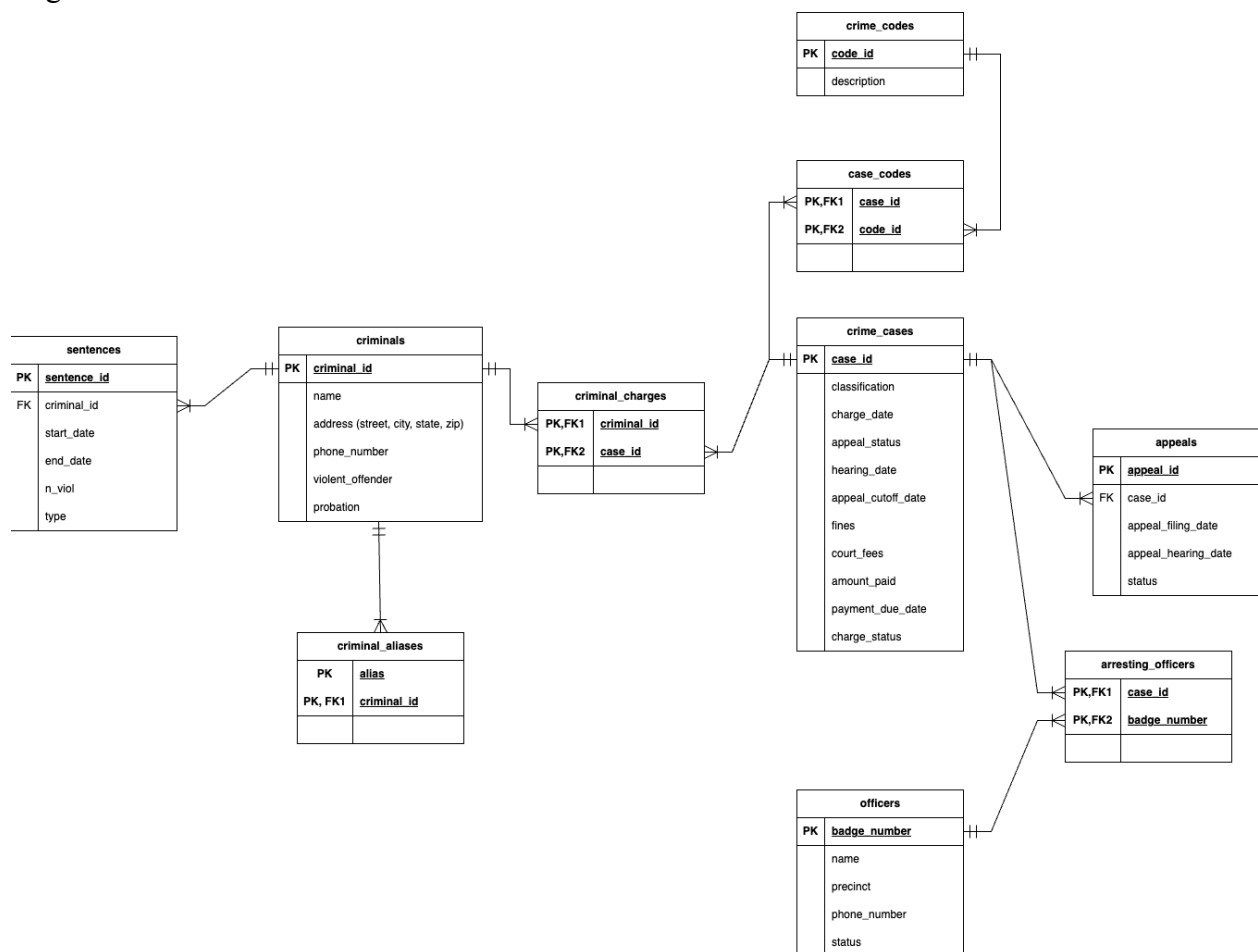
1. Added “criminal_id” foreign key to the “sentences” table, which references the “criminals” table.

2. Added “case_id” foreign key to the “appeals” table, which references the “crime_cases” table.
3. Removed the “aliases” multivalued attribute from the “criminals” table.
4. Removed the “crime_codes” multivalued attribute from the “crime_cases” table.
5. Removed the “arresting_officers” multivalued attribute from the “crime_cases” table.

As part of our ERD, we found one composite attribute:

1. The “address” attribute of the “criminals” table is a composite attribute, made up of the address’ street, city, state, and zip code. In the schema statements, the composite attribute is decomposed into its components.

Augmented ERD:



Schema Statements:

criminals(**criminal_id**, name, add_street, add_city, add_state, add_zip, phone, violent_offender, probation)

sentences(**sentence_id**, @criminal_id, start_date, end_date, n_viol, type)

crime_cases(**case_id**, classification, charge_date, appeal_status, hearing_date, appeal_cutoff_date, fines, court_fees, amount_paid, payment_due_date, charge_status)

appeals(**appeal_id**, @case_id, filing_date, hearing_date, status)

officers(**badge_number**, name, precinct, phone_number, status)

codes(**code_id**, description)

criminal_charges(@**criminal_id**, @**case_id**)

criminal_aliases(**alias**, @**criminal_id**)

case_codes(@**case_id**, @**code_id**)

arresting_officers(@**case_id**, @**badge_number**)

Part 2:

When preparing the SQL CREATE TABLE statements, we made the following assumptions about types for attributes:

1. Phone number attributes are stored as VARCHARs with length 20 to account for different formats (ie. country code, parentheses around area code, etc.).
2. Descriptions and address attributes have 255 chars.
3. Attributes with predetermined classifications were set to VARCHAR(20), since their maximum lengths are guaranteed to be less than 20.
4. Yes/no attributes are stored as Boolean values
5. Any monetary values are assumed to have 12 numbers.
6. Table IDs have 8 numeric chars.