Be sure to include all primary and foreign keys in your answers.

1) Exercise 8.21. (SQL nested queries)

2) Exercise 8.22. (Cascades on FKs)

3) Exercise 8.24 (Views)

   Assume the following functional dependencies:
   \[ \{ A, B \} \rightarrow \{ C \}, \{ A \} \rightarrow \{ D, E \}, \{ B \} \rightarrow \{ F \}, \{ F \} \rightarrow \{ G, H \}, \{ D \} \rightarrow \{ I, J \}. \]
   Decompose R into 2NF and then 3NF.

5) Consider the following relation:
   CAR_SALE(CarId, Date_sold, SalesmanId, Commision, Discount_amt)
   Assume that a car may be sold by multiple salesmen
   Assume the following FDs: \{ Date_sold \} \rightarrow \{ Discount_amt \}, \{ SalesmanId \} \rightarrow \{ Commission \}
   a. What is the primary key?
   b. Normalize to 3NF.

6) Consider the following relation for published books:
   BOOK (BookTitle, AuthorName, BookType, ListPrice, AuthorAffiliation, Publisher)
   A book may have multiple authors.
   Suppose the following dependencies exist:
   \{ BookTitle \} \rightarrow \{ Publisher, BookType \}
   \{ BookType \} \rightarrow \{ ListPrice \}
   \{ AuthorName \} \rightarrow \{ AuthorAffiliation \}
   a. What normal form is the relation currently in? Explain your answer.
   b. Apply normalization until you cannot decompose the relations further.
7) This exercise asks you to converting business statements into dependencies.

Consider the following relation
DiskDrive(serialNumber, manufacturer, model, batch, capacity, retailer).

Each tuple in the relation DiskDrive contains information about a disk drive with a unique serialNumber, made by a manufacturer, with a particular model, released in a certain batch, which has a certain storage capacity, and is sold by a certain retailer.

For example, the tuple DiskDrive(1978619, WesternDigital, A2235X, 765234, 500, CompUSA) specifies that WesternDigital made a 500GB disk drive with serial number 1978619, model number A2235X, in batch 765235, that was sold by CompUSA.

Write each of the following dependencies as an FD:
  a. The manufacturer and serial number uniquely identifies the drive.
  b. A model number is registered by a manufacturer and hence can’t be used by another manufacturer.
  c. All disk drives in a particular batch are the same model.
  d. All disk drives of a particular model of a particular manufacturer have exactly the same capacity.