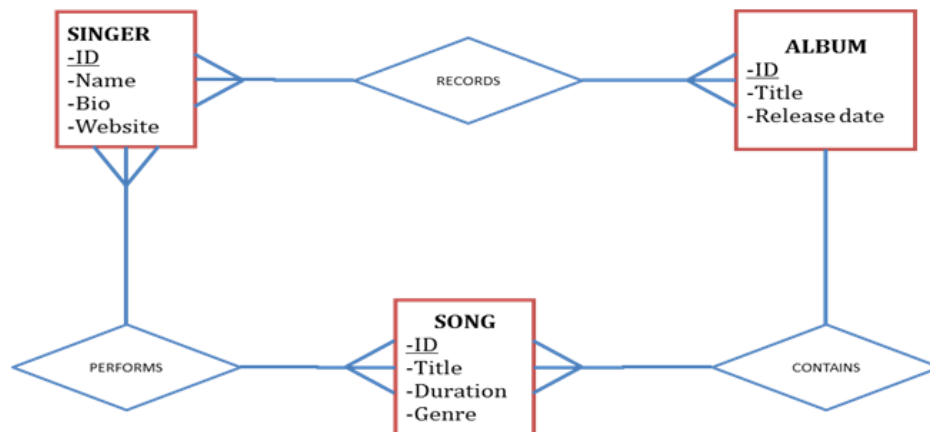


Final Exam Practice Questions

Note: The final exam is comprehensive. However, the following questions mainly focus on post-midterm material.

Database Questions

1. Suggested questions from the textbook:
Chapter 2 – questions 1 & 3
Chapter 4 – questions 2, 5, 7(except i), and 10
2. Consider the following ERD.



- a. Use Algorithm 4.2 starting on page 104 of your text to convert the above ERD to a database schema.

Write the following queries in SQL

- a. Retrieve all albums titles that were released before '1-Jan-2011'
- b. Retrieve the names and biography of all singers that have a website (a singer with no Website has the Website value in the database recorded as NULL. In SQL, this condition can be determined by asking if Website IS NOT NULL)
- c. Retrieve all songs whose duration is inclusively between 2 and 4 minutes, but whose genre is pop or rock and roll, but not country.
- d. Retrieve the song titles for all albums, ordered alphabetically by album title and for songs from the same album by song title.
- e. Retrieve the average song duration for each singer. Your query can simply output the singer id and the average song duration for that singer. It is more challenging to output the singer **name** and the average song duration. Attempt formulating the latter (with the singer's name) only after successfully formulating and understanding the former (with the singer's id).

Security questions

1. Alice sends a message to Bob encrypted with her public key. Who can decrypt the message?
2. Alice sends a message to Bob encrypted with his public key. Who can decrypt the message?
3. Alice sends a message to Bob encrypted with her private key. Who can decrypt the message?
4. Recall that a QWERTY keyboard looks like the following:



Alice invents a shared-key cryptosystem that works as follows. To encrypt a message, each alphabet symbol is replaced by the character immediately to its right on the keyboard. Spaces are replaced by ?. For instance Q is replaced by W, W by E, E by R, and P by {. She sends the following message to Bob:

O?FP?MPY?HRY?VTU{YPDUDYR<D@

Can you decode the message?

Networks questions

1. Give examples of Web applications where UDP is more suitable than TCP.
2. Give examples of Web applications where TCP is more suitable than UDP.

Multiple choice sample questions

1. The Borg alphabet consists of 12 vowels, 48 consonants and 5 'special characters'. What is the minimum number of bits need to encode the alphabet using fixed length coding?
 - a. 6
 - b. 7
 - c. 8
 - d. 64
 - e. 65

For Question 2 – 3 refer to the following ERD



2. If we employed the database mapping algorithm which of the following should occur?
 - a. The primary key of 'Student' becomes a foreign key of 'University'
 - b. The primary key of 'University' becomes a foreign key of 'Student'
 - c. The foreign key of 'Student' becomes a primary key of 'University'
 - d. The foreign key of 'University' becomes a primary key of 'Student'
 - e. The two tables become mutually exclusive and they exchange primary keys

3. Which of the following true about the relationship represented in the ERD?
 - a. There are many students for each university
 - b. There are many universities for each student
 - c. It's a many to many relationship
 - d. Students partially participate in the relationship whereas universities participate fully.
 - e. Universities partially participate in the relationship whereas students participate fully.