

CSCI 4125/5125 Course Project
Data Models and Database Systems
Spring 2022
Course Project
Phase 4: Intermediate SQL

Due: Thursday, 4/7 @ 11:59pm

Reading: Silberschatz Chapters 3.5, 3.7, 4.1, 4.2, 17

Submission Guidelines:

1. This assignment is worth 100 points for all students.
2. It is your responsibility to make sure all files are readable and submitted on time.

Submission:

- Part A requires you to submit a single .sql file and a single .txt file worth 80 points. There are also two extra credit questions worth a total of 10 bonus points.
- Part B requires you to submit a file of choice (e.g., Word, PDF) containing the short answer questions worth 20 points.

Part A. Intermediate Retrieval Queries (80 points, 10 points each)

Write a SQL query for each of the following problems. Unless values are specified in the problem, do not hardcode values in queries. In other words, your query should still answer the problem if the data changes. **Submit:** your answers in a single .sql file named hospital_queries2.sql and the outputs from each of your queries in a .txt file named hospital_results2.txt.

1. Retrieve the names of all physicians who specialize in dermatology and have worked more than 22 hours.
2. Find the names of all nurses who are directly supervised by Chris Summa. Note: You must use the name. Do not hardcode the nurse ID.
3. For each physician specialty, list the specialty, the number of physicians that have that specialty, and the total number of hours worked by those physicians.
4. Retrieve the names of all nurses who monitor at least one bed. Make sure to remove duplicates.
5. Retrieve the names of all nurses who do not monitor any beds.
6. Retrieve the names of all nurses whose supervisor's supervisor has N01 for their ID.
7. For each physician specialty, find the total number of patients whose physician has that specialty.
8. Find the average salary for all nurses who monitor at least 2 beds.
9. Find the patient assigned to a bed that is monitored by the nurse with the lowest salary.
10. Retrieve the average age of patients that are assigned to a bed.

Extra Credit. Retrieval Queries Requiring Regular Expressions (+5 points each)

The following problems are extra credit for all students. These problems require you to use the regular expression function REGEXP_LIKE that we discussed in class.

11. Find physicians whose specialty consists of exactly 2 words. For example, the query should return records for "General Practice", but not "Oncology". Also, the specialty should be properly capitalized (both first and last word start with an upper-case letter and rest of the word is lower-case). For example, the query should return results for "General Practice" but not "general Practice".
12. Find all beds that have a room number that end in an odd number (e.g., return 101, but not 102).

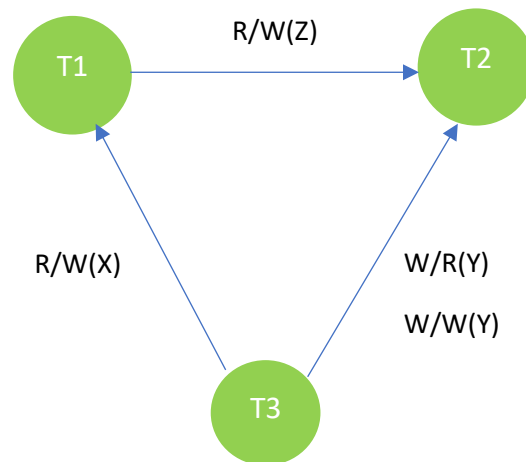
Part B. Transactions & Serialization (20 points, 10 points each)

Consider the three transactions T1, T2, and T3, and the schedules S1 and S2 given below. Draw the serializability (precedence) graphs for S1 and S2, and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s).

T1: R1(X), R1(Z), W1(X)
T2: R2(Z), R2(Y), W2(Z), W2(Y)
T3: R3(X), R3(Y), W3(Y)

S1: R1(X), R2(Z), R1(Z), R3(X), R3(Y), W1(X), W3(Y), R2(Y), W2(Z), W2(Y)

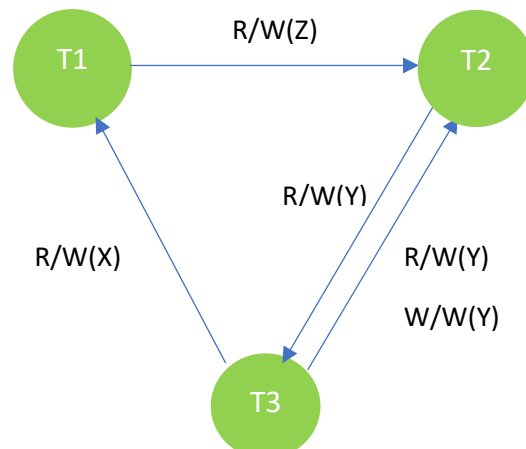
T1	T2	T3
R(X)		
	R(Z)	
R(Z)		
		R(X)
		R(Y)
W(X)		
		W(Y)
	R(Y)	
	W(Z)	
	W(Y)	



S1 is serializable, and the equivalent sequential schedule is $T3 \rightarrow T1 \rightarrow T2$.

S2: R1(X), R2(Z), R3(X), R1(Z), R2(Y), R3(Y), W1(X), W2(Z), W3(Y), W2(Y)

T1	T2	T3
R(X)		
	R(Z)	
		R(X)
R(Z)		
	R(Y)	
		R(Y)
W(X)		
	W(Z)	
		W(Y)
	W(Y)	



S2 is not serializable because there is a cycle between T2 and T3, and therefore there is no equivalent serial schedule.