

# CSCI 4125 Database Structures - Phase 2

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Due Oct. 22, 2025

## I. SQL DDL

To maintain referential integrity, **Phase2\_Task1\_Schema.sql** drops these tables in order at the beginning of the script and inserts them in the reverse order:

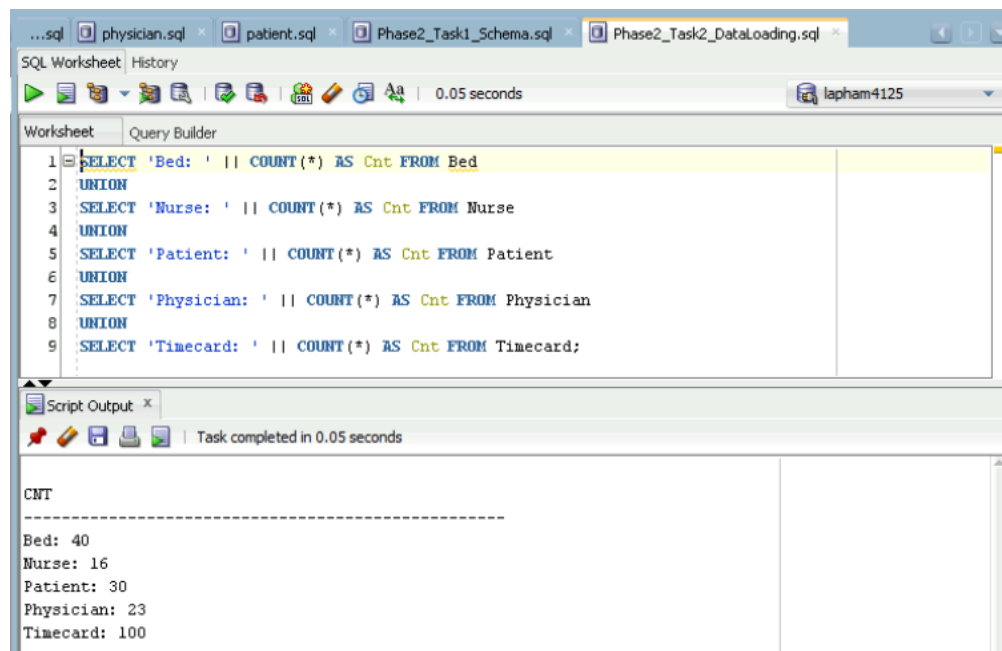
- Timecard
- Bed
- Nurse
- Patient
- Physician

## II. Data Loading

**Phase2\_Task2.java** reads text files of the tables specified in the command-line, maintaining domain integrity. The table data provided must be added in the reverse order above to maintain entity and referential integrity.

- **Usage:** javac Phase2\_Task2.java && java Phase2\_Task2 [tableName]

**Phase2\_Task2\_DataLoading.sql** verifies that the data was loaded correctly.



The screenshot shows a SQL Worksheet window with the following tabs: ...sql, physician.sql, patient.sql, Phase2\_Task1\_Schema.sql, and Phase2\_Task2\_DataLoading.sql. The active tab is Phase2\_Task2\_DataLoading.sql. The worksheet contains a SQL query that counts the number of rows in five tables: Bed, Nurse, Patient, Physician, and Timecard. The query is as follows:

```
1 SELECT 'Bed: ' || COUNT(*) AS Cnt FROM Bed
2 UNION
3 SELECT 'Nurse: ' || COUNT(*) AS Cnt FROM Nurse
4 UNION
5 SELECT 'Patient: ' || COUNT(*) AS Cnt FROM Patient
6 UNION
7 SELECT 'Physician: ' || COUNT(*) AS Cnt FROM Physician
8 UNION
9 SELECT 'Timecard: ' || COUNT(*) AS Cnt FROM Timecard;
```

The Script Output window shows the results of the query, indicating that the task was completed in 0.05 seconds. The output is as follows:

```
CNT
-----
Bed: 40
Nurse: 16
Patient: 30
Physician: 23
Timecard: 100
```

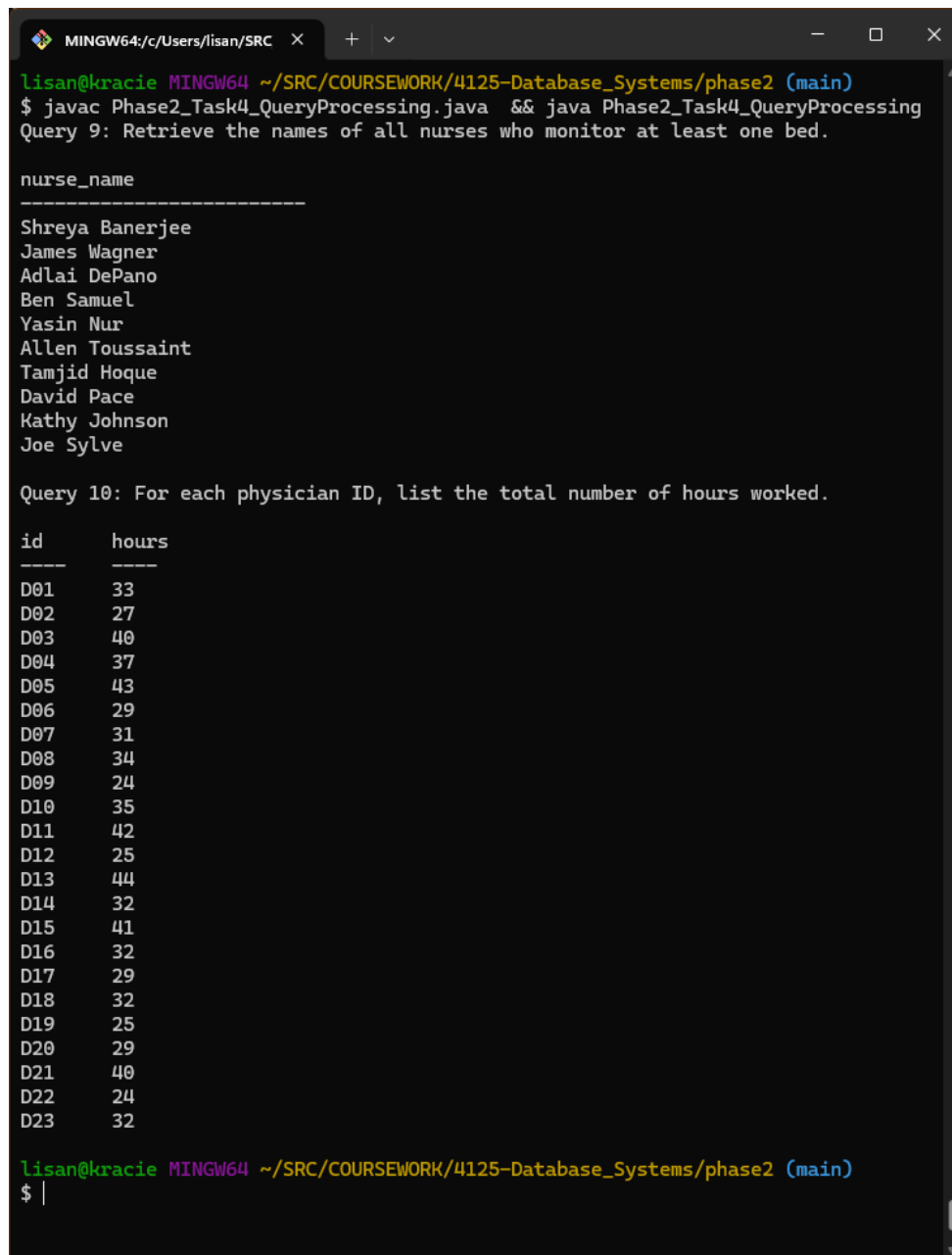
### III. Retrieval Queries

Phase2\_Task3\_Queries.sql contains 19 SELECT queries using the data in the previous steps.

### IV. Query Processing

Phase2\_Task4.java is the flat file model implementation of two queries from Task 3:

- **Query 09:** Retrieve the names of all nurses who monitor at least one bed. Make sure to remove duplicates.
- **Query 10:** For each physician ID, list the total number of hours worked.



```
MINGW64/c/Users/lisan/SRC x + v
lisan@kracie MINGW64 ~/SRC/COURSEWORK/4125-Database_Systems/phase2 (main)
$ javac Phase2_Task4_QueryProcessing.java && java Phase2_Task4_QueryProcessing
Query 9: Retrieve the names of all nurses who monitor at least one bed.

nurse_name
-----
Shreya Banerjee
James Wagner
Adlai DePano
Ben Samuel
Yasin Nur
Allen Toussaint
Tamjid Hoque
David Pace
Kathy Johnson
Joe Sylve

Query 10: For each physician ID, list the total number of hours worked.

id      hours
-----
D01     33
D02     27
D03     40
D04     37
D05     43
D06     29
D07     31
D08     34
D09     24
D10     35
D11     42
D12     25
D13     44
D14     32
D15     41
D16     32
D17     29
D18     32
D19     25
D20     29
D21     40
D22     24
D23     32

lisan@kracie MINGW64 ~/SRC/COURSEWORK/4125-Database_Systems/phase2 (main)
$ |
```

## V. Transaction Processing

### Transactions:

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

### Schedules:

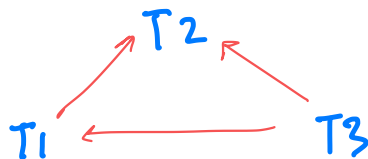
- S1: R1(X), R2(Z), R1(Z), R3(X), R3(Y), W1(X), W3(Y), R2(Y), W2(Z), W2(Y)
- S2: R1(X), R2(Z), R3(X), R1(Z), R2(Y), R3(Y), W1(X), W2(Z), W3(Y), W2(Y)

S1

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

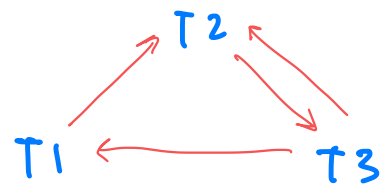
S2

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



serializable

< T3, T1, T2 >



not serializable

< T2, T3 > cycle

< T1, T2, T3 > cycle