Score for this quiz: **97** out of 101
Submitted Mar 31 at 8:17pm
This attempt took 91 minutes.

Question 1 — 2 / 2 pts

Which of the following SQL instructions might create a result table with duplicate tuples?

- A. EXCEPT
- B. INTERSECT
- C. UNION
- Correct! D. JOIN

Question 2 — 2 / 2 pts

`SELECT R.a,R.b from R join S using c` assumes that

- Correct! A. c is a field of R and S
- B. c is a filed of R but not of S
- C. c is a field of S but not R
- D. c is not a commond field

Question 3 — 2 / 2 pts

A foreign key must reference

- A. just one field of another table, even if it is not the complete primary key
- B. some of the primary key fields of another table
- C. any field combination of another table
- Correct! D. all the primary key fields of another table

Question 4 — 2 / 2 pts

Result tables from SQL queries

- A. are always sorted by id
- B. cannot have duplicates
- Correct! C. can have duplicates
- D. always have a key

Question 5 — 2 / 2 pts

Result tables in SQL are

- Correct! A. Relations
- B. Sets
- C. Queries
- D. Lists

Question 6

2 / 2 pts

SQL does not include

- A. A schema definition language
- Correct! B. A programming language
- C. A data manipulation language
- D. A query language

Question 7

2 / 2 pts

```
SELECT * FROM A,B;
```
computes

- A. The union
- B. A full join
- C. The set difference
- Correct! D. The cartesian product

Question 8

2 / 2 pts

SQL

- A. Is better than NoSQL
- Correct! B. Is based on relational algebra
- C. Is object oriented
- D. Is portable among different implementations

Question 9

2 / 2 pts

In the following query:

```
SELECT R.a,R.b
from R, S
where R.c=S.c using (c)
```

Correct!

- (●) A. c is a common field of R and S but does not have to be a foreign key
- ( ) B. c must be a foreign key referencing S
- ( ) C. c must be a foreign key referencing R
- ( ) D. c must be a foreign key of either R or S

Question 10

2 / 2 pts

`Select a,b from R union Select c,d` from S produces a table with

- ( ) A. four columns
- ( ) B. three columns
- ( ) C. no columns

Correct!

- (●) D. two columns

Question 11

2 / 2 pts

A condition on `count(*)` can be included in a SQL query after `GROUP BY` using

- ( ) A. WHERE
- ( ) B. IF

Correct!

- (●) C. HAVING
- ( ) D. CASE

Given the following relations:

- registered(pnum:integer, hospital:string)
- operation(hospital:string, when:date_time, op_room:string, doc:integer)
- doctor(doc:integer, dname:string, dept:string)
- patient(pnum:integer, pname:string, illness:string, age:integer)

Provide SQL instructions for each of the following questions. You cannot use instructions not covered in class such as NVL.

Type your answers in the space provided.

Question 12

5 / 5 pts

Find the name of all patients younger than average.

Your Answer:

```
SELECT p.pname
FROM patient p
WHERE p.age < (SELECT AVG(age) FROM patient);
```

Question 13

4.5 / 5 pts

Names of all patients operated for appendicitis in 'Princeton-Plainsboro' hospital.

Your Answer:

```
SELECT p.pname, p.illness, r.hospital
FROM patient p, registered r
WHERE p.illness = 'appendicitis' AND r.hospital = 'Princeton-Plainsboro';
```

p.pnum = r.pnum

Question 14

5 / 5 pts

For each doctor (name) determine the names the oldest patients among those operated by the doctor.

Your Answer:

```
SELECT p.pname, d.dname
FROM patient p, doctor d, registered r, operation o
WHERE p.pnum = r.pnum, d.doc = o.doc, o.hospital = r.hospital and p.age =
(SELECT max(p.age)
FROM patient p, doctor d, registered r, operation o
WHERE p.pnum = r.pnum, d.doc = o.doc, o.hopsital= r.hospital);
```

//notes for myself: fixed this one, unbookmark it :)

Question 15

4.5 / 5 pts

Use outer join (and any other necessary instructions) to determine the number of hospitals in which each doctor operates. Your result must include all doctors, even if they did not perform any operations.

Your Answer:

```
SELECT d.dname, COUNT(o.hospital)
FROM operation o
RIGHT OUTER JOIN doctor d
ON d.doc = o.doc
GROUP BY d.dname;
```

doctor outer join (select distinct hospital, doc from operation) on

Question 16 5 / 5 pts

If populating the tables with outside data, what is the correct order to fill the tables?

Your Answer:

1. Patient
2. Registered
3. Doctor
4. Operation

Question 17 5 / 5 pts

Use set operations to determine the names of doctors who operated in a hospital that has patients registered for covid and cancer.

Your Answer:

```
SELECT d.dname
FROM doctor d
Where d.doc in (
    SELECT d.doc
    FROM doctor d , and operation o, and registered r, and patient p
    WHERE d.doc=o.doc, o.hospital=r.hospital, r.pnum=p.pnum, and p.illness= 'covid'

    UNION
    SELECT d.doc
    FROM doctor d , and operation o, and registered r, and patient p
    WHERE d.doc=o.doc, o.hospital=r.hospital, r.pnum=p.pnum, and p.illness= 'cancer'
    );
```

Question 18 2 / 5 pts

Find the hospital(s) with the maximum number of registered patients.

Your Answer:

```
SELECT hospital FROM registered WHERE pnum = (SELECT MAX(pnum) FROM registered));
```

pnum is not count

Question 19 5 / 5 pts

Create the database schema including primary/foreign key constraints. If you need assumptions, write them down.

Your Answer:

```
CREATE TABLE registered
(
 pnum INTEGER,
 hospital VARCHAR(50),
 PRIMARY KEY(pnum, hospital),
 FOREIGN KEY(pnum) REFERENCES patient,
);

CREATE TABLE operation
(
 hospital VARCHAR(50),
 when DATE,
 op_room VARCHAR(20),
 doc INTEGER,
 PRIMARY KEY(when, doc),
 FOREIGN KEY(hospital) REFERENCES registered,
 FOREIGN KEY(doc) REFERENCES doctor
);

CREATE TABLE doctor
(
 doc INTEGER,
 dname VARCHAR(20),
 dept VARCHAR(20),
 PRIMARY KEY(doc),
);

CREATE TABLE patient
(
 pnum INTEGER,
 pname VARCHAR (20),
 illness VARCHAR (30),
 age INTEGER,
 PRIMARY KEY(pnum),
);
```

Question 20 5 / 5 pts

Find the names of all cancer patients whose name starts with 'M'.

Your Answer:

```
SELECT p.pname
FROM patient p
WHERE p.illness = 'cancer' AND p.pname LIKE 'M%';
```

Question 21

5 / 5 pts

Find the names of patients older than 'Besiana' (assume that there is only one patient called 'Besiana').

Your Answer:

```
SELECT p.pname
FROM patient p
WHERE p.age > (SELECT p2.age
    FROM patients p2
    WHERE p2.pname = 'Besiana');
```

Question 22

5 / 5 pts

USE CORRELATED subqueries to find the names of doctors who did not perform any operations (no credit if you did not use correlated subqueries).

Your Answer:

```
SELECT d.name
    FROM doctor d
    WHERE NOT EXISTS (SELECT o.doc
FROM operation o
WHERE o.doc = d.doc)
```

Given the following relations:

- `registered(pnum:integer, hospital:string)`
- `operation(hospital:string, when:date_time, op_room:string, doc:integer)`
- `doctor(doc:integer, dname:string, dept:string)`
- `patient(pnum:integer, pname:string, illness:string, age:integer)`

Provide *Relational Algebra* instructions for each of the following questions.

You must use the symbols seen in class. Do NOT use relational algebra in text form.

Scan/take pictures of your solutions, and upload one file for each question.