INFO90002 Exam Revision 3 S1 2019 Suggested Answers

1. Security and Ethics - Explain the difference between a logical and physical backup?

A logical back up uses SQL to extract the data from the database. This includes all the data, the DDL statements to create the tables, indexes and constraints (including not nulls, primary and foreign keys). A logical backup can only occur while the database is open and running.

A physical backup makes copies of the physical database files located on disk. It relies on an operating system copy of the file. The database may be shutdown or running when a physical backup occurs.

2. What are the advantages of a distributed (non replicated) database when compared to decentralized databases.

A distributed database means that the data is in the one logical database. Users will not need to disconnect from one data source then connect to a different data source to retrieve data. New nodes joining the distributed database only get the data they need and it is usually stored close to where users retrieve it. It is easier for end users to use a distributed database when compared to decentralized databases.

3.1 Give three examples of the types of data that can be stored in a column-type database

As column type NoSQL database functions similarly to relational tables, it is the variety of those columns

Each row does not need to have the same number of columns

Customer Orders

Single Sign On data entries for each Employee

Banking Transactions for each customer

e.g for Customer Orders

Order 1	Alice	Item 1	Qty	Price	Item 2	Qty	Price	Item	Qty	Price
Order 2	Bob	Item			Quantity			Price		
Order 3	Alice	Item 1	Qty		Price	Item 2		Qty	Price	

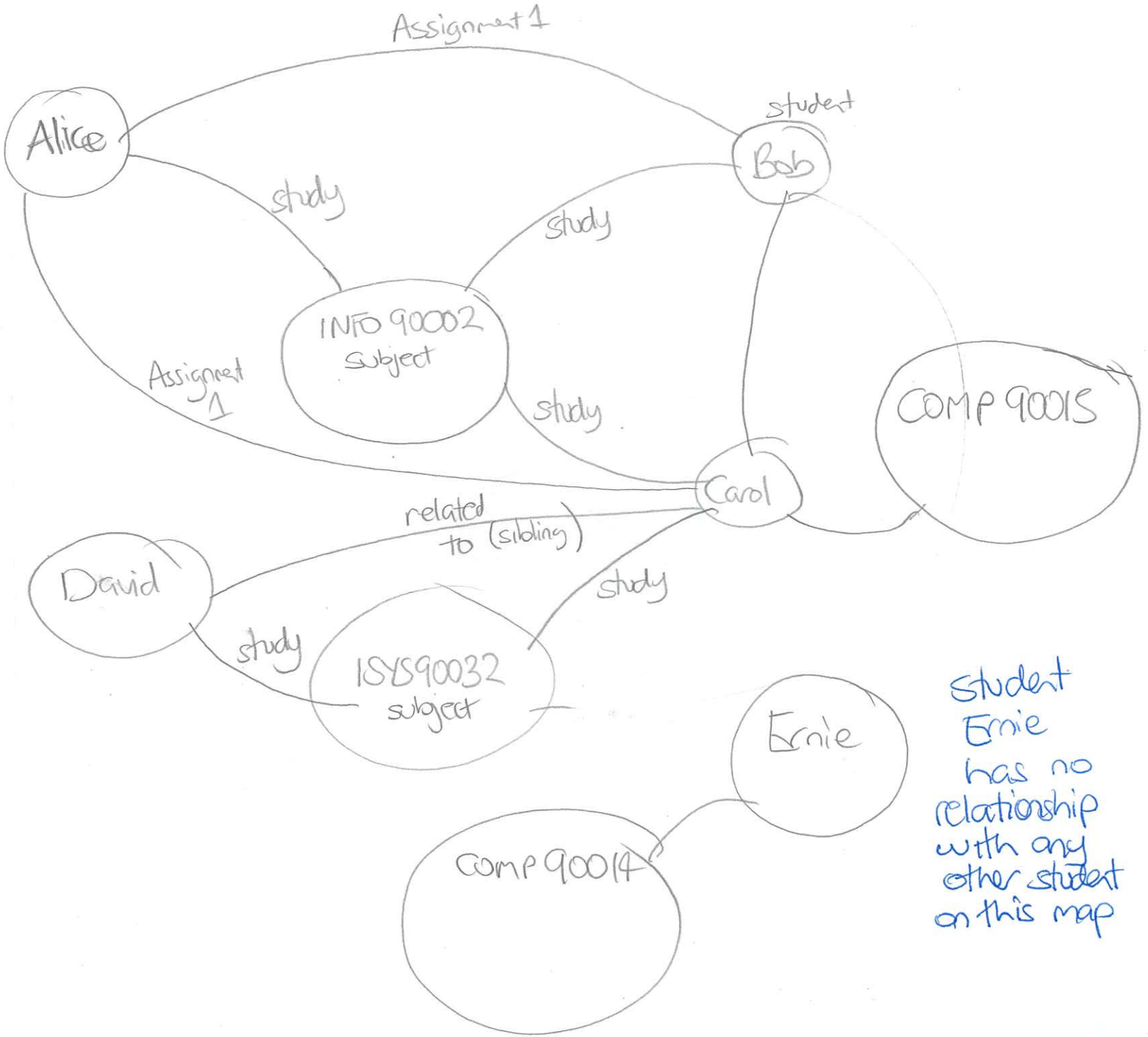
Each row in the order table has a different number of columns (11, 5, 8)

Example of a graph database

○ = node

⌒ = arc

The relationships between nodes is important



Student Ernie has no relationship with any other student on this map

3.2

4. What is page level locking? How is it different to other types of database locking?

Page level locking is a locking level between table level and row level locking. We don't lock all rows in the table, but the number of rows that fit inside a memory page. It is different to the other types of database locking because it does not explicitly apply to a database object. That is it doesn't apply to a database, a table or a row but to the space available in a memory buffer.

5. 1 How is security enforced in multi-tier applications?

- Application password at the application level to allow access to the database application
- Database password at the database level for access to the underlying entities (tables)
- Secure network connectivity between the client and server (e.g. HTTPS / encryption)

5.2 What are the inputs and outputs in each layer of a 3 tier system architecture

	INPUT	**OUTPUT**
Presentation Layer	Keyboard, touchscreen, scanner	Screen, Printer, Phone Message
Business Layer	Input handling	Enforcement of Business Rules
Storage Layer	Persistent storage of data	Retrieval of data for manipulation and viewing

6.1

```
UPDATE emp
SET job = 'MANAGER'
WHERE name = 'SCOTT';
```

6.2

```
DELETE FROM emp
WHERE name = 'MILLER';
```

6.3

```
INSERT INTO emp VALUES
(7967, 'PATEL', 'CLERK', 7788, '1984-08-27', 800.00, 0.00, 20);
```

6.4

```
UPDATE emp
SET salary = SALARY + 1000.50
WHERE job = 'CLERK';
```

6.5

```
SELECT Boss.name, COUNT(Wrk.empno) as emp_count
FROM emp as Boss NATURAL JOIN emp as Wrk
ON Wrk.boss = Boss.empno
GROUP BY Boss.name
HAVING emp_count >= 2;
```