

## Exam #1

*CSC 3300 – Feb 16, 2018*

- Read through the entire exam
- Place your name (Last Name first, first name last) on the Scan Tron
- For any T/F questions, T is (1) or (A), F is (2) or (B)
- Make sure you understand the instructions before answering the question
- Each question is worth 4 points.

1. A set of operations that either completes successfully in its entirety, or fails completely leaving the database in a consistent state, adheres to the property of
  - a. Durability
  - b. Atomicity
  - c. Concurrency
  - d. Transactions
  - e. Consistency

ANSWER: This is the property of Atomicity – we want to ensure that a record is either complete or not saved

2. When various copies of the data no longer agree, this violates the property of data – and is a big reason we use DBMS rather than file system level DBs
  - a. Durability
  - b. Atomicity
  - c. Concurrency
  - d. Transactions
  - e. Consistency

ANSWER: This is the property of Data Consistency – data should be consistent throughout the system

3. T F SQL is a powerful general purpose programming language

This is FALSE. SQL is not a general purpose language

4. T F The following is an example of the DDL portion of SQL :  
**select \* from students;**

This is FALSE. This is an example of the DML – Data Manipulation Language. DDL would be for building the students schema

5. T F In the relational database model a tuple corresponds to a column in a table

This is FALSE. The tuple would correspond to a row in a table

6. T F Natural Join and Cartesian Product accomplish the same task

This is FALSE. A Natural Join and a Cartesian Product both join tables but the natural join considers the union based on the intersection of values in the fields with the same name

7. T F It is possible to order the display of tuples in SQL using “order by” and it sorts in descending order by default

This is FALSE. By default the order by will sort in ascending order

8. T F SQL is the dominant database structure for online large scale database systems

This is FALSE. SQL is dominant for traditional databases but there is not currently a dominant system for online large scale systems like Azure, AWS etc

9. Almost all commercial systems offer most, if not all of the \_\_\_\_\_ feature set

- a. SQL – 86
- b. SQL – 89
- c. SQL – 92
- d. SQL – 1999
- e. SQL – 2003

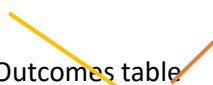

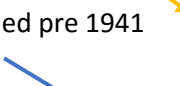


The answer is C. Almost all support SQL-92, most support parts of the 2003 standard but not the entirety.

10. T F SQL Supports the use of the standard 3 Logic units of AND, OR and NOT

This is TRUE.

Given the following database layout match the meaning on the left with the relational algebra on the right

| Classes  |        | Battles |        | Outcomes |        | Ships    |        |
|----------|--------|---------|--------|----------|--------|----------|--------|
| class    | string | name    | string | ship     | string | name     | string |
| type     | string | date    | date   | battle   | string | class    | string |
| country  | string |         |        | result   | string | launched | number |
| numGuns  | number |         |        |          |        |          |        |
| bore     | number |         |        |          |        |          |        |
| displace | number |         |        |          |        |          |        |

11. All ships not in a battle  A.  $\pi_{ship, battle} (Outcomes)$
12. The Primary key in the Outcomes table  B.  $\pi_{launched < 1941 \text{ and } numGuns > 8} (\sigma_{country} (Classes \bowtie Ships))$
13. Countries with ship launched pre 1941 with more than 8 guns  C.  $\pi_{name} (Ships) - \pi_{name} (\rho_{name \leftarrow ship} (Outcomes))$
14. Ships with same name as their class  D.  $\pi_{name} (Ships \bowtie \rho_{name \leftarrow class} (Classes))$   
 E.  $\pi_{country} (\sigma_{launched < 1941 \text{ and } numGuns > 8} (Classes \bowtie Ships))$

Fill in the blank with the following words:

- A. Candidate Key
- B. Foreign Key
- C. Super Key
- D. Natural Join
- E. Cartesian Product

15. A \_\_\_\_\_ **FOREIGN KEY** \_\_\_\_\_ is a primary key from another table that acts as a constraint on input
16. The \_\_\_\_\_ **NATURAL JOIN** \_\_\_\_\_ operation is typically used to cross reference tables and requires that the tables have column names in common. Its symbol is the bowtie
17. A \_\_\_\_\_ **SUPER KEY** \_\_\_\_\_ is a list of all possible tuples that can be used to uniquely identify a relation
18. The \_\_\_\_\_ **CARTESIAN PRODUCT** \_\_\_\_\_ operation is typically used to cross reference tables and requires that the tables do not have a column name in common.
19. The actual content of the database at a particular point in time is referred to as the database
- 
- a. Schema
  - b. Instance
  - c. System
  - d. Structure

The answer is B.

20. T F The "select" statement corresponds to the selection operator in relational algebra

This is FALSE. The select statement corresponds to the projection operator from relational algebra.  
The selection operator is the where statement in SQL

For the following five questions, match the terminology on the left with the correct definition on the right

- |             |   |   |
|-------------|---|---|
| 21. float   | → | A. Fixed point number, with user specified precision    |
| 22. varchar | → | C. Variable length character string                     |
| 23. char    | → | E. Fixed length character string                        |
| 24. numeric | → | A. Fixed point number, with user specified precision    |
| 25. real    | → | D. Floating point number, with user specified precision |