Assoc. Prof. Dr. Đặng Trần Khánh

**Review Open-Book Exam 60’ - Fundamental Concepts of Data Security**

(IT140IU - Sep 07, 2021)

Student name/ID: .....LÝ MINH TRUNG...ITDSIU19023.......................

**Question 1: Are the following statements true or false? and why?**

1. Given a relation schema EMPLOYEE(SSN, FNAME, LNAME, SUPERSSN, DNO) where employee SUPERSSN is the

direct supervisor of employee SSN. The following SQL statement returns names of all employees that have the direct

supervisor:

SELECT FNAME, LNAME

FROM EMPLOYEE

WHERE SUPERSSN <> NULL;

*Answer (True/False, Why): FALSE because NULL has no value -> cannot be compared using the scalar value operators*

2. Given a relation schema EMPLOYEE as shown in question (1) above. The following statement always causes error(s):

ALTER TABLE Employee ADD Job VARCHAR(15) NOT NULL;

*Answer (True/False, Why): TRUE because ALTER TABLE only allows columns to be added that can contain nulls, or have a DEFAULT definition specified, or the column being added is an identity or timestamp column, or alternatively if none of the previous conditions are satisfied the table must be empty to allow addition of this columns*

3. The three following operations are equivalent on R(A,B,C)

(a) σA=c (R(A,B,C))

(b) {t | R(t) AND t.A=c}

(c) {xyz | R(xyz) AND z=c}

*Answer (True/False, Why): False because 3 is different from other while 1 and 2 are the same*

4. Aggregate functions (MIN, MAX, AVERAGE, COUNT, SUM) only work with non-NULL values.

*Answer (True/False, Why): TRUE because they still count but do not work*

5. In SELECT statements, aggregate functions (MIN, MAX, AVERAGE, COUNT, SUM) can only appear in the list of returned

attributes of the SELECT clause or in the HAVING clause.

*Answer (True/False, Why): FALSE*

6. Every relation with two attributes is in BCNF.

*Answer (True/False, Why): TRUE because as with the rules of BCNF, any relation with two attributes gets into Boyce codd normal form*

7. Given a relation schema LOTS(PROPERTY\_ID#, COUNTY\_NAME, LOT#, AREA) and two functional dependencies:

FD1: PROPERTY\_ID# à {COUNTY\_NAME, LOT#, AREA}

FD2: {COUNTY\_NAME, LOT#} à {PROPERTY\_ID#, AREA}

Then LOTS is in BCNF.

*Answer (True/False, Why):*

8. Given two relations R and S we always have: |R x S| > |R <join condition> S|

*Answer (True/False, Why): True because join condition will compound 2 simmilar colummns into one base on conditon*

Assoc. Prof. Dr. Đặng Trần Khánh

9. Physical data independence is the capability to change the conceptual schema without having to change the internal schema.

*Answer (True/False, Why): FASLE because*  *Physical data independence is the capability to change the internal schema without having to change the conceptual schema*

10. The degree of a relation is the number of tuples (rows) existing in that relation.

*Answer (True/False, Why): False because The degree of a relation is the number of attributes existing in that relation*

**Choose all correct answers for each query below:**

11. Who or what is responsible for maintaining database consistency?

A. Database designers

B. Database applications

C. The DBMS vendor

D. Database management system

E. All of the above

12. Which of the following belong to “physical security”:

A. Database servers

B. Windows Server 2008

C. Users

D. DB2

13. Given an R-tree *T*, storing MBR (minimum bounding rectangles) of 3-dimensional spatial objects. Assume that Q(x,y,z) is a

point in *T*’s effective data space. To determine which *T*’s MBRs are containing Q:

A. We will have to search on only one *T*’s branch.

B. We will have to search on two *T*’s branches

C. May be only T’s root node should be checked.

D. We do not know in advance how many T’s branches will be traversed.

E. Only two *T*’s branches will be pruned during the tree traversal.

14. Which of the following are not functions of a DBA?

A. Security and authorization

B. Transaction management

C. Database design

D. Performance monitoring

E. Back up

15. Which of the following mechanisms can be used for user authentication:

A. Something the user knows

B. Something the user possesses

C. Something the user is

D. Where the user is

E. Access control methods

16. Bell-LaPadula’s MAC model deals with:

A. Data integrity

B. Data confidentiality

C. Both data integrity and confidentiality

D. Data secrecy

17. Choose all the correct statements about the relational data model

A. Tuple, row, record have the same meaning

B. One relationship may have many primary keys

C. One relationship must have at least one key

D. One relationship must have at least one foreign key

18. SOA is one of the typical choices for IT architecture. It stands for:

A. Software-Oriented Architecture

B. State Of the Art a.

Assoc. Prof. Dr. Đặng Trần Khánh

C. Service-Oriented Architecture

D. None of the above

19. IT asset and IT capability are two concepts related to information resources. What components below belong to IT

assets?

A. Technical skills

B. Relationship skills

C. eBay, Facebook, and Amazon

D. IT infrastructure

E. IT management skills

20. What of the following are kind of ISMS?

A. ISO 27001:2013

B. ISO 27001:2005

C. ISO/IEC 27001:2013

D. ISM3

E. ITIL

F. Only “a” and “b” of the above are correct

21. The basic countermeasures of information security include:

A. Availability

B. Authorization

C. Identification

D. Non-repudiation

E. Authentication

F. All of the above

**Question 2**

**(2.1)** With the two access control models, *open* and *close*, in information systems, which of the following

statements is incorrect and why:

(a) Close access control systems are not preferable to the open ones

*Why: few websites, permit clients to unreservedly access and update data on the web*

(b) Close access control systems are not suitable for a university management information system

*Why: …………………………………………………………………………………………………………………………..*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

(c) We should use the close access control model in national security systems

*Why: …………………………………………………………………………………………………………………………..*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

(d) Both (a) and (c) are correct

Assoc. Prof. Dr. Đặng Trần Khánh

**(2.2)** Given the below R-tree:

Assume that Q1 is a query rectangle, what nodes of this tree will be accessed to answer the following

question: “Find all data objects that intersect with Q1”:

*Answer (list the accessed nodes in some order of access)*:

*……………………………………………………………………………………………………………………………….…*

*……..…………………………………………………………………………………………………………………………..*

*……………………………………………………………………………………………………………………………….…*

*……..…………………………………………………………………………………………………………………………..*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

*………………………………………………………………………………………………………………………………….*

***---End---***\_\_