

Reg. No. :

Question Paper Code : 12098

M.E./M.Tech. DEGREE EXAMINATIONS, JANUARY 2022.

First Semester

Big Data Analytics

CP 4152 — DATABASE PRACTICES

(Common to M.E. Computer Science and Engineering / M.E. Computer Science and Engineering (With Specialization in Artificial Intelligence and Machine Learning / M.E. Computer Science and Engineering (With Specialization in Cyber Security) / M.E. Computer Science and Engineering (With Specialization in Networks) / M.E. Software Engineering / M.Tech. Information Technology)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Outline unary relationship in the entity relationship model with an example.
2. What is a foreign key? Give example.
3. Name the types of fragmentation in a distributed database environment.
4. Outline the need for open database connectivity.
5. What is XML schema?
6. Outline unstructured data with an example.
7. Present an outline of Neo4j.
8. What is big data?
9. Write a note on access control.
10. What are covert channels?

PART B — (5 × 13 = 65 marks)

11. (a) Outline select, project, Cartesian product and join operations in relational algebra with an example. (13)

Or

- (b) (i) Consider the following relation :

ENROLMENT (ROLLNUMBER, NAME, COURSE_CODE,
COURSE_NAME, SESS, GRADE)

The primary key of the relation is (ROLLNUMBER,
COURSE_CODE, and SESS).

The following functional dependencies hold :

ROLLNUMBER → NAME

COURSE_CODE → COURSE_NAME

ROLLNUMBER, COURSE_CODE, SESS → GRADE

SESS is the session of enrolment (For example: November 2017,
April 2018)

Is relation ENROLMENT normalized? If yes, justify else state
reasons and normalize the same. (7)

- (ii) Consider the following relation :

STUDENT (ROLLNUMBER, NAME, DOB, GENDER,
BRANCH_CODE, BRANCH_NAME)

The primary key of the relation is ROLLNUMBER. The following
functional dependencies hold :

ROLLNUMBER → NAME, DOB, GENDER, BRANCH_CODE

BRANCH_CODE → BRANCH NAME

Is relation STUDENT normalized? If yes, justify the relation is
normalized else state reasons and normalize the same. (6)

12. (a) What is a distributed transaction? Outline distributed query processing
with an example. (13)

Or

- (b) What is an active database? Elaborate the event condition action model
with an example. (13)

13. (a) Elaborate the XML hierarchical data model with an example. (13)

Or

- (b) What is XPath and XQuery? Elaborate XML querying using XPath and
XQuery with an example. (13)

14. (a) What is NoSQL? Elaborate the features of NoSQL databases. (13)

Or

(b) What is Hbase? Elaborate the Hbase data model with an example. (13)

15. (a) (i) Compare discretionary access control and mandatory access control. (6)

(ii) Elaborate role based access control with an example. (7)

Or

(b) What is SQL injection? Elaborate with relevant examples. (13)

PART C — (1 × 15 = 15 marks)

16. (a) A Company is organized into departments. Each department has employees working in it. The attributes of department include department number and department name. The attributes of employee include employee number, employee name, date of birth, gender, date of joining, designation and basic pay. Each department has a manager managing it. There are also supervisors in each department who supervise a set of employees. Each department controls a number of projects. The attributes of project include project code and project name. A project is controlled only by one department. An employee can work in any number of distinct projects on a day. The date an employee worked, in time and out time has to be kept track. The company also keeps track of the dependents of each employee. The attributes of dependent include dependent name, date of birth, gender and relationship with the employee.

(i) Model an Entity Relationship diagram for the above scenario. (7)

(ii) Map the Entity Relationship diagram you have modeled to relations. (8)

Or

(b) Consider the following relational schema for a banking database application :

CUSTOMER (CID, CNAME)

BRANCH (BCODE, BNAME)

ACCOUNT (ANO, ATYPE, BALANCE, CID, BCODE)

An account can be a savings account or a current account. Check ATYPE in 'S' or 'C'. A customer can have both types of accounts.

TRANSACTION (TID, ANO, TTYPE, TDATE, TAMOUNT)

TTYPE (Transaction Type) can be 'D' OR 'W'

D – Deposit; W – Withdrawal

The primary key of each relation is underlined. Write collections in MongoDB to implement the above relational schema. (15)