IBDP Computer Science
Assignments
Topic: DBMS

1. Give the terms for each of the following:
   a) Collection of logically related records.
   b) DBMS creates a file that contains description about the data stored in the database.
   c) Attribute that can uniquely identify the tuples in a relation.
   d) Special value that is stored when actual data value is unknown for an attribute.
   e) An attribute which can uniquely identify tuples of the table but is not defined as primary key of the table.
   f) Software that is used to create, manipulate and maintain a relational database.
2. Why foreign keys are allowed to have NULL values? Explain with an example
3. Differentiate between:
   a) Database state and database schema
   b) Primary key and foreign key
   c) Degree and cardinality of a relation
4. Compared to a file system, how does a database management system avoid redundancy in data through a database?
5. What are the limitations of file system that can be overcome by a relational DBMS?
6. A school has a rule that each student must participate in asports activity. So each one should give only one preference for sports activity. Suppose there are five students in a class, each having a unique roll number. The class representative has prepared a list of sports preferences as shown below.

Answer the following:

Table: Sports Preferences

Roll_no	Preference
9	Cricket
13	Football
17	Badminton
17	Football
21	Hockey
24	NULL
NULL	Kabaddi

a) Roll no 24 may not be interested in sports. Can a NULL value be assigned to that students preference field?
b) Roll no 17 has given two preferences sports. Which property of relational DBMC is violated here? Can we use any constraint or key in the relational DBMS to check against such violation, if any?
c) Kabaddi was not chosen by any student. Is it possible to have this tuple in the Sports Preferences relation?

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1. In another class having 2 sections, the two respective class representatives have prepared 2 separate Sports Preferences tables, as shown below:

Sports preference of section 1 (arranged on roll number column)

Table: Sports Preferences

Roll_no	Sports
9	Cricket
13	Football
17	Badminton
21	Hockey
24	Cricket

Sports preference of section 2 (arranged on Sports name column, and column order is also different)

Table: Sports Preferences

Sports	Roll_no
Badminton	17
Cricket	9
Cricket	24
Football	13
Hockey	21

Are the states of both the relations equivalent? Justify.

2. The school canteen wants to maintain records of items available in the school canteen and generate bills when students purchase any item from the canteen. The school wants to create a canteen database to keep track of items in the canteen and the items purchased by students. Design a database by answering the following questions:
   a) To store each item name along with its price, what relation should be used? Decide appropriate attribute names along with their data type. Each item and its price should be stored only once. What restriction should be used while defining the relation?
   b) In order to generate bill, we should know the quantity of an item purchased. Should this information be in a new relation or a part of the previous relation? If a new relation is required, decide appropriate name and data type for attributes. Also, identify appropriate primary key and foreign key so that the following two restrictions are satisfied:
      i) The same bill cannot be generated for different orders.
      ii) Bill can be generated only for available items in the canteen.
   c) The school wants to find out how many calories students intake when they order an item. In which relation should the attribute 'calories' be stored?

3. An organisation wants to create a database EMPDEPENDENT to maintain following details about its employees and their dependent.
   EMPLOYEE(AadharNumber, Name, Address, Department, EmployeeID)
   DEPENDENT(EmployeeID, DependentName, Relationship)
   a) Name the attributes of EMPLOYEE, which can be used as candidate keys.
   b) The company wants to retrieve details of dependent of a particular employee. Name the tables and the key which are required to retrieve this detail.
   c) What is the degree of EMPLOYEE and DEPENDENT relation?

4. School uniform is available at M/s Sheetal Private Limited. They have maintained SCHOOL_UNIFORM Database with two relations viz. UNIFORM and COST. The following figure shows database schema and its state.

School Uniform Database

Attributes and Constraints

Table: UNIFORM

Attribute	UCode	UName	UColor
Constraints	Primary Key	Not Null	-

Table: COST

Attribute	UCode	Size	Price
Constraints	Composite Primary Key		>0

Table: UNIFORM

UCode	UName	UColor
1	Shirt	White
2	Pant	Grey
3	Skirt	Grey
4	Tie	Blue
5	Socks	Blue
6	Belt	Blue

Table:

UCode	Size	COST Price
1	M	500
1	L	580
1	XL	620
2	M	810
2	L	890
2	XL	940
3	M	770
3	L	830
3	XL	910
4	S	150
4	L	170
5	S	180
5	L	210
6	M	110
6	L	140
6	XL	160

a) Can they insert the following tuples to the UNIFORM Relation? Give reasons in support of your answer.

i) 7, Handkerchief, NULL
ii) 4, Ribbon, Red
iii) 8, NULL, White

b) Can they insert the following tuples to the COST Relation? Give reasons in support of your answer.

i) 7, S, 0
ii) 9, XL, 100

5. In a multiplex, movies are screened in different auditoriums. One movie can be shown in more than one auditorium. In order to maintain the record of movies, the multiplex maintains a relational database consisting of two relations viz. MOVIE and AUDI respectively as shown below:

Movie(Movie_ID, MovieName, ReleaseDate)
Audi(AudiNo, Movie_ID, Seats, ScreenType, TicketPrice)

a) Is it correct to assign Movie_ID as the primary key in the MOVIE relation? If no, then suggest an appropriate primary key.
b) Is it correct to assign AudiNo as the primary key in the AUDI relation? If no, then suggest appropriate primary key.
c) Is there any foreign key in any of these relations?

Student Project Database

Table: STUDENT

Roll No	Name	Class	Section	Registration_ID
11	Mohan	XI	1	IP-101-15
12	Sohan	XI	2	IP-104-15
21	John	XII	1	CS-103-14
22	Meena	XII	2	CS-101-14
23	Juhi	XII	2	CS-101-10

Table: PROJECT

ProjectNo	PName	SubmissionDate
101	Airline Database	12/01/2018
102	Library Database	12/01/2018
103	Employee Database	15/01/2018
104	Student Database	12/01/2018
105	Inventory Database	15/01/2018
106	Railway Database	15/01/2018

Table: PROJECT ASSIGNED

Registration_ID	ProjectNo
IP-101-15	101
IP-104-15	103
CS-103-14	102
CS-101-14	105
CS-101-10	104

6. For the above given database STUDENT-PROJECT, answer the following:
   a) Name primary key of each table.
   b) Find foreign key(s) in table PROJECT-ASSIGNED.
   c) Is there any alternate key in table STUDENT? Give justification for your answer.
   d) Can a user assign duplicate value to the field RollNo of STUDENT table? Jusify.

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1. For the above given database STUDENT-PROJECT, can we perform the following operations?
   a) Insert a student record with missing roll number value.
   b) Insert a student record with missing registration number value.
   c) Insert a project detail without submission-date.
   d) Insert a record with registration ID IP-101-19 and ProjectNo 206 in table PROJECT-ASSIGNED.

2. Differentiate between DBMS and RDBMS.

3. Define following terms:
   a) Table
   b) Tuple
   c) Record
4. What is NULL Value?.

5. Define following terms:
   a) Primary Key
   b) Composite Key
   c) Unique Key
   d) Alternate Key
   e) Candidate Key
   f) Foreign Key
6. Differentiate between primary key and foreign key.

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1. What is Normalization?

2. Why Normalization is required?

3. Explain three types of anomalies in a database.

4. Explain First Normal Form (1NF).

5. Explain Second Normal Form (2NF).

6. Explain Third Normal Form (3NF).

Date: 25th June 2020
Subject – ITGS
IBDP Year II

Q1. How digital transaction has revolutionized the online and offline business?

Q2. What are the latest ways to monitor employees in the organization?

Q3. What is the importance of collaborative software for telecommuters?

Q4. Analyse today's situation of pandemic with reference to the employees who are working from home and using IT to stay connected with their colleagues.

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Q1. What are the different types of e-commerce?

Q2. Explain at least 5 social and ethical issues related to e-banking?

Q3. What is the importance of data mining in online business?

Q4. Explain the need of payment gateways in online transaction and also give some examples of the companies involved in providing such support. Try to find out the means or the protocols which these companies use to ensure secure transaction.