

[illegible]

Database (Carefully Observation required for Question 1 and 2)

1. Events

Event_Name	Event Type	Event Coordinator
Basket Ball	Sports	Mr. Adeel
Futsal	Sports	Mr. Adeel
Rob maze	EE	Mr. Adeel
Badminton	Sports	Mr. Adeel
Speed Programming	CS	Mr. Adeel
Taken Tag	Gaming	Mr. Adeel
BUISNESS IDEAS	Management	Mr. Adeel

2. Timeline

Time	Day	Location
08:00-09:45	Day 1	Front ground, 101
05:00-06:30	Day 2	Cricket Ground
04:00-05:53	Day 3	Futsal Ground, 102
03:45-09:00	Day 1	Main Lobby, 101

3. Society

Society_id	Society Name	Organizer_id
So-001	FAS	O-001
So-004	FEGS	O-005
So-002	Rang	O-003
So-007	Arts	O-003
So-003	Business	O-006
So-009	FCAP	O-004

4. Event Organizer

Organizer_id	Organizer Name	Organizer-Office-Address	Organizer_Dept
O-001	Mr. Zeeshan	CS-11	CS
O-004	Mr. Amir	F-208	MG
O-003	Mr. Usman	CS-09	CS
O-006	Mr. Habib	CS-08	CS
O-005	Mr. Adeel	CS-14	CS

5. Media/ Sponsorships

Sponsor-Id	Sponsor-Name	sponsored-amount
S0019	HLB	4,000
FD00120000	City FM 93	5,999
XM0213212	Oklays Bristo	10,000
XMN009	Roof Top Rest	98,000
S000563	Fork n knife	1,245
S00125634	Bahria Town	19, 000
S001	Gawadar Golf City	2,1053

7. Participants

P-Name	P-Affiliation Type 'Not Null'	Event_Name
Ali	UCP	Basket Ball
Adeel	GC-FSD	Futsal
Faheem	FAST-CFD	Rob maze
Azeem	FAST-ISB	Badminton
Asif	LUMS	Speed Programming
Zain	NUST	Taken Tag
Zainab	Arid University	BUISNESS IDEAS

Question No. 1 Answer the following.**(Marks: 15)****Triggers**

i) In the given database, consider one more attribute '**sponsored-amount**' in the table **Media/Sponsorships**. Write PL/SQL statements to create a **trigger** which will validate the value of sponsored-amount that is in the range of 5000 to 90,000, if not then trigger will generate an exception informing to user either its value is low or higher than the range. Also use SQL insert and update statements to test it. **(8 Marks)**

View

ii) Write an SQL query to create a **view** that selects every **P-Affiliation** in the "**Participants**" table with a participation count higher than the average participation count. **(7 Marks)**

Question # 02.**(Marks: 20)****Normalization Anomalies & Functional Dependencies**

- I. Identify the **Update Anomaly** in the above database, discuss how it can be resolved. **(2 Marks)**
- II. What will happen on anomalies (Insert, Delete, Update **(Anyone)**), if we change the type of attribute 'P-Affiliation' may Null of table '**Participants**' **(2 Marks)**
- III. Identify the **Delete Anomaly** in the above database, discuss how it can be resolved. **(2 Marks)**
- IV. Identify **Insert Anomaly** in the above database **(2 Marks)**
- V. In case of **deleting** record of '**O-003**' in '**Event Organizer**' table, what other event will be happened in the above database. **(1 Marks)**
- VI. Identify which table(s) in the above database is not is **First Normal Form. (1NF)**. Convert above database in (1NF) if identified **(2 Marks)**
- VII. Identify which table(s) in the above database is not is **Second Normal Form. (2NF)**. Convert above database in (2NF) if identified **(3 Marks)**
- VIII. Identify which table(s) in the above database is not is **Third Normal Form. (3NF)**. And define by giving example if the above database is currently in (3NF) **(3 Marks)**
- IX. Identify those tables which are not linked in the above database. Suggest attributes for Linking of these tables. **(3 Marks)**

Question # 03**The DB-Pizza Store**

Consider the following relational design used in our friendly local DB-Pizza store in Blacksburg:

Customer (cid, name, phonenumber, ccn, neighborhood, age)

Pizza (pid, pname, size, price)

Order (cid, pid, ordertime, orderyear, ordermonth, orderday, quantity, slices)

Supplies (sid, sname, amountleft, unitprice)

Ingredient (pid, sid, amount)

In the **Pizza** table, every pizza has a name (e.g., “the works”) and particular size (e.g., 7 inches) and price and is assigned a unique pid. Note that different pizzas may have the same name, but different sizes.

The **Order** table includes the records about which customer ordered which pizza, quantity of pizzas, slices, orderyear (e.g., 2012), ordermonth (e.g., 12), orderday (e.g., 27), and the order time (e.g., "6:13pm"). Note that every customer can order one or more pizzas.

The **Customer** table maintains the personal information, such as a unique id, name, phone number, credit card number (ccn), neighborhood (e.g., Foxridge and Terrace View), and age. It is possible that two different people have the same name.

The **Supplies** table includes the information of the various groceries used by the store: the name, unit-price, and the amount-left in the store (e.g. the store might have 3kgs of mozzarella left with a unit price of 5\$ per kg).

The **Ingredient** table keeps the records about the amount of ingredients used by each pizza (so "The works 7inch" might use only 10gms of mozzarella, while "Four cheese 12inch" might use 40gms).

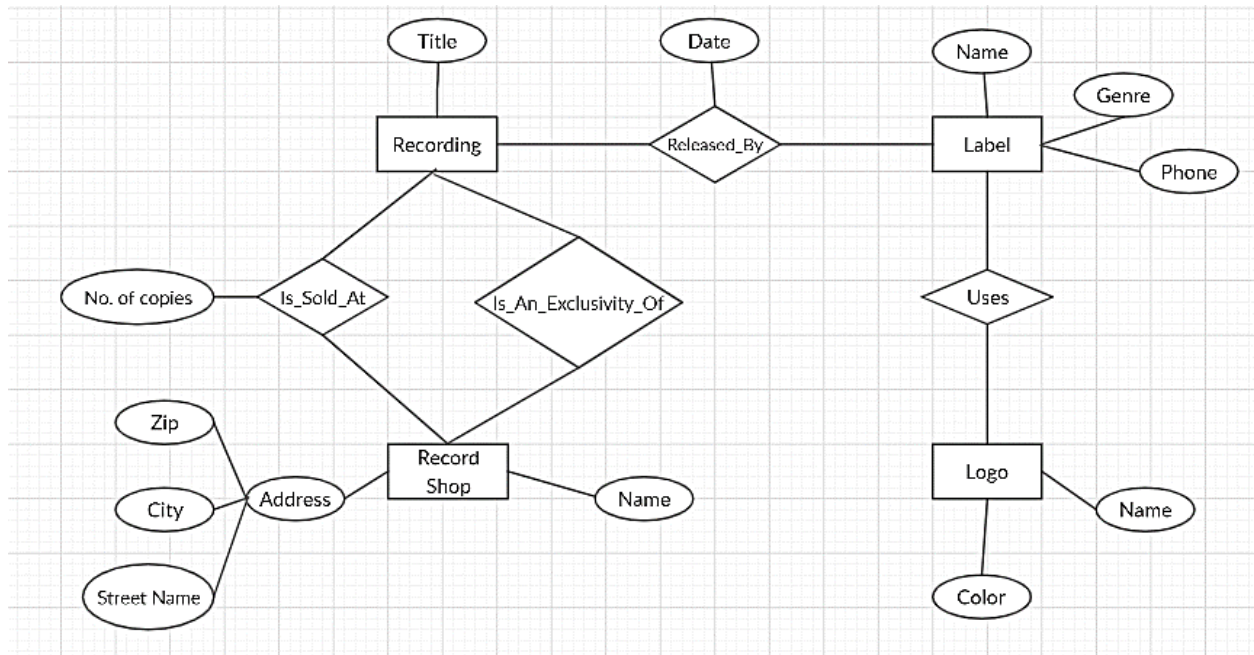
Answer the following

(Marks: 2+2+3+3=10)

- i. Specify the candidate keys for “Customer” and “Order table”
- ii. What are good primary keys for the five tables?
- iii. Specify the foreign keys for this schema with references.
- iv. Specify additional constraints on each table other than keys.

Question 4:**(Marks: 10)**

Consider the following ER diagram:



This diagram, to your expert eyes, has **multiple flaws, missing constraints, cardinality ratios** and has some **inconsistencies** with their requirements. **Re-draw** the **ER diagram** after correcting the mistakes as many as you can, and suggest improvements or solution when you can think of one.

Question 5**(Marks: 10)****Enhanced Entity Relationship Diagram**

Consider a database system for a baseball organization such as the major leagues. The data requirements are summarized as follows:

- The personnel involved in the league include players, coaches, managers, and umpires. Each is identified by a unique personnel id. They are also described by their first and last names along with the date and place of birth.
- Players are further described by other attributes such as their batting orientation (left, right, or switch) and have a lifetime batting average (BA).
- Within the players group is a subset of players called pitchers. Pitchers have a lifetime ERA (earned run average) associated with them.
- Teams are uniquely identified by their names. Teams are also described by the city in which they are located and the division and league in which they play (such as Central division of the American League).
- Teams have one manager, a number of coaches, and a number of players.
- Games are played between two teams with one designated as the home team and the other the visiting team on a particular date. The score (runs, hits, and errors) are recorded for each team. The team with the most runs is declared the winner of the game.
- With each finished game, a winning pitcher and a losing pitcher are recorded. In case there is a save awarded, the save pitcher is also recorded.
- With each finished game, the number of hits (singles, doubles, triples, and home runs) obtained by each player is also recorded.

Design an **Enhanced Entity-Relationship diagram for the BASEBALL** database.

Question 6**(Marks: 20)****Joins & Indexing**

(i). Enlist students first name and last name in single column (use alias “Top_3_postions”) along with total score for top three students who have the highest total score across all subjects obtained in the exams (Hint: Use join). (8 marks)

(ii). Write a **nested/correlated query** to retrieve student ID, exam ID and exam score of those students

Student Table (Sample Data)

student_ID	first_name	last_name
1001	Dillon	Neitzel
1002	Bridgette	Viruet
1003	Lean	Wessel
1004	Corey	Mogan
1005	Amberly	Schneideman

Graded Table (Sample Data)

student_ID	exam_id	scores
1001	1	61
1002	1	5
1001	2	98
1002	2	71
1001	3	60
1002	3	62
1001	4	36
1002	4	85
1001	5	90
1002	5	21

Exam Table (Sample Data)

exam_name	exam_id	date
mathematics	1	2018-06-01
linear algebra	2	2018-06-06
chemistry	3	2018-06-11
physics	4	2018-06-15
english language	5	2018-06-20

having exam score less than the average score for that particular exam. (7 marks)

(iii). For both part 1 and 2 assuming the same tasks, create an **index** on the suitable attribute's for the better performance also give solid reasoning/justification (with query) why have you chosen the specific attribute's and the type of indexing. (5 Marks)

Question 7:**(Marks: 5)****Transaction Processing**

Develop a transaction scenario in the form of SQL language, in which you have to transfer payment from one bank account to another. Make sure that the payment comes out of one account, and into the other, at exactly the same time. Transaction should be designed in a way that it must not be lost from both accounts or be duplicated in both accounts.

Assume account IDs as numeric such as Account ID 6512 and 6257 with some initial balance in each account. **Transfer amount** should be last four digits of your Roll No.

Question 8.**(Marks: 10)****Database Transaction Scheduling**

Draw a precedence graph for the following three transactions and write down the conflict equivalent schedule.

Time	T ₁	T ₂	T ₃
t ₀	Read (A)		
t ₁	Read (B)		
t ₂		Read (A)	
t ₃		Read (C)	
t ₄	Write (B)		
t ₅	Commit		
t ₆			Read (B)
t ₇			Read (C)
t ₈			Write (B)
t ₉		Write (A)	Commit
t ₁₀		Write (C)	
t ₁₁		Commit	

END