2017/2018 نموذج اجابة

Kafrelsheikh University
Faculty of Engineering
Electrical Engineering Dept.
Subject: Database Mangement Systems
(Full Mark: 90 Marks)

2nd Year Students
(2007 modified)
Model Answer-Final Exam
Date: 15 /1 / 2018
Time Allowed : 3 hours

The course code: ECS2108	This course intend the following iLOS according to (NARS 2009): a (4, 5, 7, 8, 11) - b (2, 3, 8, 9, 12) - c (3, 9) - d (2, 6, 7, 8)

Model Answer of the exam

Answer of Question 1 *(20 Marks)*

Ans:

(a) Define the Relational Database. What is the difference between Relational Database schema and the Entity-Relationship schema.

Ans:

Relational Databases schema

Database technology involving tables (relations) representing entities and primary/foreign keys representing relationships

Entity-Relationship schema

It consists of: Entities – Relationships – Attributes

(b) (i)Transfer each of the following two EER schema to Relational Database schema, then,
(ii) Denormalize each of them in suitable rela

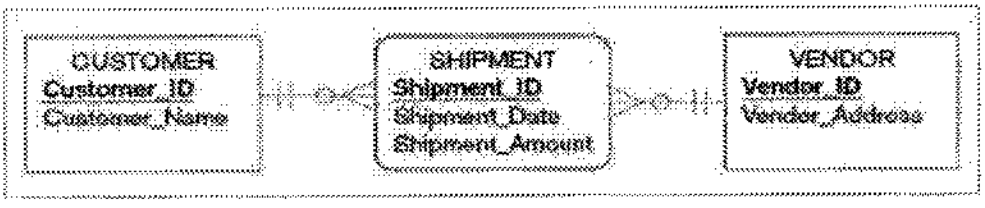
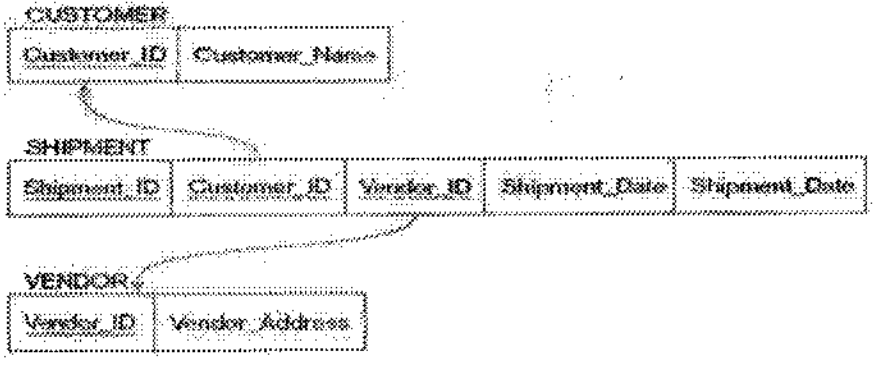


Fig. 1

Ans:

Relational Model



Denormalize:

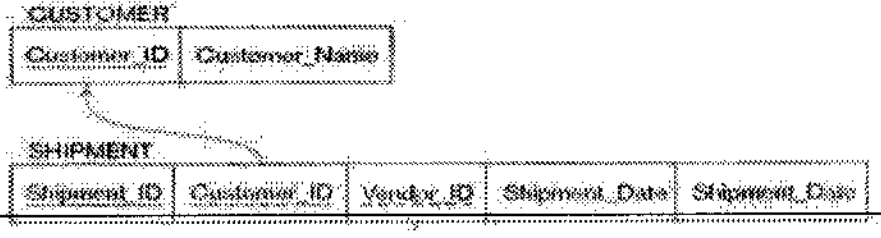
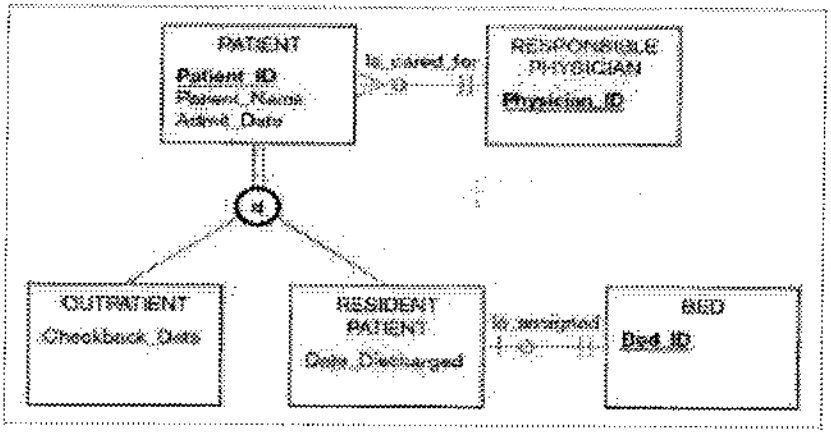


Fig. 2:



Ans:

Answer of Question 2 *(20 Marks)*

(a) What is the "E-R Model" referred to? What are the main components of ER model? Explain by example.

Ans:

"E-R Model" referred to: Entity Relationship Model>

Main component of ER model:

- Entities:
- Relationships:
- Attribute (Draw any example explain the three elements)

(b) What is the difference between supertype and subtype relationships in EER Model of DBMS.

Ans:

- Subtype: A subgrouping of the entities in an entity type that has attributes distinct from those in other subgroupings
- Supertype: A generic entity type that has a relationship with one or more subtypes

OR (Draw any example explain the three elements)

(c) A bank has three types of **ACCOUNTS**: checking, savings, and loan. Following are the attributes for each type of account:

CHECKING: **Acct No, Date Opened, Balance, Service Charge**
SAVINGS: **Acct No, Date Opened, Balance, Interest Rate**
LOAN: **Acct No, Date Opened, Balance, Interest Rate, Payment**

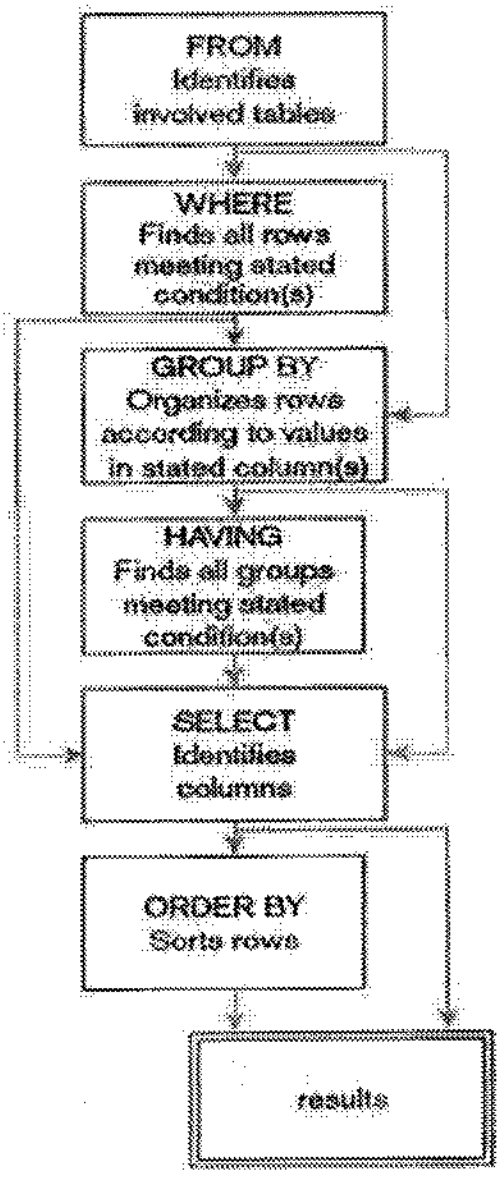
Assume that each bank account must be a member of exactly one of these subtypes.

i. Draw an Entity-Relationship schema for this situation. (Remember to include a subtype discriminator.)
ii. What attribute or attributes did you designate as the **identifier** for the **ACCOUNTS** entity? Why?
iii. Transfer the following E-R schema to Relational Database schema.

Answer of Question 3 *(30 Marks)*

(a) SELECT statement is one of the important statements in SQL language. Write the parts of this statement in order.

Ans:

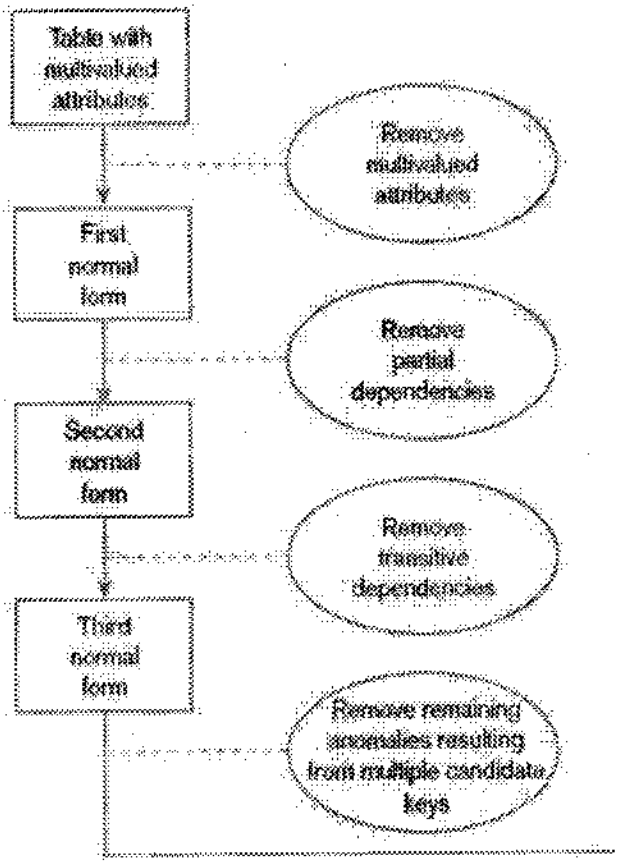


(b) What is meant by Data Normalization? Construct the three main steps in ***Normalization***.

Ans:

- Primarily a tool to validate and improve a logical design so that it satisfies certain constraints that ***avoid unnecessary duplication of data***
- The process of decomposing relations with anomalies (unusual) to produce smaller, ***well-structured*** relations

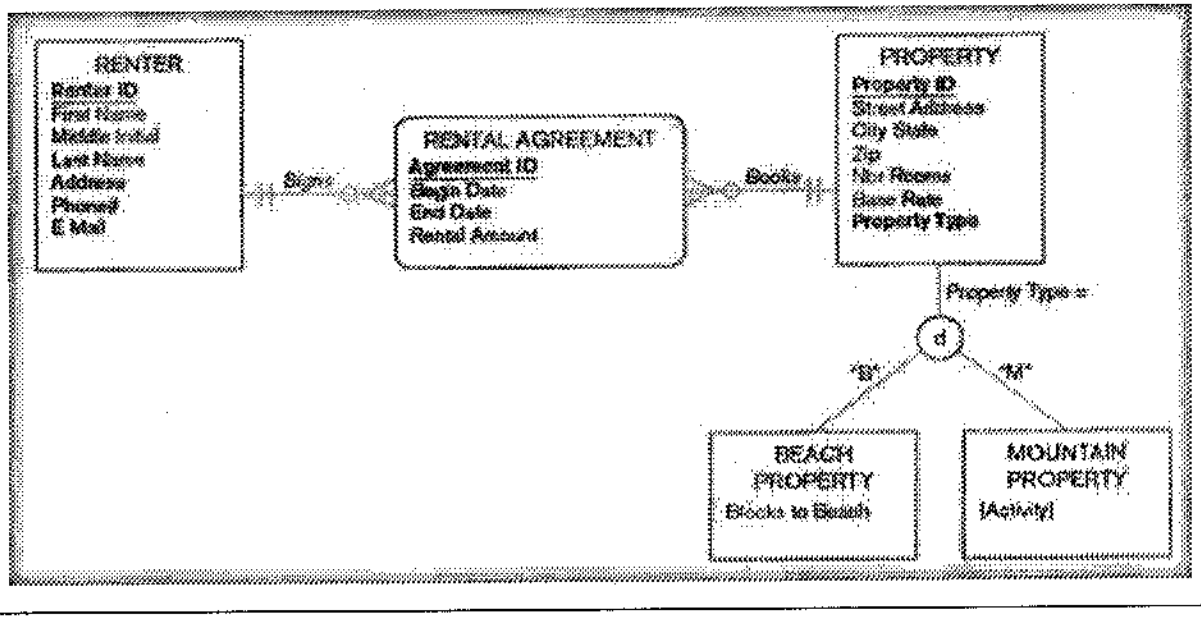
(or any answer near for this definition)



The three main steps in ***Normalization***

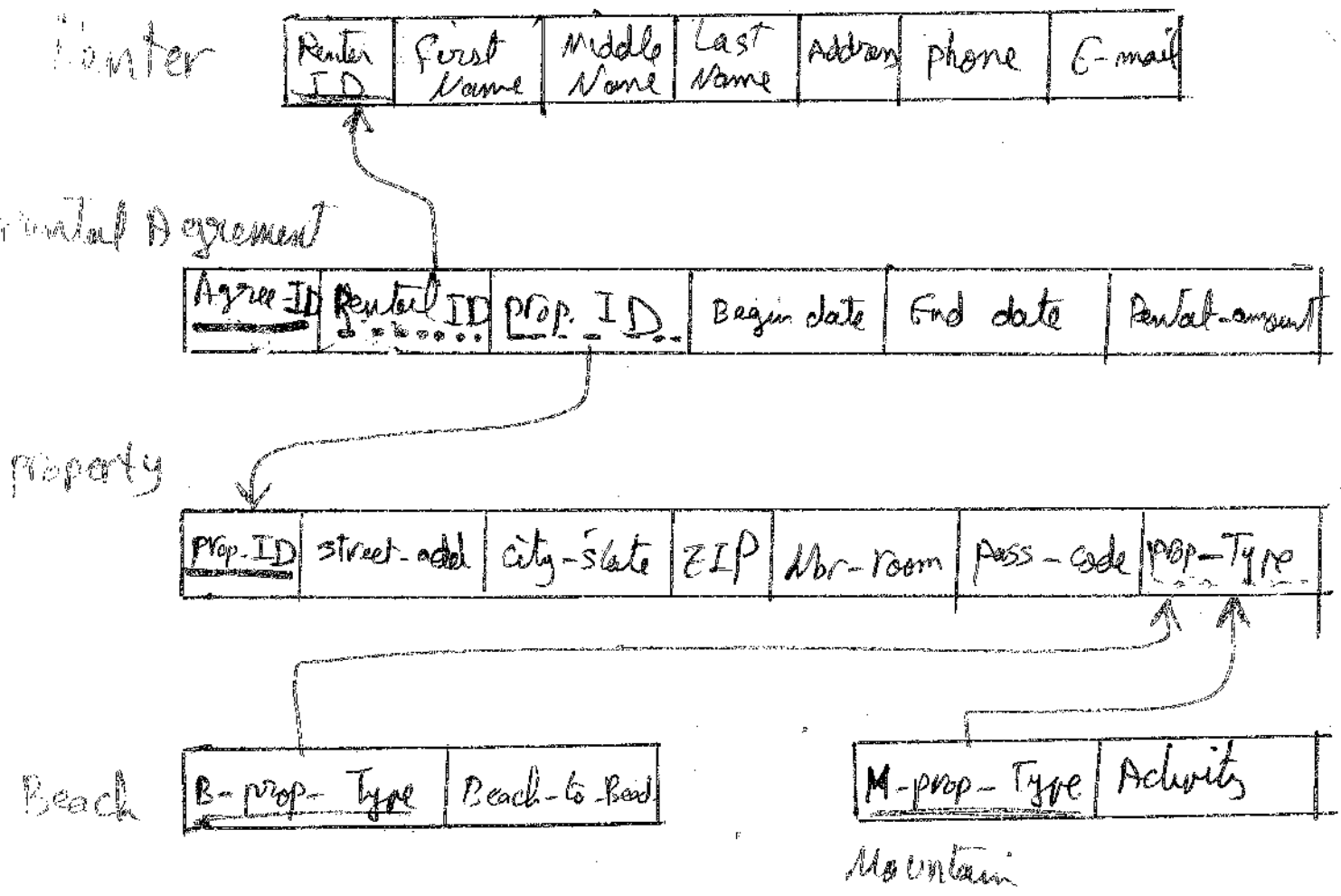
(c) The following figure shows an EER diagram for Vacation Property Rentals. This organization rents preferred properties in several states. As shown in the figure, there are two basic types of properties: beach properties and mountain properties.

i. Transform the EER diagram to a set of relations and develop a relational schema.
ii. Diagram the functional dependencies and determine the normal form for each relation.
iii. Convert all relations to third normal form, if necessary, and draw a revised relational schema.
iv. Suggest an integrity constraint that would ensure that no property is rented twice during the same time interval.

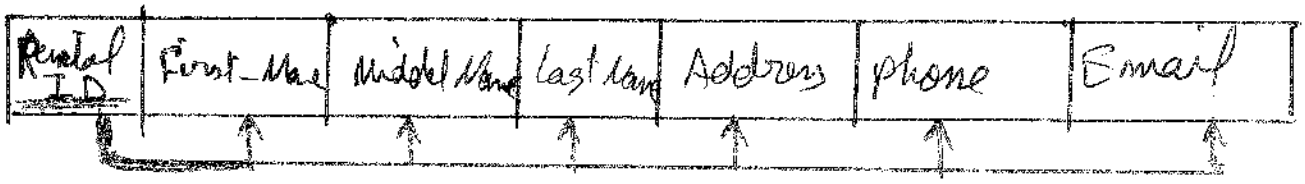


(c) (It's a design Question — any answer has part of degree)

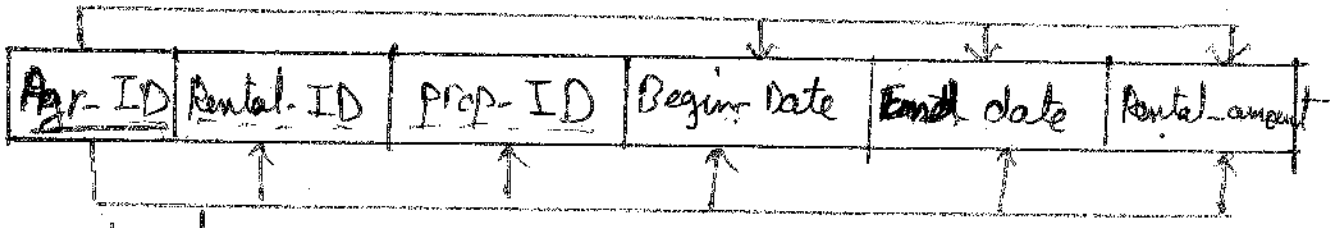
Relational form:



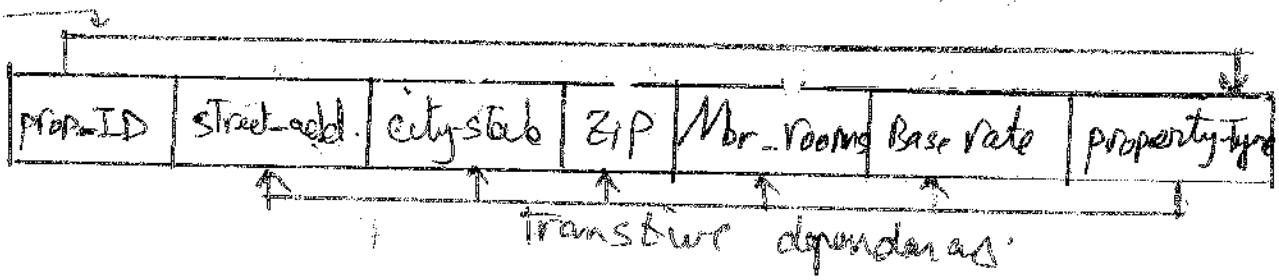
Functional dependences and Normal forms:



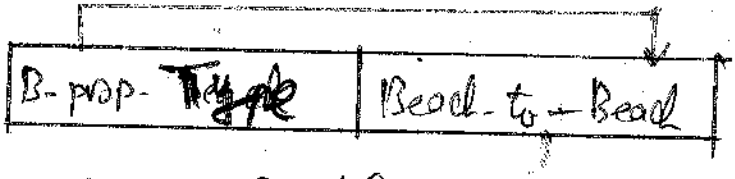
Fully Function dependancy ⇒ 2 N Form.



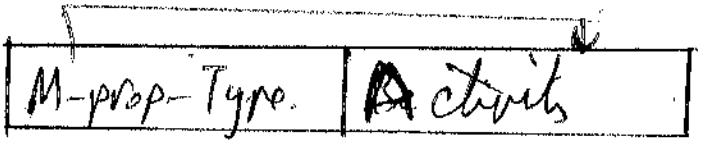
Fully dependency ⇒ 3 NF



Transtive ⇒ 2 NF



fully dependance ⇒ 3 NF



fully dependance ⇒ 3NF

The revised Relational schemal after normalization:

Renter

Renter_ID	First Name	Middle	Last name	Address	phone	Email

Rental_Agr.

Agr_ID	Rental ID	prop_ID	Begin_Date	End date	Rental amt

Property

prop ID	street_addr	city_state	ZIP	Mbr_Rooms	Base rate	prop_Type

prop_ID	R_prop_Type	Bedd_to_Bed

prop_ID	M_prop_Type	Activate

Answer of Question 4 *(20 Marks)*

(a) In the Physical Design Process, what is meant by Data Volume and Usage Analysis.

Ans:

- Data volume and frequency-of-use statistics are important inputs to the physical database design process, particularly in the case of very large-scale database implementations.
- The size and usage patterns must be maintained of the database throughout its life cycle.

(b) What is meant by Denormalization? Mention the common denormalization opportunities.

Ans:

- Transforming ***normalized*** relations into ***unnormalized*** physical record specifications
- Common denormalization opportunities
  - One-to-one relationship
  - Many-to-many relationship with attributes
  - Reference data (1:N relationship where 1-side has data not used in any other relationship)

(c) Consider the following normalized relations for a sports league:

TEAM (TeamID, TeamName, TeamLocation)
PLAYER (PlayerID, PlayerFirstName, PlayerLastName, PlayerDateOfBirth, PlayerSpecialtyCode)
SPECIALTY (SpecialtyCode, SpecialtyDescription)
CONTRACT (TeamID, PlayerID, StartTime, EndTime, Salary)
LOCATION (LocationID, CityName, CityState, CityCountry, CityPopulation)
MANAGER (ManagerID, ManagerName, ManagerTeam)

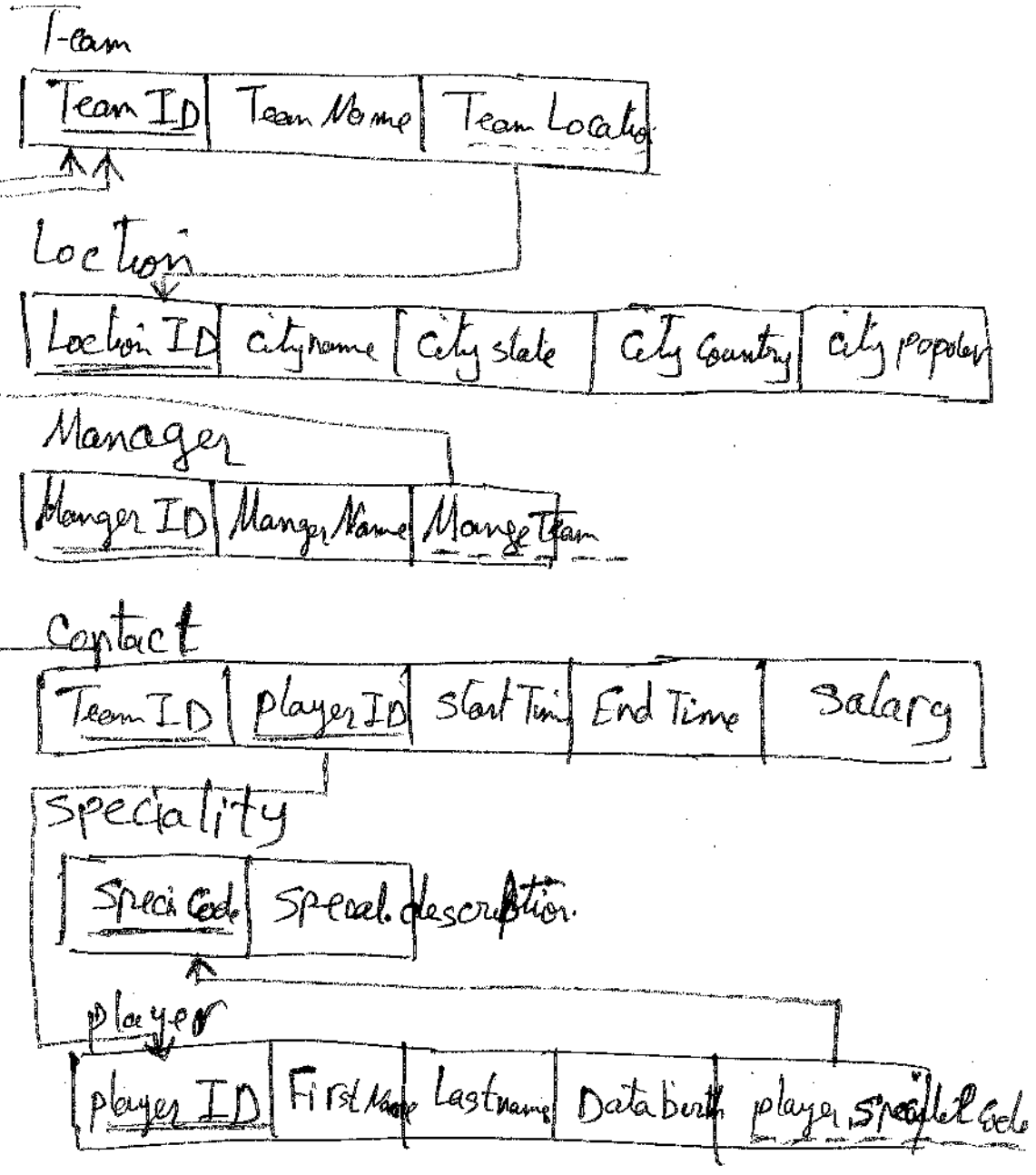
(i)What additional information would you need to make fully informed denormalization decisions?

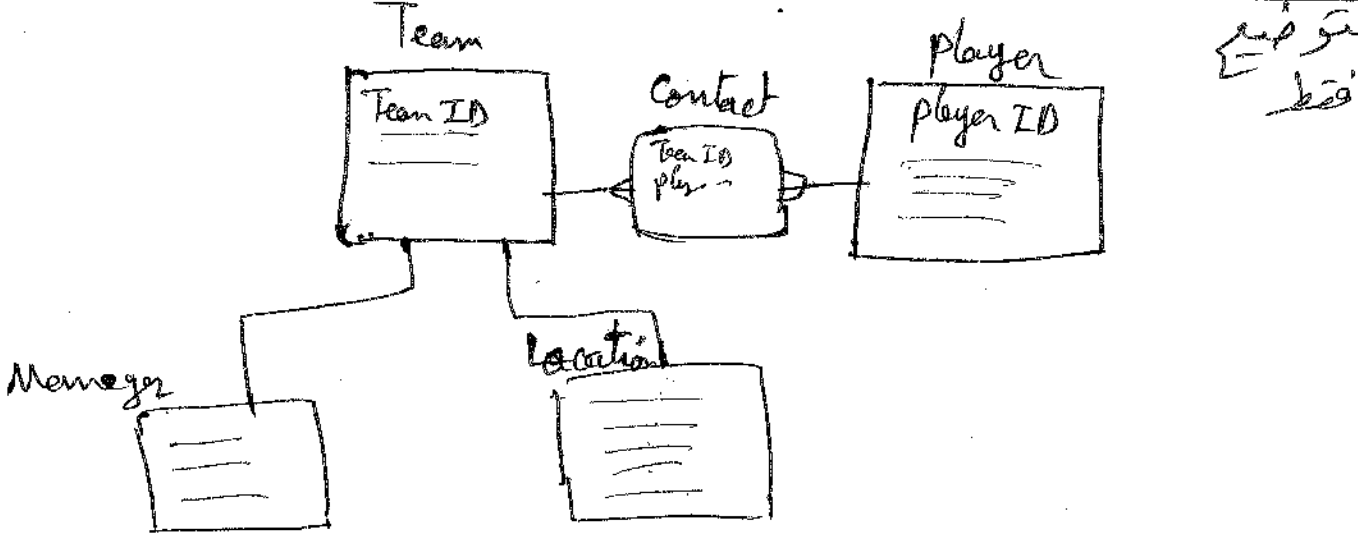
(ii)Draw the relations after denormalization process.

With my best wishes

Dr. Ghada Hamisa
Faculty of Engineering
(Computer & Control Dept.)

Q4 (c)





توضيح فقط

i) Additional Information are:

1- obtain the relationship between relations

2- show the referential integrity

3- obtain correctly the function dependency.

From the previous relational model & (normalized relational model):

1- join [Manger table + Location → Team]

2- join [speciality + Contact → player]

3- Remove Contact Table and

Therefore (Functional dependancies):

Team ID → Team Name, Team Loc. start time, End Time, Manger ID, manger name

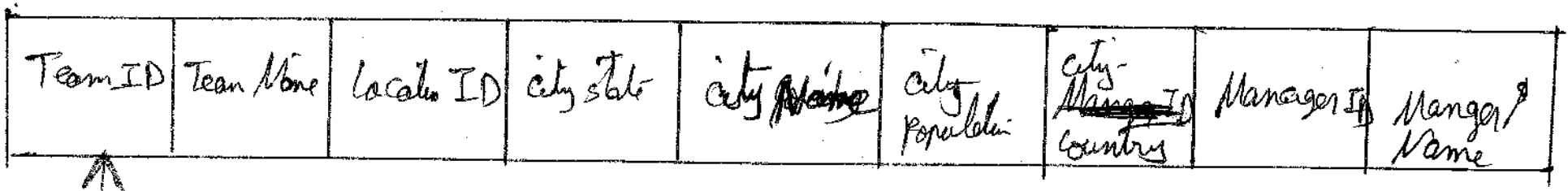
player ID → First name, last name, start time, End Time, Salary.

Location ID → city name, city state, city Country

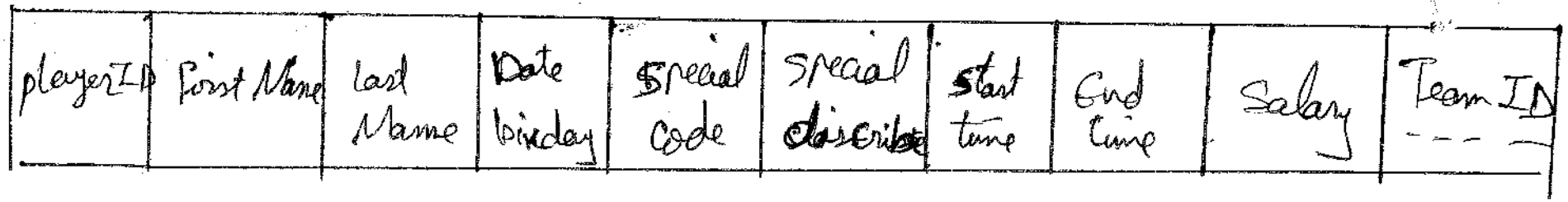
The denormalized form (in ideal case):

(

Team



player



Any design near that design has a part of points