King Saud University

College of Computer and Information Sciences
Computer Science Department

Course Code:	CSC 380
Course Title:	Principle of Database
Semester:	Spring 2015 2016
Exercises Cover Sheet:	**Mid 2 Exam**

| Student Name:	
Student ID:	
Student Section No.	

Tick the Relevant	Computer Science B.Sc. Program ABET Student Outcomes	Question No. Relevant Is Hyperlinked	Covering %
√	a) Apply knowledge of computing and mathematics appropriate to the discipline;	3,4	48
√	b) Analyze a problem, and identify and define the computing requirements appropriate to its solution	2	26
√	c) Design, implement and evaluate a computer-based system, process, component, or program to meet desired needs;	1	26
	d) Function effectively on teams to accomplish a common goal;		
	e) Understanding of professional, ethical, legal, security, and social issues and responsibilities;		
	f) Communicate effectively with a range of audiences;		
	g) Analyze the local and global impact of computing on individuals, organizations and society;		
	h) Recognition of the need for, and an ability to engage in, continuing professional development;		
	i) Use current techniques, skills, and tools necessary for computing practices.		
	j) Apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;		
	k) Apply design and development principles in the construction of software systems of varying complexity;		

Question 1: (4 Marks)

Map the following ER diagram into a relation schema. Show the different constraints and specify how the total participation is reflected in your obtained schema.
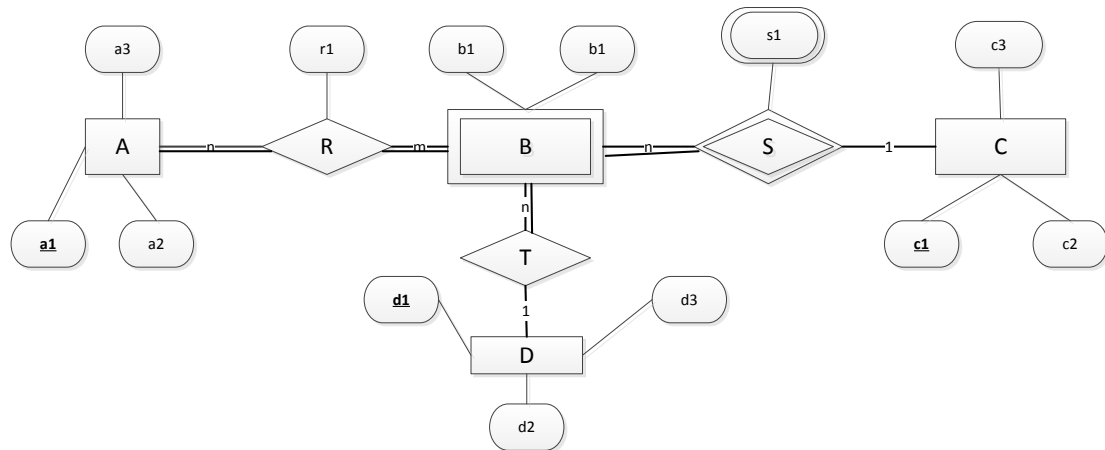
Question 2: (4 Marks)

Consider a Metro Management System (MMS). We need to manage the metros, the drivers, and the stations.

- A metro has an Id and a name, and goes from one departure station to one destination station through several intermediary stations.
- Several metros may have the same departure station or the same destination station but not both.
- The driver has an id and a name and he is always assigned the same metro. A metro can be driven by several drivers at different time.
- A station has an Id, a name, and we can know all the metros that goes through that station.

Draw an entity-relationship diagram suitable to represent this system, in particular the connections between the main entities, their type of relationships and their related attributes.

Question 3: (4 Marks)

Given a relation schema R(A, B, C, D, E, G) with

   F={A➜BC, B➜C, C➜BED, BD➜E, E➜D, G➜E}

1. Give a minimal cover of F
2. Determine all keys of R
3. Determine B^+ and $(BE)^+$
4. Give a 2NF decomposition of R
5. Give a 3NF decomposition of R
6. Is your decomposition BCNF? If not give a BCNF decomposition.
7. Does your decomposition preserve the dependencies? Prove your answer.

Question 4: (3 Marks)

Given this database schema :

   Dish(**DId**, name, type)   type means: appetizer, dessert, main dish, etc.

   Restaurant(**RId**, RName, type, ChefName, phoneNumber, address)

   Offers(**Rid, DId**, price)

Write down the following queries in **SQL**:

1. Retrieve the restaurant **names** and **addresses** that serve "pizza" **and** "Macaroni".
2. Retrieve all restaurant **names** that serve "pizza" but not "Macaroni".
3. Retrieve the price of the most expensive dish of the restaurant "AlSaraya"
4. Give the number of menu that offers each restaurant

Result

Question No.	Relevant Student Outcome	SO is Covered by %	Full Mark	Student Mark	Assessor's Feedback
1	c	26	4		
2	b	26	4		
3	a	26	4		
4	a	22	3		
Totals		100%	15		

I certify that the work contained within this assignment is all my own work and referenced where required. Student Signature: Date:			Feedback Received: Student Signature: Date: