

King Fahd University Of Petroleum and Minerals

Department of Information and Computer Science

ICS 324-04: DATABASE SYSTEMS

Semester 062

Time Allowed: 90 Minutes

Student ID: _____

Name: _____

Instructor: Muhammad Waheed Aslam

Problem	Points	Score
Question 1	22	
Question 2	20	
Question 3	16	
Question 4	16	
Question 5	26	
Total	100	

Notes:

- *Please skim through all the questions, make sure that you understand them, and then attempt to answer them with a time-allocation in mind. If any question is not clear, get it clarified during the first fifteen minutes.*
- *If you need to make any assumptions, please document them as part of your answers.*
- *There are four questions in this exam each focusing on a distinct aspect. You are expected to answer all of them.*

March 19, 2007

Question #1

a) What are a *Database* and a *Database Management System (DBMS)*? **(4 points)**

b) Briefly describe the difference between the *Database Administrator* and the *Database user*. **(4 points)**

c) Briefly describe two of the advantages and two of the disadvantages of using a DBMS: **(8 points)**

Advantages

Disadvantages

d) Briefly describes three of the major functions of a DBMS. **(6 points)**

Question #2

a) What is a *data model*? What concepts are used in conceptual data model? **(4 points)**

b) What is the difference between a database schema and a database state? **(4 Points)**

c) Briefly describes **two** of the major components of a DBMS **(4 points)**

d) An application program is a program written in a host language like C, COBOL, Pascal, etc. To interact with the database, the program contains DML statements (like embedded SQL). Explain how a DBMS transforms the application program into an executable code? **(8 points)**

Question #3

- a) Briefly describe each of the following concepts in the context of the relational model: relation, attribute, degree and cardinality. (4 points)
- b) Define foreign Key. What is this concept used for? (4 points)
- c) List various update operations on a relation and discuss the types of integrity constraints that must be checked for each update operation. (8 points)

Question #4

Given the relational database instance below, indicate whether each of the following update operations are acceptable or not, and if not why? **(16 Points)**

1) Insert the tuple < 'ICS1', 'Mulhem',2175 > into OWNER.

2) Delete the BOOK tuple with CODE = 'ICS1'.

3) Modify the CODE of the BOOK tuple with TITLE = 'AI' to 'ICS4'.

4) Modify the BCODE of the OWNER tuple with PHONE = 3345 to 'ICS5'.

BOOK	<u>CODE</u>	<u>TITLE</u>	<u>AUTHOR</u>	<u>YEAR</u>
	ICS1	Databases	Elmasri	1990
	ICS2	Data Structures	Knuth	1987
	ICS3	AI	Rich	1986
	ICS4	Logic	Manna	1986

OWNER	<u>BCODE</u>	<u>NAME</u>	<u>PHONE</u>
	ICS1	Maghrabi	4698
	ICS2	Najjar	3345
	ICS4	Aslam	2356
	ICS3	Maghrabi	4698

Question #5 Given the following relations:

Hotel

Hotel-No	Name	Address
H1	Meridian	Khobar
H2	Sheraton	Dammam

Room

Room-No	Hotel-No	Type	Price
R1	H1	Single	300
R2	H1	Double	400
R3	H1	Single	350
R1	H2	Double	500
R2	H2	Single	350
R3	H2	Double	400

Booking

Hotel-No	Guest-No	Date-From	Date-To	Room-No
H2	G1	Nov. 20	Nov. 22	R1
H2	G3	Jan. 1	Jan. 5	R2
H1	G4	Jan 3	Jan 5	R1
H1	G2	Dec. 21	Dec. 30	R3

Guest

Guest-No	Name	Address
G1	Ahmad Ali	Jeddah
G2	Mohammad Kamel	Taif
G3	Ali Barakat	Mekka
G4	Said Khaled	Madina

a) write the appropriate SQL statements to answer the queries below: (16 points)

i) Find all single rooms that costs more than SR300.

ii) Find the names and addresses of all guests who reserved rooms starting from or after 'Jan. 5'

iii) Find the type and price of the room that is reserved by 'Mohammad Kamel'.

b) Insert following records in to HOTEL table (6 points)

H3	Hilton	Dhahran
H4	Intercontinental	Jubail

c) Delete the record of the guest, who belongs to Taif (4 points)