

20XX Autumn Examination (*Specimen Exam Paper*)

DATABASE MANAGEMENT (20XX Autumn Term)

XX XXX 20XX

Time Allowed: 2 hours

9:00am – 11:00am

Examination Number								
Student Number								

THIS PAPER MUST BE RETURNED

Admissible / Inadmissible materials in this examination:	Stationery provided to candidates (standard items)	Material to be returned to the invigilator at the end of the examination
1. Calculators are NOT allowed. 2. Dictionaries are NOT allowed. Violation of the above may lead to disqualification from the examination.	1 Examination paper	1 Examination paper

Instructions:

1. Answer this examination paper in English.
2. Read the instructions in the examination paper carefully and write your answers in the spaces provided in the examination paper. Answers not recorded in this paper or the appropriate booklet/sheet will not be marked. Begin each question on a new page and write the question number at the top of each page you have worked on.
3. Write any rough work in this examination paper or any booklet you requested, and cross it through afterwards. Rough work will not be marked.
4. Write clearly. It may not be possible to award marks where the writing is very difficult to read.
5. After the invigilator has announced that the examination has started, write your examination number, student number and course code on the cover of the examination paper or other sheet(s) distributed by the invigilator. **Failure to do so will mean that your work cannot be identified.**
6. At the end of the examination, hand over the examination paper to the invigilator.
7. **Do NOT open this examination paper until you are told to do so, otherwise you may be disqualified.**

Note on this specimen paper:

- *This specimen is aimed primarily to illustrate the overall format and some types of exam questions.*
- *The mark allocations, question topics, question types and level of difficulties may be varied in the exam.*

(100 marks)

- i. You should attempt **ALL** the questions in this examination paper.
- ii. Write all your answers in this examination paper. Answers not recorded on this examination paper will not be marked.

Question 1 (10 marks)

(a) Answer T for true and F for false.

		Answer
i	We can use DROP statement to remove a database or table permanently from the system.	
ii	A record in a relational database is called a tuple.	
iii	The primary key does not necessarily have to be unique for a given table.	
iv	Multiple constraints cannot be included in a single query.	
v	A relation may have multiple foreign keys.	

(b) Fill in the blank. Provide the answer on the line.

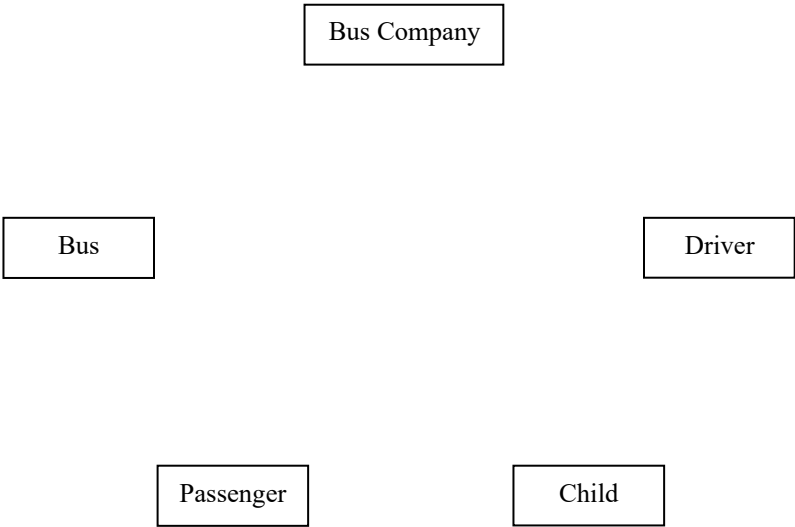
- i. SQL is a combination of a _____ language and a _____ language.
- ii. The aggregate function _____ returns number of values in specified column.
- iii. The SQL _____ clause contains the condition that specifies which rows are to be selected.
- iv. To exclude one or more values using a condition, the SQL keyword _____ must be used.

Question 2 (10 marks)

Consider the following description:

A bus company has many buses and many drivers. Each driver is responsible for driving one bus and a bus is driven by zero or at most one driver. Each passenger can take at most one bus at a time and a bus can be taken by zero or many passengers. A driver can have zero or more than one child and a child may have one or both parents being bus drivers.

Using the notations of our textbook, complete the following ER diagram based on the above descriptions. You do not need to add new entity types but please state any assumptions needed.



Question 3 (15 marks)

(a) Explain what a "candidate key" is. Give one difference between a candidate key and a primary key.

(b) Explain "recursive relationship" of ER models by giving an example.

(c) List four limitations of File-Based System.

Question 4 (15 marks)

(a) The tuples of a relation `Product` are given below:

productID	productName	price
c1234	Personal computer	8000
n2000	Notebook computer	12000
k9988	Keyboard	250

Write down whether each of the following SQL statements is valid or invalid. If it is valid, state the results after its execution. If it is invalid, give the reason why.

(i) `select productID, SUM(price) from Product;`

(ii) `select productName, price from Product
order by price
where productName like '%computer';`

(iii) `select productName from Product
where price > (select AVG(price) from Product);`

(b) Based on the following relations:

Customer

CustID	CName	Type
C001	Ashley Lam	Silver
C002	John Lee	Silver
C003	Ashley Lam	Gold
C004	John Lee	Silver

Branch

BranchID	Location
B001	Mong Kok
B002	Homantin
B003	Mong Kok

Order

OrderID	SalesTotal	CustID	BranchID
O001	100	C001	B002
O002	50	C001	B001
O003	500	C002	B001
O004	200	C003	B002
O005	100	C001	B002
O006	200	C002	B001
O007	120	C004	B003

(i) Identify the Candidate Key(s), and Primary Key for relation Customer.

(ii) Identify the Alternate Key(s) and Foreign Key(s) for relation Order.

Question 5 (35 marks)

This question is based on the following relations of a hotel:

Hotel (hotelNo, hotelName, city)

Primary Key hotelNo

Room (roomNo, class, price)

Primary Key (roomNo)

Guest (guestNo, guestName, guestAddress)

Primary Key guestNo

Booking (hotelNo, guestNo, roomNo, stayDays)

Primary Key (hotelNo, guestNo, roomNo)

Foreign Key hotelNo references Hotel(hotelNo)

Foreign Key guestNo references Guest(guestNo)

Foreign Key roomNo references Room(roomNo)

where relations contain the following properties:

Hotel:

- hotelNo consists of 3 characters and is not null;
- hotelName consists at most 30 characters;
- city consists at most 50 characters;
- primary Key is hotelNo

Room:

- roomNo consists of 3 characters and not null;
- class consists of 1 character;
- price may contain 2 decimal places and must be between \$500 and \$10,000 (i.e. the price can be \$788.55);
- primary Key is roomNo

Guest:

- guestNo consists of 3 characters and is not null;
- guestName consists at most 40 characters and is not null;
- guestAddress consists at most 120 characters;
- primary Key is guestNo

Booking:

- hotelNo consists of 3 characters;
- guestNo consists of 3 characters;
- roomNo consists of 3 characters;
- stayDays consists an integer;
- Primary Key (hotelNo, guestNo, roomNo)
- Foreign Key hotelNo references Hotel(hotelNo)
- Foreign Key guestNo references Guest(guestNo)
- Foreign Key roomNo references Room(roomNo)

Using a **single** SQL statement (based on the Oracle syntax taught in this course), perform the following:

- a. Create the relation Room with a default value of 'D';

- b. Add a check constraint with constaint named as classChk for column class in Room table which must be one of 'S', 'D', or 'F' for single, double and family respectively;

- c. Modify the datatype of column contactNo to 8 characters in relation Guest;

- d. Show the total income (named as income) from bookings for the 'First World' Hotel. The total income is the room price of all the days stayed.

- e. List roomNo and class whose price is greater than the average price, and show by how much (named as priceDiff).

- f. Create a view hotelBookingCount which contains the following summary information of each hotel (in a row): hotel No, total number of bookings of the hotel (renamed column as bookingCount);

- g. Update the price of all rooms by a discount rate of 5%;

- h. Remove the guest Ashley who lives in Germany;

Question 6 (15 marks)

This question is based on the following relations related to a hotel:

Hotel

hotelNo	hotelName	city
H01	First World	London
H02	Center Net	Hong Kong
H03	The Grand	Hong Kong
H04	Grosvenor	Tokyo

Room

roomNo	class	price
R01	D	700
R02	D	900
R03	S	700
R04	F	2000

Guest

guestNo	guestName	guestAddress
G01	Eric	23 Nathan Road, Hong Kong
G02	Ray	10 London Avenue, UK
G03	Ashley	1-1-3 Nishishinjuku, Tokyo, Japan
G04	Ashley	60311 Frankfurt am Main, Germany

Booking

hotelNo	guestNo	roomNo	stayDays
H01	G02	R04	2
H01	G02	R03	1
H02	G01	R01	14
H02	G02	R04	2
H03	G03	R02	1
H03	G01	R03	8

- (a) Write a PL/SQL block which list guest No, guest name and the total number of days stayed for guestNo 'G02'.

[illegible]

[5 marks]

- [illegible]

[10 marks]

COMPS320F Specimen Exam