

Student Number:	Seat Number:
Student Name:	Module Group:



Databases

Year 1 Semester 2

SCHOOL OF INFOCOMM TECHNOLOGY

Diploma in Information Technology

Diploma in Data Science

SAMPLE COMMON TEST (OPEN BOOK)

Revision Paper 1

INSTRUCTIONS TO CANDIDATES:

1. Write your Student Number, Name, Module Group and Seat Number CLEARLY in the boxes provided above.
2. This paper consists of **14** pages including this cover page. Check carefully to make sure your set is complete.
3. Answer **ALL** questions in the spaces provided.
4. There is one appendix attached as:
Appendix 1: 'Pilot of the Airwaves' Case Scenario for Questions 1 & 2.
5. **DO NOT** detach any pages from this booklet.
6. This is an open book test. You are allowed to have only paper materials and non-programmable calculators with you.

Grade	
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QUESTION 1: 30 marks

In the context of Relational Theory, answer the following questions with reference to the ‘Pilot of the Airwaves’ case scenario given in Appendix 1.

- (a) (i) For the DiscJockey relation, suggest its list of candidate keys and rank them in the order of suitability as primary key.

- (ii) What do you understand by the term ‘null’? What happens if a new disc jockey, May Lim is given ‘null’ as her DjId?

- (iii) The primary key for DiscJockeyRoster relation is given as a composite key of ProgrammeNo and DjId. Is this necessary? Explain why? Can DjId on its own be the primary key?

- (iv) What you understand by the term ‘degree of a relation’? Give the degree of ProgrammeSchedule.

- (v) What do you understand by the term ‘domain’? Give the domain of the attribute ScheduledTime.

(15 marks)

- (b) Identify the types of violation on relational integrity arising from the following actions. For each violation, explain how it occurs:
- (i) Insert the following tuple into the DiscJockeyRoster relation.

<u><ProgrammeNo></u>	<u><DjId></u>	<u>Role</u>
Pg05	Dj005	Lead presenter

(ii) Delete the following tuple from the Song relation.

<u>SongId</u>	Title	Artist	Duration (min)	Genre
So001	Pilotting the Airwaves	Charles Bore	3:40	Pop

(iii) Insert the following tuple into Playlist Relation.

<ProgrammeNo>	<SongId>	<u>SequenceNo</u>	ScheduledTime
Pg01	Jo001	3	0927

(9 marks)

(c) For each of the following statements, state True or False and briefly explain why it is so.

- (i) A song is sung by two singers. It is possible to have a second attribute named 'Artist' so that the names of both singers can be stored in the two Artist attributes in Song relation.

- (ii) Some of the programmes have quiz questions. Listeners can call in to answer them and win a prize. In order to keep track of the winners and prizes, a new relation called PrizeWinner is required.

- (iii) A new channel is introduced to play classical music. The existing tables will be sufficient to hold the data requirement of this new channel.

(6 marks)

- b. The room which channel “Double Three” normally uses to air its programmes is being renovated. The channel is now moved to room B02-33. Write the SQL code to reflect this change in the database.

(6 marks)

- c. Write the SQL code to list the details of all programmes that are scheduled to be aired in August 2009. Display the list according to the alphabetical order of the programme titles. You are required to provide 2 versions, one using DATE function and one without the use of DATE function.

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(10 marks)

- d. The programme director wants to know which female disc jockey has a role as a 'Lead presenter'. Write the SQL code to list the details of these disc jockeys together with their programme numbers.

(7 marks)

- e. A new disc jockey, Irine Soh (ID = 'Dj006'), has been hired to anchor a new Mandarin channel called "Nine Three Hundred" (ID = '9300') which will be launched soon. It will be using room B02-03 to air its programmes. Write the SQL code to include this new information in the database.

(7 marks)

QUESTION 3: 30 marks

RelnoVa is a renovation company that prides itself in providing innovative and corrective solutions to its customers in breathing life into new and ageing buildings.

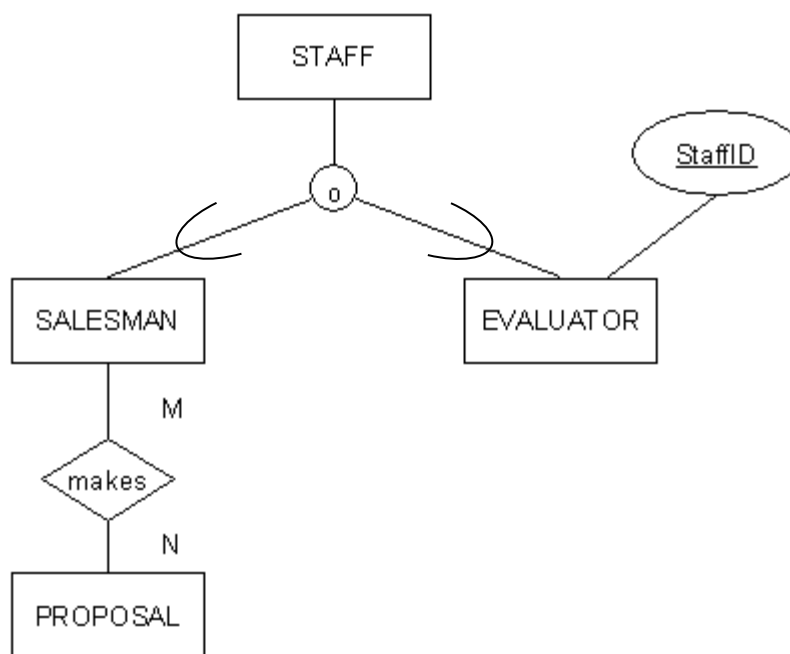
The company now has a team of salesmen and evaluators among others. They do not play overlapping roles. Information of the company staff includes the unique identifier, name, date of birth, gender, educational qualifications.

Salesmen will make proposals to clients who want to either repair or renovate their homes. Each proposal is undertaken by only one salesman. Information of it will include the unique identifier and date of the proposal. Each proposal is then being submitted to one of the company's evaluators who will examine it for its profitability. Upon approval, a job will then be negotiated and confirmed for the client of each proposal. The job will have a unique identifier, date of the job and completion date. Tasks are identified for the job. Each task will include a description, the cost, start and end dates. It will also be given a serial number unique only within the job. Not all proposals are converted to jobs.

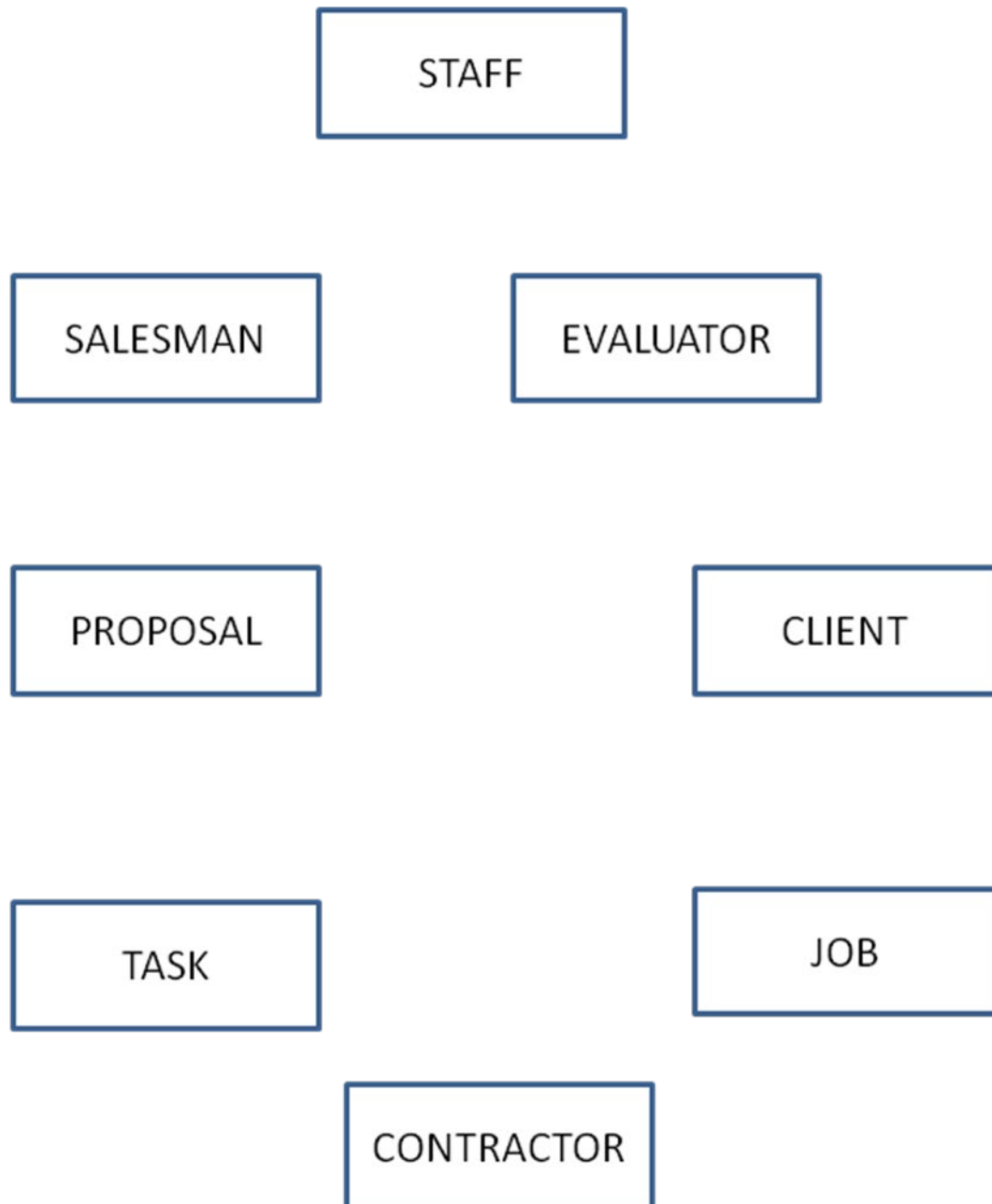
The job is then tendered to an external contractor. Information kept of this contractor includes a unique identifier, name and contact person.

Information about clients includes a unique identifier for each client, his name and address.

- a) The diagram below shows a partial ER model of the case above. There are three errors in the diagram. (Ignore all other primary keys, attributes and relationship not shown in the diagram). Identify and explain why they are errors. Hence correct them by redrawing the model.

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- b) Complete the ER model by drawing in the missing relationship (cardinality ratio, participation type), primary and partial keys and attributes.

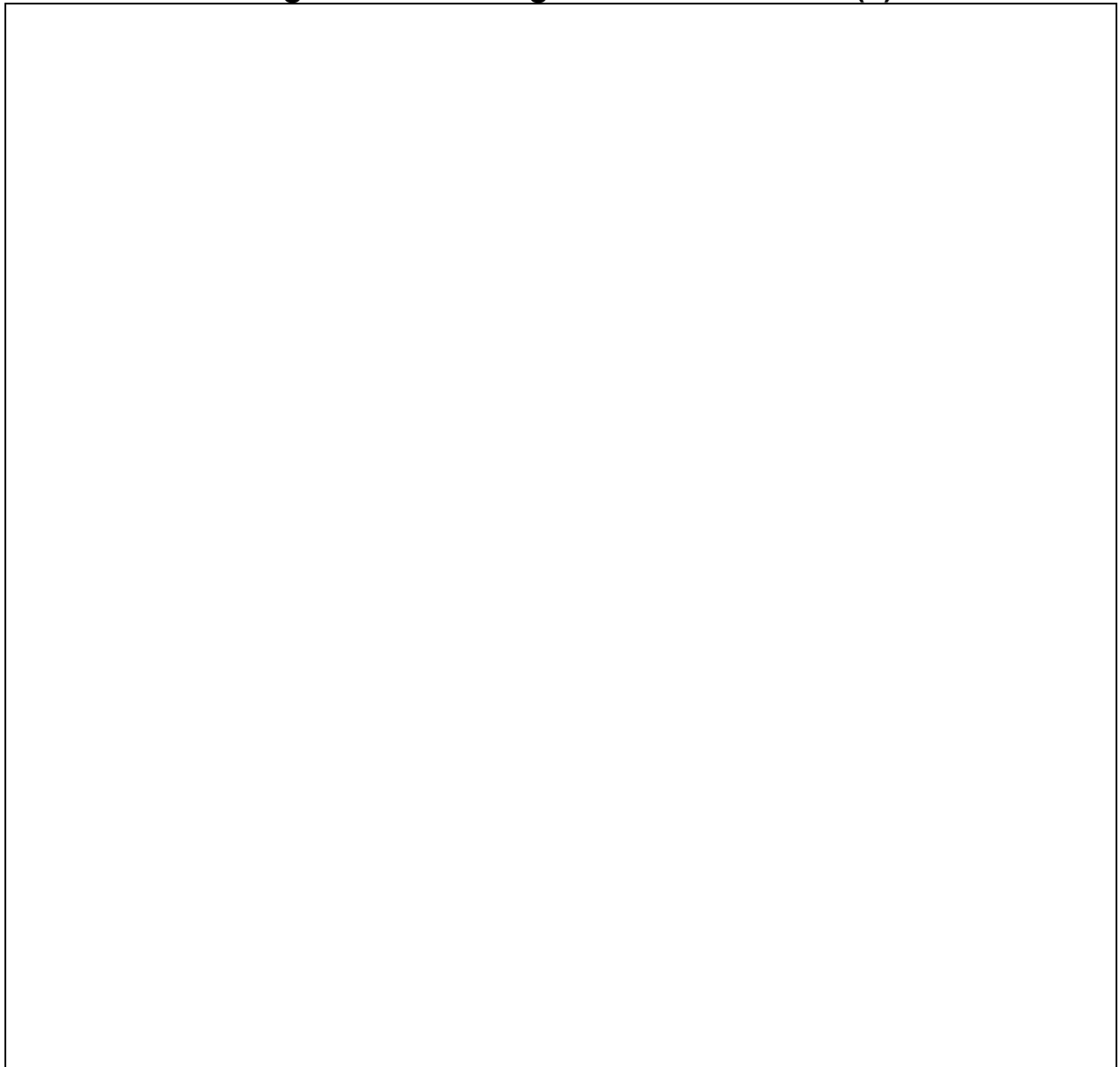


(14 marks)

- c) If instead of the job being carried out totally by one contractor, it will be given to different contractors to work on different tasks of the job and a staff within the company is being appointed as project manager to supervise the job. This change will involve CONTRACTOR, JOB, TASK, and one more new entity, PROJECT MANAGER, Draw a subset of the ER model involving these entities, the new relationships between these entities, indicating the cardinality ratio, participation, partial and primary keys. (You may leave out the non-key attributes).

(10 marks)

Figure 3-3 ER Diagram for Question 3 (c)



Appendix 1: 'Pilots of the Airwave' Case Scenario

'Pilots of the Airwave' is an application package that has been developed by ApeX Software House to allow disc jockeys of its clients to be creative in making their programmes interesting and engaging. It has a huge collection of songs licensed from the various major music publishers together with jingles from advertisers. It allows the capturing and updating of information about the disc jockeys and scheduling of programme sessions.

A programme director will start scheduling the programmes months ahead before rostering disc jockeys for the programmes. Each programme may be hosted by one or more disc jockeys. Each disc jockey may host many programmes. These disc jockeys, working for the different channels, will then plan two weeks in advance the playlists of what songs to be played during the programmes they host. They will be told what jingles to play for advertisers. Broadcasting and recording for each channel are done in the same sound room and there is no sharing of sound rooms.

During the programme, the songs are played in the sequence given and the time scheduled in the playlist. However, the disc jockeys can override this sequence and timing on a need basis. When an override is used, the playlist will be updated to reflect what is actually played in a particular session. The playlists will then be used for auditing purpose and to adjust payment of royalties to the copyright owners of the songs.

Having this new system has brought about many benefits for everyone. One benefit the disc jockeys can enjoy is that they can plan the time for the songs, the jingles and the talk time, allowing for the news reading and the traffic conditions reporting. Another benefit is that they may even make sure that a particular song is not played more than a certain number of times within a period of time. Moreover, the automatic play feature of a playlist is particularly useful when there is only jockey on duty and there is a need for a rest break.

The following relations contain complete list of test data for the system.

DiscJockey Relation

<i>DjId</i>	<i>Name</i>	<i>Gender</i>	<i><ChannelId></i>	<i>PetName</i>
Dj001	Jaramie Lee	Female	9033	JL
Dj002	Alvin Toh	Male	9033	Chipmunk
Dj003	Horace Png	Male	9500	Hooray
Dj004	Jerald See	Male	9500	I see
Dj005	Michelle Cheng	Female	9500	Meshare

Channel Relation

<i>ChannelId</i>	<i>Channel name</i>	<i>Language</i>	<i>RoomLocation</i>
9033	Double Three	English	B01-33
9500	95 Oldies	English	B01-05
9333	Three Tree	Mandarin	B01-13

(Continued on next page...)

Appendix 1: 'Pilots of the Airwaves' Case Scenario (Con'td)**Song Relation**

<u>SongId</u>	<u>Title</u>	<u>Artist</u>	<u>Duration (min)</u>	<u>Genre</u>
So001	Piloting the Airwaves	Charles Bore	3:40	Pop
So002	More changes	Blue or Black	4:20	Soft Rock
So003	My way to heaven	Led Astray	7:20	Heavy metal
So004	Land of Confusion	Superman	3:30	Soft Rock
Jo001	Cool Consulate	Advertisement	0:25	Jingle
Jo002	Wonderful world	Advertisement	0:30	Jingle
So005	Drunk with Love	Which Dion	4:06	Pop

ProgrammeSchedule Relation

<u>ProgrammeNo</u>	<u>PDate</u>	<u>PTime</u>	<u>Title</u>
Pg01	04/08/09	0900-1100	Good Morning Singapore
Pg02	04/08/09	2200-2400	Take it Easy
Pg03	05/08/09	1100-1400	Midday cruising
Pg04	08/08/09	1400-1700	Lazy Friday Afternoon
Pg06	11/08/09	0900-1100	Good Morning Singapore

Playlist Relation

<u><ProgrammeNo></u>	<u>SequenceNo</u>	<u><SongId></u>	<u>ScheduledTime</u>
Pg01	1	So002	0910
Pg01	2	Jo001	0915
Pg01	3	So001	0920
Pg02	2	So001	2210
Pg03	5	So003	1200
Pg04	4	So005	1420

DiscJockeyRoster Relation

<u><ProgrammeNo></u>	<u><DJId></u>	<u>Role</u>
Pg01	Dj001	Lead presenter
Pg01	Dj002	Assistant presenter
Pg02	Dj003	Co-presenter
Pg02	Dj004	Co-presenter
Pg01	Dj004	Assistant presenter

Important Notes:

1. Primary keys are underlined.
2. Character and Date columns are left-justified.
3. Date values are in DD/MM/YY format.

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