



COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NCIS301/CIS301: DATABASE SYSTEMS

SUPPLEMENTARY EXAMINATIONS

JANUARY 2020

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DURATION: (3HRS)

INSTRUCTIONS

1. Choose **All** questions from **Section A** and **TWO** questions in **Section B**.
 2. Use only the Examination Answer Book provided. Obtain a Continuation Answer Book if necessary.
 3. Write legibly and concisely
 4. You are expected to give a critical analysis of each question.
 5. Provide the following information on the cover page of the Examination Answer Book.
 - 5.1 Write your University I.D. number clearly in the space provided. Do not write your name on the Answer Book.
 - 5.2 Write the Course Code & Course Title indicated above in the space provided.
 - 5.3 For Faculty write 'CBPLG'
 - 5.4 For Academic Year write 2018/2019
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Section A: Answer ALL Questions

1. Car inspection ERD [20 Marks]

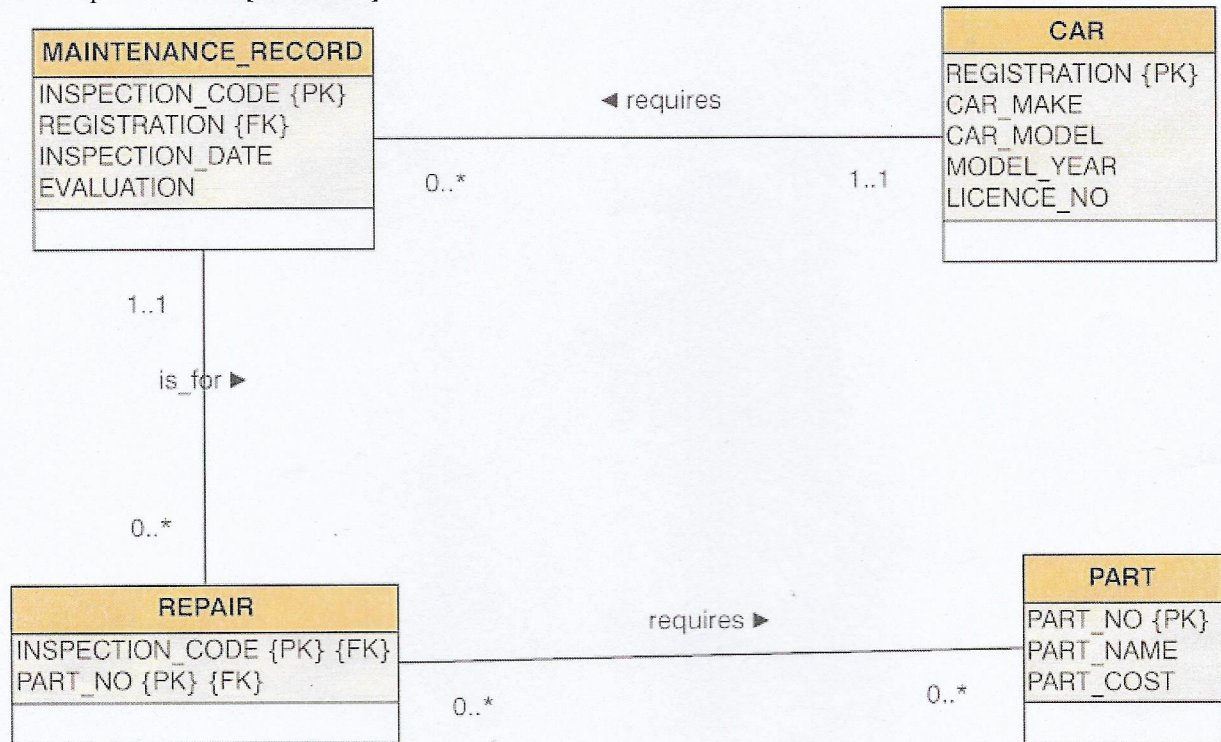


FIGURE 4.20 The car inspection database

Database name: Ch04_Car_Inspection

Table name: CAR

REGISTRATION	CAR_MAKE	CAR_MODEL	CAR_COLOUR	MODEL_YEAR	LICENCE_NO
3679MR82	Toyota	Corolla	Blue	2006	19671r29788
E-TS965	Nissan	Micro	Red	2004	1973Smith121
PE57UVP	Peugeot	407	Blue	2007	1990btj2212
PISE567	Volkswagen	Eos	Lime	2006	DF-678-WV
ROMA482	Volkswagen	Golf GT	Black	2007	AQ-123-AV
Z-BA975	Peugeot	207	Black	2007	1990vrt7312

Table name: PART

PART_NO	PART_NAME	PART_COST
12390	Paint sealants	€14.05
12391	Wiper	€10.05
12392	Brake pads	€24.99
12393	Brake Discs	€40.54
12395	Spark Plugs	€0.00
12396	Airbag	€24.05
12397	Tyres	€25.00

Table name: MAINTENANCE_RECORD

INSPECTION_CODE	REGISTRATION	INSPECTION_DATE	EVALUATION
100036	PE57UVP	10/05/2008	FAIL ✓
100390	RCMA482	01/09/2008	✓
106750	E-TS865	01/03/2008	✗ PASS
123456	Z-BA975	08/10/2008	FAIL ✓
145678	P13E567	30/09/2007	✗ PASS
200450	E-TS865	21/02/2005	✗ PASS
200456	E-TS865	01/04/2007	✗ FAIL

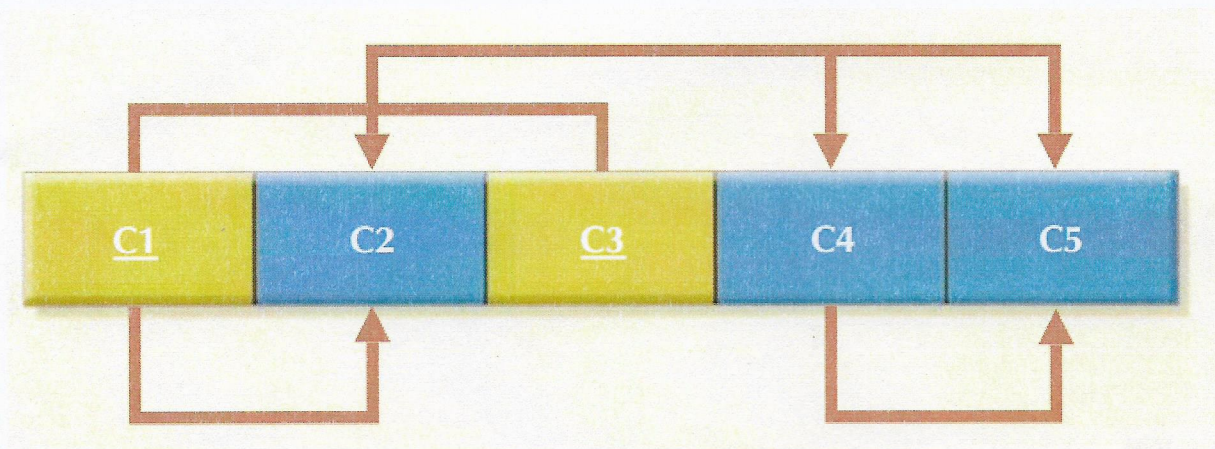
Table name: REPAIR

INSPECTION_CODE	PART_NO
106750	12396
106750	12397
100036	12393
200450	12391
100036	12397
200450	12392
200456	12397

Derive relational algebra expressions to achieve the following:

- 'List all information about cars where the model year is after 2006.' [5 Marks]
- 'Display all the part names and their prices where the cost of the part is greater than 120.00.' [5 Marks]
- 'List the car registration and model details and part numbers for all cars where the model year is 2007, where an inspection was carried out after 01/03/2008, which resulted in a part being required for a repair.' [10 Marks]

2. Dependency diagrams [20 Marks]



- What is a partial dependency? With what normal form is it associated? [5 Marks]
- Identify and discuss each of the indicated dependencies. [5 Marks]
- Create a database whose tables are at least in 2NF, showing the dependency diagrams for each table. [5 Marks]
- Create a database whose tables are at least in 3NF, showing the dependency diagrams for each table. [5 Marks]

Section B: Choose any TWO questions

QUESTION 1: RELATIONAL ALGEBRA

FIGURE P4.1 – The Ch04_Restaurant_Guide database tables

Database name: Ch04_Restaurant_Guide

Table name: CUSINE

TYPE	CATEGORY
American	FAST FOOD
French	FINE DINING
Chinese	BUFFET
South African	FINE DINING

Table name: CUSTOMER

CUS_CODE	CUS_LNAME	CUS_PHONE
10010	Ramas	844-2573
10011	Dunne	894-1238
10012	Smith	894-2285

Table name: RESTAURANT

REST_NAME	REST_LOCATION	REST_PRICE	REST_TYPE
MacDonalds	the Hague	€	American
Claridges	London	€€€€€	French
Pompidou	Paris	€€€€	French
The Islands	Cape Town	€€€€	South African
Frankies	Milan	€€	American

Table name: VISIT

CUS_CODE	REST_NAME	NO_TIMES_VISITED	DATE_LAST_VISITED	LAST_BILL_AMOUNT
10010	The Islands	10	02/01/2008	€146.78
10011	MacDonalds	87	30/12/2007	€7.98
10011	Claridges	1	01/01/2008	€520.22
10012	Pompidoe	5	03/01/2007	€68.75
10012	MacDonalds	32	04/01/2008	€12.75

The four relations shown in Figure P4.1 represent tables in a database which contains information about customers eating habits. The database tables store information about customers and the types of restaurants that they frequently visit. In addition for each restaurant the types of cuisine which is served recorded.

Use the relations shown in Figure P4.1 to write relational algebraic expressions for the following queries in Problems a–e **[SHOW LOGICAL STAGES]**.

- Display all information about restaurants where the restaurant price is equal to '€€€€'. **[5 Marks]**
- Find all the customers who have visited MacDonald's. **[5 Marks]**

- c. List the names of all restaurants where it is possible to have fine dining. **[5 Marks]**
- d. Show the names of all customers who went to Claridges before 10th January 2008 or have spent more than €250 on the last bill. [5 Marks]
- e. Find the names and phone numbers of all customers who have visited fast food restaurants more than 40 times. **[5 Marks]**

QUESTION 2: DATA MODELLING

Database name: Ch03_CheapCo

Table name: PRODUCT Primary Key: PROD_CODE

Foreign Key: VEND_CODE

PROD_CODE	PROD_DESCRIPTION	PROD_STOCK_DATE	PROD_ON_HAND	PROD_PRICE	VEND_CODE
12-VW/P2	7.25-cm. power saw blade	07-Apr-06	12	€0.94	123
1QQ23-55	2.5-cm. wood screw, 100	19-Mar-06	123	€3.55	123
231-78-W	PVC pipe, 3.5-cm., 4m.	07-Dec-05	45	€7.01	121
33564/U	Rat-tail file, 0.125-cm., fine	08-Mar-06	18	€0.94	123
AR/3/TYR	Cordless drill, 0.25-cm.	29-Nov-05	8	€36.33	121
DT-34-VWV	Phillips screwdriver pack	20-Dec-05	11	€18.40	123
EE3-67/W	Sledge hammer, 6kg.	25-Feb-06	9	€14.21	121
ER-56/DF	Houselite chain saw, 16-cm.	28-Dec-05	7	€186.04	125
FRE-TRY9	Jigsaw, 12-cm blade	12-Aug-05	67	€1.15	125
SE-67-89	Jigsaw, 8-cm. blade	11-Oct-05	34	€1.07	125
ZW-QR/AV	Hardware cloth, 0.25-cm	23-Apr-06	14	€10.26	123
ZX-WR/FR	Claw hammer	01-Mar-06	15	€7.07	121

Table name: VENDOR Primary Key: VEND_CODE

Foreign Key: none

VEND_CODE	VEND_NAME	VEND_CONTACT	VEND_AREACODE	VEND_PHONE
120	BargainSnapper, Inc.	Melanie T. Travis	0181	899-1234
121	Cut'nGlow Co.	Henry J. Olero	0181	342-9896
122	Rip & Rattle Supply Co.	Anne R. Morrins	0113	225-1127
123	Tools 'R Us	Juliette G. McHenry	0161	546-7894
124	Trowel & Dowel, Inc.	George F. Frederick	0113	453-4567
125	Bow & Wow Tools	Bill S. Sedwick	0113	324-9988

- For each table, identify the primary key and the foreign key(s). If a table does not have a foreign key, write *None* in the space provided. **[5 Marks]**
- Do the tables exhibit entity integrity? Answer yes or no; then explain your answer. **[5 Marks]**
- Do the tables exhibit referential integrity? Answer yes or no; then explain your answer. Write NA (Not Applicable) if the table does not have a foreign key. **[5 Marks]**
- Create the ERD using UML notation for this database. **[5 Marks]**
- Create the data dictionary for this database. **[10 Marks]**

QUESTION 3: ADVANCED DATA MODELLING

- What two conditions must be met before an entity can be classified as a weak entity? Give an example of a weak entity. **[15 Marks]**
- What is a strong (or identifying) relationship? Give an example using ERD **[15 Marks]**

All the Best!!