**Database Concepts**

**HIT234 Midterm Examination**

**23rd April 2025**

**Darwin 9:00am-11:30am**

**IMPORTANT: Answer All questions in the spaces provided after each question**

***Answer ALL three questions (TOTAL MARK: 30)***

**Question 1: Vehicle Database SQL statements (16 points, each question is 2 points)**

Using the vehicle database in Appendix A, write SQL statements for each of the following queries.

1. Write an SQL statement to show the name of employees who are in business department or in administration department.

**Answer:**

SELECT FirstName, LastName FROM Employee WHERE Department IN ('Business', 'Administration');

1. Find the rego numbers of cars that were taken more than once.

**Answer:**

SELECT Reg No FROM Employee\_Vehicle GROUP BY [Reg No] HAVING COUNT(\*) > 1;

1. Retrieve all vehicle ever assigned to information technology employees.

**Answer:**

SELECT DISTINCT V.\* FROM Vehicle V

JOIN Employee\_Vehicle EV ON V.[Reg No] = EV.[Reg No]

JOIN Employee E ON EV.Employee\_No = E.Employee\_No

WHERE E.Department = 'Information Tech';

1. Find the number of cars used by employees, excluding those employees with Employee-No = 120 and those belonging to information Tech department.

**Answer:**

SELECT COUNT(DISTINCT [Reg No]) AS Cars\_Used FROM Employee\_Vehicle EV

JOIN Employee E ON EV.Employee\_No = E.Employee\_No WHERE E.Employee\_No <> 120

AND E.Department <> 'Information Tech';

1. Find the name and department of the employees, who have taken a Mazda and Ford car between 11/08/2011 and 11/09/2011.

**Answer:**

SELECT E.FirstName, E.LastName, E.Department FROM Employee E WHERE E.Employee\_No IN

( SELECT EV1.Employee\_No FROM Employee\_Vehicle EV1

JOIN Vehicle V1 ON EV1.[Reg No] = V1.[Reg No] WHERE V1.Make = 'Mazda' AND EV1.[Date Taken] BETWEEN '2011-08-11' AND '2011-09-11' )

AND E.Employee\_No IN

( SELECT EV2.Employee\_No FROM Employee\_Vehicle EV2 JOIN Vehicle V2 ON EV2.[Reg No] = V2.[Reg No] WHERE V2.Make = 'Ford'

AND EV2.[Date Taken] BETWEEN '2011-08-11' AND '2011-09-11' );

1. Find the employee names who used the most cars.

**Answer:**

SELECT E.FirstName, E.LastName FROM Employee E

JOIN Employee\_Vehicle EV ON E.Employee\_No = EV.Employee\_No

GROUP BY E.Employee\_No, E.FirstName, E.LastName

HAVING COUNT(DISTINCT EV.[Reg No]) =

(SELECT MAX(CarCount) FROM

( SELECT COUNT(DISTINCT [Reg No]) AS CarCount FROM Employee\_Vehicle GROUP BY Employee\_No ) AS Sub

);

1. Find employees who have used vehicles of all available colours.

**Answer:**

SELECT E.FirstName, E.LastName FROM Employee E

JOIN Employee\_Vehicle EV ON E.Employee\_No = EV.Employee\_No

JOIN Vehicle V ON EV.[Reg No] = V.[Reg No]

GROUP BY E.Employee\_No, E.FirstName, E.LastName

HAVING COUNT(DISTINCT V.Colour) = ( SELECT COUNT(DISTINCT Colour) FROM Vehicle );

1. Find the employee/s who taken a vehicle on 02/09/2011 and 12/09/2011.

SELECT E.FirstName, E.LastName

FROM Employee E

WHERE E.Employee\_No IN (

SELECT EV1.Employee\_No

FROM Employee\_Vehicle EV1

WHERE EV1.[Date Taken] = '2011-09-02'

)

AND E.Employee\_No IN (

SELECT EV2.Employee\_No

FROM Employee\_Vehicle EV2

WHERE EV2.[Date Taken] = '2011-09-12'

);

**Question 2: ER-Diagrams (8 Points)**

For each of the below scenarios draw a separate E-R Diagram including attributes, cardinalities and identifiers when applicable.

1. SYDNEY-IT Pty Ltd is made up of a number of departments, identified by a dept-id and location, that manage one or more projects. Each project, identified by a project-id and budget, is made up of one or more team members. Each project team member belongs to one department and zero to one project. One of the team members supervise the other team members on the project (**4 marks)**

***ANSWER QUESTION 2-a:***

1. Employees (identified by EMP-ID, SURNAME, FIRST-NAME, and Date-of Birth) make many orders (identified by ORDER-NO, ORDER-DATE, DES, WUOTED-PRICE) for Customers (Identified by CUST-ID). The orders are for one customer at a time, but a customer might have many orders. The orders create many requests (Identified by REQUEST-NO, START-DATE, END-DATE). Those requests might result in few jobs (identified by JOB-NO, COST) and consequently will use different materials (identified by MATERIAL-ID, MATERIAL-DES). The requests are made to one section, but a section has many requests **(4 marks)**

***ANSWER QUESTION 2-b:***

**Question 3: E-R Diagrams (6 points)**

Draw an E-R diagram for the scenario below.

Darwin Antiques buys and sells one-of-a-kind antiques of all kinds (e.g., furniture, jewellery, china, and clothing). Each item is uniquely identified by an **item number** and has a **description, asking price**, **condition**, and **open-ended comments**. Darwin Antiques works with many different individuals, called clients, who sell items to and buy items from the store. Some clients only sell items to Darwin Antiques, some only buy items from it, and some others both sell and buy. A client identified by a **client number** and has a **client name and address**. When Darwin Antiques sells an item in stock to a client, the owners want to record the commission paid, the **actual selling price, sales tax, and date sold**. When Darwin Antiques buys an item from a client, the owners want to record the **purchase cost, date purchased, and condition at time of purchase**

***ANSWER QUESTION 3:***

**Appendix A**

**Vehicle**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Reg No | Make | Model | Year | Colour |
| BRG446 | Ford | Meteor | 2009 | White |
| VRG655 | Bmw | Coupe | 2008 | Blue |
| NMT667 | Madza | Delivery Van | 2010 | Green |
| CCT899 | Toyota | HiLuxe | 2009 | Red |
| FGR122 | Mitsubishi | Magna | 2007 | Purple |

**Employee Table**

|  |  |  |  |
| --- | --- | --- | --- |
| Employee\_No | FirstName | LastName | Department |
| 118 | Riley | Griffin | Business |
| 123 | Bryn | Underwood | Information Tech |
| 156 | Anna | Thanh | Administration |
| 166 | Justin | Brownworth | Business |
| 120 | Sarah | McDonald | Services |
| 134 | Tammy | Hubber | Manager |

**Employee Vehicle Table**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Employee\_veh | Reg No | Employee\_No | Date Taken | Date Returned |
| A12 | BRG446 | 118 | 1/09/2011 | 3/09/2011 |
| A13 | NMT667 | 156 | 2/09/2011 | 3/09/2011 |
| A14 | CCT899 | 166 | 2/09/2011 | 4/09/2011 |
| A15 | FGR122 | 134 | 3/09/2011 | 5/09/2011 |
| A16 | BRG446 | 118 | 4/09/2011 | 10/09/2011 |
| A17 | NMT667 | 166 | 5/09/2011 | 10/09/2011 |
| A18 | NMT667 | 134 | 11/09/2011 | 15/09/2011 |
| A19 | FGR122 | 166 | 12/09/2011 | 15/11/2011 |
| A20 | NMT667 | 118 | 14/11/2011 | 15/11/2011 |