



SEMESTER 1 Continuous Assessment 4 Normalisation and physical design

MODULE: CA218 - Introduction to Databases

PROGRAMME(S): CASE2

YEAR OF STUDY: 2

EXAMINER(S):

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INSTRUCTIONS: This template is provided for completing the questions in CA4. This template must be used and any modification should be explicitly indicated.
Follow the instructions provided in the Loop page under the Assessments section.
This is a group work of two students.

ID: (Enter your DCU Student ID number in the right box below)

Student 1

2	0	4	2	3	6	0	2
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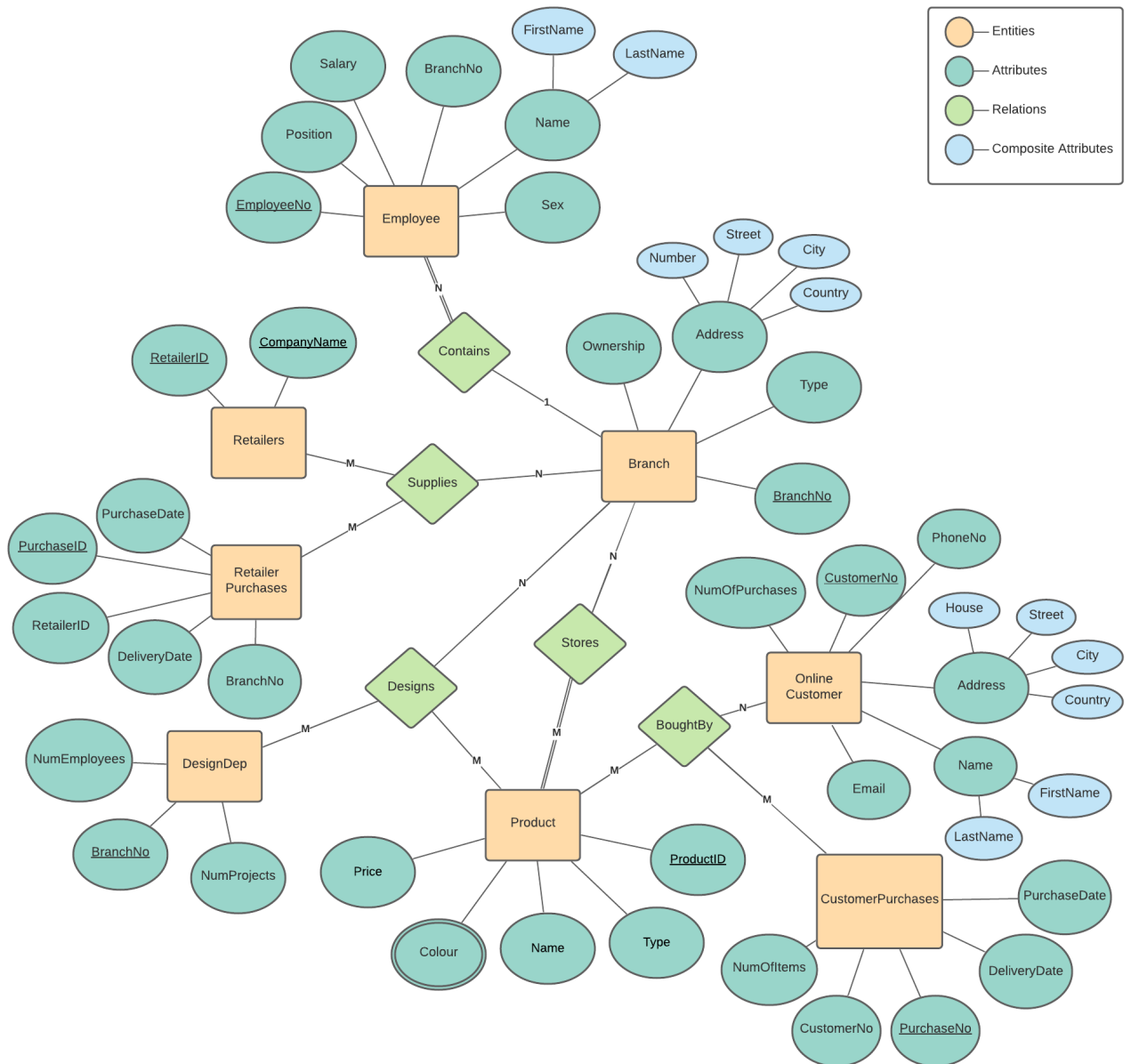
Student 2

2	0	4	1	5	6	2	4
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Group Number: 40

1. Show your final ER diagram from CA2 (5 Marks).
Following feedback from CA2 the following revisions are made.

1. Changes the Contains property connecting Product and Branch name to Stores.
2. Changed Employee to Branch relation to total participation.
3. Changed Product to Branch relation to total participation.
4. Replaced county with city in online customer address and branch address.
5. Added RetailerPurchases and CustomerPurchases entities.



2. Map your ER diagram into a logical table following the ER mapping steps (25 Marks).

Step 1: Map Strong Entities

Retailers (RetailerID, CompanyName)

Branch (BranchNo, Ownership, buildingNo, street, City, country, Type)

Employee (EmployeeNo, firstName, lastName, Sex, Position, Salary, BranchNo)

Online Customer (firstName, lastName, NumOfPurchases, CustomerNo, houseNo, street, City, country, Email, PhoneNo)

DesignDep (BranchNo, NumEmployees, NumProjects)

Product (ProductID, Name, Colour, Type, Price)

RetailerPurchases (PurchaseID, RetailerID, PurchaseDate, DeliveryDate, BranchNo)

CustomerPurchases (PurchaseNo, CustomerNo, NumberOfItems, PurchaseDate, DeliveryDate)

Step 2: Map Weak Entities

The above ER diagram does not have any weak entity.

Step 3: Map 1:1 Relationships

The above ER diagram does not have any 1:1 relationship.

Step4: Map 1:N/N:1 Relationships

Contains is a 1:N relationship. From one branch there can be many employees

Employee (EmployeeNo, firstName, lastName, Sex, Position, Salary, BranchNo)

FK: BranchNo

Step 5: Map M:N Relationships

There are three M:N relationships: BoughtBy, Designs, Stores and Supplies. Take the primary keys of the participating entities along with the relationship attributes (if any) and create a new table.

Stores (ProductID, BranchNo)

FK: ProductID, BranchNo

BoughtBy (ProductID, CustomerID, PurchaseNo)

FK: ProductID, CustomerID, PurchaseNo

Designs (BranchNo, ProductID)

FK: BranchNo, ProductID

Supplies (RetailerID, BranchNo, PurchaseID)

FK: RetailerID, BranchNo, PurchaseID

Step 6: Map Multivalued attributes

Colour (ProductID, ProdColour)

FK: ProductID

Final Tables:

Retailers (RetailerID, CompanyName)

Branch (BranchNo, Ownership, buildingNo, street, City, country)

Employee (EmployeeNo, firstName, lastName, Sex, Position, Salary, BranchNo)

Online Customer (firstName, lastName, NumOfPurchases, CustomerNo, houseNo, street, City, country, Email, PhoneNo)

DesignDep (BranchNo, NumEmployees, NumProjects)

Product (ProductID, Name, Colour, Type, Price)

RetailerPurchases (PurchaseID, RetailerID, PurchaseDate, DeliveryDate, BranchNo)

CustomerPurchases (PurchaseNo, CustomerNo, NumberOfItems, PurchaseDate, DeliveryDate)

Colour (ProductID, ProdColour)

Stores(ProductID, BranchNo)

BoughtBy (ProductID, CustomerID, PurchaseNo)

Designs (BranchNo, ProductID)

Supplies (RetailerID, BranchNo, PurchaseID)

3. Normalise each table up to 3rd normal form (1st Normal form, 2nd Normal form, 3rd normal form) (30 Marks). Note: you may check each table resulting from step 2 for 1st, 2nd, 3rd normal forms and if not normalised, convert the table into the corresponding normal form.

The tables above have no violations to the normal forms. There is no redundancy in how the data is stored.

1st Normal form

All the tables are in their 1NF. No intersection of rows and columns contain a multiple value.

2nd Normal form

All the tables are in their 2NF. No partial dependency is observed.

3rd normal form

All the tables are in their 3rdNF. No transitive dependency is observed.

4. Using project database available to you on MySQL, write a DDL to create the tables in your database (focus only on the core tables, only 3 tables) (30 Marks). Ensure you use the correct datatypes, length, primary key, and foreign key (if any).

Included in the CA218-CA4.sql file.

5. Write an SQL DML to Insert at least 3 records in the tables you created in Q4. (10 Marks)

Included in the CA218-CA4.sql file.