



SEMESTER 2 Continuous Assessment 4

Normalisation and physical design

MODULE: CA218 - Introduction to Databases

PROGRAMME(S): COMSCI AND CASE

YEAR OF STUDY: 2

EXAMINER(S):

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Ext:6714

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 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	1	3	0	6	3	7	3
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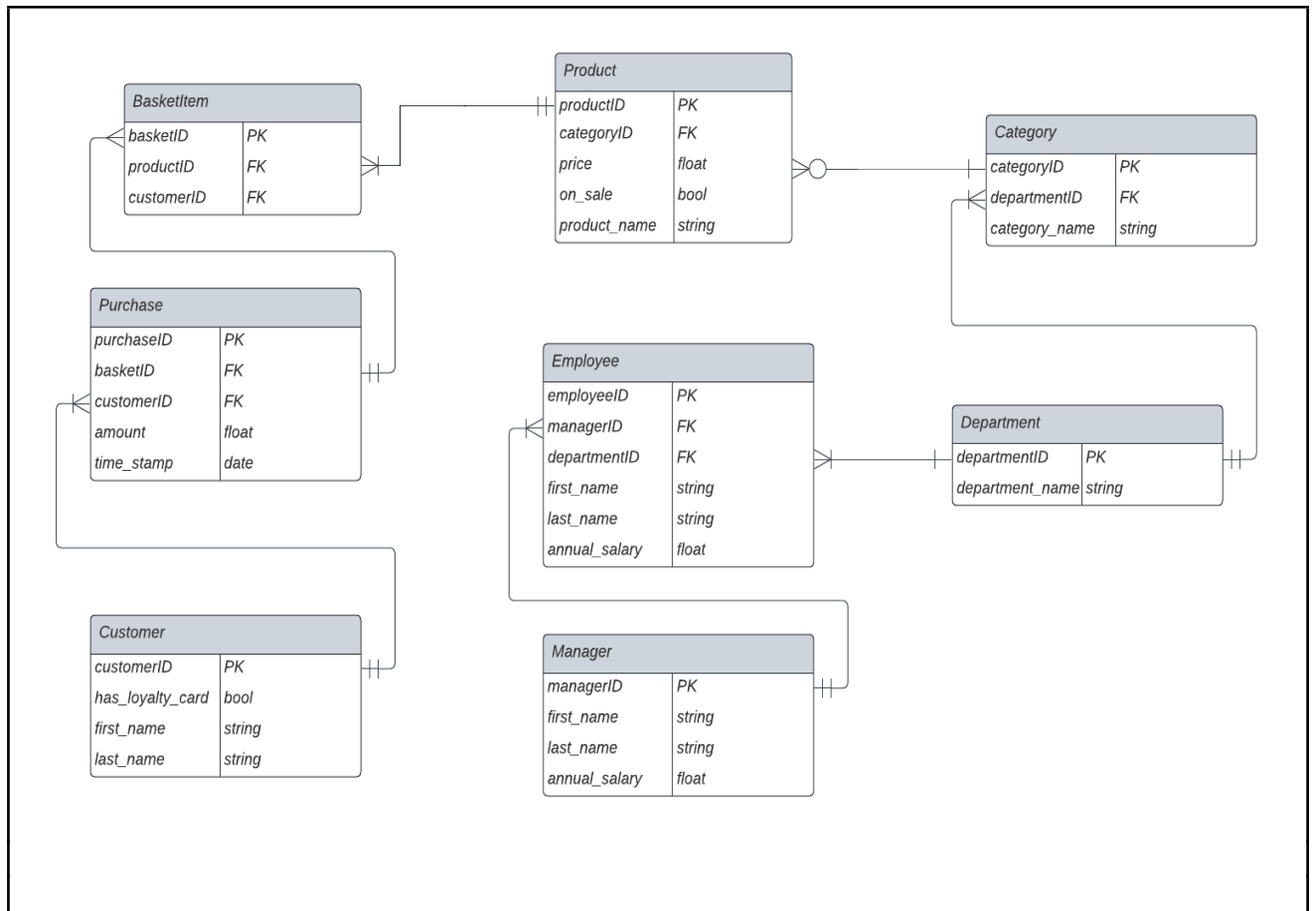
Student 2

2	1	4	8	3	7	2	2
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Group Number: 27

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

1. Removed all multivalued attributes
2. Removed the shops entity
3. Removed the warehouse entity
4. Analysed and fixed cardinalities among entities
5. Created new entities like BasketItem, Manager and Purchase



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

Step 1: Map Strong Entities:

Customer (customerID, has_loyalty_card, first_name, last_name),
Manager (managerID, first_name, last_name, annual_salary),
Employee (employeeID, first_name, last_name, annual_salary),
Department (departmentID, department_name),
Category (categoryID, category_name),
Product (productID, price, on_sale, product_name),
BasketItem (basketID),
Purchase (purchaseID, amount, time_stamp),

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

Employee (employeeID, first_name, last_name, annual_salary, managerID, departmentID,
FK: managerID, departmentID),
Category (categoryID, category_name, departmentID,
FK: departmentID),
Product (productID, price, on_sale, product_name, categoryID,
FK: categoryID),
BasketItem (basketID, productID, customerID,
FK: productID, customerID),
Purchase(purchaseID, amount, time_stamp, basketID, customerID,
FK: basketID, customerID),

Step 5: Map M: N Relationships

There are no M: N relationships.

Step 6: Map Multivalued attributes

There are no multivalued attributes.

Final Tables:

Customer (customerID, has_loyalty_card, first_name, last_name),

Manager (managerID, first_name, last_name, annual_salary),

Employee (employeeID, first_name, last_name, annual_salary, managerID, departmentID),

Department (departmentID, department_name),

Category (categoryID, category_name, departmentID),

Product (productID, price, on_sale, product_name, categoryID),

BasketItem (basketID, productID, customerID),

Purchase (purchaseID, amount, time_stamp, basketID, customerID),

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.

Now, go through each of the above table and check if there are any tables violating the following normal forms and fix them. If there is no violation, explain. If your ER is robust, you may find your tables already in their 3rd normal form. This is not always the case, check your design.

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.