

- Name: Pedro Claudio Martinez
- Student ID: 2510674
- Module: ACCA4023
- Lecturer: Suresh Shanmugasundaram

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1. Introduction

For the following scenario we need the following tables, which we will name below

Create Table Category (**Category_id PK, Name, Medicine_id FK**)

Create Table Customers (**Customer_id PK, FirstName, LastName, DateOfBirth, Phone, Email, Category_id FK**)

Create Table Suppliers (**Supplider_id PK, Name, Contact_name, Phone, Email, Medicine_id FK**)

Create Table Medicines (**Medicine_id PK, Name, Description, Price, Stock, ExpirateDate, Medication_id FK**)

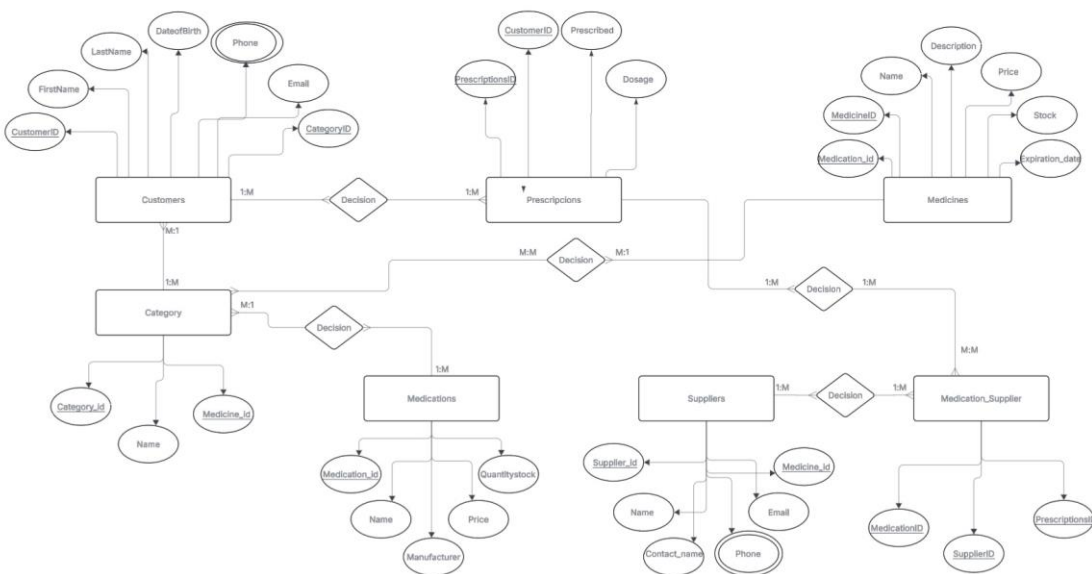
Create Table Prescriptions (**Prescription_id PK, Customer_id Fk, Prescribed, Dosage**)

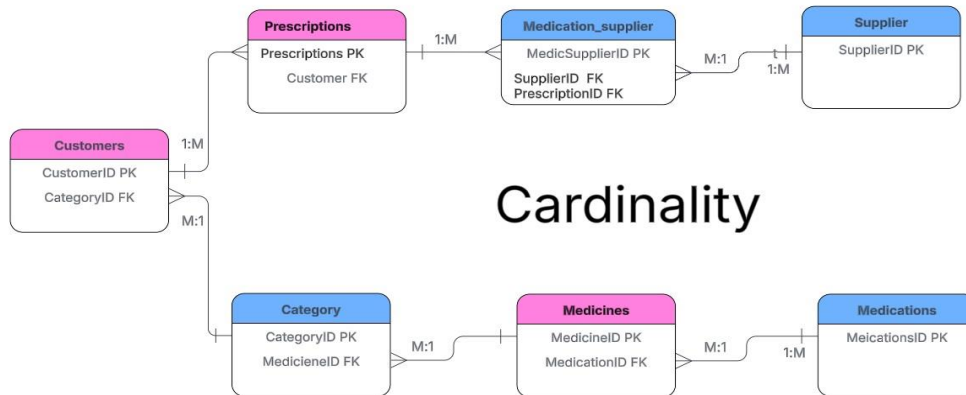
Create Table Medications (**Medication_id PK, Name, Manufacturer, Price, Quantity_in_Stock**)

Create Table Medications_Supplier (**Medication_id PK, Supplier_id FK, Prescriptions_id FK**)

2. Scenario Analysis

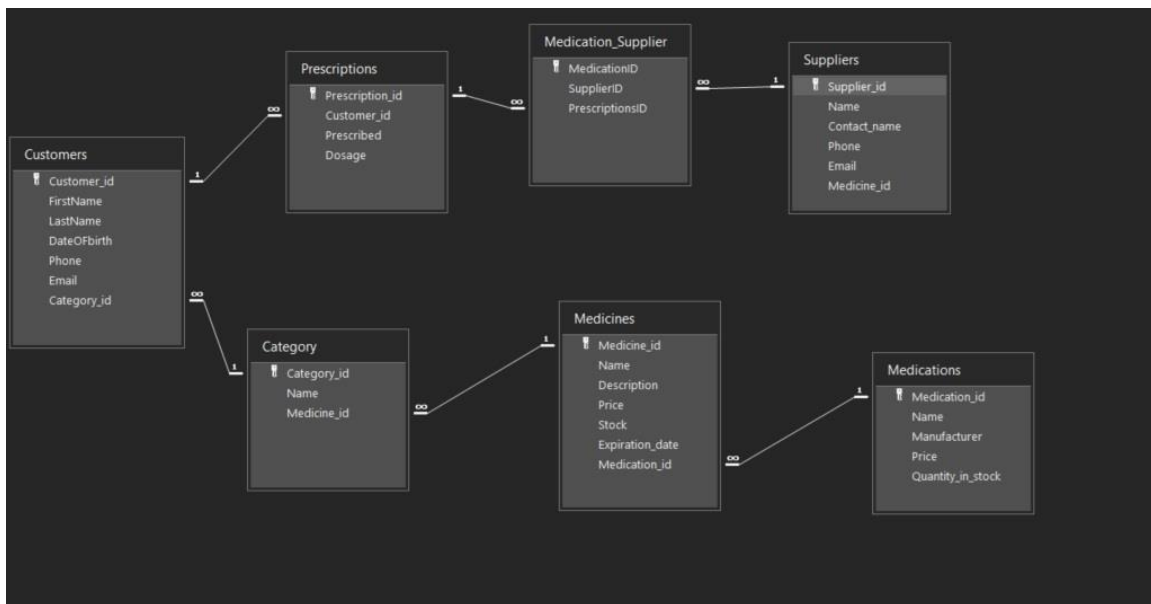
In the diagram we can observe the entities inside a rectangle, and the attributes in ovals which are related to their different cardinalities one to many, many to many etc.





3. Entity-Relationship Diagram (ERD)

4. Data Structure Design



5. Normalization Compliance (Up to 3NF)

In the first normal form, we remove lists and repeating groups; all values must be atomic.

So, what we did was separate the languages into different attributes.

Employee_ID	Name	Department	Language
1	Peter	RRHH	French, Portugues
2	Laura	Marketing	English, Spanish
3	Ana	Science	Italy
4	Jhon	Computer	English

Employee_ID	Language	Click to Add
1	English	
2	French	
3	Spanish	
4	Italy	
5	Portugues	
*	(New)	

In the Second normal form Partial dependencies or composite keys are eliminated, there can be no repetitions in multiple elements in the primary keys

EmployeeID	Language	Click to Add
1	French	
1	French	
3	Italy	
4	Spanish	
5	Portugues	

In the third normal form, transitive dependencies are eliminated.

6. Query Development Farmacy

FirstName	LastName	DateOfbirth	Medicine_id	Category_Ne	Medicines_N	Description
Alice	Smith	12/06/1980	1	Painkillers	Paracetamol	Pain relief
Bob	Jones	03/11/1992	2	Vitamins	Amoxicillin	Antibiotic
Charlie	Brown	15/02/1975	3	Antibiotics	Vitamin C	Immune support

Name	Prescribed	FirstName	LastName	DateOfbirth	Phone	Dosage	Description	Price	Stock
Paracetamol	03/01/2026	Alice	Smith	12/06/1980	07123456789	500mg	Pain relief	£5.00	100
Amoxicillin	06/03/2026	Bob	Jones	03/11/1992	07234567890	200mg	Antibiotic	£2.00	60
Vitamin C	30/10/2026	Charlie	Brown	15/02/1975	07345678901	250mg	Immune support	£3.00	200

FirstName ▾	LastName ▾	Phone ▾	Email ▾	Name ▾	Quantity_in_ ▾
Alice	Smith	07123456789	alice.smith@example.com	Paracetamol	200
Bob	Jones	07234567890	bob.jones@example.com	Ibuprofen	150
Charlie	Brown	07345678901	charlie.brown@example.com	Amoxicillin	100
*					

7. Query Development Bike

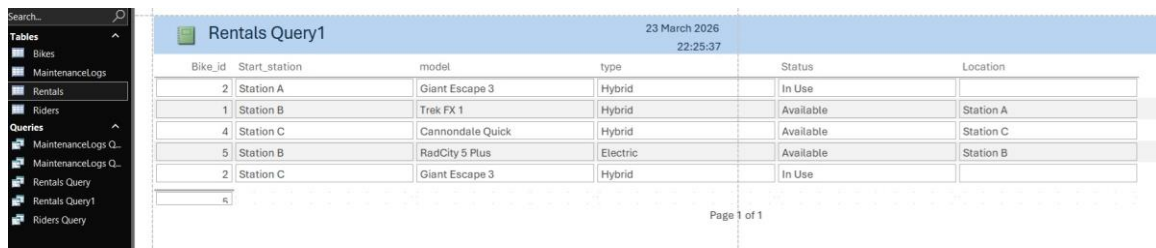
bike_id ▾	model ▾	type ▾	Status ▾	Location ▾	Click to Add ▾
1	Trek FX 1	Hybrid	Available	Station A	
2	Giant Escape 3	Hybrid	In Use		
3	Specialized Sirrus	Road	Maintenance	Workshop	
4	Cannondale Quick	Hybrid	Available	Station C	
5	RadCity 5 Plus	Electric	Available	Station B	
0					

rider_id ▾	name ▾	Log_id ▾	issue_description ▾	status ▾
2	Alice Morgan	9002	Tire replacement	Completed
1	Jamal Rivera	9005	Chain lubrication	Completed
5	Sofia Delgado	9005	Chain lubrication	Completed
3	Priya Shah	9004	Gear shifting issue	Completed
4	Ethan Brooks	9003	Battery diagnostic	In Progress

rider_id ▾	name ▾	email ▾	Phone ▾	Membership ▾	Click to Add ▾
1	Jamal Rivera	jamal@example.com	75551045	Casual	
2	Alice Morgan	alice@example.com	75551023	Annual	
3	Priya Shah	priya@example.com	75551074	Monthly	
4	Ethan Brooks	ethan@example.com	75451074	Casual	
5	Sofia Delgado	sofia@example.com	17451074	Annua	
0					

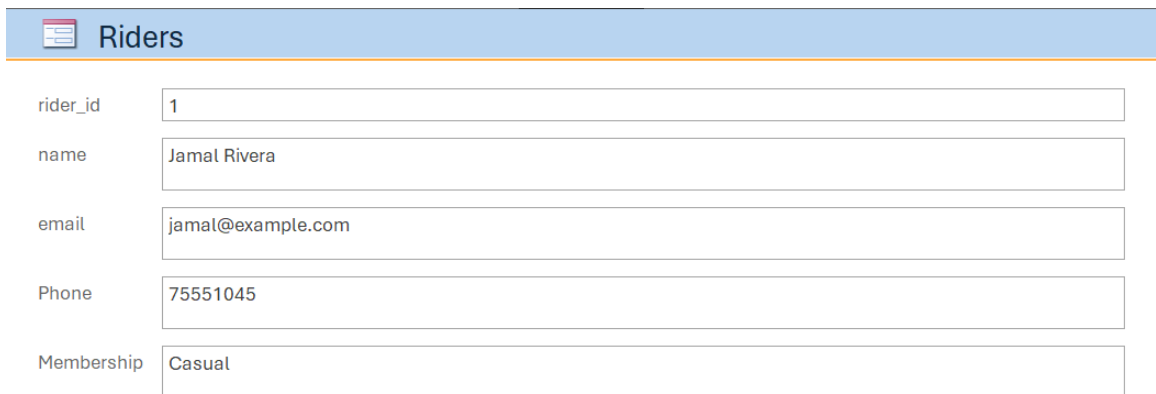
Bike_id ▾	Start_station ▾	model ▾	type ▾	Status ▾	Location ▾
1	Station B	Trek FX 1	Hybrid	Available	Station A
2	Station A	Giant Escape 3	Hybrid	In Use	
2	Station C	Giant Escape 3	Hybrid	In Use	
4	Station C	Cannondale Quick	Hybrid	Available	Station C
5	Station B	RadCity 5 Plus	Electric	Available	Station B

8. Forms and Reports



The screenshot shows a SQL Server Enterprise Manager interface. On the left is a 'Server Explorer' pane with a tree view containing 'Tables' (Bikes, MaintenanceLogs, Rentals, Riders), 'Queries' (MaintenanceLogs Q..., MaintenanceLogs Q..., Rentals Query, Rentals Query1, Riders Query), and 'Views'. The main area displays the results of 'Rentals Query1' as of 23 March 2026 at 22:25:37. The results are shown in a table with 6 columns: Bike_id, Start_station, model, type, Status, and Location. There are 6 rows of data. The bottom status bar indicates 'Page 1 of 1'.

Bike_id	Start_station	model	type	Status	Location
2	Station A	Giant Escape 3	Hybrid	In Use	
1	Station B	Trek FX 1	Hybrid	Available	Station A
4	Station C	Cannondale Quick	Hybrid	Available	Station C
5	Station B	RadCity 5 Plus	Electric	Available	Station B
2	Station C	Giant Escape 3	Hybrid	In Use	
6					



The screenshot shows a web form titled 'Riders'. It contains several input fields for user information. The fields are labeled 'rider_id', 'name', 'email', 'Phone', and 'Membership'. The values entered in the fields are '1', 'Jamal Rivera', 'jamal@example.com', '75551045', and 'Casual' respectively.

rider_id	1
name	Jamal Rivera
email	jamal@example.com
Phone	75551045
Membership	Casual

A form is an interface where the user can enter, edit, or delete data.

Capturing new information

Updating existing records

Validating data before saving

Allowing users to interact with the database without writing code

Bikes			
model	type	Status	Location
Trek FX 1	Hybrid	Available	Station A
Giant Escape 3	Hybrid	In Use	
Specialized Sirrus	Road	Maintenance	Workshop
Cannondale Quick	Hybrid	Available	Station C
RadCity 5 Plus	Electric	Available	Station B

A **report** is a document generated from stored data. Its purpose is to display information in an organized way, usually for analysis or decisionmaking.

9. Validation and Testing

Medication_	Name	Manufactur	Price	Quantity_in	Click to Add
1	Paracetamol	PharmaCorp	£4.99	200	
2	Ibuprofen	MedLife	£6.50	150	
3	Amoxicillin	HealthGen	£12.00	100	
(New)			£0.00	0	

Microsoft Access


need to write medicines

OK

Effective text validation reduces system errors, improves user experience, and strengthens security by ensuring that only clean, structured, and safe data enters the database.

10. Reflection

In the world of data, each entity represents a unique piece of a larger reality. Validating them, organising them into diagrams and transforming them into reports is not just a technical process: it is a reminder that knowledge needs structure to become understanding. Just as a well-designed database reveals hidden patterns, our life also becomes clearer when we organise our ideas, verify what we believe and observe the full picture. Only then do the details become meaningful.

11.

Conclusion

With these practices I have learned a lot about the importance of databases in our lives, I have learned to create diagrams which serve as a guide to start any project, on the other hand normalisations which are essential for the organisation of databases and the elimination of errors which helps us a lot to make a more robust database, furthermore the entities and cardinality which we use to define the relationships of the databases, it is also important to know that with this practice I have realised for example the use of attributes which if ...

12. References

Bibliography

Ralph Peeters, A. S. (2024). Entity Matching using Large Language Models.
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