IT 2351 Spring 2021 Matt Mahoney Assignment 5 No 1

Number 1

Mahoney_guitar_shop database design

Tables:

- administrators
    - Primary key - admin_id
    - Relationships: none
- order_items
    - Primary key - item_id
    - Foreign key - order_id (orders table)
    - Foreign key - product_id (products table)
    - Relationships
        - One to Many - orders to order_items
        - One to Many - products to order_items
- products
    - Primary key - product_id
    - Foreign key - category_id (categories table)
    - Relationships
        - One to Many - categories to products
        - One to Many - products to order_items
- categories
    - Primary key - category_id
    - Relationships
        - One to Many - categories to products
- orders
    - Primary key - order_id
    - Foreign key - customer_id (customers table)
    - Relationships
        - One to Many - customers to orders
        - One to Many - orders to order_items
- customers
    - Primary key - customer_id
    - Relationships
        - One to Many - customers to orders
        - One to Many - customers to addresses
- addresses
    - Primary key - address_id
    - Foreign key - customer_id (customers table)
    - Relationships
        - One to Many - customers to addresses

Cardinality - categories and products
categories: The Left Table Cardinality is Min 1 and Max 1
products: The Right Table Cardinality is Min 1 and Max n (or *)
This describes a one to many relationship between categories and products

Number 2

Raw Data

Student ID	Student Name	Address	Email	Classes	Major
S1	Joe Green	124 Main Street	joe@school.edu	IT1025/MATH1200 IT1050	Programming
S2	Sue Smith	345 Second Street	sue@school.edu	IT1025/IT1050/IT2351	Programming
S3	Nick Green	45 York Road	nick@school.edu	1025	Networking
S4	Andy Andrews	600 5th Avenue	andy@school.edu	1025/1050	Networking
S5	Tom Baker	123 Any Street	tom@school.edu	2351/1025	Dance
S6	Fred Jones	456 Nice Road	fred@school.edu	2351	Networking
S7	Marcy Jones	777 Sunny Lane	marcy@school.edu	1150/1025	Programming

First Normal Form

First Normal Form means that each intersection of row and column contains only one value, and there are no repeating columns.
To split out this data to meet those criteria I created new rows, one for each class that a student is taking. This leads to repeating rows (for instance, there are three rows for S1, Joe Green).
NOTE: For ease of typing in all this data repeatedly, I simplified the classes to just their numbers (i.e. 1025 instead of IT 1025).

Student ID	Student Name	Address	Email	Class	Major
S1	Joe Green	124 Main Street	joe@school.edu	1025	Programming
S1	Joe Green	124 Main Street	joe@school.edu	1200	Programming
S1	Joe Green	124 Main Street	joe@school.edu	1050	Programming
S2	Sue Smith	345 Second Street	sue@school.edu	1025	Programming
S2	Sue Smith	345 Second Street	sue@school.edu	1050	Programming
S2	Sue Smith	345 Second Street	sue@school.edu	2351	Programming
S3	Nick Green	45 York Road	nick@school.edu	1025	Networking
S4	Andy Andrews	600 5th Avenue	andy@school.edu	1025	Networking
S4	Andy Andrews	600 5th Avenue	andy@school.edu	1050	Networking
S5	Tom Baker	123 Any Street	tom@school.edu	2351	Networking
S5	Tom Baker	123 Any Street	tom@school.edu	1025	Dance

S6	Fred Jones	456 Nice Road	fred@school.edu	2351	Networking
S7	Marcy Jones	777 Sunny Lane	marcy@school.edu	1150	Programming
S7	Marcy Jones	777 Sunny Lane	marcy@school.edu	1025	Programming

Second Normal Form

Second Normal Form means that every non-key column must depend on the entire primary key.
I split this data into two tables, and added key columns.
The primary key on the Students table is Student ID.
The primary keys on the Classes table are Student ID and Class Sequence. Student ID is a foreign key on the classes table to Student ID on the Students table.
Students

Student ID	Student_Name	Address	Email	Major
S1	Joe Green	124 Main Street	joe@school.edu	Programming
S2	Sue Smith	345 Second Street	sue@school.edu	Programming
S3	Nick Green	45 York Road	nick@school.edu	Networking
S4	Andy Andrews	600 5th Avenue	andy@school.edu	Networking
S5	Tom Baker	123 Any Street	tom@school.edu	Dance
S6	Fred Jones	456 Nice Road	fred@school.edu	Networking
S7	Marcy Jones	777 Sunny Lane	marcy@school.edu	Programming

Classes

Student ID	Class Sequence	Class Number
S1	1	1025
S1	2	1200
S1	3	1050
S2	1	1025
S2	2	1050
S2	3	2351
S3	1	1025
S4	1	1025
S4	2	1050
S5	1	2351
S5	2	1025
S6	1	2351
S7	1	1150
S7	2	1025

Third Normal Form

Third Normal Form means that every non-key column must depend only on the primary key.
I further separated the data, keeping the Students table the same as it was in Second Normal Form. I added a Classes table to assign each class a unique ID. I created a Class_Sequences table to join the Students and Classes tables.

Students
The primary key is Student ID.

Student ID	Student_Name	Address	Email	Major
1	Joe Green	124 Main Street	joe@school.edu	Programming
2	Sue Smith	345 Second Street	sue@school.edu	Programming
3	Nick Green	45 York Road	nick@school.edu	Networking
4	Andy Andrews	600 5th Avenue	andy@school.edu	Networking
5	Tom Baker	123 Any Street	tom@school.edu	Dance
6	Fred Jones	456 Nice Road	fred@school.edu	Networking

7	Marcy Jones	777 Sunny Lane	marcy@school.edu	Programming

Classes
The primary key is Class ID.

Class ID	Class Number
1	1025
2	1050
3	1150
4	1200
5	2351

Class_Sequences
The primary key is Class Sequence ID. This table has a foreign key Student ID to the Students table and a foreign key Class ID to the Classes table.

Class Sequence ID	Student ID	Class ID
1	1	1
2	1	4
3	1	2
4	2	1
5	2	2
6	2	5
7	3	1
8	4	1
9	4	2
10	5	5
11	5	1
12	6	5
13	7	3
14	7	1