# Part 1

Have not found “Challenges” section

# Part 2

Note: Could not figure out what “volume” was referring to with questions 2 and 3.

**Sum of Money Screenshot**

**A screenshot of a computer

Description automatically generated**

Shows the statement used to get the sum of sales for each customer.

**1st Normal Form Violation**

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Student Name** | **Student Phone** |
| 1 | Kohl | 4029842172 |
| 2 | Bob | 1234567890, 1687891021 |

Violates 1st Normal Form due to the comma separated values under Student Phone field.

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Student Name** | **Student Phone** |
| 1 | Kohl | 4029842172 |
| 2 | Bob | 1234567890 |
| 2 | Bob | 1687891021 |

Can be fixed by separating entry into a separate row.

**2nd Normal Form Violation**

|  |  |  |
| --- | --- | --- |
| **Student Num** | **Course Num** | **Course Fee** |
| 1 | C1 | 1000 |
| 2 | C2 | 1500 |
| 1 | C4 | 2000 |
| 4 | C3 | 1000 |
| 4 | C1 | 1000 |
| 2 | C5 | 2000 |

The attribute Course Fee is dependent on a subset of candidate key, which is a partial dependency and is not 2nd Normal Form.

**Table 1**

|  |  |
| --- | --- |
| **Student Num** | **Course Num** |
| 1 | C1 |
| 2 | C2 |
| 1 | C4 |
| 4 | C3 |
| 4 | C1 |
| 2 | C5 |

**Table 2**

|  |  |
| --- | --- |
| **Course Num** | **Course Fee** |
| C1 | 1000 |
| C2 | 1500 |
| C3 | 1000 |
| C4 | 2000 |
| C5 | 2000 |

To fix the issue, we can split the data into 2 tables to reduce redundant data and make it 2nd Normal Form compliant.

**3rd Normal Form Violation**

|  |  |  |  |
| --- | --- | --- | --- |
| **Student ID** | **Student Name** | **Course** | **Course Instructor** |
| 1 | Bob | Math | Mr. Johnson |
| 2 | Steve | Science | Mrs. Smith |
| 3 | Kohl | English | Mr. Johnson |
| 4 | Billy | Math | Mrs. Brown |

With this table, we have repeating instances of Course and Course Instructor for each Student Name.

|  |  |
| --- | --- |
| **Student ID** | **Student Name** |
| 1 | Bob |
| 2 | Steve |
| 3 | Kohl |
| 4 | Billy |

|  |  |  |
| --- | --- | --- |
| **Student ID** | **Course** | **Course Instructor** |
| 1 | Math | Mr. Johnson |
| 2 | Science | Mrs. Smith |
| 3 | English | Mr. Johnson |
| 4 | Math | Mrs. Brown |

To fix this issue, we split the data into two tables to remove the repeating groups.

**Sources**

[First Normal Form](https://www.geeksforgeeks.org/first-normal-form-1nf/)

[Second Normal Form](https://www.geeksforgeeks.org/second-normal-form-2nf/?ref=next_article)

[Third Normal Form](https://www.kevsrobots.com/learn/sqlite3/15_3nf.html)

# Part 3

**Combined Screenshot**

**A screenshot of a computer

Description automatically generated**

Shows the result of clicking an album, the resulting tracks, and the result of clicking the track row to bring up the music video.