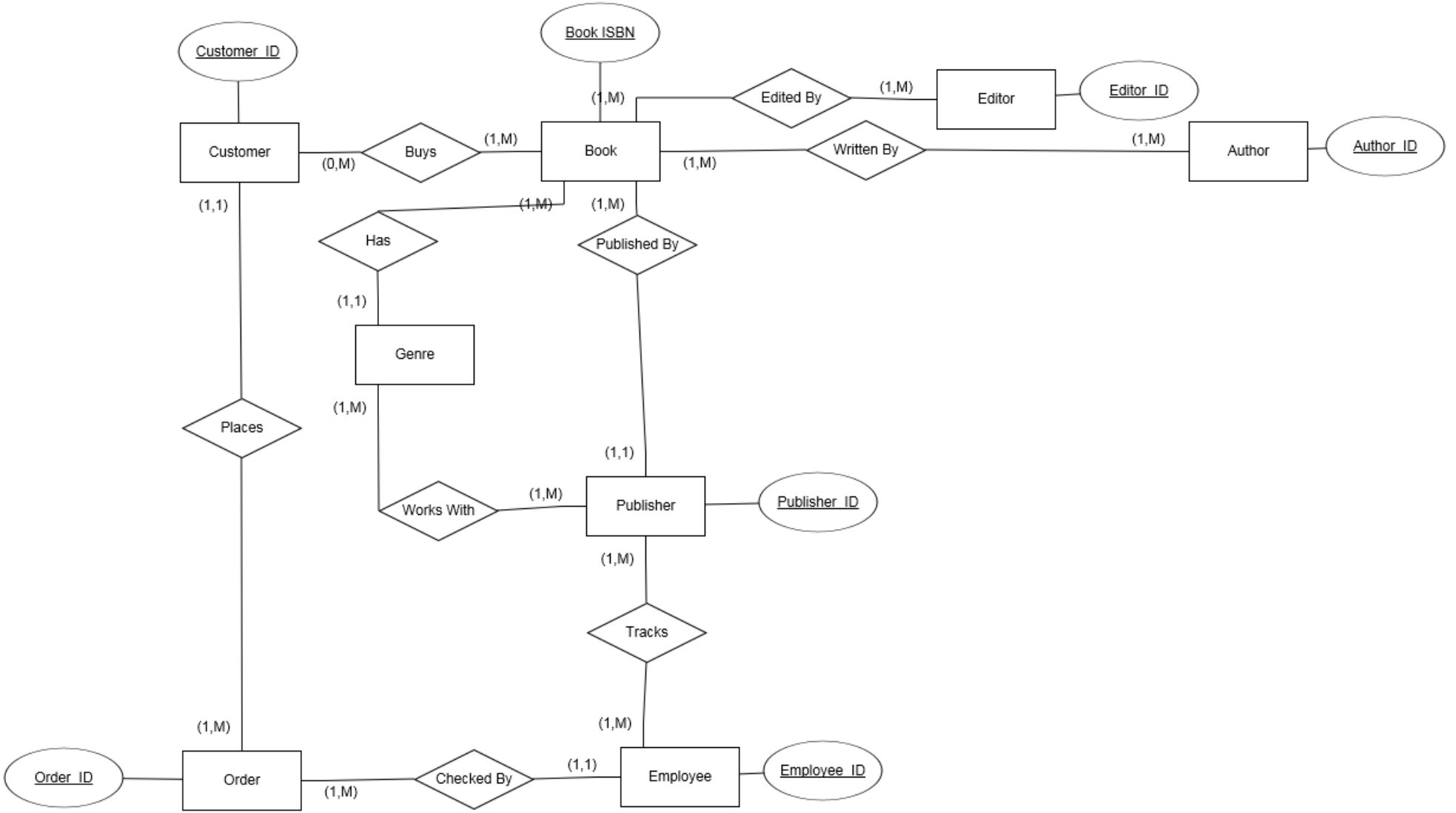
Assignment 4

ER Diagram to Normalization

Student Name	Ankita Upadhyay
Student zID	Z1836412
Course Number	CSCI 566
Assignment number	Assignment 4

1) Assumptions

1) A member or non-member whoever is buying book is a customer .
2) An order is not shipped/delivered until all the items in it are available (no back orders or partial orders).
3) An order status can have values placed , shipped and delivered.
4) All addresses are within the US
5) A book can be written by one or more authors or in the case of anthologies, where there are too many authors to list, a book will have one or more editors.
6) The book store also wants to be able to track the types of books that customers buy and there needs to be a way to contact customers.
7) Books are categorized by genre, publishers usually work with a limited number of genres, but each book is published by only one publisher.
8)A customer buys atleast one book .


Customer_ID
Book ISBN
Customer
Buys
(0,M)
(1,M)
Book
(1,M)
Edited By
(1,M)
Editor
Editor_ID
(1,M)
Written By
(1,M)
Author
Author_ID
(1,1)
(1,M)
(1,M)
Has
Published By
(1,1)
Genre
(1,M)
Places
(1,1)
Works With
(1,M)
Publisher
Publisher_ID
(1,M)
Tracks
(1,M)
(1,M)
Order_ID
Order
(1,M)
Checked By
(1,1)
Employee
Employee_ID

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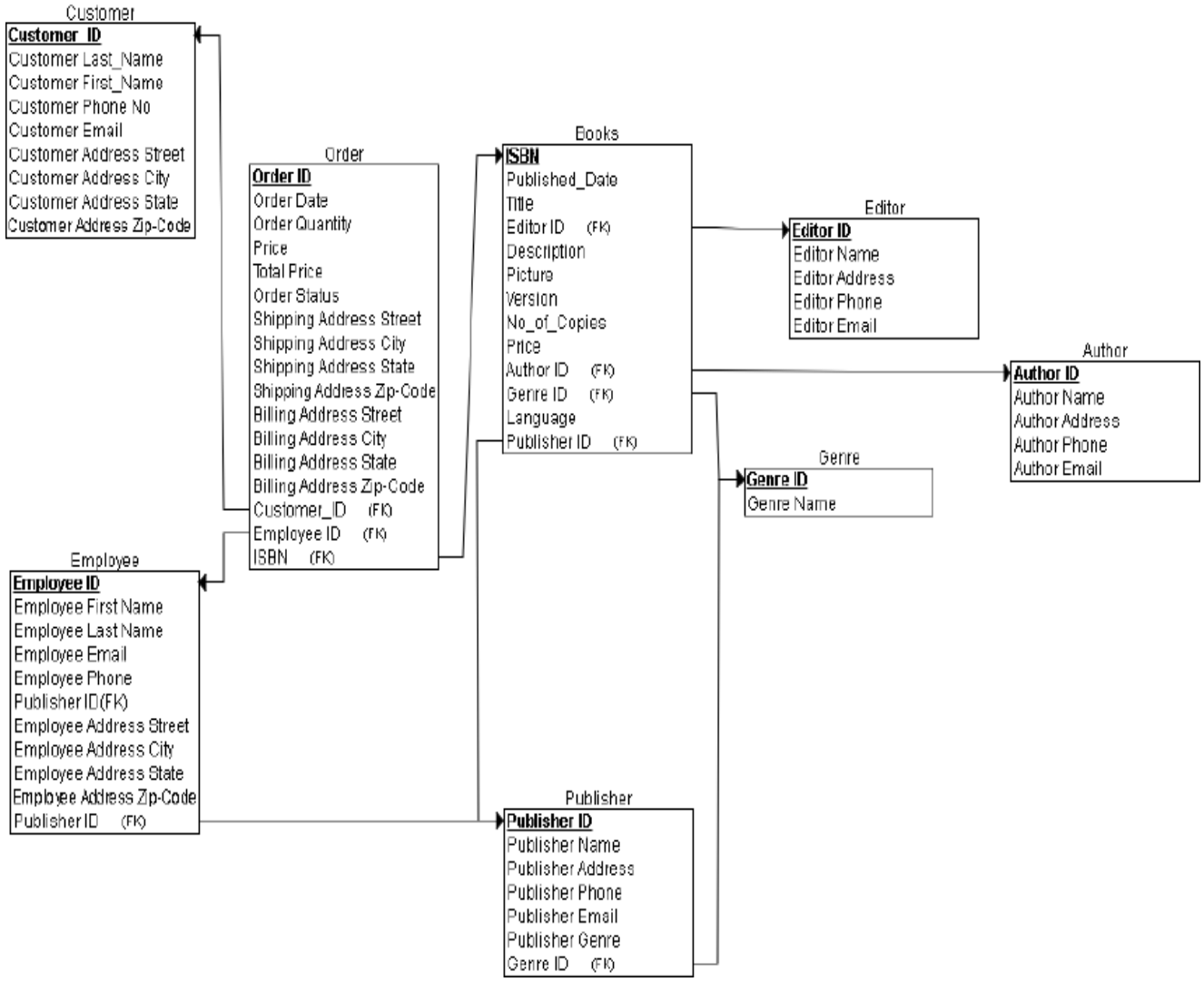
Entities



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Relationships

Relationship Name	Relationship Between
Buys	Customer, Book
Places	Customer, Order
Checked by	Order, Employee
Tracks	Employee, Publisher
Works with	Publisher, Genre
has	Book, Genre
Published By	Book, Publisher
Written By	Book, Author
Edited By	Book, Editor

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2)

- **Customer** (Customer_ID, Customer_Last_Name, Customer_First_Name , Customer_Address_Street , Customer_Phone_No , Customer_Email , Customer_Address_City , Customer_Address_State , Customer_Address_Zip-Code)

- **Author** (Author_ID, Author_Name , Author_Address , Author_Phone , Author_Email)

- **Editor** (Editor_ID , Editor_Name , Editor_Address , Editor_Phone , Editor_Email)

- **Genre** (Genre_ID , Genre_Name)

- **Publisher** (Publisher_ID , Genre_ID, Publisher_Name , Publisher_Address , Publisher_Phone , Publisher_Email , Publisher_Genre)

  → Genre_ID is FK to Genre Table

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- **Books** (ISBN , Genre_ID, Publisher_ID, Author_ID, Editor_ID, published_Date , Title , Description , Picture , Version , No_of_Copies , Price , Language)

  → Genre_ID is FK to Genre Table
  → Publisher_ID is FK to Publisher Table
  → Author_ID is FK to Author table
  → Editor_ID is FK to Editor table

- **Order** (Order_ID , ISBN , Customer_ID, Employee_ID , Order_Status , Order_Date , Price , Order_Quantity , Total_Price , Shipping_Address_Street , Shipping_Address_City , Shipping_Address_State , Shipping_Address_Zip-Code , Billing_Address_Street , Billing_Address_City , Billing_Address_State , Billing_Address_Zip-Code)

  → ISBN is FK to Books table.
  → Customer_ID is FK to Customer table
  → Employee_ID is FK to Employee table

Assignment 4

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Assignment number	Assignment 4

- **Employee** (Employee_ID , Publisher_ID , Employee_First_Name , Employee_Last_Name , Employee_Email , Employee_Phone , Employee_Address_Street, Employee_Address_City , Employee_Address_State , Employee_Address_Zip-Code)

  → Publisher_ID is FK to Publisher Table

- The Author relation is not in 1NF because
  i) A book can be written by one or more authors.
  ii)Also A book can be edited by one or more editors.
  iii)Also a single can be in multiple orders
  This means the data in every field is not atomic. So, we are splitting Books & Orders table .

Books (ISBN , Genre_ID , Publisher_ID , Published_Date , Title , Description , Picture , Version , No_of_Copies , Price , Language)

→ Publisher_ID is FK to Publisher table
→Genre_ID is FK to Genre table

Book_Author(ISBN,Author_ID)

Assignment 4

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→ ISBN is FK to Books table
→ Author_ID is FK to Author table

Book_Editor(ISBN,Editor_ID)

→ ISBN is FK to Books table
→ Editor_ID is FK to Editor table

Order (Order_ID , Customer_ID, Employee_ID , Order_Status , Order_Date , Price , Order_Quantity , Total_Price , Shipping_Address_Street , Shipping_Address_City , Shipping_Address_State , Shipping_Address_Zip-Code , Billing_Address_Street , Billing_Address_City , Billing_Address_State , Billing_Address_Zip-Code)

→ Customer_ID is FK to Customer table
→ Employee_ID is FK to Employee table

Orders_Books(Order_ID,ISBN,Quantity)

→ ISBN is FK to Books table.
→ Order_ID FK to Order table

Assignment 4

ER Diagram to Normalization

Now All below tables

Customer (Customer_ID, Customer_Last_Name, Customer_First_Name , Customer_Address_Street , Customer_Phone_No , Customer_Email , Customer_Address_City , Customer_Address_State , Customer_Address_Zip-Code)

Author (Author_ID, Author_Name , Author_Address , Author_Phone , Author_Email)

Assignment 4

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Assignment number	Assignment 4

Editor (Editor_ID , Editor_Name , Editor_Address , Editor_Phone , Editor_Email)

Genre (Genre_ID , Genre_Name)

Publisher (Publisher_ID , Genre_ID, Publisher_Name , Publisher_Address , Publisher_Phone , Publisher_Email , Publisher_Genre)

→ Genre_ID is FK to Genre Table

Books (ISBN , Genre_ID , Publisher_ID , Published_Date , Title , Description , Picture , Version , No_of_Copies , Price , Language)

→ Publisher_ID is FK to Publisher table
→Genre_ID is FK to Genre table

Book_Author(ISBN,Author_ID)

→ ISBN is FK to Books table
→ Author_ID is FK to Author table

Assignment 4

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Book_Editor(ISBN,Editor_ID)

→ ISBN is FK to Books table
→ Editor_ID is FK to Editor table

Order (Order_ID , Customer_ID, Employee_ID , Order_Status , Order_Date , Price , Order_Quantity , Total_Price , Shipping_Address_Street , Shipping_Address_City , Shipping_Address_State , Shipping_Address_Zip-Code , Billing_Address_Street , Billing_Address_City , Billing_Address_State , Billing_Address_Zip-Code)
→ Customer_ID is FK to Customer table
→ Employee_ID is FK to Employee table

Orders_Books(Order_ID,ISBN,Quantity)
→ ISBN is FK to Books table.
→ Order_ID FK to Order table

Employee (Employee_ID , Publisher_ID , Employee_First_Name , Employee_Last_Name , Employee_Email , Employee_Phone , Employee_Address_Street, Employee_Address_City , Employee_Address_State , Employee_Address_Zip-Code)

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→ Publisher_ID is FK to Publisher Table

are in 3NF because :

1) The tables are in 1NF as there are no repeating groups
2) The tables are in 2NF as each of its non-prime attributes are fully dependent on its prime attributes .
3) None of the non – prime attributes are transitively dependent on each other .