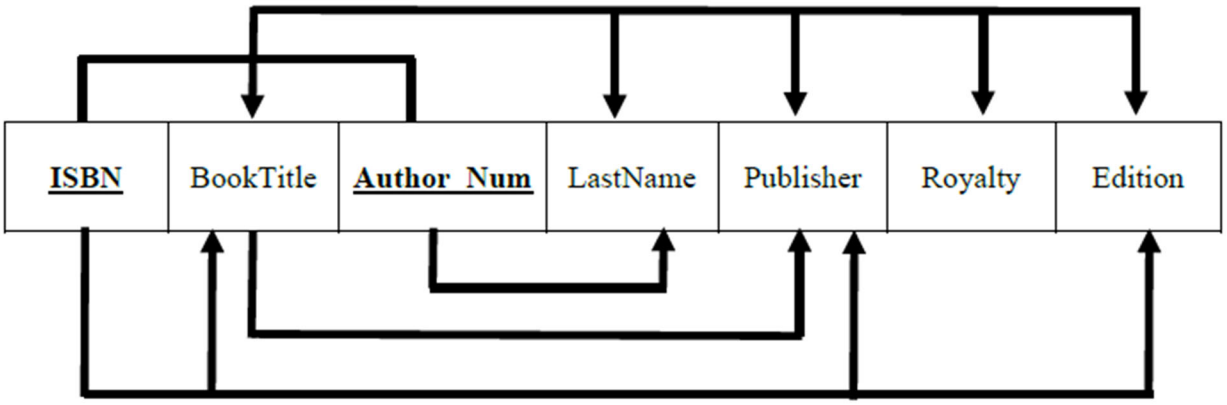
Sean Bupara
MGP/B/T-287
Winter 2021

HOMEWORK 2

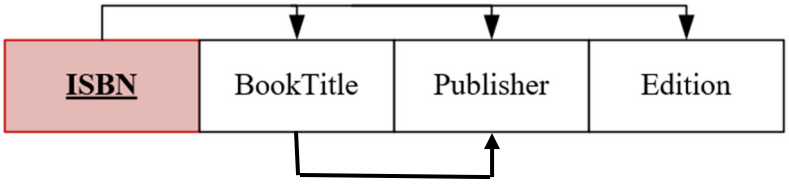
Question 1 (20 points)

The dependency diagram indicates that authors are paid royalties for each book they write for a publisher. The amount of the royalty can vary by author, by book, and by edition of the book.



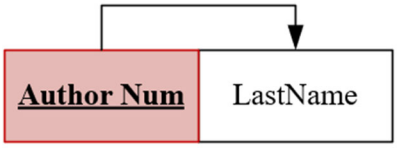
a. Based on the dependency diagram, create a database whose tables are at least in 2NF, showing the dependency diagram for each table.

BOOK

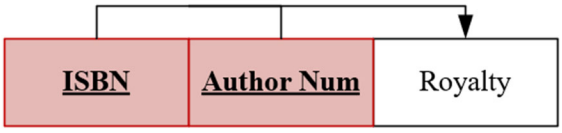


Transitive Dependency

AUTHOR

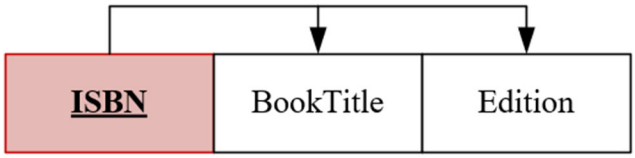


ROYALTY

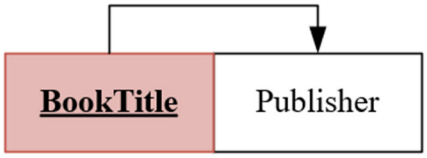


b. Create a database whose tables are at least in 3NF, showing the dependency diagram for each table.

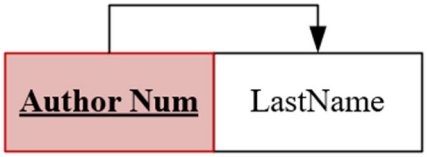
CATALOG



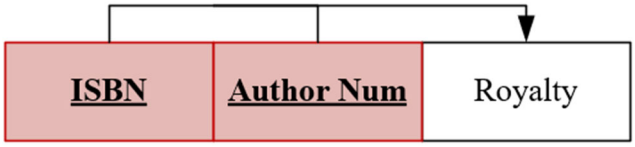
TITLE



AUTHOR

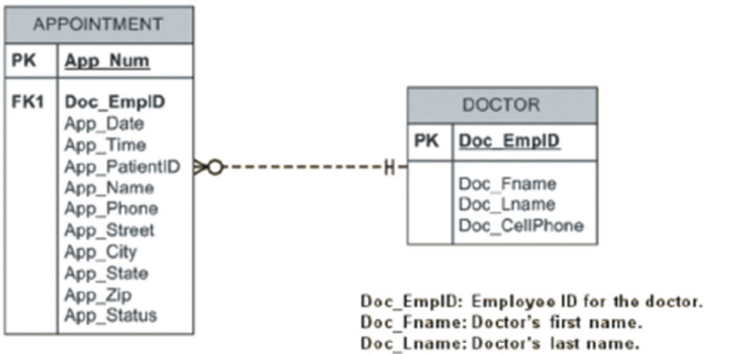


ROYALTY



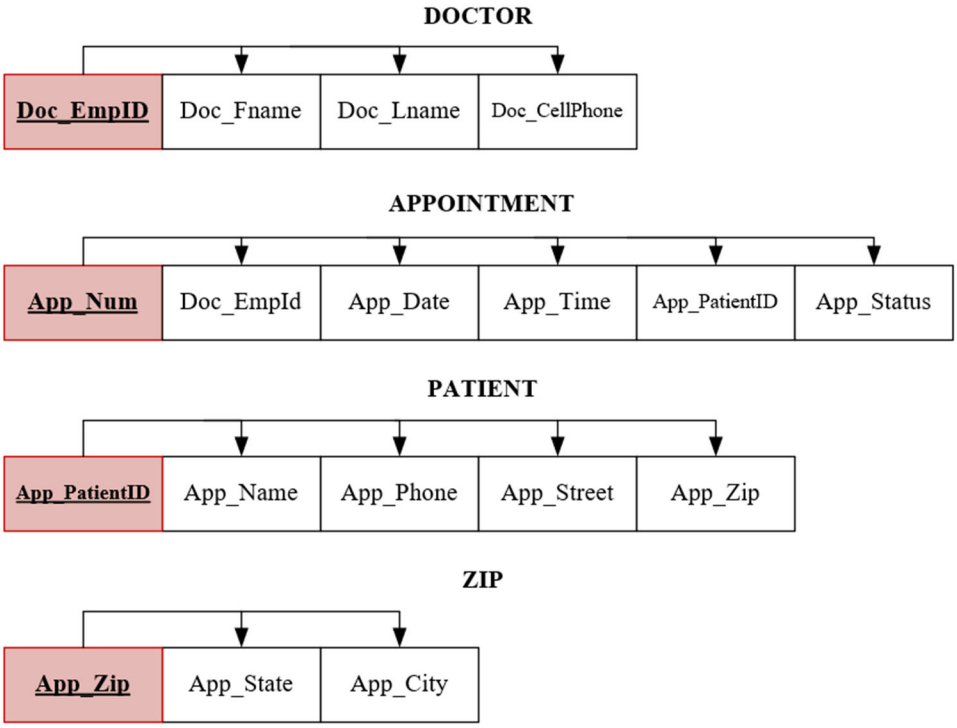
Question 2 (30 points)

Using the descriptions of the attributes given in the figure, convert the ERD shown in figure below into a dependency diagram that is in at least 3NF. Assume that a zip code only determines one city and state.



Doc_EmpID: Employee ID for the doctor.
Doc_Fname: Doctor's first name.
Doc_Lname: Doctor's last name.
Doc_CellPhone: Doctor's cell phone number.

App_Num: System-generated number.
App_Date: The date of the appointment.
App_Time: The time of the appointment.
App_PatientID: The ID number of the patient.
App_Name: The name of the patient.
App_Phone: The contact phone number of the patient.
App_Street: The street address for the patient.
App_City: The city the patient lives in.
App_State: The state the patient lives in.
App_Zip: The zip code for the patient's address.
App_Status: The status of the appointment (pending, closed, cancelled)



Question 3 (50 points)

To keep track of office furniture, computers, printers, and other office equipment, the FOUNDIT Company uses the table structure shown below.

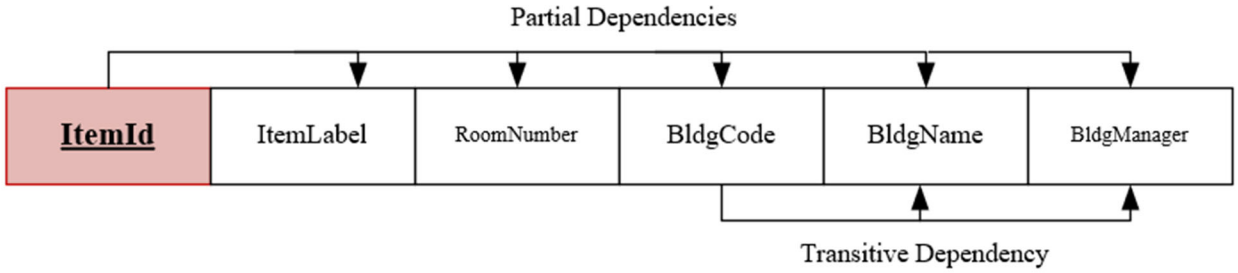
Attribute Name	Sample Value	Sample Value	Sample Value
ITEM_ID	231134-678	342245-225	254668-449
ITEM_LABEL	HP DeskJet 895Cse	HP Toner	DT Scanner
ROOM_NUMBER	325	325	123
BLDG_CODE	NTC	NTC	CSF
BLDG_NAME	Nottooclear	Nottoclear	Canseefar
BLDG_MANAGER	I. B. Rightonit	I. B. Rightonit	May B. Next

a. Given that information, write the relational schema and draw the dependency diagram. Make sure that you label the transitive and/or partial dependencies.

Schema:

FOUNDIT(**ITEM_ID**,ITEM_LABEL,ROOM_NUMBER,BLDG_CODE,BLDG_NAME,BLDG_MANAGER)

Dependency Diagram:



b. Write the relational schema and create a set of dependency diagrams that meet 3NF requirements. Rename attributes to meet the naming conventions and create new entities and attributes as necessary.

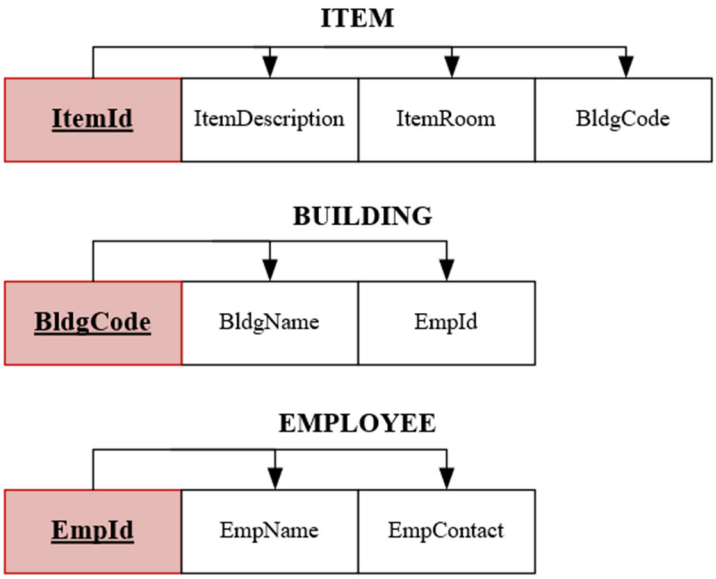
Schema:

ITEM(**ItemID**, ItemDescription, ItemRoom, BldgCode)

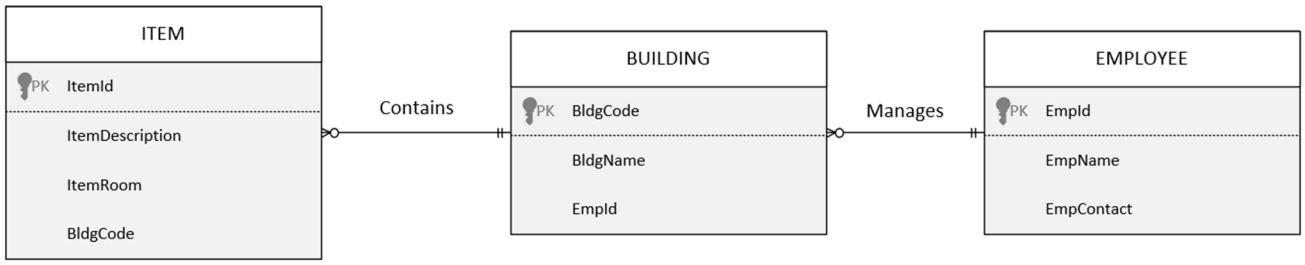
BUILDING(**BldgCode**, BldgName, EmpId)

EMPLOYEE(**EmpID**, EmpName, EmpContact)

Dependency Diagram:



c. Draw the Crow's Foot ERD.



Question 4 (50 points)

Suppose you are given the following business rules to form the basis for a database design. The database must enable the manager of a company dinner club to mail invitations to the club's members, to plan the meals, to keep track of who attends the dinners, and so on.

- Each dinner serves many members, and each member may attend many dinners.
- A member receives many invitations, and each invitation is mailed to many members.
- A dinner is based on a single entree, but an entree may be used as the basis for many dinners. For example, a dinner may be composed of a fish entree, rice, and corn, or the dinner may be composed of a fish entree, a baked potato, and string beans.

Because the manager is not a database expert, the first attempt at creating the database uses the structure shown below.

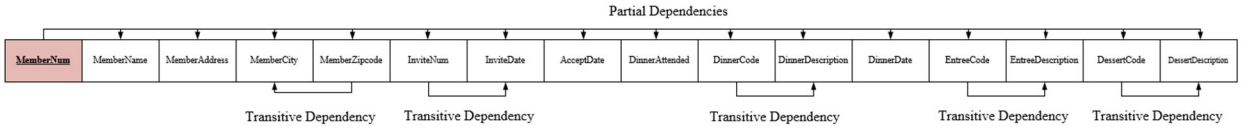
Attribute Name	Sample Value	Sample Value	Sample Value
MEMBER_NUM	214	235	214
MEMBER_NAME	Alice B. VanderVoort	Gerald M. Gallega	Alice B. VanderVoort
MEMBER_ADDRESS	325 Meadow Park	123 Rose Court	325 Meadow Park
MEMBER_CITY	Murkywater	Highlight	Murkywater
MEMBER_ZIPCODE	12345	12349	12345
INVITE_NUM	8	9	10
INVITE_DATE	23-Feb-2016	12-Mar-2016	23-Feb-2016
ACCEPT_DATE	27-Feb-2016	15-Mar-2016	27-Feb-2016
DINNER_DATE	15-Mar-2016	17-Mar-2016	15-Mar-2016
DINNER_ATTENDED	Yes	Yes	No
DINNER_CODE	DI5	DI5	DI2
DINNER_DESCRIPTION	Glowing sea delight	Glowing sea delight	Ranch Superb
ENTREE_CODE	EN3	EN3	EN5
ENTREE_DESCRIPTION	Stuffed crab	Stuffed crab	Marinated steak
DESERT_CODE	DE8	DE5	DE2
DESERT_DESCRIPTION	Chocolate mousse with raspberry sauce	Cherries jubilee	Apple pie with honey crust

a. Given the table structure above, write the relational schema and draw its dependency diagram. Label all transitive and/or partial dependencies.

Schema:

MEMBER(**MemberName**, InviteNum, DinnerCode, EntreCode, DessertCode, MemberName, MemberAddress, MemberCity, MemberZipcode, InviteDate, AcceptDate, DinnerDate, DinnerAttended, DinnerDescription, EntreeDescription, DessertDescription)

Dependency Diagram:



b. Break up the dependency diagram you drew in part a to produce dependency diagrams that are in 3NF and write the relational schema. (Hint: You might have to create a few new attributes. Also, make sure that the new dependency diagrams contain attributes that meet proper design criteria; that is, make sure there are no multivalued attributes, that the naming conventions are met, and so on.)

Schema:

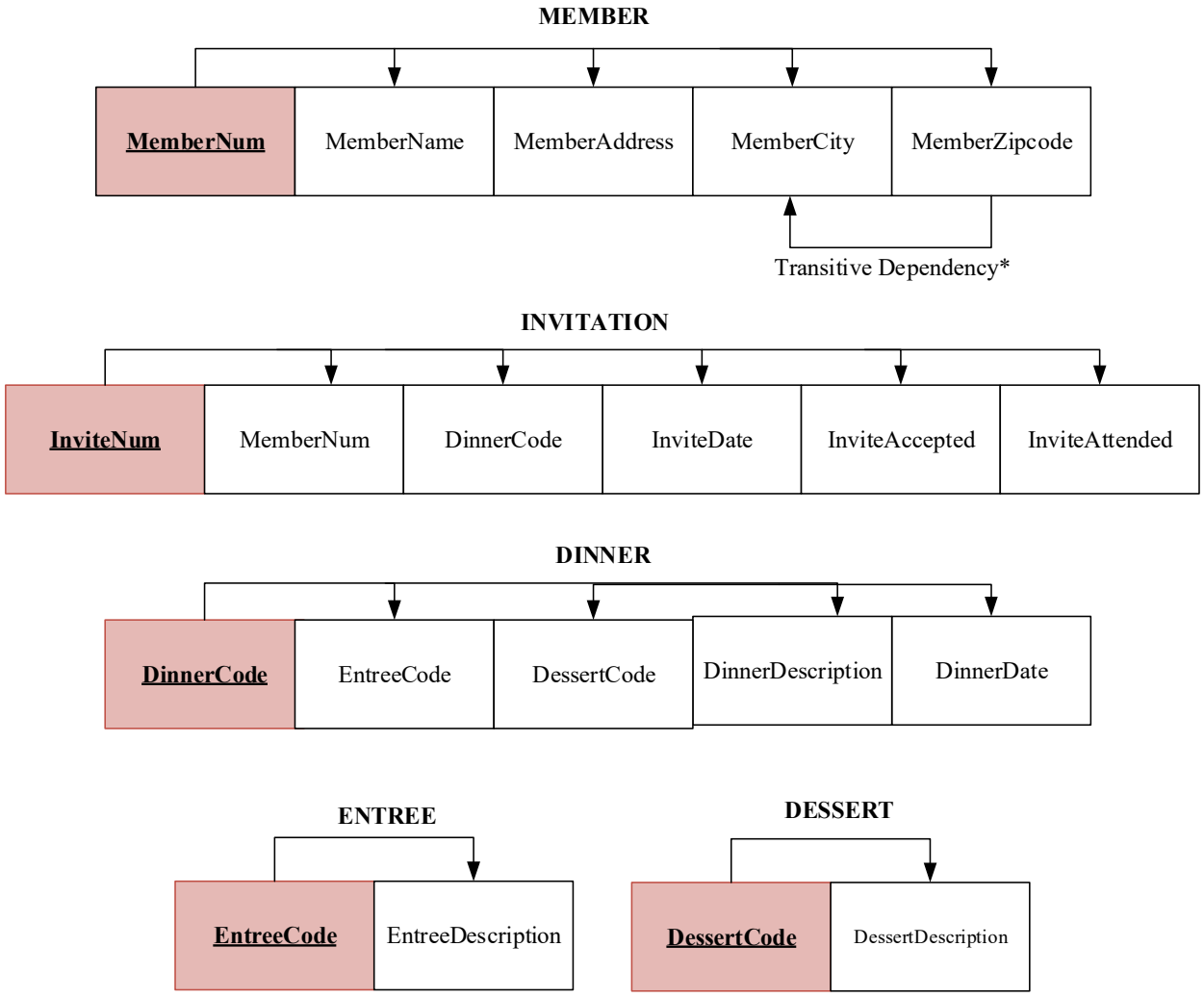
MEMBER(**MemberNum**, MemberName, MemberAddress, MemberCity, MemberZipcode)

INVITATION(**InviteNum**, **MemberNum**, **DinnerCode**, InviteDate, InviteAccepted, InviteAttended)

DINNER(**DinnerCode**, EntreeCode, DessertCode, DinnerDescription, DinnerDate)

ENTRÉE(**EntreeCode**, EntreeDescription)

DESSERT(**DessertCode**, DessertDescription)



* I have decided to retain the transitive dependency in MEMBER to avoid unnecessary complications of creating a ZIPCODE table.

c. Using the results of part b, draw the Crow's Foot ERD.