Assignment-1-Team-19

Team members: Anannya Chatterjee, Tejasvi Meka

2-39(a)

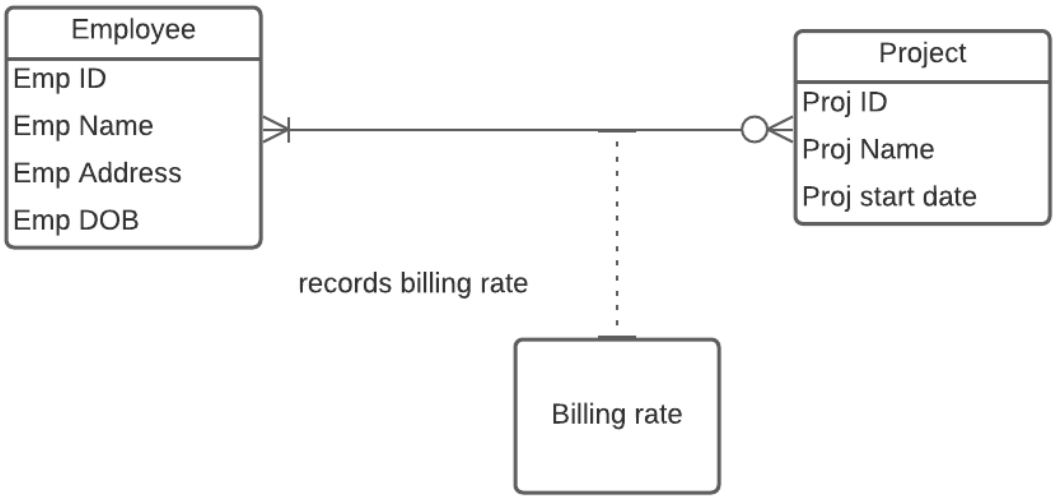

Fig2-39(a) ERD

Primary Keys: We are describing the Primary keys of the Employee entity and the Project entity here. "**Emp ID" is the PK of Employee entity and "Proj" ID is the PK of the Project entity**.

Relationships and Cardinalities are described in words here**:**

Each employee is assigned to zero or many projects and
Each project has minimum one employee or many employees assigned to it.

Billing rate Entity:

It is the associative entity on our ERD. Since there exists a many to many Relationship between Employee and Project entities, so there exists an associate entity in the Entity Relationship Diagram.

The "Billing rate" entity will have Emp ID and Proj ID from the Employee and Project entities respectively. These are the Foreign keys here as these are the Primary Keys in Employee and Project entities respectively.

2-39(b)

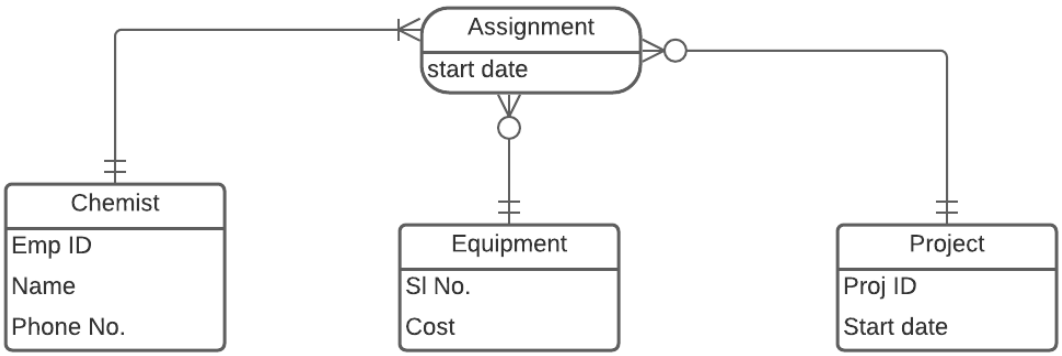

Fig2-39(b) ERD

Primary Key, Foreign key: We are describing the Primary key, foreign key and other attributes of the Chemist, Equipment and the Project entities.

Here, the various attributes of 'Chemist entity' include **Employee ID (Primary key)**, Name and Phone No. The attributes of 'Project entity' include **Project ID (Primary key)** and Start Date. The various attributes of 'Equipment entity' include **Serial No (Primary key)** and Cost. The associative entity is "Assignment" which has 'Start date' as one of its attributes.

Relationships and Cardinalities:

One Chemist is mandatorily assigned to at least one project and one equipment item.
One Equipment may or may not get assigned to any chemist.
One Project may or may not get assigned to either a chemist or an equipment.

Assignment Entity:
All the above three entities participate together in the "Assigned relationship" that is formed as an associative entity. The name of this is "Assignment entity".
Here we are tracking the "Assign Date" for each Chemist who is assigned to any project and equipment item. As we see, this Assignment entity will help us to do that in our ERD.

'Start date' is an attribute of this Assignment Entity. As we see here the Equipment entity and the Project entity do not have to participate in any kind of assignments.

2-39(c)

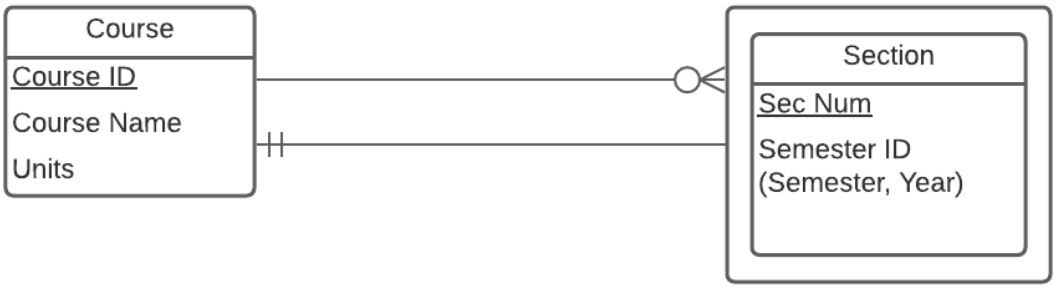

Fig2-39(c) ERD

Primary Key: Here we are describing the Primary key and other attributes of the Course and Section entities
Here, the attributes of 'Course' include **Course ID (Primary key),** Course Name and Units. Attributes of Section include **Sec Num (Primary key)** and Semester ID.

Relationships and Cardinalities:
One course can have zero or many sections.
Each section will have mandatory only one course.

2-39(d)

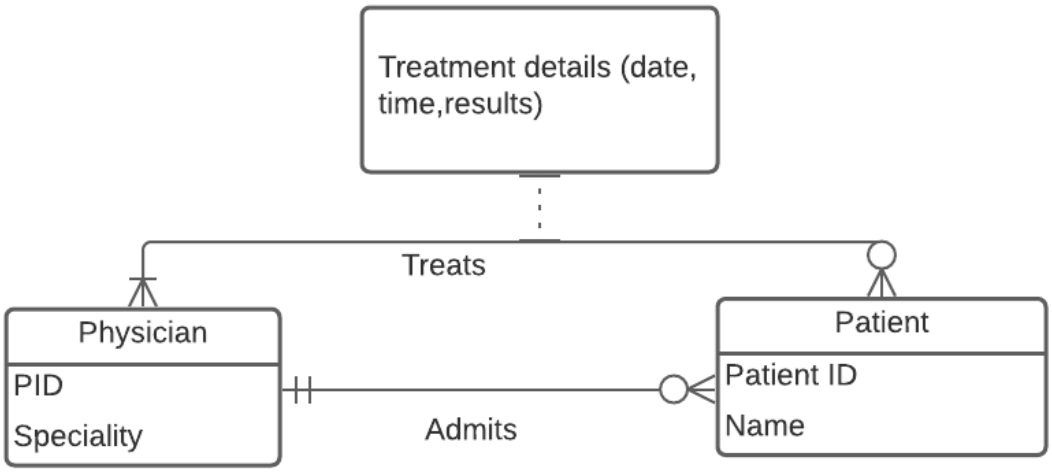

Fig2-39(d)(1) ERD

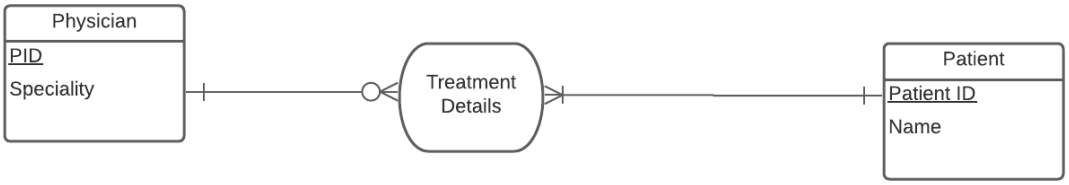

Fig2-39(d)(2) ERD

Primary Key, Foreign key: We are describing the Primary key, foreign key and other attributes of the Physician and Patient entity.

Here, the attributes of 'Physician' entity include **PID (Primary key)** and Speciality. Attributes of 'Patient' entity include **Patient ID (Primary key)** and Start Date.

Relationships and Cardinalities:
Here cardinalities are described as:
Each physician admits zero or many patients.
Each patient will be admitted by only one physician (mandatory).

And here treatment logics are recorded as:
Each physician may treat zero or many patients.
Each patient must be treated by at least one physician.

The **Fig**2-39(d)(1) ERD could also be updated to show 'Treatment Details' associative entity (considering the respective attributes) to depict the Many to Many relationship between Patients and Physicians. That is captured in **Fig**2-39(d)(2) ERD.

Treatment Details Entity:
The two entities that participate in the 'Treats' relationship are Physician and Patient. This association is captured or modeled with the help of associative entity 'Treatment Details'. This entity will help us to record the details of the treatment. This associative entity would have 'Date, Time, Results' as its attributes.

2-39(e)

First scenario: One credit check can be used by more than one credit request.

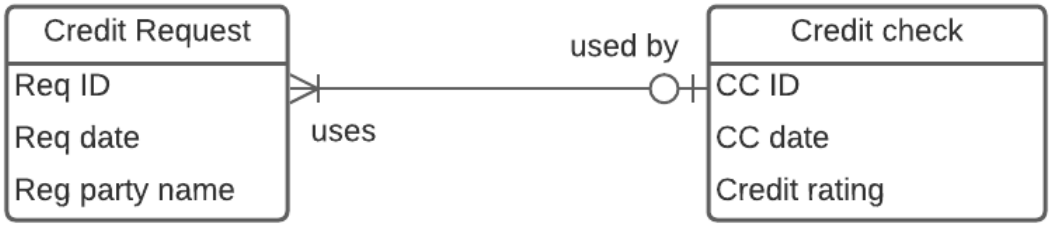

Fig2-39(e)(1) ERD

Primary keys: Req ID(Request ID) from Credit Request entity is the primary key.
CC ID (Credit check ID) from Credit check entity is the primary key.

Relationships and Cardinalities:
One Credit check can be used by more than one Credit request.
One Credit request may not use or maximum use one credit check.

Second Scenario: One Credit check can only be used by one credit request – It involves 2 Entities.

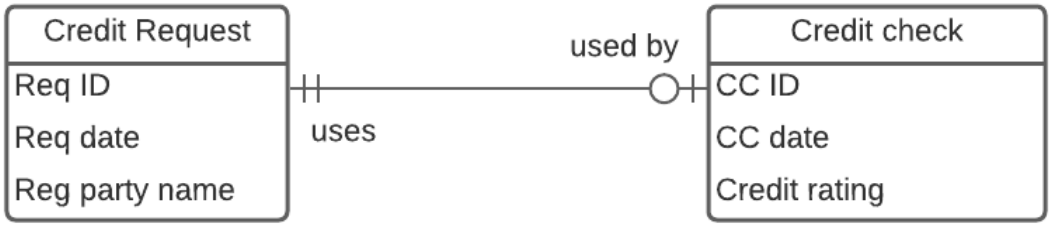

Fig2-39(e)(2) ERD

Second Scenario: One credit check can only be used by one credit request – It involves only 1 Entity.

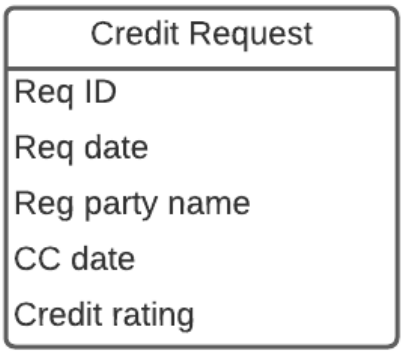

Fig2-39(e)(3) ERD

2-39(f)

Initial diagram:

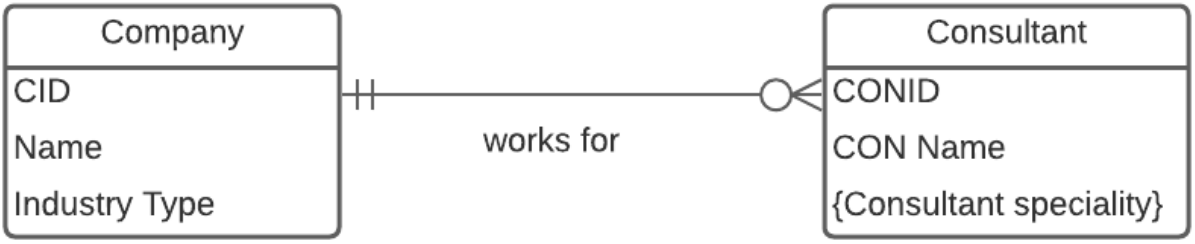

Fig2-39(f)(1) ERD

Primary Key: CID (Company ID) from Company entity
CONID (Consultant ID) from Consultant entity

Company and Consultant entities: The cardinality described here is:
One consultant works for one and only one company.
One company may hire multiple consultants.

Now, considering situations.

Situation 1 – Here we are adding Hourly Rate attribute. This is the rate a consultant charges a company for each hour of his or her work. If we follow the business rule that one consultant can work for only one company at a time, then we can add 'hourly rate' attribute to the consultant entity. Below is the diagram.
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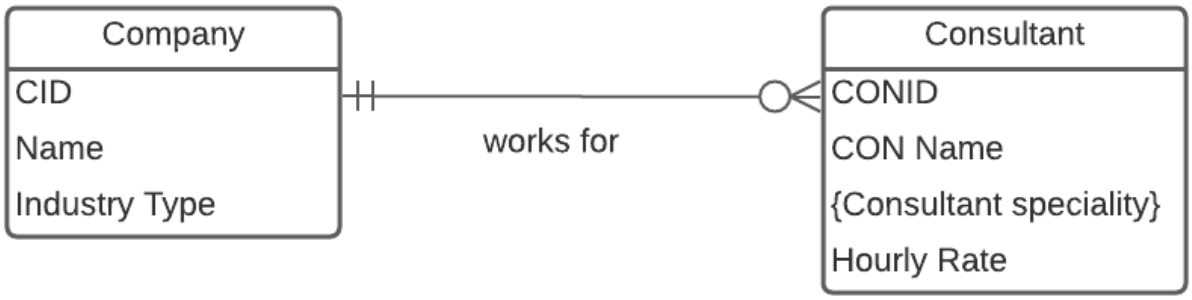

Fig2-39(f)(2) ERD

Primary Keys: **CID (Company ID)** from company entity
CONID (Consultant ID) from consultant entity. Hourly rate is added as an attribute to this entity.

Situation 2**:**

Company and Contract entities: Considering this second situation where we see that each time one consultant works for one company, a contract is written describing the terms for this consulting engagement. So here the 'hourly rate' attribute is moved to 'Contract entity' since this allows a Consultant to change his or her hourly rate based on the respective contract details for a company.

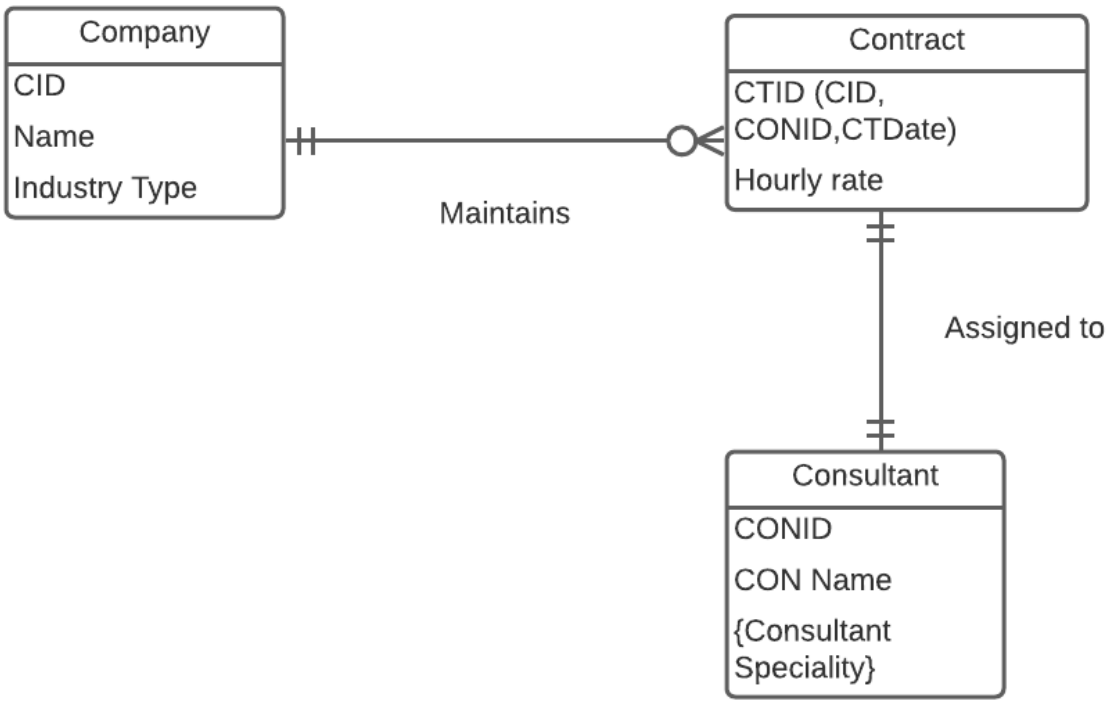

Fig2-39(f)(3) ERD

Primary Keys: CID(Company ID) from company entity
CONID(Consultant ID) from consultant entity
CID, CONID(composite primary key) from contract entity

Foreign Key: CID(Company ID) and CONID(Consultant ID) are Foreign keys in Contract Entity.

Relationships and Cardinalities:

Contract and Consultant entities:
One company may maintain zero or many contracts.
One contract is maintained by one and only one company.

Contract and Consultant entities: Here cardinality described as mandatory one contract is assigned to mandatory one consultant and vice versa.

Situation 3 –For tracking all the historical CONTRACT information for all consultants and all companies, Contract entity is made as associate entity.

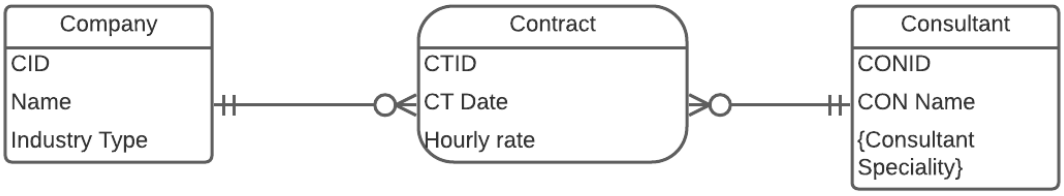

Fig2-39(f)(4) ERD

Primary Keys: CID (Company ID) from Company entity
CONID (Consultant ID) from Consultant entity
CTID (Contract ID) from contract entity

Relationships and Cardinalities:

Company and Contract entities: Here cardinality is explained as One Company maintains zero or many contracts. One contract is maintained by only one company.

Contract and Consultant entities: Here cardinality is explained as one consultant has worked on zero or many contracts. One contract is assigned to one and only one Consultant

2-39(g)

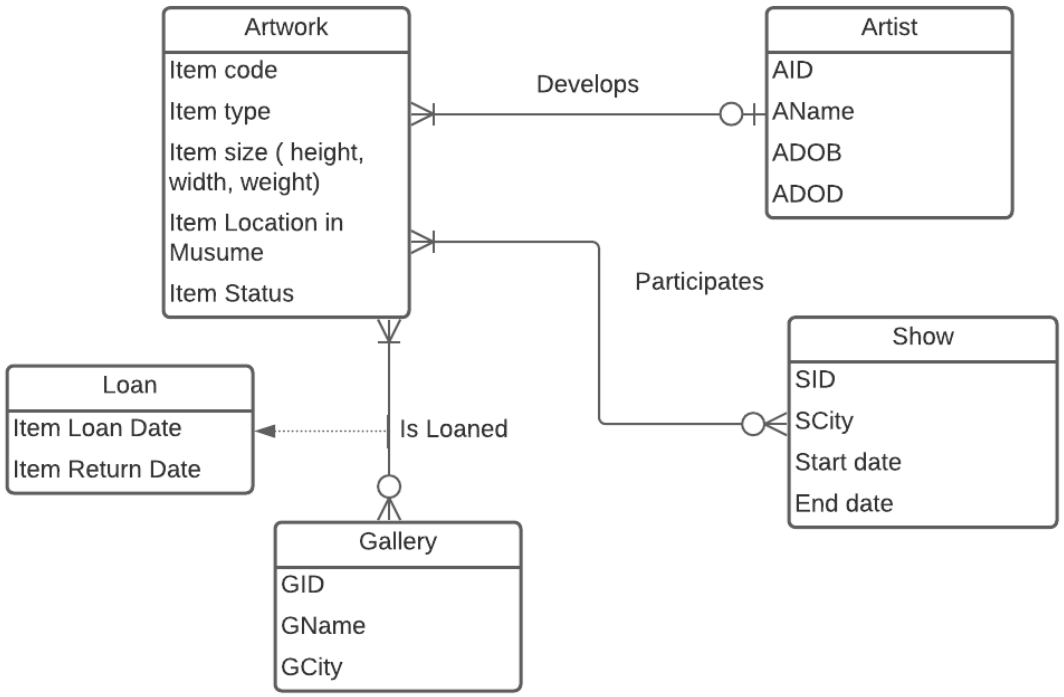

Fig2-39(g) ERD

Primary Keys: (Item code) from Artwork entity
AID(Artist ID) from Artist entity
SID(Show ID) from show entity
GID(Gallery ID) from gallery entity.

Relationships and Cardinalities:

Artwork and Artist Entities: One artist develops one or more artwork.
One artwork is developed by 0 or one Artist (Here 0 is used for Unknown Artist)

Artwork and Show Entities: One artwork may participate in zero or many shows.
One Show can display one or many Artworks.

Artwork and Gallery Entities: One artwork is loaned by zero or many Galleries.
One Gallery can loan one or many artworks. Loan date and item return date are specified in the relation**.**

2-39(h)

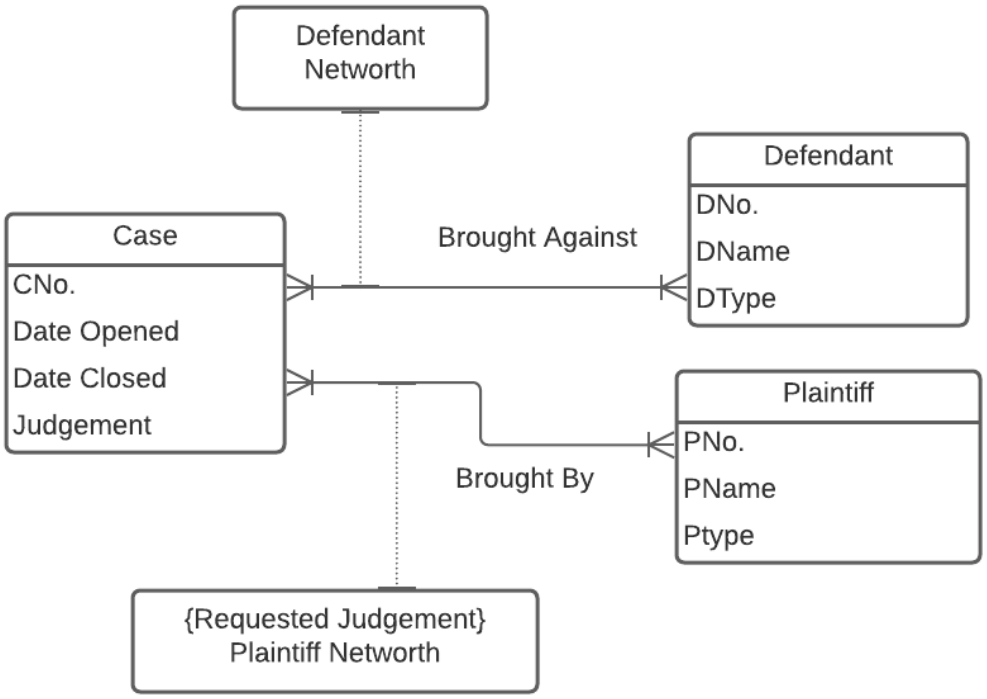

Fig2-39(h) ERD

Primary Keys: CNo.(case number) from case entity is the PK.
DNo.(Defendant number) from defendant entity is the PK.
PNo.(Plaintiff number) from plaintiff entity is the PK.

Relationships and Cardinalities:

Since Plaintiff Net Worth and Defendant net worth is applicable only during the time of the Case, they are showcased as the attributes of the many to many relationship between Case and Defendant, Plaintiff entities.

- **Case and Defendant entities:** There exists a M:N Cardinality between Case and Defendant
- **Case and plaintiff entities:** There exists a M:N Cardinality between Case and Plaintiff

2-39(i)

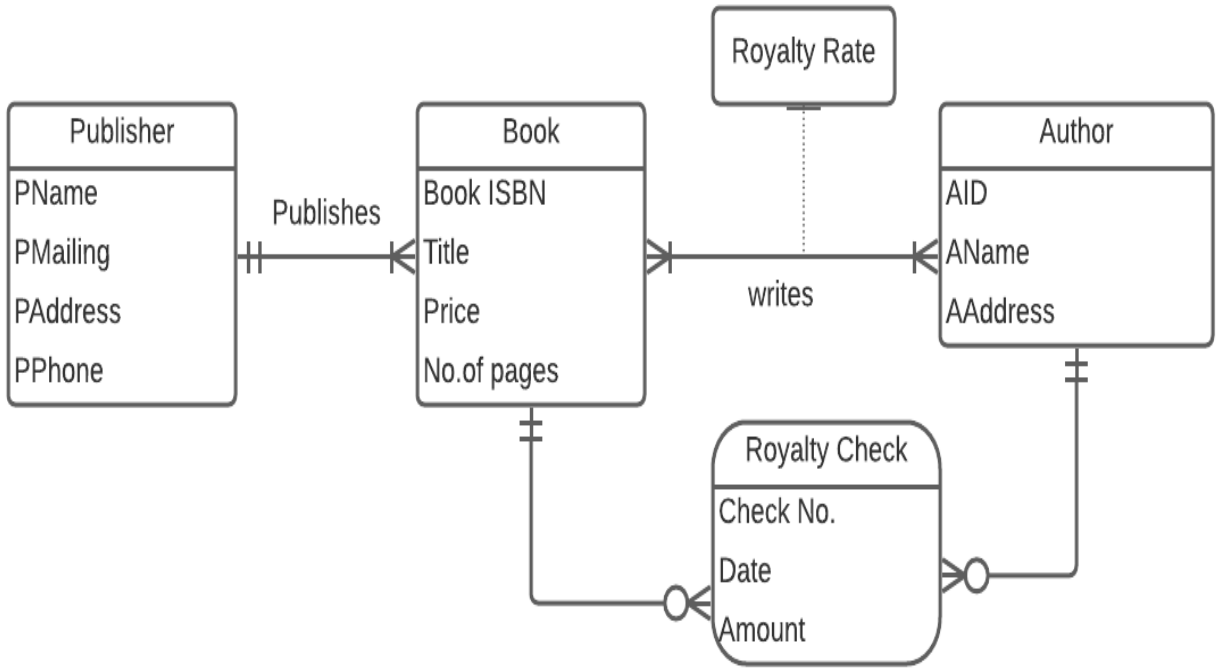

Fig2-39(i) ERD

Primary keys:

PName (Publisher name) from publisher entity is the PK.
BOOK ISBN from book entity is the PK.
AID(Author ID) from author entity is the PK.
CheckNo. from royalty check entity is the PK.

Relationships and Cardinalities:

Publisher and book entity:
One publisher can publish one or many books.
One book can be published by mandatorily one and only one publisher.

Book and Author entity:
One author can write one or many books.
One book can be written by one or many authors.

Since there exists M:N relationship between Book and Author, so an associative entity comes into picture. This is “Royalty Check”. It has Check No, Check Date and Check Amount as its various attributes.

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2-49) The solution for this problem starts in the next page. Please scroll down.

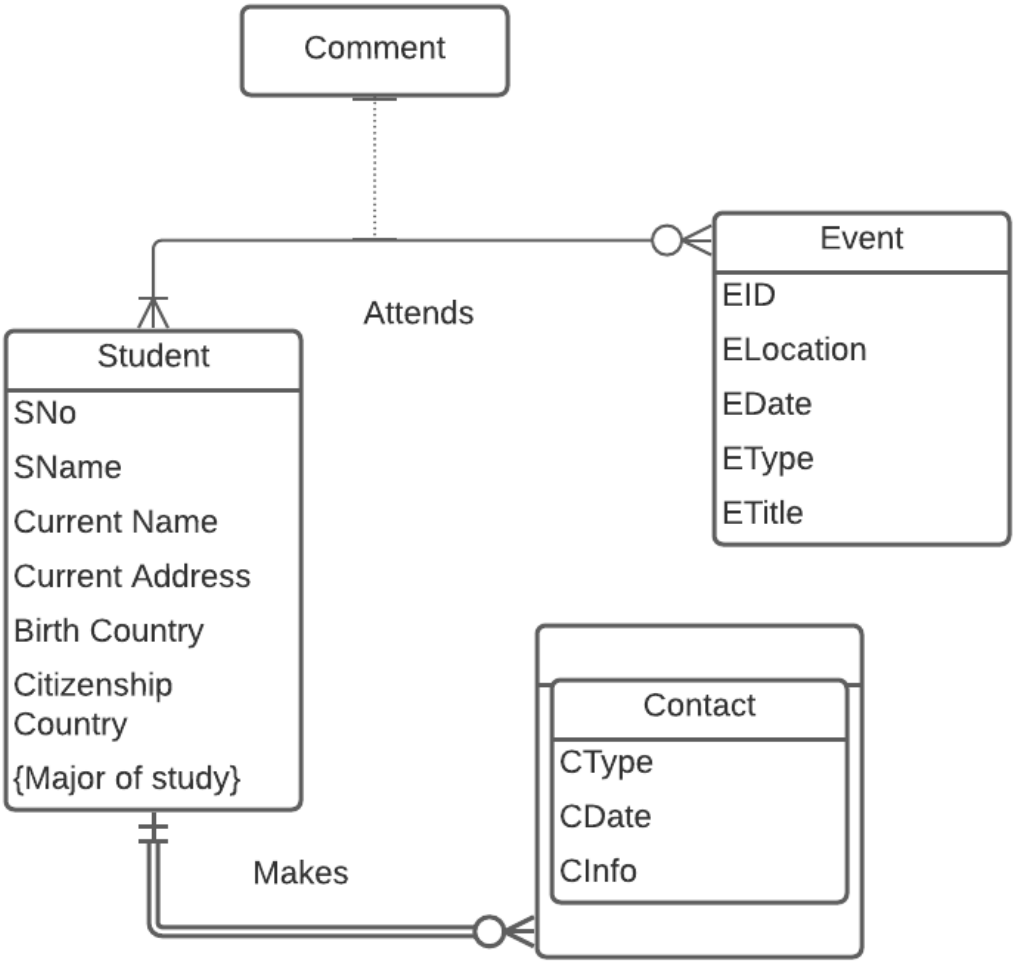


Fig2-49 ERD

Primary Keys: SNo (Student number) from Student entity
EID (Event ID) from Event entity.

Contact entity is weak entity since it is dependent on student entity.

Relationships and Cardinalities:

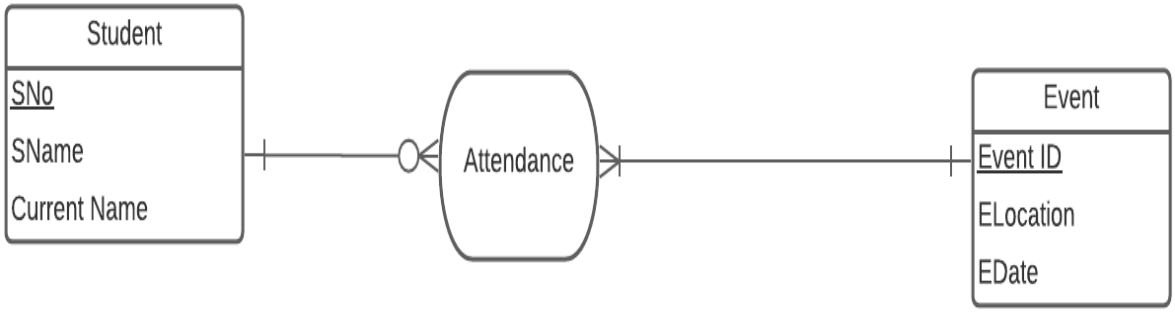
Student and event entities:
One student may attend zero or many events.
One event is attended by one or many students.

Student and contact entities:
One Contact can be made by only one Student.
One Student may make many types of contact.

In Student entity Major attribute is multivalued since it is given that each student has one or two majors.

The Comments is an attribute of the 'Attends' Relationship. The other attributes that might better describe the Attends Relationship are Date, Duration etc.

Also, since Student and Event has M:N relationship, we can think of an associative entity "Attendance" that will collect the data and record which student have attended which events.



The associative entity "Attendance" will have the required data about which student attended which event. Comments from the students can also be recorded here as an attribute of this entity.

Relationships and Cardinalities:

Student and event entities:
One student may attend zero or many events.
One event is attended by one or many students.

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