ICT_104 Week 5

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Unit : ICT_104

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Tutorial Questions.

1. Use the following business rules to create a Crow's Foot ERD. Write all appropriate connectivities and cardinalities in the ERD.

• A department employs many employees, but each employee is employed by only one department.

• Some employees, known as "rovers," are not assigned to any department.

• A division operates many departments, but each department is operated by only one division.

• An employee may be assigned many projects, and a project may have many employees assigned to it.

• A project must have at least one employee assigned to it.

• One of the employees manages each department, and each department is managed by only one employee.

• One of the employees runs each division, and each division is run by only one employee.

Answer :

Entities:

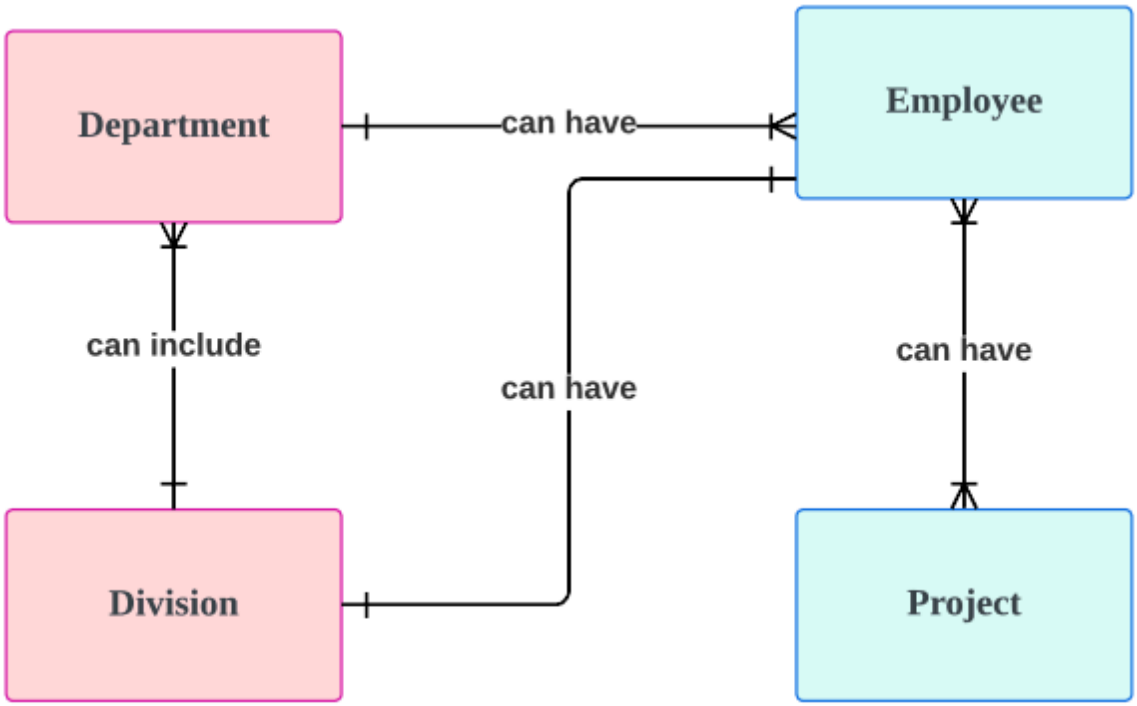
- Department
- Employee
- Division
- Project

Business Rules :

- One department is shared by many employees; each employee belongs to one department.
- Some employees (rovers) belong to no department.
- One division manages many departments; each department belongs to one division.
- Employees can be assigned to many projects; projects can have many employees assigned to them.
- Every project must have at least one employee assigned to it.
- Every department is managed by one employee; every employee manages one department.
- Each division is headed by an employee, and each employee has been put in charge of one division.

Associations:

- Department to Employee: One department employs many employees . Some employees (rovers) are not assigned to any department, so the relationship can be optional for employees.
- Division to Department: One division operates many departments .
- Employee to Project: An employee may be assigned to many projects, and a project may have many employees . At least one employee must be assigned to each project.
- Employee to Department-for-management: One employee manages each department.
- Employee to Division-for-management: One employee runs each division.



Reference: Lucid Software Inc., 2024. *Lucidchart: Diagramming application*. Available at: https://www.lucidchart.com [Accessed 30 October 2024].

2. Create a complete ERD in Crow's Foot notation that can be implemented in the relational model using the following description of operations. Hot Water (HW) is a small start-up company that sells spas. HW does not carry any stock. A few spas are set up in a simple warehouse so customers can see some of the models available, but any products sold must be ordered at the time of the sale.

- HW can get spas from several different manufacturers.
- Each manufacturer produces one or more different brands of spas.
- Each and every brand is produced by only one manufacturer.
- Every brand has one or more models.
- Every model is produced as part of a brand. For example, Iguana Bay Spas is a manufacturer that produces Big Blue Iguana spas, a premium-level brand, and Lazy Lizard spas, an entrylevel brand. The Big Blue Iguana brand offers several models, including the BBI-6, an 81-jet spa with two 6-hp motors, and the BBI10, a 102-jet spa with three 6-hp motors.
- Every manufacturer is identified by a manufacturer code. The company name, address, area code, phone number, and account number are kept in the system for every manufacturer.
- For each brand, the brand name and brand level (premium, mid-level, or entry-level) are kept in the system. For each model, the model number, number of jets, number of motors, number of horsepower per motor, suggested retail price, HW retail price, dry

weight, water capacity, and seating capacity must be kept in the system.

Answer :

Entities:

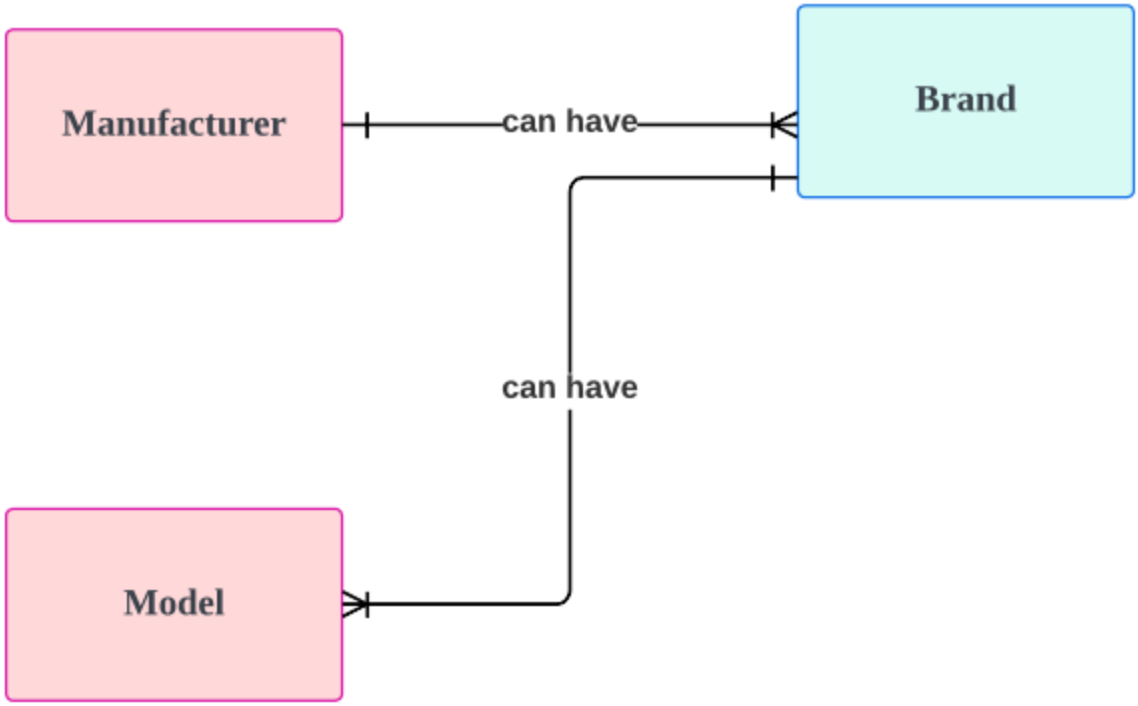
- Manufacturer
- Brand
- Model

Business Rules :

- HW receives spas from manufacturers.
- One manufacturer produces multiple brands; one brand has one manufacturer.
- One brand has multiple models; one model belongs to one brand.

Association :

- Manufacturer to Brand: One manufacturer produces many brands.
- Brand to Model: One brand has many models.



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3. The Jonesburgh County Basketball Conference (JCBC) is an amateur basketball association. Each city in the county has one team as its representative. Each team has a maximum of 12 players and a minimum of 9 players. Each team also has up to 3 coaches (offensive, defensive, and physical training coaches). During the season, each team plays 2 games (home and visitor) against each of the other teams. Given those conditions, do the following: Identify the connectivity of each relationship.

• Identify the type of dependency that exists between CITY and TEAM.

• Identify the cardinality between teams and players and between teams and city. Identify the dependency between COACH and TEAM and between TEAM and PLAYER.

• Draw the Chen and Crow's Foot ERDs to represent the JCBC database.

• Draw the UML class diagram to depict the JCBC database.

Answer :

Entities:

- City
- Team
- Player
- Coach

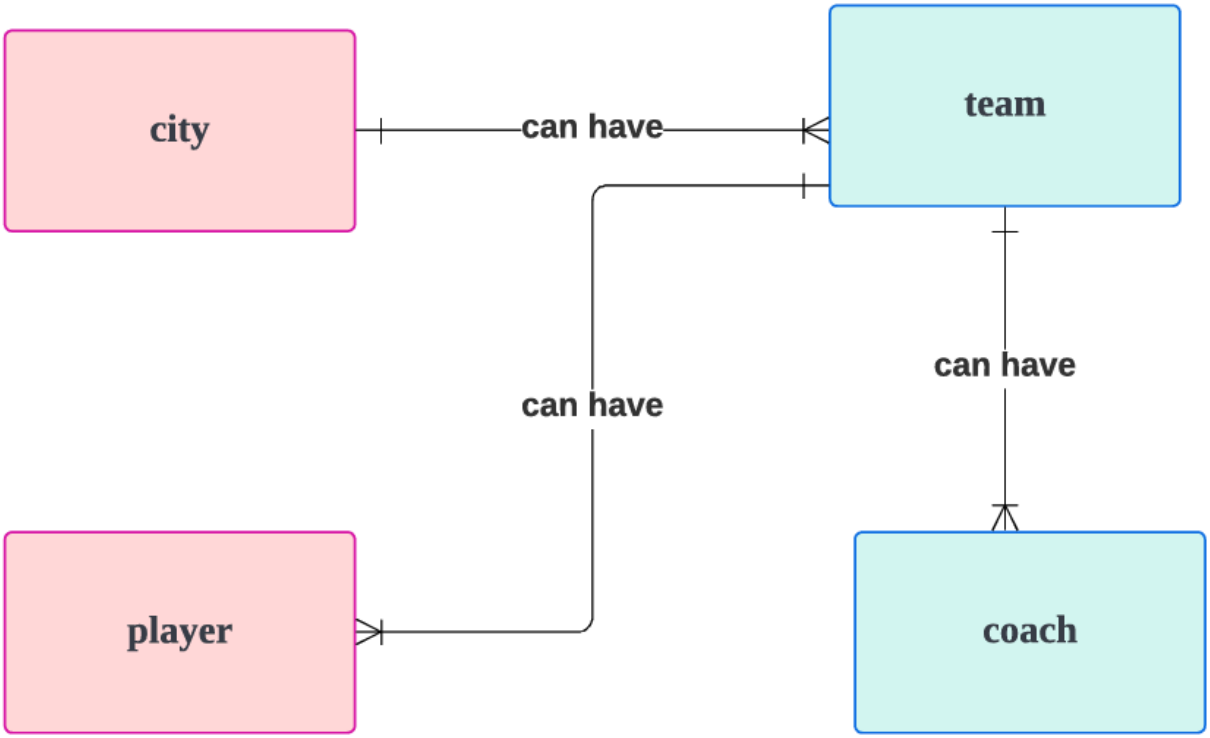
Business Rules :

- Each city has only one basketball team assigned.
- Each team must be assigned to only one city.
- Every basketball team can have any number of players, but no less than 9 and no more than 12 players.
- Only one team can be assigned to every player.
- Every basketball team may have no more than 3 coaches assigned.
- Only one team can be assigned to every coach.

- Each team plays 2 games against every other team in the conference - home and away.
- If a team is deleted, all its players and coaches must also be deleted.
- Every player must be registered with a team prior to the start of the season.
- No coach can at one time be assigned to more than one team.

Association :

- City to Team : Each city has one team - a 1:1 relationship.
- Team to Player : Each team can have from 9 to 12 players1 relationship.
- Team to Coach : Each team may have a total of 3 coaches in the bench area relationship.



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