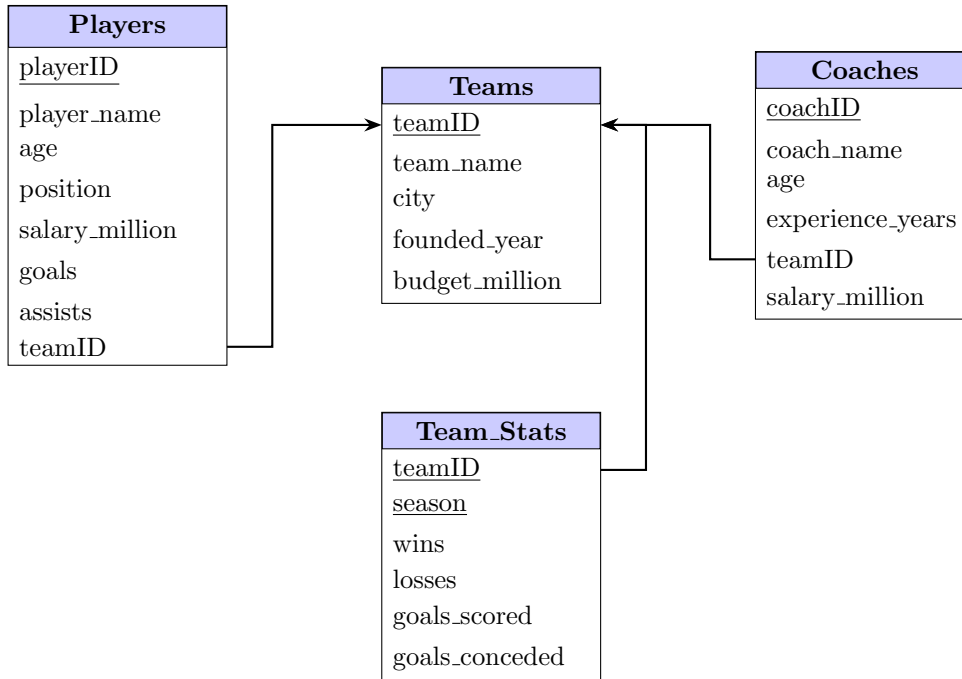# CSCD 327 Homework 1

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1 Draw a schema diagram for the following database.

- Teams (<u>teamID</u>, team_name, city, founded_year, budget_million)
- Players (<u>playerID</u>, player_name, age, position, salary_million, goals, assists, teamID)
- Coaches (<u>coachID</u>, coach_name, age, experience_years, teamID, salary_million)
- Team_Stats (<u>teamID</u>, <u>season</u>, wins, losses, goals_scored, goals_conceded)

2 Consider the following schema: R($\underline{A_1}$, A_2, A_3, A_4).
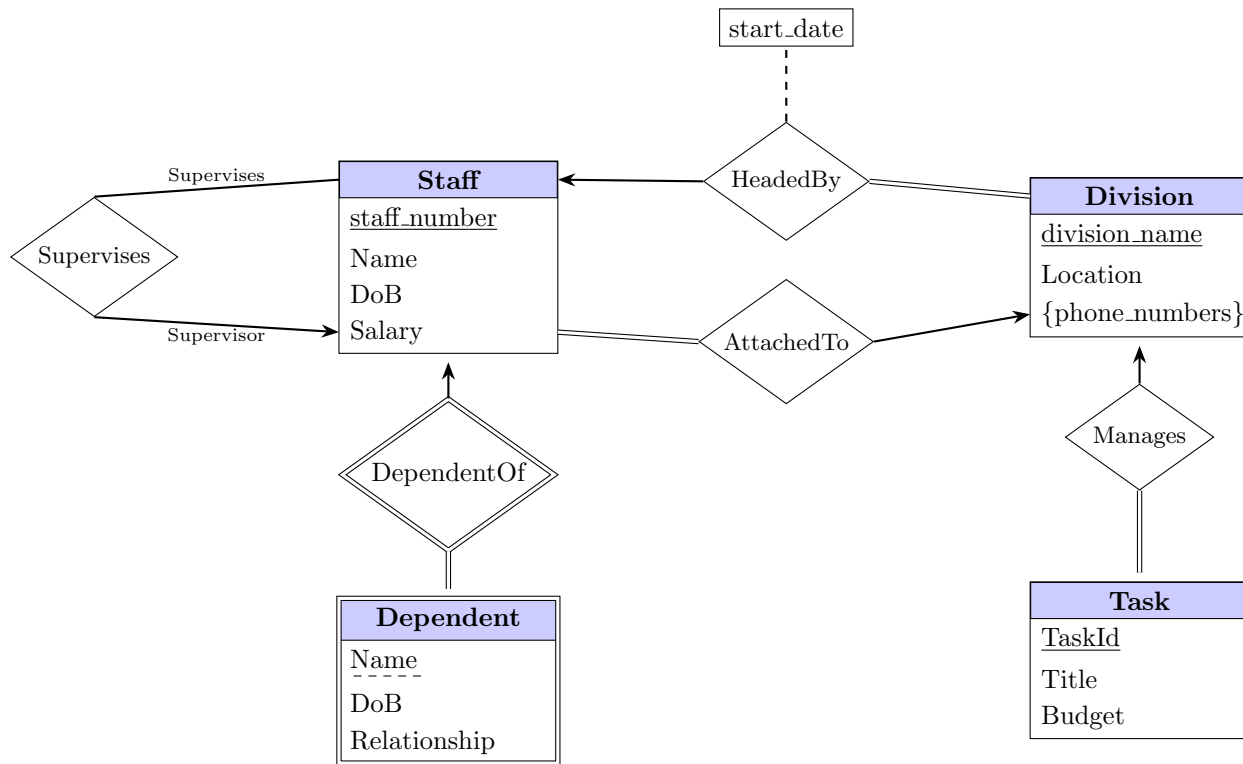
2.1 Is (A_1, A_3) a candidate key for R? Why or why not?

(A_1, A_3) is not a candidate key for R because A_1 alone is a unique identifier, and candidate keys must be minimal.

2.2 Is (A_1, A_4) a superkey for R? Why or why not?

(A_1, A_4) is a superkey for R because it can uniquely identify each tuple in R. Adding attributes to a superkey produces another superkey.

3 Draw an ER diagram for the requirements provided.

4 Create Relational Schemas for the ER diagram. Explain the creation process step by step.

Convert Strong Entity Sets

- Division(<u>division_name</u>, location)

  - DivisionPhone(<u>division_name</u>, <u>phone_number</u>)

- Staff(<u>staff_number</u>, name, DoB, salary)

- Task(<u>TaskId</u>, title, budget)

Convert Weak Entity Sets

- Dependent(<u>staff_number</u>, <u>name</u>, DoB, relationship)

Convert Relationship Sets

- HeadedBy(<u>division_name</u>, staff_number, start_date)

- AttachedTo(<u>staff_number</u>, division_name)

- Manages(<u>task_id</u>, division_name)

- Supervises(<u>staff_number</u>, supervisor_staff_number)

- DependentOf(<u>staff_number</u>, <u>name</u>)

Find Redundancies

- HeadedBy can be removed by adding staff_name and start_date to Division.

- AttachedTo can be removed by adding division_name to Staff.

- Manages can be removed by adding division_name to Task.

- DependentOf can be removed as it is the identifying relationship for Dependent.

Final Schemas

- Division(<u>division_name</u>, location, headed_by, headed_start_date)

- DivisionPhone(<u>division_name</u>, <u>phone_number</u>)

- Staff(<u>staff_number</u>, name, DoB, salary, division_name, supervisor_staff_number)

- Task(<u>TaskId</u>, title, budget, division_name)

- Dependent(<u>staff_number</u>, <u>name</u>, DoB, relationship)

- Supervises(<u>staff_number</u>, supervisor_staff_number)