Northeastern University
CS5200 – DBMS
Spring 2025, Derbinsky

Homework 4

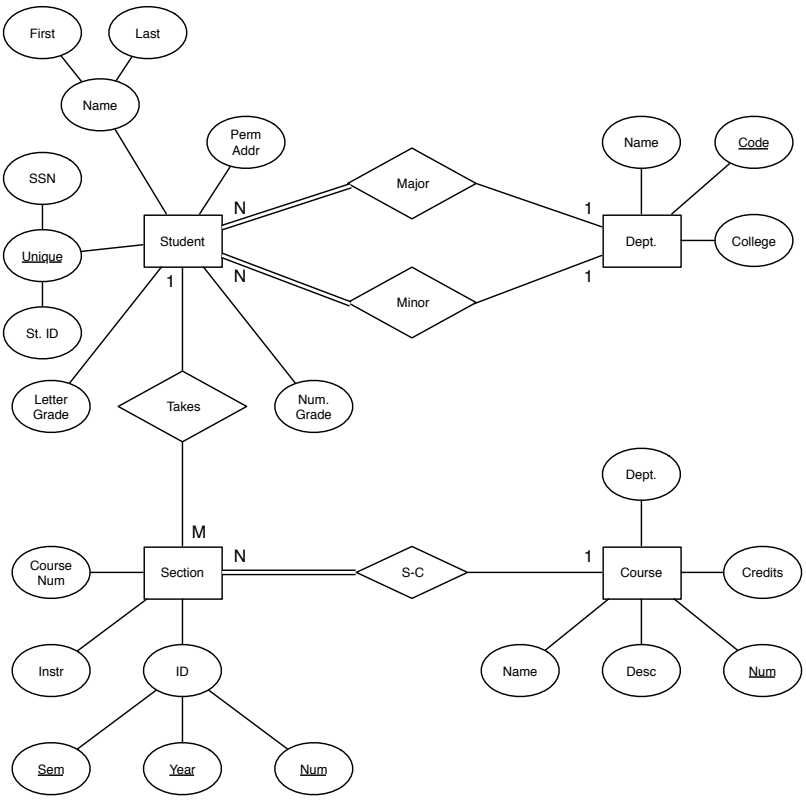
This assignment has three (3) problems (equally weighted). Notes:

- To receive credit, submit to Canvas **a single PDF file** that contains your responses to all the problems.
- You must typeset all responses and use software of your choice (e.g., `draw.io/diagrams.net`, OmniGraffle, PowerPoint, Lucidchart) to produce professional diagrams – hand-drawn/written work will receive 0% credit.
- All ERDs **must** use the notation introduced in class – 0% credit will be awarded for diagrams using other dialects (e.g., "crow's feet").
- Logical schema may use horizontal (e.g., slides, practice diagrams) or vertical (e.g., Chinook) notation – 0% credit will be awarded for UML or other formats.

Problem 1. You are given a narrative and an ER Diagram below. Find at least ten (10) mistakes in the diagram. Submit the diagram with your corrections, as well as an English description of each mistake. You must assume that all domain information to be reflected in the diagram is mentioned in the description.

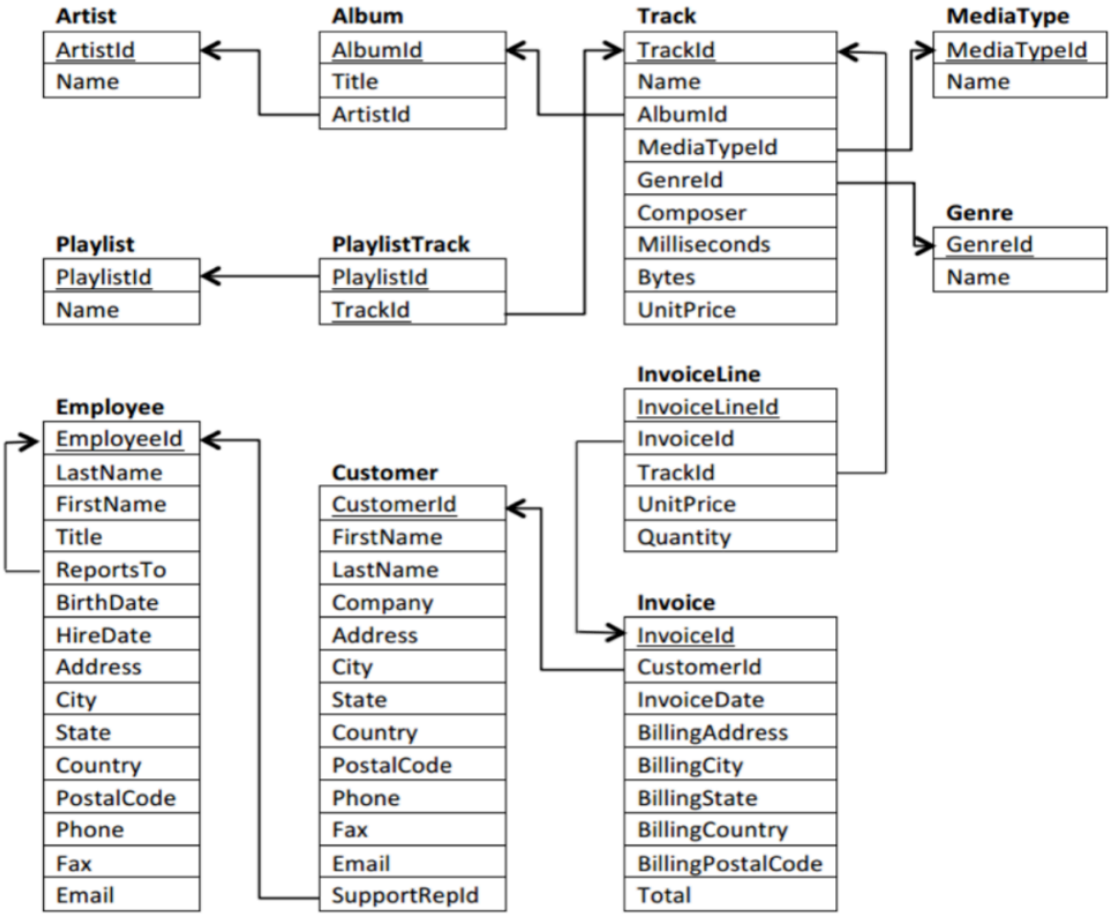
You get equal credit for each corrected mistake; even if correcting a mistake requires several changes to the diagram. For each correction, you will receive half of the points for your textual description of the mistake, as well as justification with respect to the narrative and ERD, and half if you fully correct the issue in your diagram. Please number each textual description, and label the associated change(s) in the diagram, such that your submission is clear and understandable. You will get extra credit if you find mistake(s) your instructor has not anticipated.

- The university keeps track of each student's name, student ID, social security number, permanent address, major department, and minor department (if any). Some applications need to refer to the city, state, and ZIP code of the student's permanent address, as well as the student's last name. Both SSN and student ID have unique values for each student.
- Each department is described by a unique name, a unique department code, and a college name.
- Each course has a course name, description, unique course number, credits, and offering department.
- Each section has an instructor, semester, year, course, and section number. The section number distinguishes sections of the same course that are taught during the same semester/year.
- When a student takes a section of a course, they receive a letter grade and a numeric grade. Given a numeric grade from the instructor, the letter grade is assigned based upon the university's standard grade-conversion table.



Problem 2. Remember the Chinook database?? It's baaaackkk!! :)

Based upon the relational schema (included below), reverse-map to produce an ER diagram for this digital media store.



Problem 3. Produce a 3NF relational schema for the following narrative. Note any requirements that are not specified and make appropriate assumptions to complete the specification. (If you are not sure if an assumption is reasonable – ask!) Be sure to indicate foreign and primary keys where appropriate. If it helps, you may draw an ERD first, and then map to relations, but this is not required (nor would the ERD be considered/graded). Do NOT introduce artificial internal identifiers that are not mentioned in the narrative.

- All profiles have a unique id (e.g., 42), a unique URL, a name, and a picture. Each profile is either an organization or a human.
- An organization profile has a mission and a vision.
- A human profile can have any number of projects, each with a name distinct to that profile (e.g., "SQLiteDiff") and associated description (e.g., "Utility to facilitate fast feedback for learning SQL on a known SQLite database."). It can also have any number of employment positions: each such position has an order, which is unique within the profile (e.g., the first position vs second vs ...); title; description; duration (start date, optional end date); and associated organization (assuming that the organization has a profile).