Homework #5

CIS 4301 - Spring 2025

Submission Format

You will submit a soft copy of your solution using e-Learning (`http://elearning.ufl.edu`) by the end of the day (23:59 / 11:59 PM) on the assigned date (April 10th). Save your solution as a PDF file and name it `hw5.pdf`.

At the top of every solution file you submit, include your name, assignment number, and the due date.

Problem Statement

Consider the relation **BookingDetails** with the following schema and functional dependencies:

Relation: `BookingDetails(agent, traveler_ssn, trip_id, start_location, end_location, years_experience, passport_number, expiration_date)`

Functional Dependencies:

1. `agent` → `years_experience`
2. `traveler_ssn` → `passport_number`
3. `passport_number` → `expiration_date`
4. `trip_id` → `start_location, end_location`

Instructions

1. Compute the Primary Key:

- Based on the schema and functional dependencies provided, compute the primary key for the `BookingDetails` relation.

2. Decompose into BCNF:

- Determine if any of the functional dependencies violate BCNF. For each violation, decompose the relation accordingly.
- Continue the decomposition until all resulting relations are in BCNF.

3. List the Final Relations:

- After decomposing the relation, list all final relations in BCNF.
- Clearly indicate the attributes in each relation and specify the primary key for each decomposed relation.

4. Justify Each Decomposition Step:

- For each decomposition, write a brief justification, including why the specific dependency caused a violation of BCNF and how the decomposition resolves this violation.