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Homework 1

1. Create relational schemas.
   a) Airport(airport_code, airport_name, city, state, elevation)
      - Primary key: airport_code
      - Example:
        - (SEA, Seattle-Tacoma International, Seattle, Washington, 433)
        - (GEG, Spokane International, Spokane, Washington, 2385)
        - (SFO, San Francisco International, San Mateo, California, 13)

   b) AirlinesInfo(airline_code, airline_name, hub_id, year_found)
      - Primary key: airline_code
      - Foreign key: AirlinesInfo.hub_id REFS Airport.airport_code
      - Example:
        - (AS, Alaska Airlines, SEA, 1933)
        - (UA, United Airlines, ORD, 1926)
        - (DL, Delta Airlines, ATL, 1925)

   c) FlightInfo(airline_code, flight_num, departure_code, arrival_code, flight_freq)
      - Primary key: (airline_code, flight_num)
      - Foreign key:
        - FlightInfo.airline_code REFS AirlinesInfo.airline_code

    - FlightInfo.departure_code REFS AirlinesInfo.airport_code
    - FlightInfo.arrival_code REFS AirlinesInfo.airport_code
  - Example:
    - (AS, 1, DCA, SEA, 7)
    - (UA, 219, ORD, HNL, 7)
    - (DL, 12, SEA, ATL, 7)

d) FlightSegment(airline_code, flight_num, departure_code, arrival_code)

  - Primary key: (airline_code, flight_num, departure_code)
  - Foreign key:
    - FlightSegment.(airline_code, flight_num) REFS AirlinesInfo.(airline_code, flight_num)
    - FlightSegment.departure_code REFS Airport.airport_code
    - FlightSegment.arrival_code REFS Airport.airport_code
  - Example:
    - (AS, 1, DCA, SEA)
    - (UA, 154, HNL, MAJ)
    - (UA, 154, MAJ, KSA)
    - (UA, 154, KSA, PNI)
    - (UA, 154, PNI, TKK)
    - (UA, 154, TKK, GUM)

2. Create relational schemas.

a) Employee(employee_id, first_name, last_name, start_date, department_name)

- Primary key: employee_id

- Example:
    - (116695, Jane, Doe, 20220307, Human Resources)
    - (918382, Meredith, Gray, 20170903, Operations)
    - (948298, Harvey, Specter, 20191021, Legal)

b) Project(project_id, department, leader_id, start_date, budget)

- Primary key: project_id
- Foreign key:
    - Project.leader_id REFS Employee.employee_id
- Example:
    - (1029, Human Resources, 116695, 20230201, 700)
    - (1158, Operations, 918382, 20230528, 2500)
    - (1203, Legal, 948298, 20230903, 5000)

c) I choose to go with the approach that the database will remove the entry of a manager if one stops managing another employee. This means that only the current managerial information.

ManagementHistory(employee_id, manager_id, start_date)

- Primary key: employee_id
- Foreign key:
    - ManagementHistory.employee_id REFS Employee.employee_id
    - ManagementHistory.manager_id REFS Employee.employee_id
- Example
    - (827394, 812849, 20230201)
    - (472924, 275629, 20221229)

    - (747298, 4719284, 20210627)

3. Application database analysis.
    - I use TikTok quite often, so I thought I would do about it.
    - Possible relations:
        - Client: This relation contains the ID of each user, as well as their data like phone number, region, password, etc. This relation is needed to establish account ownership and distinguish which user it is for the machine learning model to apply correctly.
        - Video: Assuming TikTok's data is stored in some extensive data framework that is collected and aggregated through different services, there should be a relation that maps the unique ID of each video with its location and associated categories. I imagine, for each video, there is an algorithm that vets through and assigns a scaled number result to each video, which can later be used to suggest videos to the user. This relation is needed to access the video to supply it to the user rapidly.
        - Machine Learning result: This relation stores the result from the machine learning model. Assuming the result is scaled as a number that can be used to suggest videos with similar category points based on the Video relation.
    - Besides, it is noted that there might be other services that also have their own relational schemas, but these three are the main ones that run TikTok.