Mahidol University International Collage

Computer Engineering International Program

EGCI321 Database Systems

– Assignment 1 (10%) –

Due on Tuesday 23rd October 2025 by 14:00

1. (10 marks) E-R Diagram

1.1 Draw the E-R diagram (Chen Model) which represents the airline reservation system. The E-R diagram must be designed by following the list of the requirements and constraints below. (8 marks)

1.2 List all the involved schema based on your E-R diagram and please specify any related keys and constraints. (2 marks)

The List of Requirements and Constraints

(a) The database represents each AIRPORT, keeping its unique Airport Code, the AIRPORT Name, Latitude, Longitude, City and State in which the AIRPORT is located.

(b) Each AIRLINE has AIRLINE NO, and AIRLINE NAME

(c) Each AIRPLANE has AIRPLANE NO, AIRPLANE NAME and MODEL

(d) Each airplane must be owned by an airline

(e) Each airline's FLIGHT has a unique number, and the FLIGHT is scheduled weekly.

(f) A FLIGHT is composed of only one-way FLIGHT (for example, flight number CO123 departure from New York to Los Angeles).

  o Each FLIGHT has FLIGHT NO, AIRLINE NO, AIRPLANE NO, DEPARTURE AIRPORT, Scheduled Departure Time, ARRIVAL AIRPORT, Scheduled Arrival Time, Duration, and Distance.

(g) There is no FLIGHT NO that is not assigned AIRLINE NO and AIRPLANE NO.

2. (10 marks) Consider the following relational schema, an employee can work in more than one department. The begindate: field of the Works relation shows beginning date that a given employee works in a given department. Manager id (managerid) is a subset of employee id (eid).

  Emp(eid: integer, ename:string, age:integer, salary: real)
  Works(eid:integer, did:integer, begindate: integer)
  Dept(did:integer, budget:real, managerid:integer)

Write Relational Algebra for the query below. Your answer must minimize any redundant conditions or operators

(a) Show the manager's name and their salary of each department

(b) Show the list of employee ids and employee names who work in department E24

(c) Find the employee's name who start working before 2015 and their age is more than 35 years

Write SQL statement for the query below

(a) Show the list of employees who make the salary between 30,000 Baht and 50,000 Baht.

(b) Show the manager id and name who have a lowest salary.

(c) Find the department that the total salary of over all employees is higher than department budget.

(d)