

## CS 351 DATA ORGANIZATION AND MANAGEMENT

### HW4

**Date: December 28, 2010**

**Date Due: January 5, 2011**

**Important Notes:** 1. Please submit the Homework to Room EA 126 on the due date by 5:00 pm (no late submission will be accepted). 2. Answer the questions in the order they are given using a standard size paper. 3. Handwritten submissions are accepted, a word document is preferred. 4. Staple all papers and write your name and SECTION on them.

1. Construct the E/R Diagrams for the following two databases specified in Chapter 2 of the textbook:  
  
2.5 (Notown Records Database)  
2.6 (AIRPORT Database)
2. Consider the following Relational Database Schema consisting of the four Relation Schemas:  
**passenger** ( p#, pname, pcity)  
**agency** ( a#, aname, acity)  
**flight** (f#, fdate, time, from, to)  
**booking** (p#, a#, f#, fdate)

The relation **passenger** represents the passengers with the primary key p# and other attributes representing the name (pname) and the city (pcity) in which the passenger lives.

The relation **agency** represents the travel agencies with the primary key a# and other attributes representing the name of the agency (aname) and the city (acity) in which the agency is located.

The relation **flight** with the compound primary key f# (like TK130) and fdate represents the flights of airlines with the attributes flight time (time), the source city (from) and the destination city (to)

The relation **booking** with the compound primary key (p#, a#, f#, fdate) represents which passenger has a reservation made by a travel agency on a flight.

Write Relational Algebra expressions for the queries below. Do not use unneeded/unnecessary relations and do not use the rename operator  $\rho$  where it's use is really unnecessary.

1. Get full details of all flights.
2. Get full details of all flights to İstanbul.
3. Get full details of all flights from "Ankara" to "İstanbul"
4. Get agency numbers ( a# ) for agencies who made a reservation on flight TK130.
5. Get all flight numbers for passenger p# = 123 for flights to İstanbul before 01/01/2007.
6. Get passenger names for passengers who have bookings on at least one flight.
7. Get passenger names for passengers who have more than one booking.
8. Get passenger names for passengers who do not have any bookings.
9. Get agency names for agencies who live in the same city as passenger p# = 123.
10. Get all details of flights scheduled on both dates 01/12/2010 and 02/12/2010 at 16:00.
11. Get all details of flights on either of the dates 01/12/2010 or 02/12/2010 or both at 6:00
12. Get agency names for agencies that have bookings on all flights on 10/12/2010 at 6:00.
13. Get agency names for agencies who do not have any bookings for passenger p# = 123.
14. Get the passenger names for passengers who have at least all the bookings as the passenger with p# = 123.