CSI2132: Database I – Winter 2017

**Assignment 1: Due Monday Feb 6, 2017 – through Blackboard**

Covers: ER, EER, Relational Model and mapping. (5 %)

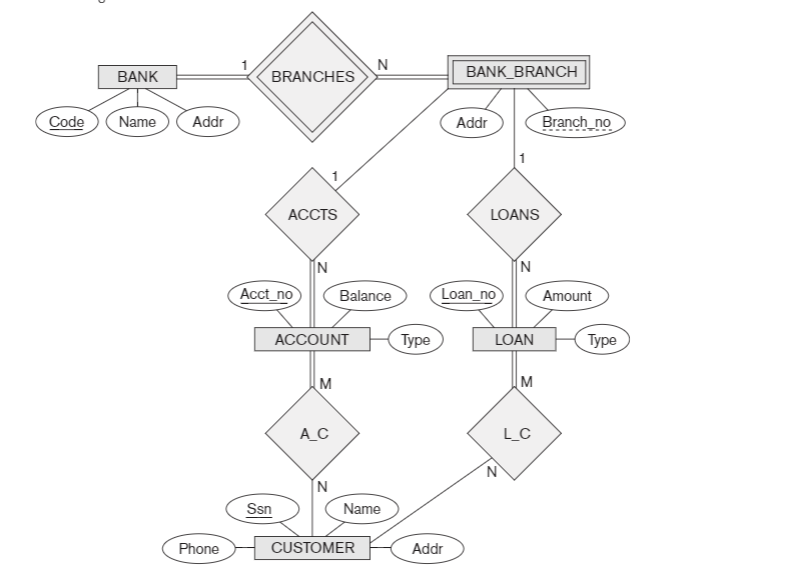
**Submit your assignment as a PDF file**.

**Entity Relational Model**

1. A database is being constructed to keep track of the teams and games of a baseball league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Design an ER schema diagram for this application, stating any assumptions you make.

**Enhanced Entity Relational Model**

1. Consider the BANK ER schema in Figure 1, and suppose that it is necessary to keep track of different types of ACCOUNTS(SAVINGS\_ACCTS, CHECKING\_ACCTS, ... ) and LOANS (CAR\_LOANS, HOME\_LOANS, ... ). Suppose that it is also desirable to keep track of each ACCOUNT’s TRANSACTIONS (deposits, withdrawals, checks, ...) and each LOAN’s PAYMENTS; both of these include the amount, date, and time. Modify the BANK schema, using ER and EER concepts of specialization and generalization. State any assumptions you make about the additional requirements.



**Figure 1: An ER diagram for a BANK database schema.**

**Relational Model**

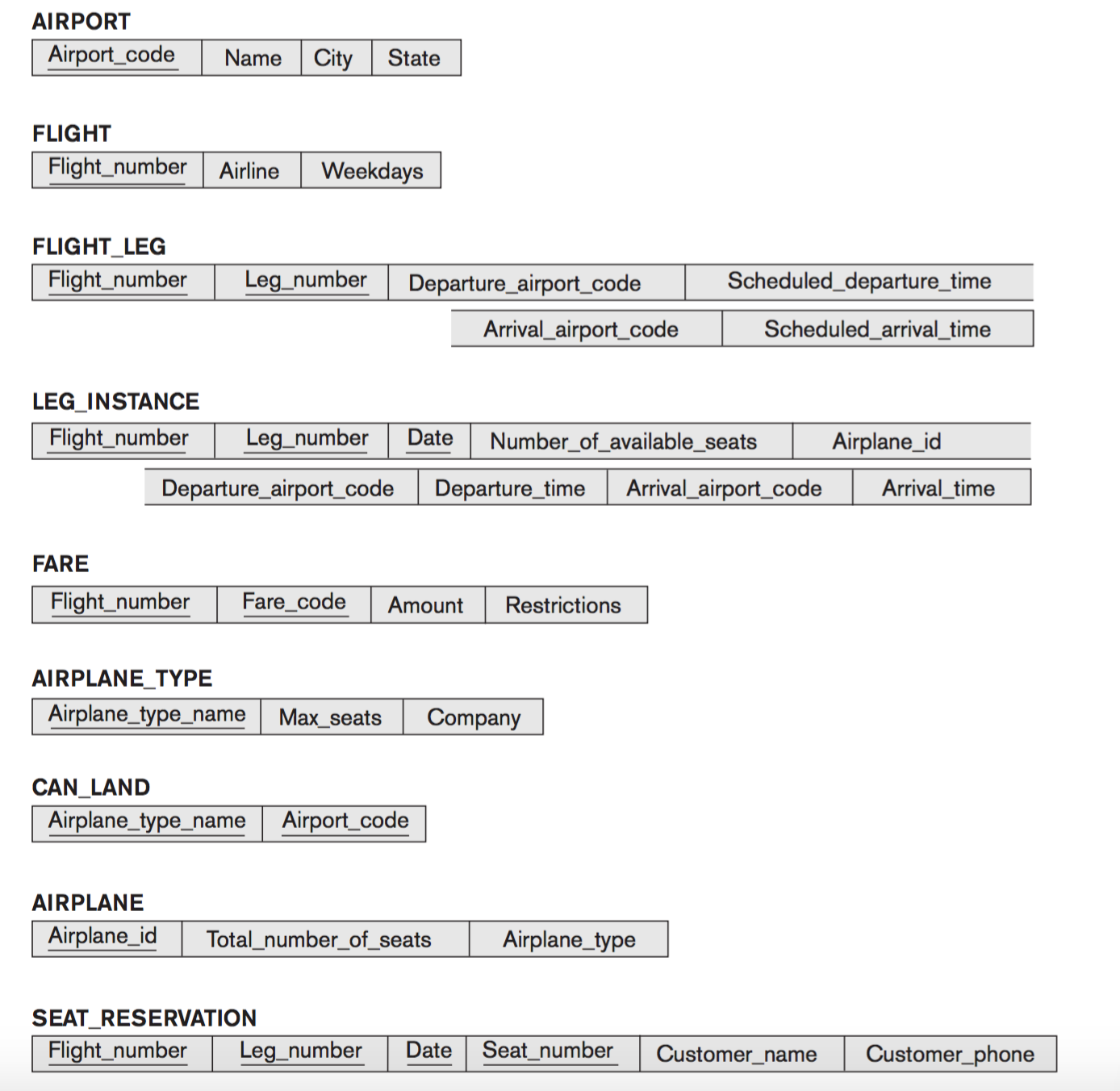
1. Consider the AIRLINE relational database schema shown in Figure 2, which describes a database for airline flight information. Each FLIGHT is identified by a Flight\_number, and consists of one or more FLIGHT\_LEGs with Leg\_numbers 1, 2, 3, and so on. Each FLIGHT\_LEG has scheduled arrival and departure times, airports, and one or more LEG\_INSTANCEs—one for each Date on which the flight travels. FAREs are kept for each FLIGH. For each FLIGHT\_LEG instance, SEAT\_RESERVATIONs are kept, as are the AIRPLANE used on the leg and the actual arrival and departure times and airports. An AIRPLANE is identified by an Airplane\_id and is of a particular AIRPLANE\_TYPE. CAN\_LAND relates AIRPLANE\_TYPEs to the AIRPORTs at which they can land. An AIRPORT is identified by an Airport\_code. Consider an update for the AIRLINE database to enter a reservation on a particular flight or flight leg on given date.

**a.** Give the operations for this update.

**b.** What types of constraints would you expect to check?

**c.** Which of these constraints are key, entity integrity, and referential integrity constraints, and which are not?

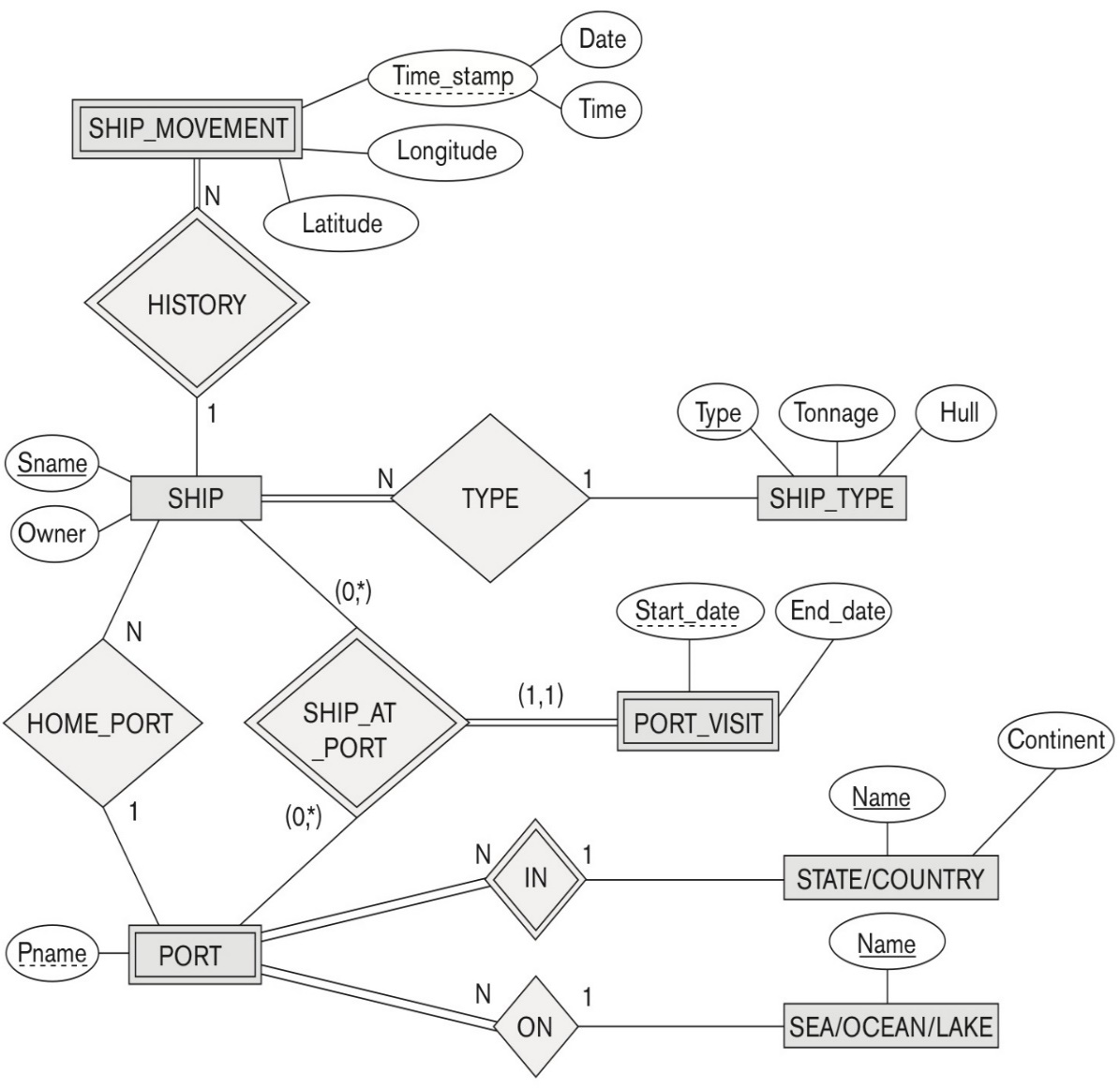
**d.** Specify all the referential integrity constraints that hold on the schema shown in Figure 2.

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**Figure 2: Referential integrity constraints displayed on the AIRLINE relational database schema.**

**Mapping Relational Model to Entity Relational Model**

1. Figure 3 shows an ER schema for a database that can be used to keep track of transport ships and their locations for maritime authorities. Map this schema into a relational schema and specify all primary keys and foreign keys.



**Figure 3: An ER schema for a SHIP\_TRACKING database**