# Harvey Mudd College
# Computer Science 133
# Database and Knowledgebase Systems
# Spring Semester 2000

## Assignment #1 – The Entity-Relationship Model

Due **5:00pm**, Friday February 4, 2000

This homework is designed to make you conscious of some of the issues facing database designers. Please state any assumptions that you make. Be creative!

You are asked to design a database for a national airline. In the database, the company wishes to keep track of reservation information as well as operational information.

Reservation information consists of passenger information (name and address), and departure information (flight number, date, source, destination, departure time and arrival time). Most of this information is always the same for a given flight number, with only the date changing. When a passenger makes a booking on a departure, a ticket number is issued. When a passenger checks in for the flight they are given a seat assignment and their bags are each tagged with a unique number.

Operational information consists of information about employees (employee number, name, address and salary) and planes (identification number, model number, serial number, service history, number of seats, and manufacturer). Some of the employees are pilots, who are also characterized by the types of planes they can fly. Some employees are ground crew, who are additionally characterized by what department they work in. All other employees are attendants. No employee is in more than one of these groups. Employees may also be passengers, but they have no special status when considered as such.

Additional operational information includes the assignment of departures to planes, the assignment of pilots to departures, and the assignment of attendants to departures.

1. Draw an entity-relationship diagram for this appplication. Use generalization, specialization and aggregation where appropriate. Do not use multi-valued attributes. Compound attributes are allowed, if they make sense. Make sure to note any weak entity sets, and to mark the primary keys/discriminators of all the entity sets.

   Make sure to designate any participation and multiplicity constraints.

2. Is there any relevant information or constraints implicit in the specification that you cannot represent in your diagram? If so, what?

3. Give SQL commands to create tables corresponding to your diagram. (Do not worry too much about the domain of each attribute. Just pick something reasonable.) Make sure you

specify primary and candidate key constraints as well as foreign key constraints. If there are any of the latter, specify the appropriate action for deletion from the referenced table.

4. Suppose the airline wanted to track its on-time record. How would you modify your diagram and tables?

5. Suppose the airline wanted to keep track of people who are flying together so that it could attempt to seat them together. How would you change your diagram? What changes/additions would this impart to the tables? What limitations do you see in this solution?