CS 450 — Spring 2016 Dr. A. Motro 3 February 2016

# Assignment No. 1: E-R Modeling

Solutions due 15 February. Please type your solution (use any diagramming tool) and upload it to Blackboard as a single pdf file.

Consider the following environment of a medical clinic. The clinic has a medical *staff* of doctors and nurses. Each staff member is identified by a three digit employee number, and has a name, a title (doctor, nurse, etc.), and a set (at least one) of medical *areas of specialty*, each associated with a name and identified by a 4 digit number. Each area of medical specialty is associated with any number of *diagnoses* (at least one). Each diagnosis is indicated with another 4 digit code, and has a name and the amount of money that will be charged to the patient. For example, the medical area 1234 may have the diagnoses 4567, 6556 and 2738; but note that another medical area may also have a diagnosis 6556, and hence the pair (1234,6556) is required to indicate a diagnosis. The *patients* of the clinic are identified by their Social Security numbers and have a name, a date of birth, an address, and a 6 character code that identifies their medical insurance plan. Each *visit* of a patient to the clinic is recorded with the patient id, the date, the member of the medical staff that consulted with the patient, and at *set* of diagnoses (at least one). The diagnoses must be within the area of specialty of the medical staff member that consulted the patient. For accounting purposes, for each diagnosis made in a visit, the amount received from the patient and the amount received from the insurance are both recorded. There is also a schedule of future appointments, where each appointment is indicated with the patient, the medical staff member, a future date, and a time slot between 9am and 4pm. Time slots are either 20 minutes, 40 minutes, or 60 minutes. A patient may not schedule more than one appointment on the same day, and members of the medical staff may not have overlapping appointments.

Provide an Entity-Relationship design for this environment, in the form of an annotated diagram. Consider using the complete set of features described in Chapter 4.1–4.4.

In particular, your diagram should indicate entity types, relationship types, attributes, weak entity types, isa relationship types, keys of entity types (and discriminators for weak entity types), single-role constraints, participation constraints, and disjointness and covering constraints. When a key of a relationship type is not a single role, or attributes of the relationship type, and it is not a combination of all the roles, then annotate the diagram with the key. Specify cardinality constraints only when they provide *additional* information.

In addition (separate from your diagram): (1) Indicate which part of the description you have *not* been able to represent in your design. (2) For each *binary* relationship type in the diagram, indicate whether its constraint is many-to-many, many-to-one, or one-to-one.