

# Assignment 3

CIS451/551, Fall 2006

due 5:00pm Thursday, October 26

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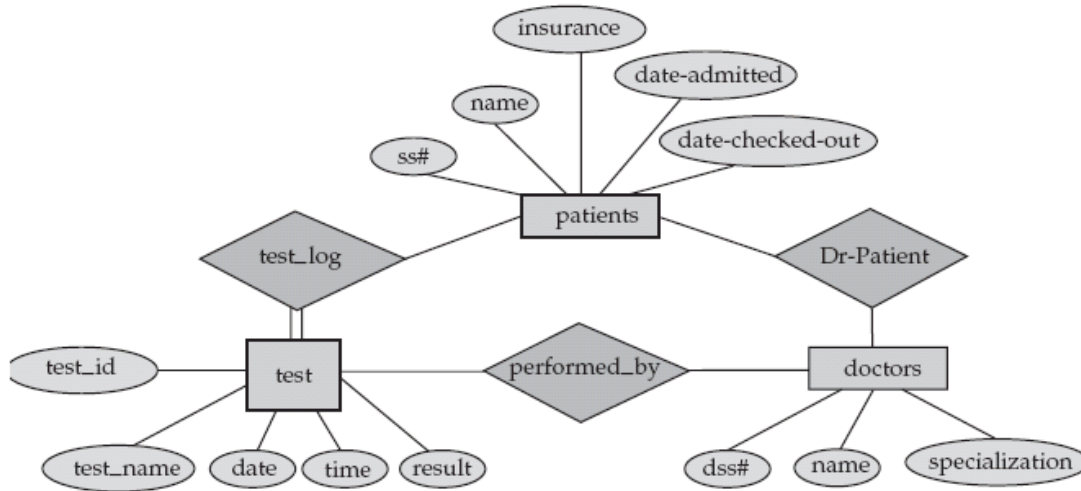


Figure 1: Hospital E-R diagram.

1. Figure 1 shows an example of an ER Diagram for a hospital domain where there are doctors, patients, tests, and so forth. Please create your own ER Diagram for a domain of your choosing. Please make it as complete and self-explanatory as possible and incorporate as many ER elements as you can (total participation, weak entity sets, cardinality constraints, keys, multivalued and derived attributes, and so on.) Use at least 3 entities. You may use your final project idea – it would be good practice.
2. Write the relational schema [e.g.,  $\text{test}(\underline{\text{test\_id}}, \text{test\_name}, \dots)$ ] for your ER Diagram in the previous problem.
3. Figure 6.19 in your textbook (2.16 in old textbook) shows a weak entity relation for *loan-payments*. Please explain why it makes sense to use a weak-entity set for *payment*. Write down a relational schema [e.g.  $R(A,B,C,\dots)$ ] for this model (include the keys, of course).
4. As you know, a primary key **is** a candidate key which **is** a superkey. Suppose we have the schema  $R(A,B,C,D)$  and two candidate keys  $C1=\{A,B,C\}$  and  $C2=\{A,C,D\}$ .
  - a. Please write down a new set which is a superkey.
  - b. If designer of Database-1 uses  $\text{PK}=C1$  as the primary key in their implementation, but another designer of Database-2 uses  $\text{PK}=C2$  as the primary key, who is right? Suppose they do not enforce any other constraints in the database (i.e., they choose and implement a primary key but ignore the other candidate key or superkey knowledge.) Over time, data is inserted into each database table under those conditions, expecting the database to enforce the primary key, which the database does perfectly, but nothing else. Later, we want to combine the two tables into one. What problem will we have to deal with? (*Hint*: Make up two sample data tuples (rows in the table) that illustrates the problem and clearly indicate which Database, 1 or 2, your data comes from.)