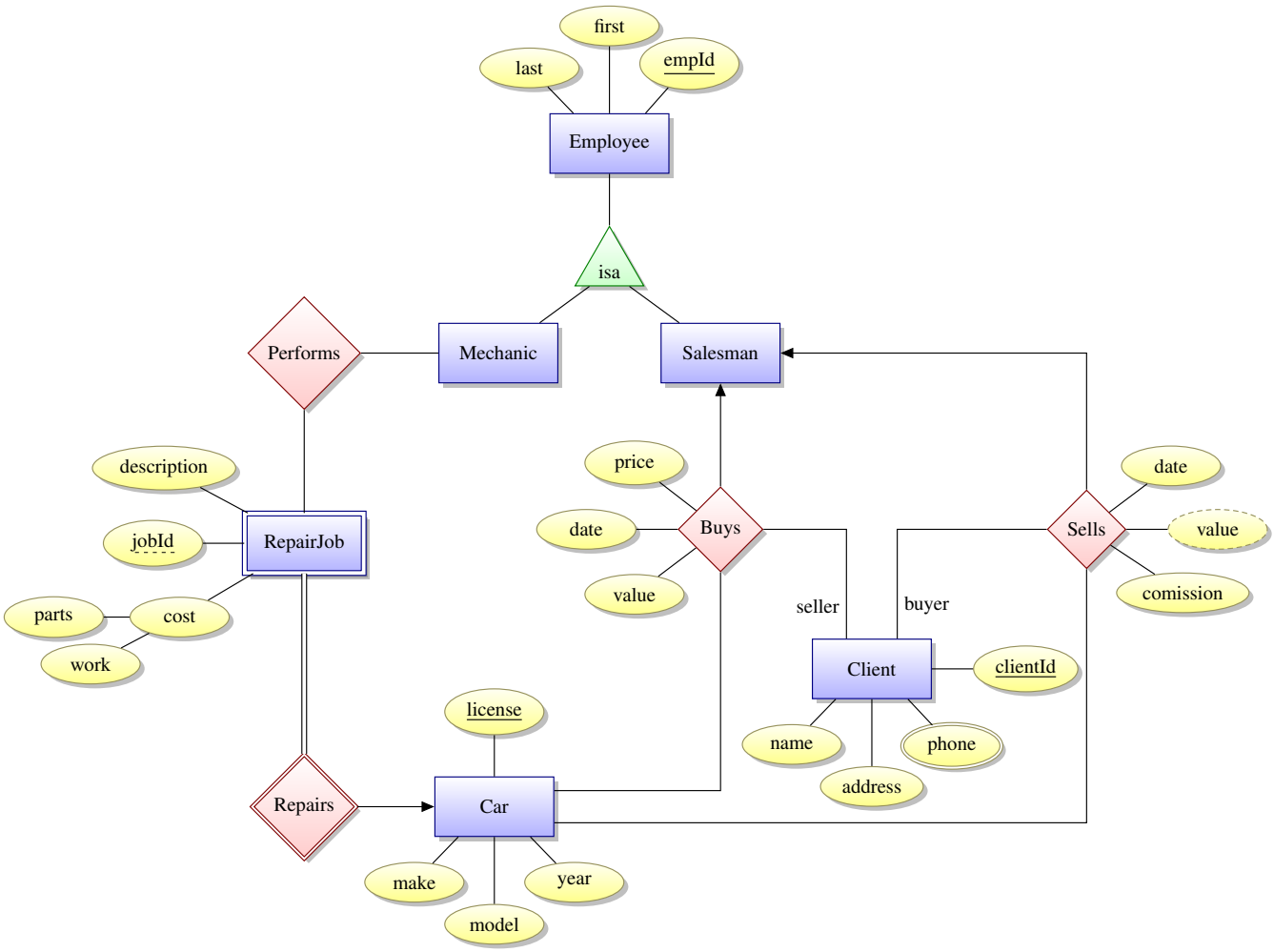
CSE 462 Classwork #7: ER Design

Name: _____ Date: March 25–28, 2011

***** Solved in class. *****

1. Consider the ER Model represented by the diagram below. Identify and characterize the entity sets, their attributes, and relationships. Explain the *is-a* relationships, the weak entitity set and its identifying relationship. Describe the role of the *Client* entity set as well as its relationships with *Salesman* and *Car*. Finally, identify possible aspects of the real world that are not contemplated in this ER Model. To complete the exercise, briefly discuss the implementation of this model as a relational schema.



2. Consider the academic application described below.

- Each department has a name and a university-provided identifier.
- Each instructor has a title (e.g., Associate Professor), a name, a university-provided identifier, and is hired by some department for an anual salary.
- Each course has a title (e.g., Database Concepts), a code (e.g., CSE462), and appears in the handbook listing of some department.
- Each student has a name, a university-provided identifier, and a U.S. address consisting of the street, number, city, state, and zip code.
- A student is associated with a department once he/she picks her major.
- Courses are offered on a regular basis. Each course offering consists of an academic semester (e.g., Spring 2011), a classroom (e.g., Clemens 322), a course, and an instructor. The only restriction is that no two offerings of the same course are ever taught by the same instructor in the same semester. Students may enroll in multiple course offerings, and each offering may have multiple students enrolled.
- State any additional assumptions you make.

Create an ER model for this application. Provide your model in the form of an ER diagram. For every relationship in the diagram, make sure you define the nature of their participation (cardinality) correctly as well as total participations, if any.

3. Map the ER Model of the previous problem to a relational schema step-by-step. For every table, include their attributes, keys, and foreign keys. Perform all reasonable optimizations.

4. Consider the relation schema R(A, B, C) and consider the following problem: one wishes to check whether the functional dependency AB $\rightarrow$ C holds in a given instance of R. Write TWO distinct SQL queries to perform the check, one with and one without aggregation. Your queries must return a single tuple if the dependency holds, and no tuples otherwise. Assume R is non-empty.