CS 450 — Summer 2017 Dr. A. Motro 28 Jun 2017

Assignment No. 1: E-R Modeling

Solutions due 5 July. Please type your solution (use any diagramming tool) and upload it to Blackboard as a single pdf file.

Consider the following environment of a department store. The store has several *departments*. Departments are of two kinds only: *retail* departments (e.g., apparel, kitchen, bedroom) and *administrative* departments (e.g., personnel, accounting, shipping). Each department is identified by a string, which is the letter 'D' followed by 3 digits, and has a name. The store's *employees* are identified by a string, which is the letter 'E' followed by 3 digits. Each employee has a name and a set of skills (e.g., programmer, salesperson, customer-service). Each employee is assigned to a single department, and each department has at most 40 employees. Administrative departments have a manager who is an employee who works for the department. Each *item* that the store sells is identified by a string, which is the letter 'I' followed by 3 digits. Each item has a name (e.g., shirt, coat, toaster), a description, a price, the cost of shipping, and the quantity-on-hand. Each item is sold by a single department. Each *supplier* of the store is identified by string, which is the letter 'S' followed by 3 digits. Each supplier has a name and a location. Each supplier can supply one or more of the items that the store sells at a cost set by the supplier. Each item is available from one or more suppliers. Each *customer* of the store is identified by a string, which is the letter 'C' followed by 3 digits. Each customer has a name, an address and one or more credit cards that can be used for purchasing. Each credit card has a type (e.g., Visa, MasterCard, American Express), a number, an expiration date ,which is a 6-digit number in the form YYMMDD, and a credit limit. Each *purchase* order placed by a customer specifies the item number, the quantity, the date, and the credit card to be used. The store then charges the credit card with the total amount (including shipping), and ships the item to the address. A customer is allowed at most 10 purchases in each calendar month and is not allowed to buy the same item more than once in a given date. Each *procurement* order the store places with a supplier specifies the supplier number, the item number, the date and the quantity, and is assigned a unique transaction number, which is the letter 'T' followed by a 3 digit number.

Provide an Entity-Relationship design for this environment, in the form of an annotated diagram. Your diagram should include entity types, relationship types, attributes of entity types and of relationship types, weak entity types, isa relationship types, keys of entity types (and discriminators for weak entity types), keys of relationship types, single-role constraints, participation constraints, and disjointness and covering constraints. For relationship constraints, use only the cardinality notation (i.e., avoid the thick-lines and arrows).

In addition (separate from your diagram), Indicate which part of the description you have *not* been able to represent in your design.