Information and Database Management Systems I (CIS 4301)

(Fall 2014)

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Exam 1 Part 1 Solutions

Name:	
UFID:	
Email Address:	

Pledge (Must be signed according to UF Honor Code)

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

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Signature

For scoring use only:

	Maximum	Received
Question 1	20	
Question 2	30	
Total	50	

Question 1 (Knowledge Questions) [20 points]

Explain the following notions as precisely as possible (No need to provide examples).

1. Database [2 points]

Shared collection of logically related data (and a description of this data), designed to meet the information needs of an organization.

1. The difference between *data definition language* (*DDL*) and *data manipulation language* (*DML*). [4 points]

DDL permits specification of data types, structures and any data constraints.
DML is the general enquiry facility (query language) of the data and permits retrieval of data.

2. The difference between *external level* and *conceptual level*. [4 points]

External level is the users' view of the database that is relevant to a particular user.
Conceptual level is the community view of the database and describes what data is stored in the database and the relationships among the data.

3. Relation *r* [3 points]

A relation *r* with respect to a relation schema $R(A_1, ..., A_n)$ is defined as any set of n-tuples from the Cartesian product of *n* domains $dom(A_1) \times \ldots \times dom(A_n)$ where $dom(A_i)$ denotes the domain of attribute A_i.

4. Candidate Key [4 points]

An attribute, or set of attributes, that satisfies the following:
1. Uniquely identifies a tuple within a relation. (Uniqueness)
2. No proper subset of it has the uniqueness property (Irreducibility)

5. Superkey. [3 points]

Any set of attributes that contains or is equal to a candidate key.

Question 2 (ER Model) [30 points]

A hospital in Gainesville needs a database with the requirements listed below. Design an ER diagram for the database of the hospital. For each entity set, mark clearly the primary key (If the primary key is not specified by requirement, use your best knowledge to add your own key or use existing attributes). For each relationship you identified, state the cardinalities (1:1, 1:m or m:n) on the entities participating in this relationship. [30 points]

1. Each *patient* has a patient ID, a name, a phone number, an address, a date of birth, is admitted to one or more hospital departments on specific dates, has one or more illnesses, has one or more doctors. Each individual patient can require several medicines be administered on specific dates and on specific times.
2. Each *illness* has a name, a description, a unique index in DiseasesDB, and an emergency level on a scale of 1 to 10
3. Each *employee* has a name, a date of birth, a social security number, a degree (e.g. M.D.), a start date (date on which the employee began working for the hospital), a specific salary per hour (e.g. $100 per hour), a specific working hours per week (e.g. 20 hours per week), a role responsibility description and each employee works in one department and can take care of up to 5 patients.
4. Each *department* has a name, an internal hospital department number, a capacity and a list of illnesses that can be admitted to the department.
5. Each *medicine* has a name, a unique CAS number (e.g. 68882), a pregnancy category (e.g. C), a unit price, a type (e.g. intravenous, oral) and an expiration date.

[Each entity set needs to have a primary key / partial key. Grading criteria:
* Missing keys/attributes: -1 each, -5 max
* Bad design: -1~10, depending on how bad it is.
* Missing relationship/entity: -2 each.
* Missing/incorrect cardinalities: -1 each, -5 max.]