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CSCI 2020 Database Fundamentals

HW1

DBMS Terms and Concepts & the Relational Model

Due: by class time on the due date as noted in the Course Calendar

*Submit as a word processed document to the dropbox
(...and bring a hard copy to class)*

Use the spaces provided to answer the questions. When asked to explain or define a term, a repetition of the books definition, one found on the Internet, from another text, or the definition given in the notes is NOT acceptable. For full credit the definition must be in your own words.

- 1) (5 pts) Which of the following statements is true, and WHY?
- a. A database can be useful without a DBMS
 - b. A DBMS can be useful without a database.

Answer: A is true because without a database, a database management system has nothing to manage.

- 2) (5 pts) The ordering of rows in a table is not important.
- a. True
 - b. False

Answer: True, rows can be in any order.

- 3) (5 pts) The ordering of values inside the rows of a table is not important.
- a. True
 - b. False

Answer: False, the ordering of values inside the rows does matter.

5) (20 pts) If a single fact is stored multiple times in a database that is redundancy. The two tables PERSON and GRADEBOOK below show redundant data. The PERSON table has one entry for every person in Starfleet and uses the ID column as a unique identifier. The GRADEBOOK table lists each grade assigned to a person in Starfleet during their training. It uses the combination of the PERSON column and the COURSE column for its unique identifier. The PERS column in GRADEBOOK uses the same values as the ID column in PERSON.

- (5 pts) Which column or columns contain redundant data?
- (5 pts) What would motivate you to want this duplication?
- (5 pts) Give an example row to be added to one of the tables shown below to demonstrate an example of uncontrolled redundancy.
- (5 pts) Give an example of a specific constraint you would place on **programs** that accessed this database to control the redundancy?

PERSON			
ID	NAME	DEPT	GENDER
SC937	Kirk	CMD	M
SM105	McCoy	MED	M
SE602	Rand	CMD	F
SE197	Scott	ENG	M
S179	Spock	SCI	M
SC835	Sulu	CMD	M
SE213	Spock	ENG	F

GRADEBOOK					
PERS	NAME	DEPT	DATE	COURSE	GRADE
S179	Spock	SCI	12/1/2252	CSCI1100	A
SC835	Sulu	CMD	1/30/2266	CSCI1100	A-
SC937	Kirk	CMD	1/11/2266	CSCI1100	D
S179	Spock	SCI	12/1/2286	CSCI4127	A
SC835	Sulu	CMD	12/1/2286	CSCI1701	B+
SC937	Kirk	CMD	12/1/2286	CSCI1100	C+
SE197	Scott	ENG	12/1/2286	CSCI1100	A
SE213	Spock	ENG	12/1/2286	CSCI1100	A
SM105	McCoy	MED	12/1/2286	CSCI1100	C

Answers:

- The following columns are redundant:
 - Person.ID and Gradebook.Pers
 - Person.Name and Gradebook.Name
 - Person.Dept and Gradebook.Dept
- If the speed of the database is needed over size of the database, then you would want duplicate data, however, when some updates to the database are made, both tables must be updated.
- | | | | | | |
|-------|------|-----|------------|----------|---|
| SC937 | Kirk | ENG | 12/15/2289 | CSCI1260 | B |
|-------|------|-----|------------|----------|---|
- When inserting a new grade record, programs would be require to verify that the Pers, Name, and Dept columns are valid values in the Person table.

- 8) (20 pts) You are to create two example database tables below. Each table should have at least 3 columns. One of the tables should have a foreign key to the other table. Populate each table with at least 3 rows of data.

Answers:

Robot.ID is a primary key and Creator.ID is a primary key. Creator.Creation is a foreign key that references Robot.ID.

ROBOT		
ID	NAME	Skill
1	Bob	Cooking
2	Alice	Housework
3	Lucy	Planning
4	Gabe	Social interaction

CREATOR		
ID	NAME	CREATION
1	The Kid	1
2	The Housewife	2
3	The Engineer	4
4	The Architect	3

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