MSDS 7330
File Organization and Database Management
Homework Assignment 5

This is a homework assignment for MSDS7330, File Organization and Database Management. This quiz is due at the end of the synchronous class period in which the unit is discussed or whenever the instructor turns you to hand it in; whichever comes first. Enter your answer to each question in the MSDS 7330 Homework Answer Sheet Word document. Be sure to place your name and due date in the Homework Answer Sheet, and place your last name and the homework number at the beginning of the file name. For example, the filename for the homework answer sheet for homework 2 for Sohail Rafiqi should be *Rafiqi2MSDS7330HomeWorkAnswerSheet.docx*.

For each question, in the Homework Answer Sheet state the letter of your chosen answer and write out the explanation why the answer is correct. Note that the explanation involves also explaining why the other answers are not correct.

Your answer Word document should be submitted on the Canvas system for the quiz number equal to the homework number. For example, the homework 2 should be submitted for homework assignment 2.

1) In general, normalizing a single flat-file database results in which of the following?
   a) Many tables.
   b) Reduced data redundancy.
   c) No INSERT, DELETE or UPDATE anomalies.
   d) All of the above.
   e) None of the above.
2) Normalization
   a) has no impact on performance.
   b) is necessary for read-only databases.
   c) sets the business rules.
   d) is a technical exercise that does not change the business rules.
3) Normalization is required to
   a) prevent updates by unauthorized personnel.
   b) update multiple instances of data at the same time.
   c) make sure the same data is stored in multiple locations.
   d) preserve data quality.
4) In a read only database
   a) denormalization is common in order to provide efficient report generation.
   b) normalization is required to prevent update anomalies.
   c) normalization has no impact on reads.
   d) denormalization is performed to speed up writes.
5) A table normalized to first normal form (1NF) commonly
   a) includes more attributes than the non-normalized version.
   b) contains more records than the non-normalized version.
   c) contains less records than the non-normalized version.
   d) has no redundant data.
6) A relation is in first normal form (1NF) if
   a) at least one attribute in every row contain only one single (atomic) value.
   b) every non-key attribute is fully functionally dependent on the primary key.
   c) at least one attribute in every row can contain more than one value (multivalued).
   d) every attribute in every row can contain only one single (atomic) value.
7) A relation is in first normal form (1NF) if
   a) it doesn't contain an determinants.
   b) it doesn't contain any repeating groups.
   c) it doesn't contain any null values in primary key fields.
   d) it doesn't contain any functional dependences.

8) A relation is in second normal form (2NF) if
   a) it is in 1NF and every key attribute is fully functionally dependent on the primary key.
   b) it is in 1NF and every attribute is fully functionally dependent on the primary key.
   c) it is in 1NF and every non-key attribute is fully functionally dependent on the primary key.
   d) it is in 1NF and no non-key attribute is transitively dependent on the primary key.
9) A relation is in third normal form (3NF) if
   a) it is in 1NF and no non-key attribute is transitively dependent on the primary key.
   b) it is in 2NF and no non-key attribute is transitively dependent on the primary key.
   c) it is in 1NF and no non-key attribute is fully functionally dependent on the primary key.
   d) it is in 2NF and no non-key attribute is fully functionally dependent on the primary key.
10) In fourth normal form (4NF)
   a) All occurrences of an entity must contain the same number of attributes.
   b) All non-key fields must be a function of the key.
   c) All non-key fields must not be a function of other non-key fields.
   d) A row must not contain two or more independent multi-valued facts about an entity.
11) When you normalize a relation by breaking it into two smaller relations, what must you do to maintain data integrity? [Hint: more than one answer is correct.]
   a) Link the relations by a common field.
   b) Remove any functional dependencies from both relations.
   c) Assign both relations the same primary key field(s).
   d) Create a primary key(s) for the new relation.
12) Table I is in which normal form?
   a) First Normal Form (1NF)
   b) Second Normal Form (2NF)
   c) Third Normal Form (3NF)
   d) Fourth Normal Form (4NF)
13) In Table I, which of the following is apparently true?
   a) StudentID $\rightarrow$ TutorID
   b) CourseID $\rightarrow$ Room, Topic
   c) CourseID $\rightarrow$ TutorID
   d) CourseID $\rightarrow$ Topic
14) Normalization ensures that each fact (data) is
   a) stored in exactly one location.
   b) stored in multiple locations and updated simultaneously.
   c) updated in all locations simultaneously.
   d) not null.
15) In discussing normal form, a key is
   a) a unique identifier for a row in a table, used to select the row in queries.
   b) a set of attributes that describe an instance of an entity.
   c) an object defined in the system model about which data is stored in the database.
   d) a set of attributes that cannot be used to uniquely identify a row in a table.
16) The same fact (data) that is stored in multiple locations may become
   a) normalized.
   b) inconsistent.
   c) a foreign key.
   d) outdated.
17) To alter a product name requires the name to be changed in 5 different places. This is an example of a potential
   a) DELETE anomaly.
   b) INSERT anomaly.
   c) UPDATE anomaly.
   d) CREATE anomaly.
18) A school database's Students table contains the name and address details of each student. However there are many brothers and sisters in the school who live at the same address. Splitting the address details into their own table would occur when normalizing the Students table into:
   a) 1NF
   b) 2NF
   c) 3NF
   d) 4NF
19) In a normalized table, the attribute *A1* is functionally dependent on the attribute *A2*. Which os the following is true?
   a) There can be repeating values in the *A1* column.
   b) The *A2* column is a unique identifier.
   c) Each value for *A2* identifies a single value of *A1*.
   d) All of the above.
   e) None of the above.

20) A table contains data about products and customers. Splitting this table into two would occur when normalizing the table into:
    a) 1NF
    b) 2NF
    c) 3NF
    d) 4NF

21) During normalization it is first noticed that each time a particular value in attribute p occurs attribute q has the same value. Which normal form is being considered?
    a) 1NF
    b) 2NF
    c) 3NF
    d) 4NF

TABLE I
STUDENT-TUTOR TABLE

CourseID	StudentID	Date	TutorID	Topic	Room	Grade	Book	TutEmail
U1	St1	23.02.03	Tut1	GMT	629	4.7	Deumlich	tut1@fhbb.ch
U2	St1	18.11.02	Tut3	GIn	631	5.1	Zehnder	tut3@fhbb.ch
U1	St4	23.02.03	Tut1	GMT	629	4.3	Deumlich	tut1@fhbb.ch
U5	St2	05.05.03	Tut3	PhF	632	4.9	Dmmlers	tut3@fhbb.ch
U4	St2	04.07.03	Tut5	AVQ	621	5.0	SwissTopo	tut5@fhbb.ch