MIS2502 Section 002: Exam 1 Study Guide (Fall 2018)

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The exam will be a combination of multiple-choice (12 questions, 30 points) and short-answer questions (ERD 35 points, and SQL 35 points). It is a **closed-book**, **closed-notes** exam. **You will not be able to use a computer during the exam**. You may be asked to draw ERD by hand.

The following is a list of items that you should review in preparation for the exam. Note that *not every item on this list may be on the exam, and there may be items on the exam not on this list.*

**The Things You Can Do with Data/The Information Architecture of an Organization**

* What is the difference between data and information? Give examples.
* What is a transaction (both as in the context of business and in the context of database)?
* What are the characteristics of a transactional database?
  + What are the goals and benefits?
* What are the characteristics of an analytical data store?
  + What are the goals and benefits?
* What is the relationship between a transactional database and an analytical data store?

**Relational Data Modeling**

**Entity Relationship Diagram (multiple-choice and short-answer questions)**

* Be able to interpret ERDs (multiple-choice questions)
  + Identify and define entities, relationships, and attributes (Multiple choices, 1 to many relationship and many to many relationship)
* Be able to draw an ERD based on a scenario description using the correct symbols and cardinality (short-answer questions)
  + Identify primary key and non-key attributes
    - Make sure that you have a primary key for every entity
  + Cardinality
    - Maximum cardinality: One-to-one, one-to-many, many-to-many
    - Minimum cardinality: optional or mandatory (i.e., 0 or 1)
  + Identify when attributes describe entities and when they describe relationships
  + Best practices for normalization
    - If an entity has multiple sets of related attributes, split them up into separate entities
    - Each attribute should be *atomic*

**Schema (multiple-choice questions)**

* Be able to draw the corresponding schema of an ERD
  + Identify tables based on entities and relationships
  + Understand and implement primary key/foreign key relationships
  + Decomposing many-to-many relationships in an ERD into one-to-many relationships (with the added new table) in the schema
* Given data from two tables, be able to draw the results of a “join” of those tables with the data correctly “matched up” (see the examples from the slides)

**Basic SQL (multiple-choice and short-answer questions)**

* **Coverage:** 
  + **Simple SQL queries by SELECTing from a single table will be on this exam (the slide deck “2.1 SQL 1 – Out – Basics”).**
  + JOINS, subselects, etc. (the “2.2 SQL 1 – Out – Advanced” slide deck) will be on **Exam 2**. (The slide deck “3. SQL 2 – In” on creating, updating, and deleting tables and rows will also be on Exam 2.
* Given a schema of a database, be able to create a SQL statement to answer a question
  + e.g., In what state does customer Bob Smith live?   
     How many people live in each state?
* Understand how to use
  + SELECT

You will be provided the general syntax of the SELECT statement on the exam, but you will need to know how to apply it!

* + FROM
  + DISTINCT
  + WHERE (and how to specify conditions)
  + AND/OR
  + COUNT, AVG, MIN, MAX, SUM
  + GROUP BY
  + ORDER BY (ASC/DESC)
  + LIMIT
* Put single quotes around string (non-numeric) values.
  + For example, 'NJ'
* Put back quotes arround schema, table or column names (in the form of `name`) when the name crash with SQL reserved words
  + For example, orderdb.`Order`