

Mid-Term Exam Details

- ▶ Total points: 50
- ▶ Total Exam Time: 3 hrs
- ▶ Exam window: 9:30am - 12:30pm
- ▶ Exam room: V32
- ▶ Total questions: 5
- ▶ No SQL server specific questions
- ▶ Closed book/closed notes

Points Distribution

- ▶ Lesson 2: RM ~ 4
- ▶ Lesson 3: SQL ~ 12
- ▶ Lesson 5: Normalization ~ 12
- ▶ Lesson 6: ER Modeling ~ 12
- ▶ Lesson 7: Logical DB Design ~ 10

Important Topics

▶ Lesson 2: Relational Model

- ▶ No query writing using Relational algebra expressions!
- ▶ Revise other conceptual details
 - ▶ Relational Keys
 - ▶ Integrity Constraints
 - ▶ Entity integrity
 - ▶ Referential integrity

Important Topics

▶ Lesson 3 : SQL - DML

▶ SELECT statement

- ▶ Joins, Group By, Having, Aggregates, Order By

- ▶ Sequence of operation in SELECT clause

▶ No DDL questions

Important Topics

► SQL SELECT

- Properly pay attention to the columns mentioned in the SELECT list if you are using GROUP BY clause in that query. All the SELECT list columns must be either a part of GROUP BY clause or they must be included with an aggregate function.
- If HAVING clause is needed for a query then it must've some aggregate function.
- Subqueries are always evaluated first and then the outer query.
- If JOINS are required then identify a common column between the two tables and write the equality condition for that in the query.

Important Topics

▶ Lesson 5: Normalization

- ▶ How to derive functional dependencies from a given set of sample data and documentation
- ▶ Identifying CK and PK for the relations using FDs.
- ▶ Identifying Partial and Transitive dependencies to convert 1NF tables to 2NF and 3NF

Important Topics

► Lesson 5: Normalization

- Spend some more and proper time in identifying Functional Dependencies. Because if you miss to identify any FD then that'll mess up your further Normalization process.
- Always look at the meaning of the attributes as it'll help you find correct FDs.
- Do not assume that the given data is the representation of all possible values that could ever occur for that table, unless it's explicitly mentioned.
- Always identify a PK after finding all the FDs. Remember, your PK should identify all the other attributes in the table either together or individually.
- After this, find Partial Dependencies on the PK and not on anything else. PDs will exist only if your PK is a Composite Key.
- Remember the condition to identify Transitive dependency. Find if it exists for any of the decomposed tables.
- Finally, underline the PKs of all the final 3NF tables.

Important Topics

▶ Lesson 6: ER Modeling

- ▶ From the given information, identify entities, attributes, their relationships and proper multiplicities
- ▶ Cardinality and Participation constraints
- ▶ Properly capturing the given information into ER diagram

Important Topics

► Lesson 6: ER Modeling

- Do not show a relationship line twice between two entities if it's conveying the same meaning. Two lines are drawn to show two totally different relationships between those two entities.
- Write all the identified PKs, AKs clearly in the diagram along with the given attributes.
- Remember that we do not show Foreign Keys in the ER diagram.
- If there are any relationship attributes, show them with a dotted line for that relationship.
- Name of the relationship, directional arrows and multiplicities are a must. Properly write them for your ERD.

Important Topics

▶ Lesson 7: Logical DB design

- ▶ How to convert the given ER model into logical model using different rules discussed
- ▶ How to identify parent and child entities in different types of relationships
- ▶ How to take care of multi-valued attributes and composite attributes
- ▶ How to take care of relationship attributes

Important Topics

► Lesson 7: Logical DB design

- If there are multi-valued attributes then create a separate table for those and send the PK of the current entity to the new table. Properly decide the PK of this new table. It could be the composite key of PK of current entity along with the multi-valued attribute, or it could be just the multi-valued attribute.
- If there's a composite attribute, create separate columns for the subparts of this composite attribute.
- If there's 1...1 relationship with mandatory participation on both sides, then merge the entities together and create one table **ONLY** IF there are no other entities which are related to these entities creating a 1...* or *...* relationships.

Important Topics

► Lesson 7: Logical DB design

- Always create a new table for *...* relationships.
- For 1..* binary relationships, identify parent and child entities properly. Entity on the “1” side is the parent. So take the parent PK and put it in child table.
- Relationship attributes:
 - If they are of *...* relationship, then put them in the newly created table.
 - If they are of any other relationship then put them in the child table.
- Write PKs and Foreign Key references properly for all the tables along with AKs if there are any.

Summary of how to map entities and relationships to relations

❑ Whenever there are relationship attributes, it doesn't mean that everytime you'll need to create a new table, that is only true with ***:*** relationship.

❑ You can keep that relationship attribute in child table.

Entity/Relationship	Mapping
Strong entity	Create relation that includes all simple attributes.
Weak entity	Create relation that includes all simple attributes (primary key still has to be identified after the relationship with each owner entity has been mapped).
1:* binary relationship	Post primary key of entity on 'one' side to act as foreign key in relation representing entity on 'many' side. Any attributes of relationship are also posted to 'many' side.
1:1 binary relationship:	
(a) Mandatory participation on both sides	Combine entities into one relation.
(b) Mandatory participation on one side	Post primary key of entity on 'optional' side to act as foreign key in relation representing entity on 'mandatory' side.
(c) Optional participation on both sides	Arbitrary without further information.
: binary relationship, complex relationship	Create a relation to represent the relationship and include any attributes of the relationship. Post a copy of the primary keys from each of the owner entities into the new relation to act as foreign keys.
Multi-valued attribute	Create a relation to represent the multi-valued attribute and post a copy of the primary key of the owner entity into the new relation to act as a foreign key.

Exam Rules and Regulations

- ▶ All materials including backpacks, cell phones, wrist watches, class notes, textbooks and any other notes must be left at the front of the class. You will not have access to those items during the exam. Failure to do so will result in an NC grade.
- ▶ You must bring your own pens, pencils, erasers & sharpeners.
- ▶ Any form of communication with other students is not allowed during the exam. Every verbal and non-verbal form of communication with another student will result in the loss of one letter grade.
- ▶ In order to get any form of assistance from the proctor, you must raise your hand. No verbal communication is allowed until the proctor gives explicit permission.
- ▶ Once you leave the exam room, there is no reentry.
- ▶ You can request for a postponement of the exam if you are sick. In that case, you must produce a letter from a qualified physician.

All the best!