

# Revision

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# Overview

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- Exam format and content
- Module content
- Questions

## Exam Format and Content

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# Exam Format

- Answer all Three questions:
  - Q1 - Web Programming [15 Marks]
  - Q2 - Relational DB Design, Theory and DBMS [15 Marks]
  - Q3 - SQL and ER Design [20 Marks]
- Worth 50% of the final mark
- Time: 2 hours

# Exam Content

- Anything covered in the course may come up in the exam:
  - DBMS
  - Relational model and algebra
  - ER Diagram
  - Normalization
  - SQL Queries
  - HTML and CSS
  - Flask
  - ...
- Mock exam questions
- Past exam papers

## Module Content

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# Database: Relational Model

- What is Database? Why we need it?
- What is DBMS?
- Relational model
  - Relations, attributes, domains, relationship, cardinality ratio
  - Candidate keys, primary keys and foreign keys
  - Referential integrity
- Relational algebra
  - Operators: selection, projection, set operators, join operators and rename
  - Write relational algebra based on the problem description



- ER Diagram
  - Entity
  - Relationship
  - Attributes
  - Cardinality
  - Draw ER diagram according to the problem description
- Normalization
  - What is normalization? why we need it?
  - What is the functional dependency?
  - What are 1NF, 2NF and 3NF?
  - How to convert unnormalized data into 3NF?

- What is SQL?
- How to Create and Delete a table?
- How to Insert and Select data?
- How to Update and Delete data?
- Alias, subqueries, aggregate functions, grouping, joins
- What's the connection and differences between SQL and Relational Algebra?

# Interfaces: HTML and CSS

- What is HTTP?
- What is HTML?
- Syntax of HTML
  - Images
  - Hypertext links
  - Lists
  - Tables
  - Forms
- Syntax of CSS
- How to add CSS to HTML
- What is DOM?

# Interfaces: Web Application

- Python
- Flask
- Jinja
- The client-server model
- What are Web applications?
- Why we need web applications?
- Java-scripts and client-side scripting (understand only)

# How to Prepare

- Text book
- Lecture slides
- Recordings
- Lab excercises
- Mock exam questions and Past exam paper

## Quiz Feedback

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## Common Errors

- Syntax Error: e.g., Missing comma(,), semicolon(;), Use **WHERE** together with **GROUP BY**, ...
- Incorrect ordering: Lacked **ORDER BY**, **ORDER BY** on the wrong column, or **ORDER BY** with wrong order.  
A notable problem: **ORDER BY** a string, e.g., **ORDER BY** "name"
- **IS NULL**: Use of **= NULL**, **= "NULL"** or **= ""** instead of **IS NULL**
- **NATURAL JOIN**: Many solutions made use of "NATURAL JOIN" when two tables have no common attributes
- **CROSS JOIN**: Misused **CROSS JOIN** resulting in nonsensical results.
- **LEFT JOIN**: Incorrect use of **LEFT JOIN** resulted in additional (incorrect) values being returned.

## Common Errors

- **INNER JOIN**: Many solutions that made use of **INNER JOIN** with incorrect conditions.
- Ambiguous names: SQL statement errors arising from columns with the same name in different tables (during a **JOIN**). Commonly seen when using **ORDER BY**.
- Aggregate function: Missing corresponding **GROUP BY** clause when using aggregate functions, or incorrect aggregate function were used, e.g., use **SUM** to calculate the average.
- Duplicated Values: Duplicate tuples/rows in the resulting table.