

IS5102

Database Management Systems

Lecture 20: Knowledge Review

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Logistic arrangements will be announced by the Exams officer and/or level coordinator

8-hour Take Home Exam Instructions

Answer **3** out of **3** exam-style questions as you would in an exam (citations of sources are not expected; answers should be from your own memory and understanding; significant stretches of text should not be taken verbatim from sources).

Any illustrations or diagrams you include should be original (hand or computer drawn).

You may typeset your answers, or write by hand and scan them.

In either case, please return your answers as a **single PDF**.

If you handwrite, make sure the pages are legible, the right way up and in the right order.

Minor syntax errors in **SQL code** will not be penalised, provided it is clear what you meant.

Your submission should be **your own unaided work** (while you are encouraged to work with your peers to understand the content of the course while revising, once you have seen the questions you should avoid any further discussion until you have submitted your results).

You must submit your completed assessment within the given time window.

Assuming you have revised the module contents beforehand, answering the questions should take no more than **three hours**.

Good Luck!

- ▶ Lectures
- ▶ Exercises
- ▶ Coursework

Lecture 1: Why Database Management Systems?

Lecture 2: Database Design:

- ▶ Conceptual models
- ▶ Logical models

Lectures 2-4:

Entities, relations, attributes

Cardinality and participation constraints

Primary keys, super keys, candidate keys

Weak entities, partial keys (discriminators)

Specialisation and generalisation (overlapping/disjoint, partial/total)

Drawing conventions

Lectures 5-6:

Relations, tuples, attributes

Keys: candidate, primary, foreign

Domains and Attribute Types

Relation schema

Lecture 6:

Translating E-R diagram to schema diagram

Relational algebra and its operators

Lectures 7-12:

CREATE/ALTER/DROP TABLE statements and datatypes

INSERT and UPDATE

CASE and LIKE

PRIMARY KEY and FOREIGN KEY

SELECT queries, with WHERE, ORDER BY, GROUP BY, HAVING

Aggregation: AVG, MIN, MAX, SUM, COUNT

Lectures 7-12:

Cascading actions

Creating and using views

Joins: natural, outer

Functions, procedures, triggers

Authorisation: **GRANT** and **REVOKE**

Lectures 13-14:

Update Anomalies

Functional Dependencies

Full Functional Dependencies and Transitive Functional Dependencies

1st–3rd Normal Forms and Processes of Normalisation/Denormalisation

Lectures 15-20:

Data Warehousing: Why and How

Dimensional Modeling

The rise of NoSQL

Graph databases, Key-Value databases, Document-oriented databases

Uses in data mining/analytics

Good luck!