Welcome to the CoGrammar

Relational Databases and SQL

The session will start shortly...

Questions? Drop them in the chat. We'll have dedicated moderators answering questions.

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Cyber Security Session Housekeeping

- The use of disrespectful language is prohibited in the questions, this is a supportive, learning environment for all - please engage accordingly. **(Fundamental British Values: Mutual Respect and Tolerance)**

- No question is daft or silly - **ask them!**

- There are **Q&A sessions** midway and at the end of the session, should you wish to ask any follow-up questions.

- If you have any questions outside of this lecture, or that are not answered during this lecture, please do submit these for upcoming Academic Sessions. You can submit these questions here: **Questions**

Cyber Security Session Housekeeping cont.

- For all **non-academic questions**, please submit a query: **www.hyperiondev.com/support**

- We would love your **feedback** on lectures: **Feedback on Lectures**

- Find all the lecture **content** in you **Lecture Backpack** on GitHub.

- If you are hearing impaired, please kindly use your computer's function through Google chrome to enable captions.

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Safeguarding & Welfare

We are committed to all our students and staff feeling safe and happy; we want to make sure there is always someone you can turn to if you are worried about anything.

If you are feeling upset or unsafe, are worried about a friend, student or family member, or you feel like something isn't right, speak to our safeguarding team:

Scan to report a safeguarding concern

Simone Botes

Nurhaan Snyman

Rafiq Manan

Ian Wyles
Designated Safeguarding Lead

Ronald Munodawafa

Tevin Pitts

or email the Designated Safeguarding Lead:
Ian Wyles
safeguarding@hyperiondev.com

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Stay Safe Series:

Mastering Online Safety One week at a Time

While the digital world can be a wonderful place to make education and learning accessible to all, it is unfortunately also a space where harmful threats like online radicalization, extremist propaganda, phishing scams, online blackmail and hackers can flourish.

As a component of this BootCamp the *Stay Safe Series* will guide you through essential measures in order to protect yourself & your community from online dangers, whether they target your privacy, personal information or even attempt to manipulate your beliefs.

Security Tip

Verify Your Browser Extensions

Before installing browser extensions, verify their legitimacy and permissions.

- Why? Some malicious extensions can steal sensitive data or track your activity.
- How? Check reviews, download only from official stores, and ensure the developer is reputable.
- Pro Tip: Regularly audit your extensions and remove those you no longer use.

Stay safe while browsing! 🌐🔒

Learning Objectives & Outcomes

- Define the key components of a relational database, including tables, rows, columns, and keys.
- Explain the difference between relational and non-relational databases.
- Demonstrate how to write basic SQL queries for creating and retrieving data.
- Evaluate the suitability of relational databases for specific use cases.

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Data

Can you think of any applications or systems you use daily—like social media, e-commerce websites, or banking apps—and how they might store and manage the vast amounts of structured data they handle?

Polls

Please have a look at the poll notification and select an option.

Which of the following is an example of a relational database management system (RDBMS)?

A. MongoDB

B. MySQL

C. Cassandra

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Introduction to databases

- **What is a Database?**
  A structured collection of data stored electronically for easy access, management, and updating.

  Types of Databases

- **Relational Databases:** Data organized in tables with predefined schemas.
- **Non-Relational Databases:** Flexible, schema-less storage for unstructured or semi-structured data.

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Relational Databases Overview

- **Definition**
  Relational databases store data in structured tables (rows and columns) linked by relationships.

Key Features

- **Structured Data:** Uses schemas to enforce structure.
- **Relationships:** Data linked across multiple tables via keys.
- **Query Language:** Uses SQL for data manipulation and retrieval.

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Relational Databases Overview

- **Examples**
  a. MySQL
  b. PostgreSQL
  c. Oracle Database
  d. Microsoft SQL Server
  e. SQLite

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Relational VS Non-relational db

Feature	Relational (SQL)	Non-relational (NoSQL)
Structure	Fixed schema, table based	Schemaless/document/key-value
Query language	SQL	Various APIs or query language
Data type	Structured	Unstructured or semi-structured
Scalability	Vertical	Horizontal

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Advantages of relational databases

- **Data Integrity:** Ensures data accuracy and consistency with constraints.
- **ACID Compliance:** Guarantees reliable transactions: Atomicity, Consistency, Isolation, Durability.
- **Scalability:** Optimized for vertical scaling (adding resources to existing servers).
- **Query Efficiency:** Structured Query Language (SQL) enables powerful and flexible queries.
- **Secure Access:** Role-based access control and encryption capabilities.

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SQL: The Language of Relational Databases

- **What is SQL?**

  Structured Query Language used for managing relational databases.

- **CORE OPERATIONS IN SQL**
  - **Data Definition Language:** Create, modify and delete tables
  - **Data Manipulation Language:** Inserts, updates, delete and retrieve data
  - **Data Control Language:** Manage access control
  - **Transaction Control:** Ensure transactional integrity.

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Practical Example

- Creating, Inserting, Retrieving and Deleting data in a database using SQL.

- For the example, we're going to use MySQL Workbench to perform the task.

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Please have a look at the poll notification and select an option.

Which SQL command is used to create a new table in a relational database?

A. CREATE

B. INSERT

C. ALTER

D. SELECT

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Polls

Please have a look at the poll notification and select an option.

Which type of SQL statement is used to modify existing records in a table?

A. DELETE

B. UPDATE

C. ALTER

D. SELECT

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Questions and Answers

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Thank you for attending

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