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LEADERS IN IDEAS AND SOLUTIONS

Databases: review

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25th March 2019

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Submitting your assignment

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Submitting your assignment

You need to submit **some** files:

- A PDF with answers to **all** questions **including** all the SQL and PHP you write. Explain the SQL where necessary. Within the PDF, clearly indicate the score out of 40 of each student.
- A text or doc file (.rtf, .txt or .doc) with all your SQL in it.
- All PHP files requested

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Submitting your assignment

Choose one member of the group to submit the assignment - you don't need to all submit it. The others should check is has been submitted though!

Files should be named e.g., *groupX.zip.*

Names of all students in the group should be clearly marked in the pdf file.

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Submitting your assignment

Submit via Turnitin on the course webpage.

The deadline is 23:59 on Wednesday, 27th April.

The submission link was incorrectly set to close on Tuesday, 26th April - this has now been corrected.

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Example scores

Four assigned to group, all participated well

John Smith - 10

Claire Jones - 10

Peter Allan - 10

Sarah Cox - 10

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Example scores

Four assigned to group, one had dropped the course:

John Smith - 13.3

Claire Jones - 13.3

Peter Allan - 0

Sarah Cox - 13.3

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Example scores

Four assigned to group, all were active but one missed several meetings, didn't contribute much, etc.

John Smith - 11.5

Claire Jones - 11.5

Peter Allan - 5.5

Sarah Cox - 11.5

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Example scores

Four assigned to group, all were active but one got ill at the end and was unable to contribute to a lot of the final effort.

John Smith - 11.5

Claire Jones - 11.5

Peter Allan - 5.5

Sarah Cox - 11.5

Peter Allan should put in an MC form so that he does not lose out.

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Agreeing scores

Scores should be agreed by all group members *except* in the case that you have been unable to contact one of the members.

Please discuss this soon and let me know asap if there are any problems with this. You don't need to come and see me as a group - you can get in touch with me confidentially.

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Final lab - revision

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Today's lab

- Lab helpers will be there so you can go along and work on whatever would be most helpful for you - e.g., past lab sheets.
- You can work on your assignment if you like, but lab helpers will only give you very general help around this.

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Course Review

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My learning objectives*

- Understand that data and data management is *important*, *relevant* and *exciting*
- Understand how data is used and why you should care
- Be able to do your own (simple) things with data.

* check the Course Descriptor for the technical learning outcomes

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Tools we used

What kind of database did we look at?

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Relational databases

We also mentioned RDF triple stores and JSON, but only very briefly

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What language did we use to create and query our databases?

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Tools we used

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Relational databases

We also mentioned RDF triple stores and JSON, but only very briefly

What language did we use to create and query our databases?

SQL

This is standard for relational databases

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Tools we used

What kind of DMBS did we use?

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Tools we used

What kind of DMBS did we use?

MySQL

My SQL is widely used but there are also many other DBMSs that work with SQL.

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Why are databases necessary?

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Why are databases necessary?

- To make *organise* data so that it is *useful* and *accessible.*
- Databases allow us to *constrain* and *filter* our data so that we can access the data that we really want.

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What have we learnt in this course?

The key thing you have learnt are **practical SQL skills** so that you can

design, build and *query* databases

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design, build and *query* databases

We've also learnt a bit about

- what databases are for and how they are useful,
- a bit about DBMS,
- and had a look at how this all builds into the big data issues of today.

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Practical SQL skills

- Creating and populating tables

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- Naming tables and columns

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Practical SQL skills

- Creating and populating tables
- Naming tables and columns
- Datatypes (we only looked at a few)
- What primary keys are and how to create them
- Inserting data into tables

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SQL example*

We'll create a table called **Persons** which will give the ID, first name, last name and age of people.

We'll then insert some data into it.

*All SQL for these examples can be found in lecture10.sql on Vision

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Practical SQL skills

- Selecting data under different circumstances, including:
  - Ordering
  - Where
  - And/Or
  - Count
  - Sum
  - Group by

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Practical SQL skills

- Relationships between columns in tables:
  - One-to-one
  - One-to-many
  - Many-to-many
- Representing these in SQL using:
  - Foreign keys
  - Join tables
- Creating E-R diagrams to represent these

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SQL example

We'll create an **Order** table for things these people may have ordered. It will have the Order ID, order number and the ID of the person ordering it.

How do these tables join? What sort of relation is it? Do we need a join table?

We'll add some data.

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Practical SQL skills

- Querying across multiple tables
  - Selecting multiple tables to query from
  - Using foreign keys to indicate where results should come from
  - Renaming columns so results are easier to understand
  - Join statements

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Practical SQL skills

- Changing tables
  - Deleting rows
  - Using UDPATE to change a part of a row
  - Altering multiple rows simultaneously

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Practical SQL skills

- Extracting data from multiple sources using:
  - Join
  - Subqueries

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Practical SQL skills

- Altering tables:
  - Adding columns
    - Adding data to new columns
  - Deleting columns
  - Modifying columns

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Database theory

As well as developing practical SQL skills, we also looked at some database theory.

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Database theory

What DBMS are and that they provide:

- Security
- Integrity
- Concurrency control
- Recovery control

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Database theory - transactions

- What transactions are and why they are necessary
- The ACID properties:
  - Atomicity
  - Consistency
  - Isolation (serialisability)
  - Durability

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Database theory - views

- Why views are important
- Some example types of view
- How views can help with security
- We also looked at creating a view in SQL, but only very briefly

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Database theory - levels

- Physical / internal
- Logical / conceptual
- View / external

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The world of data

We have looked briefly at:

- The Semantic Web
- Ontologies
- NoSQL
- Data matching
- Provenance
- Data linking
- Social media

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The world of data

This lecture is **not** examinable and this will not form the basis for any questions.

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PHP

- We learnt what PHP is used for and basics of its syntax
- Embedding PHP in HTML
- Using PHP with HTML forms
- How to access, query and alter a SQL database using PHP

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PHP and assessment

- You are using PHP in your assessment so that you can access and manipulate your SQL database via a web page.
- The exam will NOT focus on PHP. When preparing for the exam, focus on SQL, not PHP.

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What will exam questions be like?

This year, for the first time for this course, we will be using e-exams.

You must answer ALL questions

There will be three kinds of questions:

- Multiple choice (one answer only)
- Check all that apply (multiple answers)
- Fill the blank

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Fill the blank questions

You will be provided with a list of possible options.

- You MUST choose one of these options.
- You MUST type precisely and carefully => a correct answer incorrectly spelt will be marked WRONG.
- If you have a learning profile indicating this is difficult for you (e.g., dyslexia), you answers will be marked by hand.

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Fill the blank questions

You will be provided with a diagram illustrating the database you need to create or query. This will be available electronically on every question (an icon you can click). It will also be given to you as a handout.

The same diagram is valid for every fill-the-blank question.

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Fill the blank questions

I have created a mock exam question that allows you to practice this.

https://ebs.surpass.com/ContentAuthor/testlink/a70f10961f56423990e2462f78ca418c

This is based on the database we designed in class, so you can see what this would look like in the context of the exam. I **strongly** recommend you try this out - ideally several times.

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Is revising from the slides enough?

Yes and no.

- I won't ask anything that isn't covered in the slides
- But practicing this yourself will really help you develop your SQL skills, which will give you a better chance in the exam.

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What else should I look at?

Past papers are always very helpful.

However, remember that the course has changed a bit. This year's course is very similar to last year's, but a bit different to earlier years.

The kinds of questions asked in paper exams are a bit different to what is asked in e-exams.

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What else should I look at?

There are lots of great online SQL tutorials that will help you practice your skills.

I think the best one is SQLbolt.com.

https://www.w3schools.com is also good.

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The End …

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That's all folks!

- I've really enjoyed teaching this course, and I hope you've got something out of it too.
- They've been a few teething troubles as this is my first year teaching this course and it's been substantially rewritten - sorry about those, and I hope they didn't cause you too many problems.
- Use next week to work on your assignment and practice your SQL.
- Do feel free to get in touch with me at any time if you have questions (but remember the strike!)

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That’s all folks!

Thanks for being a great group of students!