

INFS1200/7900

Introduction to Information Systems

Introduction

Hassan Khosravi

Course Related Information

An Overview of Relational Database Management Systems (DBMSs)

A Little About Me

- **Name:** Hassan Khosravi
- **Email:** h.khosravi@uq.edu.au
- **Teaching:** Roughly 20 different offerings, with class sizes ranging from 50 to 600, of 10 distinct courses to a total of roughly 4000 students.
- **Research:** Use of AI and educational technologies to enhance teaching and learning.

A Little About You

- Introduce yourself to your neighbours

Primary Goal of this Course

1. Extract information system requirements to create basic conceptual models
2. Map basic conceptual data models to relational database schema
3. Reason with the logical foundation of the relational data model and the fundamental principles of correct relational database design
4. Express queries using the SQL language to provide correct and secure retrieval of data from relational databases
5. Construct simple computer-based information systems given a complete specification
6. Perform information systems analysis and design in a group setting

Primary Goal of this Course

- You'll learn the most by *doing*. To help, we'll provide:
 - **Active Lectures:** many in-class activities
 - **Tutorials:** small group worked-examples
 - **Practicals:** hands on experience in implementing small scale information systems
 - **Assignments:** work in groups towards the design and implementation of an information system.
 - **Adaptive Learning:** a big repository of questions built in partnership with you.

Active Learning

- We will regularly be using UQ's Active Learn platform in this course.
 - Pre-lecture notes: usually posted a week before each module starts
 - Post-lecture notes: posted shortly after each lecture.
- UQ Active Learn contains multiple applications including **UQpoll** and **UQwordcloud**

URL: apps.elearning.uq.edu.au
ID: 60140



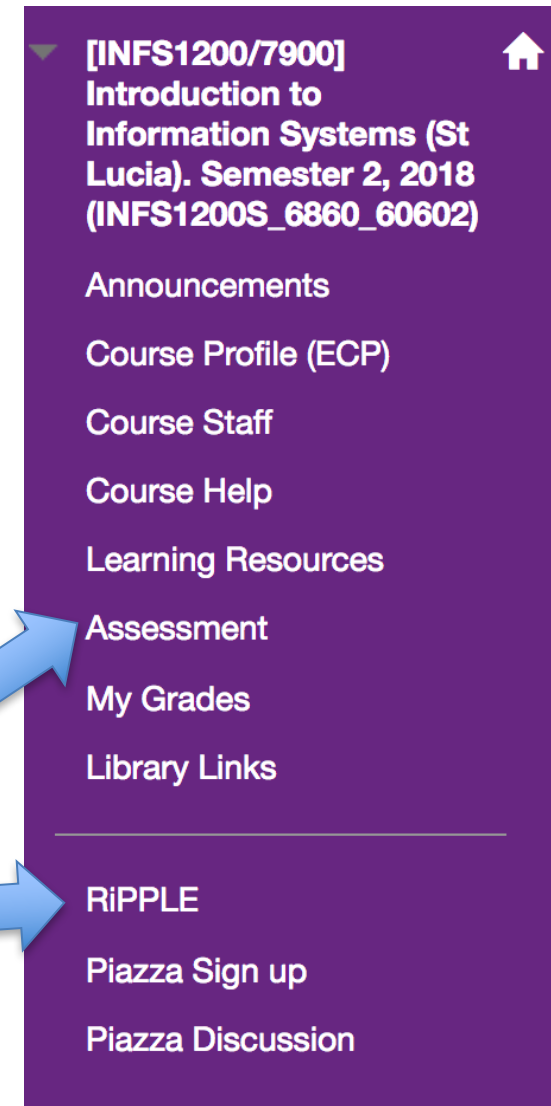
Disclosure: This application allows me to track authors of the responses.

Multi-tasking During Lectures

- Multitasking on your computer during lectures:
 - A. Helps me to learn the materials because I'm not bored and has no effect on other people
 - B. Helps me to learn better, but distracts the people around me
 - C. Makes me learn worse, but has no effect on other people
 - D. Makes me learn worse, and distracts the people around me

Collaborative Learning via RiPPLE

- RiPPLE is an adaptive, student-facing learning platform that provides the following functionalities:
 - Co-creation of content
 - Knowledge tracing
 - Content-recommendation
 - Gamification
- RiPPLE is accessible through the course website on Blackboard



The RiPPLE Platform

Question Body

File Edit View Insert Format Table Help

<> Paragraph

B *I* S A

≡

≡

≡

≡

I_x

0 WORDS POWERED BY TINYMCE

Topics

Relational Model

ER Diagrams

Relational Algebra

Data Warehouse

Normalization

Functional Dependencies

SQL

Co-creation

Which of the following is in the result:

1111

992

1.8

16

0

SQL

SELECT A.y, B.x, COUNT(*)
FROM A, B
WHERE A.x = B.y
GROUP BY A.y, B.x

Consider the following ER diagram:

1015


988

2.7

15

0

ER Diagrams



Determine the **primary key** for the "Degree" entity set.

Suppose I have a table
Cards(cardName, attack, health,
type, rarity) with the
following tuples

1111

985

2.0

13

0

SQL

cardName attack
health type rarity

Decompose the following relation into
3NF given its functional dependencies.

1019

979

2.2

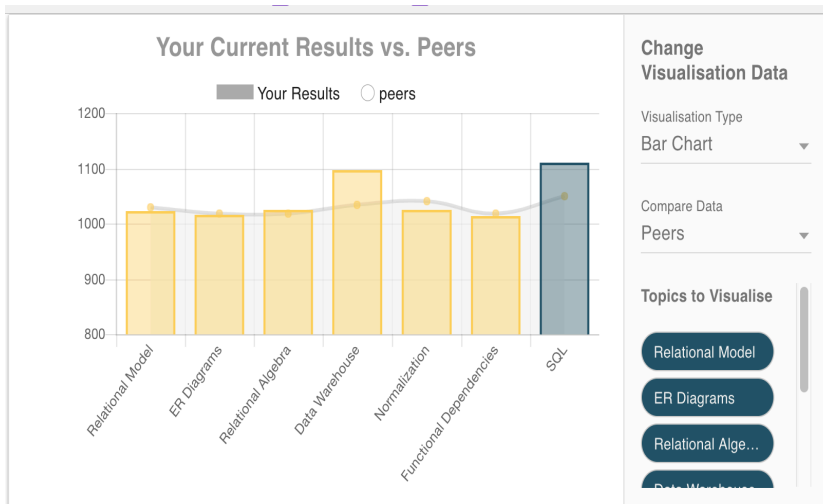
14

0

Normalization

R(ABCDEF)
D → EC
AC → B

Question Repository



Learner Model

Consider the following ER diagram:

1015

988

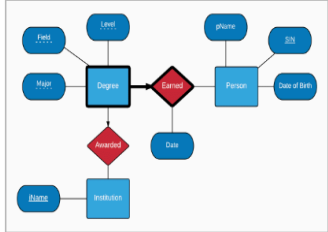
2.7

15

0

ER Diagrams

Functional Dependencies

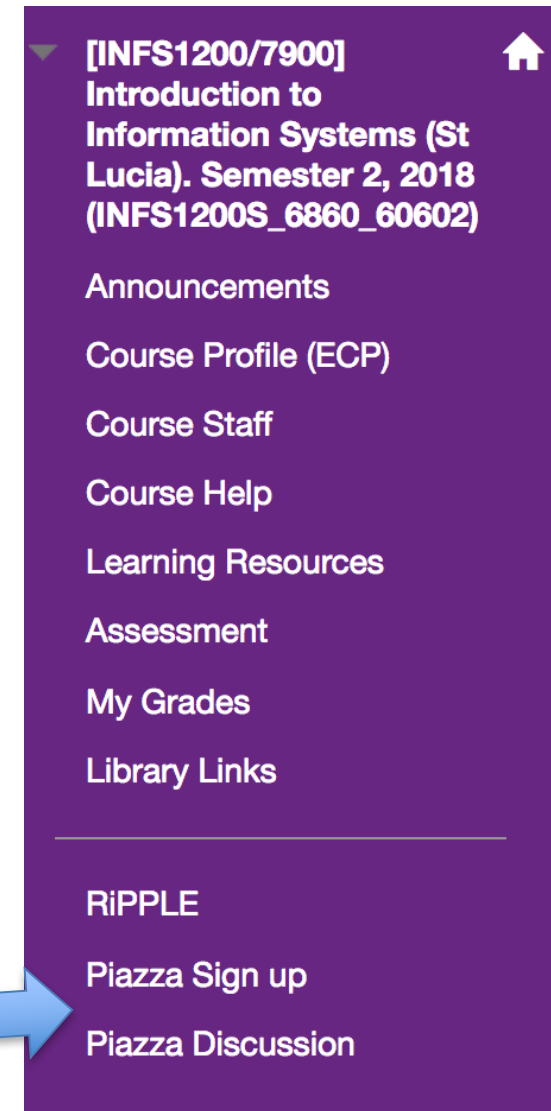


Determine the **primary key** for the "Degree" entity set.

Recommendation Engine

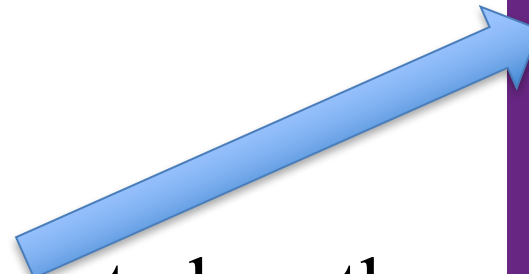
Piazza – Discussion Board


- Piazza is a Q&A web service. It can be described as "mixture between a wiki and a forum."
- It will be used by the Teaching team to communicate with you
- You can use it to ask questions, and to respond to other students' questions.
- Register via the BlackBoard webpage



Assignments

- Assignment 1 focuses on Design
 - Due: 21 Sept 2018
- Assignment 2 focuses on implementation
 - 19 Oct 2018
- Assignments will be posted on the Blackboard webpage



▼ [INFS1200/7900] Introduction to Information Systems (St Lucia). Semester 2, 2018 (INFS1200S_6860_60602) 

Announcements

Course Profile (ECP)

Course Staff

Course Help

Learning Resources

Assessment

My Grades

Library Links

RiPPLE

Piazza Sign up

Piazza Discussion

Exams

- Quiz 1: 29 August during normal lecture period
- Quiz 2: 9 October during normal Lecture period
- Final: during examination period
- Mock-up exams will be provided to help you effectively study for these exams.

Planned Assessments

Your final score would be computed as the max of two values computed using the following two assessment rubrics.

Assessment Rubric 1

Assessment Task	Due date	weighting
RiPPLE	Various due dates	10% + 1% bonus
Quiz 1	28 August	15%
Assignment 1	21 Sept	10%
Quiz 2	9 October	15%
Assignment 2	19 Oct	10%
Final exam	Examination Period	40%

Assessment Rubric 2

Assessment Task	Due date	weighting
RiPPLE		0%
Quiz 1	28 August	15%
Assignment 1	21 Sept	10%
Quiz 2	9 October	15%
Assignment 2	19 Oct	10%
Final exam	Examination Period	50%

Tentative Weekly Plan

Dates	Face-to-Face Learning Activities			Additional Learning Resources	Assessment	
	Lecture	Tutorial	Lab			
Week 1 23 Jul - 27 Jul	Introduction + ER Model			Elmasri: Chapter 3 and 4		RiPPLE Round 1
Week 2 30 Jul - 3 Aug	ER Model	ER Model	Introduction to Labwork			
Week 3 6 Aug - 10 Aug	Relational Model	Relational Model	Working with MySQL – Setting up the database (Pracs 1-3 + mini project)	Elmasri: Chapter 5 and 9		RiPPLE Round 2
Week 4 13 Aug - 17 Aug	ER-Relational Mapping	ER-Relational Mapping				
Week 5 20 Aug - 24 Aug	FDs and Normalization	Mock Exam		Elmasri: Chapter 14 and 15		
Week 6 27 Aug - 31 Aug	Quiz 1	FDs and Normalization				
Week 7 3 Sept - 7 Sept	FDs and Normalization	FDs and Normalization	Assignment Work	Elmasri: Chapter 6 and 7	Assignment 1 due	RiPPLE Round 3
Week 8 10 Sept - 14 Sept	SQL	Exam Return + solution				
Week 9 17 Sept - 21 Sept	SQL	SQL				
Reading Break 24 Sept - 28 Sept						
Week 10 1 Oct - 5 Oct	SQL	Mock Exam	Working with MYSQL queries	Elmasri: Chapter 6 and 7	Quiz 2	RiPPLE Round 4
Week 11 8 Oct - 12 Oct	Quiz 2	SQL	Assignment Work			
Week 12 15 Oct - 19 Oct	Data Warehousing & OLAP	Exam Return + solution			Assignment 2 due	
Week 13 22 Oct - 26 Oct	Revision	Consult Session	Consult Session			
Exam Period					Final	

Available on the Learning Resources page on Blackboard

Get Organised

- Read the course profile
- Make sure that you can access the blackboard site for the course
- Sign up for a Tutorial and Practical session

Additional Learning Resources

Fundamentals of Database Systems



Anonymous Feedback

- You can use my personal webpage to provide anonymous feedback.
 - <http://hassan-khosravi.net/feedback.html>
 - My main intention is to provide you with the opportunity to express what you like or dislike about the course anonymously.
 - Feedback of all kinds are welcome!
 - If appropriate, I might post your comment or a paraphrase of it on the discussion boards and respond to it.

A Humbling Journey Called Life

- How much are you really paying for your education?
- How much of it do you have?
- What can you get for free?
- What should you buy with your time?
- What is your mission in life?
- What problem(s) do you want to solve?

I am delighted to be joining you in a tiny part of your journey

Course Related Information

An Overview of Relational Database Management Systems (DBMSs)

Learning Outcomes

Description	Tag
Define the term database.	
Explain the purpose of having a database.	
Explain the high-level objectives of having a DBMS.	DBMS

**The
Economist**

Theresa May v Brussels

Ten years on: banking after the crisis

South Korea's unfinished revolution

Biology, but without the cells

MAY 6TH-12TH 2017

The world's most valuable resource



**Data and the new rules
of competition**

Data is the
new fuel for the
global economy

e.g. google searcher

WHERE is this data

e.g. find pattern

WHAT can you do with it

WHY is data so important

e.g. owner of the products own the data

WHO owns this data

HOW can you use it

e.g. relation database

Data Management

- **Data Management** is an essential skill for future workforce. It can be used to capture, store, retrieve, analyze, present and interpret (large amount of) data! data: e.g. uber - location of driver, customer & match them
- **Ride sharing** is an example of an *application area* where data plays a central role. e.g. linkein, facebook

Think of another example and discuss with the person next to you how data plays a central role in your example application. Contribute your example to the word cloud.

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Impact

Commerce



Cash management

Pricing

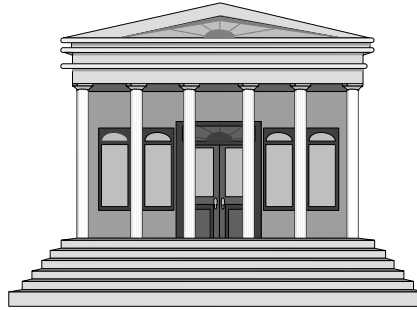
Employee records

Purchasing

Reordering

Trend analysis

Government



Law Enforcement

Election Commission

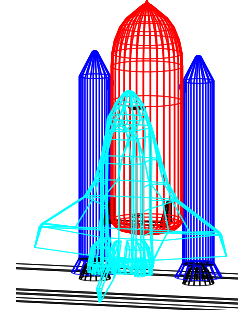
Taxation

Legal Systems

Transport & Utilities

City Councils

Science and Engineering



Health and Medicine

Space Exploration

Geography (GIS)

Architecture

Military and Defense

Telecommunications

A Motivating Example

- Suppose you are building a system to store the information pertaining to the university from scratch. You have access to an operating system of your choice, but that's it. What are some the things you need to consider for building this system?

e.g. security, course, assessability, money

Discuss with the person next to you and contribute your answer(s) to the word cloud.

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What is a database?

- A **database** is an organized collection of related data, usually stored on disk. It is typically:
 - Important data
 - Shared
 - Secured
 - Well-designed (minimal redundancy)
 - Variable size

Student

sid	name	address	phone	major
99111120	G. Jones	CPSC
...

Grade

sid	dept	course#	mark
99111120	CPSC	122	80
...

What is a database?

- A database is an organized collection of related data, usually stored on disk. It is typically:
 - Important data
 - Shared
 - Secured
 - Well-designed (minimal redundancy)
 - Variable size
- A DB typically models some real-world enterprise
 - Entities (e.g., students, courses)
 - Relationships (e.g., Ting got 95% in CPSC 221)

What is a DBMS?

- A **Database Management System (DBMS)** is a software system designed to store and manage databases. It is used to:
 - Maintain integrity (**Module 2**) e.g. course have pre-requisition, system ensure all the student enrol in the course have complete the pre-requisition
 - Control redundancy (**Module 3**)
 - Create, modify, and query a database (**Module 4**)
 - Provide support for decision making (**Module 5**) e.g. using data to make decision
- Control access existing
 - Permit concurrent access
 - Provide loading, backup, and recovery

Covered in future INFS courses

Control access

Different user groups may have different **access privileges** (Create/Alter, Update, and Retrieve), which are controlled through DBMS security subsystem, through the use of Accounts & Passwords

- **Casual users** may not have access to confidential data, e.g medical records, salary packages, police reports
- **Parametric users** may be given update access, but are generally not allowed to change the structure of data
- **Database administrators (DBAs)** generally have highest privileges, create user accounts and enforce restrictions

Permit Concurrent Access

- Imagine thousands of people working on the same file!
- DBMS handles transactions and concurrent access to data files.

The Stress of Perfection
saved on February 11, 2008 4:13 PM by Ryan McCallum

Save Save & close Discard changes

File Edit Insert Revisions Edit HTML Preview Print Email Share Publish

Undo Redo Cut Copy Paste Bold Italic Underline Text Color Background Color Link Unlink Bulleted List Numbered List Indent Outdent Decrease Indent Increase Indent Full Screen Help Style Change

"No, I don't think it would be hard to plan," said Junior Mark Fennig. "Because you have other people to help you think of ideas of what to do for the Snow Daze week, it's not just you by yourself." This is alot of quotes back to back I would try to distribute them better in the story. -Caitlin Werder 2/8/08 1:01 PM To me, it doesn't really matter if someone doesn't think the week would be hard to plan. If you do a great job of SHOWING the work that's being done, people will understand. Tell the story of the preparation, don't just get people's opinions about the preparation. Be a storyteller. -Ryan McCallum 2/11/08 4:12 PM

Everyone has their own opinion on how hard it would be to plan such a big event like Snow Daze. But most people don't understand that it is very stressful and hard to plan. Show me, don't tell me. -Ryan McCallum 2/11/08 4:13 PM Between planning dress-up days, the theme, the music, AAA activities, and school activities the volunteers have a lot to think about.

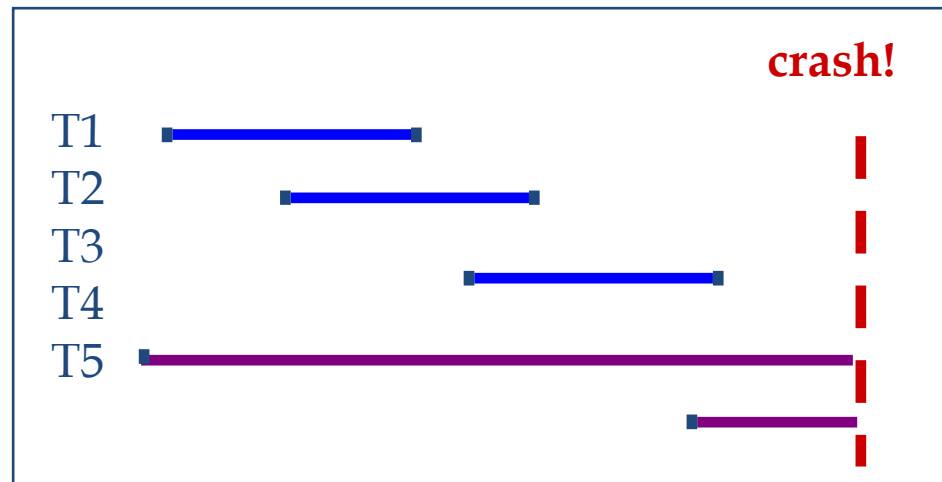
Time plays a huge role in the planning as well. New paragraph-Kelly Kiernan 2/10/08 9:22 PM "I think it would be hard because you have to get kids together to plan it that are usually in other activities and you have to get the time to plan it," said Spanish Teacher Eiyneck. You need the full name, bolded. -Owen Tierney 2/10/08 4:32 PM

As the end of Snow daze approaches, NHS gets ready for the final event, the dance. This is the event that everyone looks forward to and will be the deciding factor of whether the week was a success. That is an opinion, that everyone looks forward to the dance. try not to put in your opinion.-Kelly I agree with Kelly. Some people hate dances. -Ryan McCallum 2/11/08 4:13 PM Kiernan 2/10/08 9:24 PM No matter what the outcome is one thing is certain, a lot of hard work has been put into the week. maybe you could add some more about what snow daze is going to be like. Maybe what the theme and plans are for snow daze. You could also explain who is in charge of planning the snowdaze and what kind of stuff they have to go through. -Caitlin Werder 2/8/08 1:03 PM

First of all, your normal writing should not be Bold. Second off, if you're starting out new as a writer, remember to keep you ENTIRE story in Quote, Transition, Quote, Transition pattern, except for the intro and the ending. And remember to watch for ANY opinion. -Owen Tierney 2/10/08 4:32 PM

Backup and Recovery

- Assume that T4 is a transaction that is transferring \$1,000,000,000 from an account to another.
- What if DBMS stops running during the process?
What can go wrong?



- DBMS provides backup and recovery functionalities.

Questions

Which of the following is not a function of the DBMS

A. Enforce integrity constraints

B. Design the database to be used

C. Backup and Recovery of Database

D. Provide secure access to the database

Learning Outcomes Revisited

Description	Tag
Define the term database.	
Explain the purpose of having a database.	DBMS
Explain the high-level objectives of having a DBMS.	