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 muliple applications includding **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

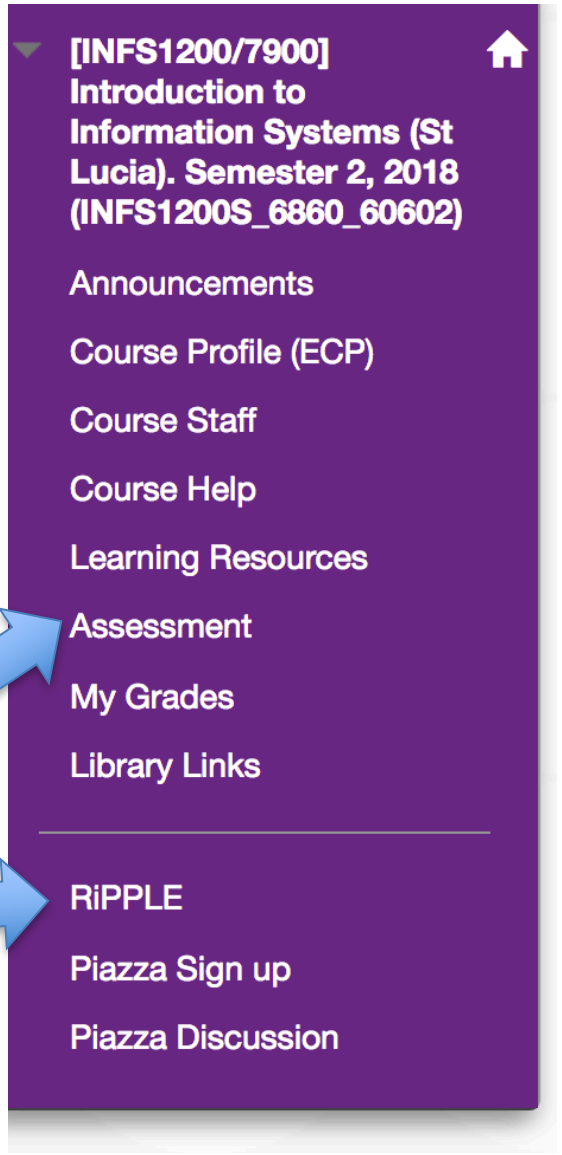
C. Makes me learn worse, but has no effect on other people

D. Makes me learn worse, and distracts the people around me

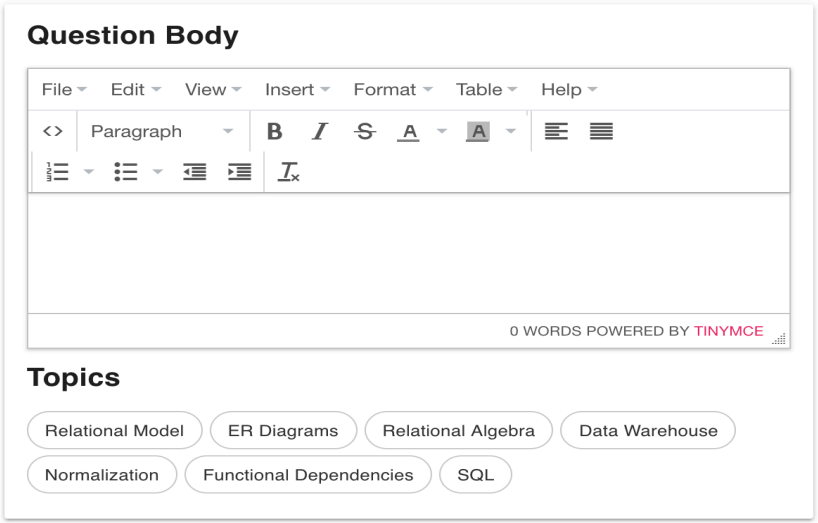
Collaborative Learning via RiPPLE

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

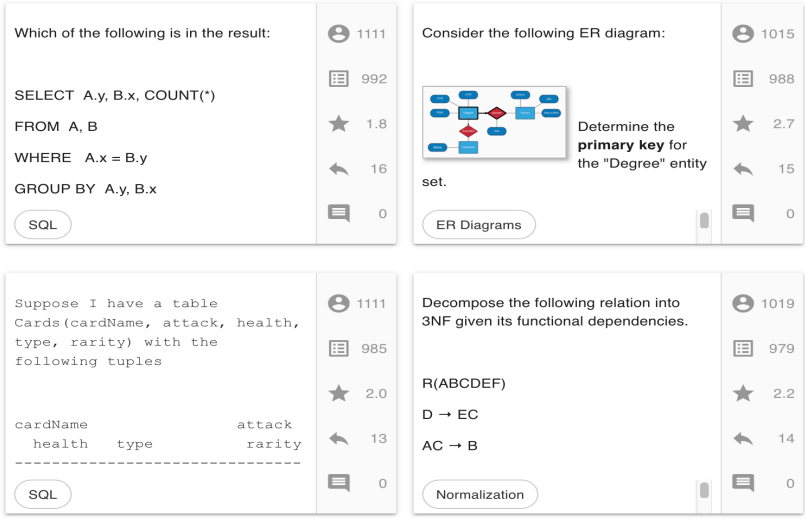
- RiPPLE is accessible through the course website on Blackboard



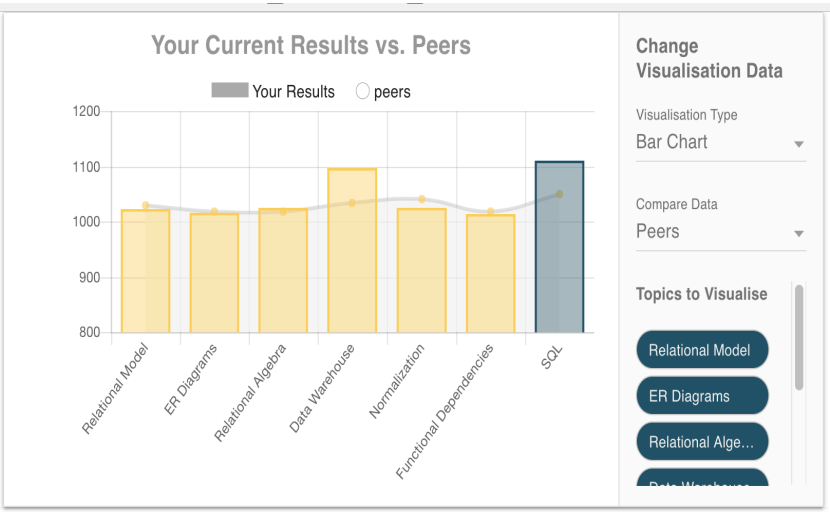
The RiPPLE Platform



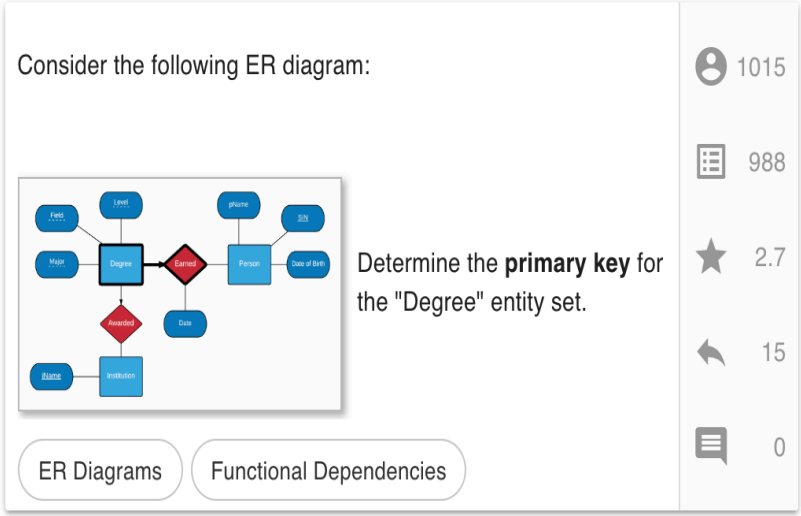
Co-creation



Question Repository



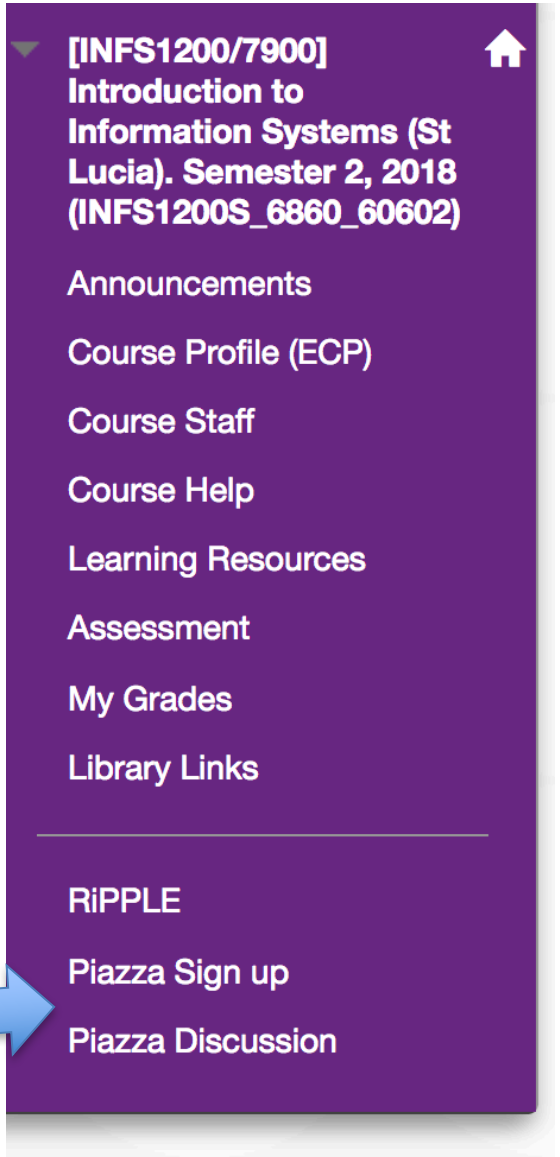
Learner Model



Recommendation Engine

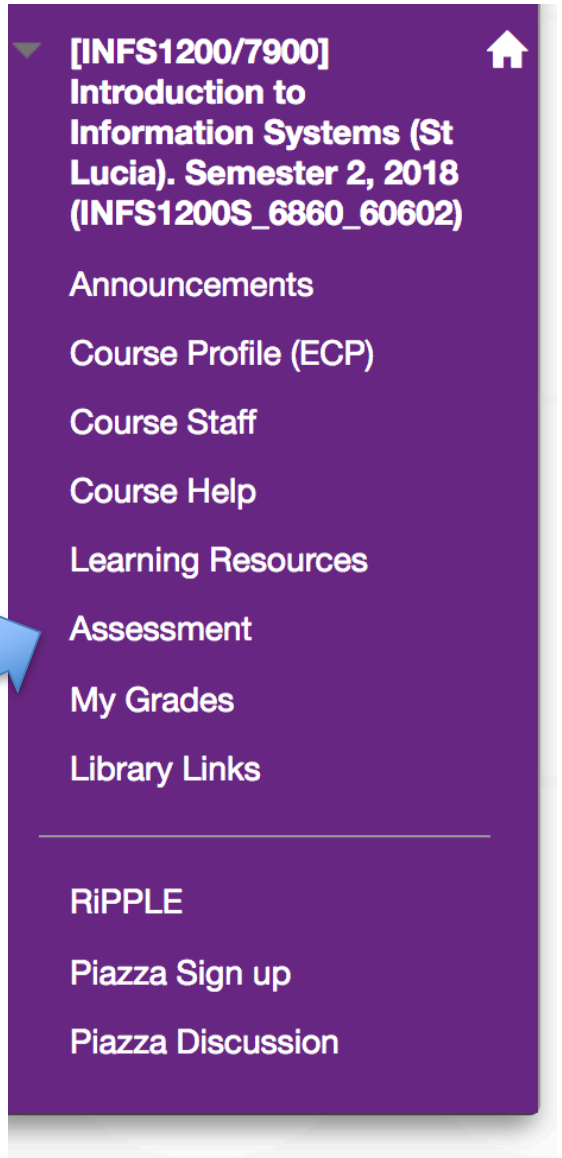
Piazza – Discussion Board

- 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



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			Quiz 1	
Week 7 3 Sept - 7 Sept	FDs and Normalization	FDs and Normalization	Assignment Work			RiPPLE Round 3
Week 8 10 Sept - 14 Sept	SQL	Exam Return + solution		Elmasri: Chapter 6 and 7		
Week 9 17 Sept - 21 Sept	SQL	SQL			Assignment 1 due	
Reading Break 24 Sept - 28 Sept						
Week 10 1 Oct - 5 Oct	SQL	Mock Exam	Working with MYSQL queries	Elmasri: Chapter 6 and 7		RiPPLE Round 4
Week 11 8 Oct - 12 Oct	Quiz 2	SQL	Assignment Work		Quiz 2	
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	

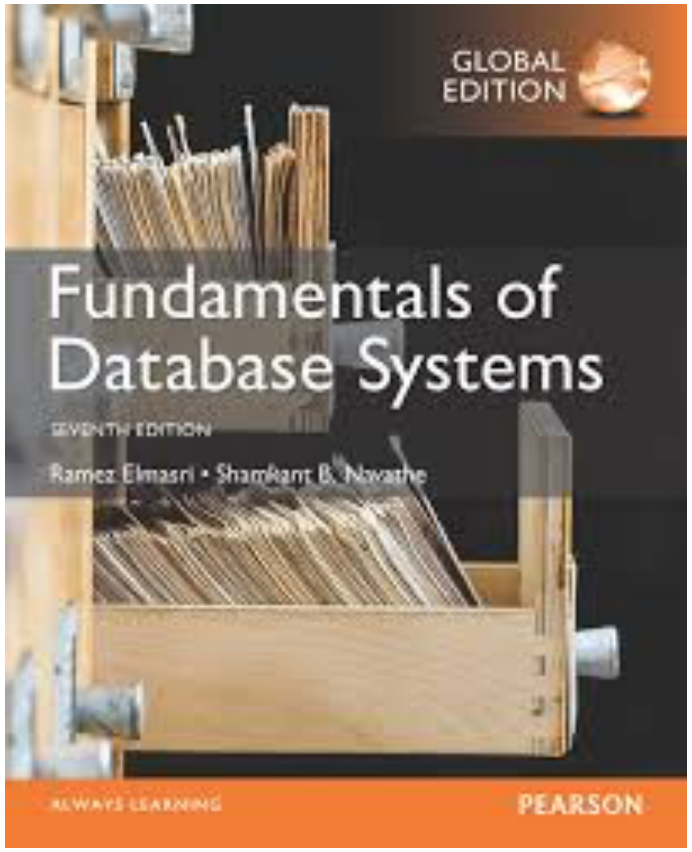
Available on the Learning Resources page on Blackboard

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.	DBMS
Explain the purpose of having a database.	
Explain the high-level objectives of having a DBMS.	

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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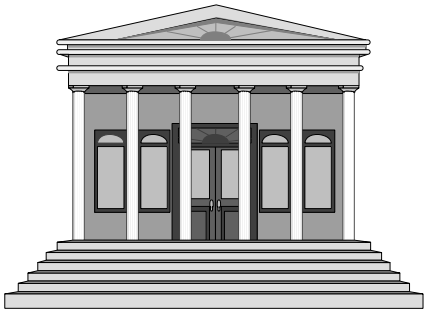
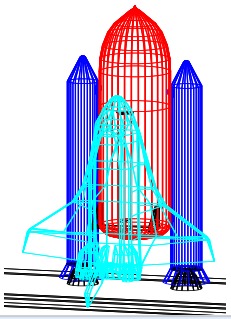
Impact

Commerce	Government	Science and Engineering
		
Cash management	Law Enforcement	Health and Medicine
Pricing	Election Commission	Space Exploration
Employee records	Taxation	Geography (GIS)
Purchasing	Legal Systems	Architecture
Reordering	Transport & Utilities	Military and Defense
Trend analysis	City Councils	Telecommunications

pertain from scratch - start from nothing

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, assessibility, 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

database

- 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

Covered in future INFS courses

  - Control access existing
  - Permit concurrent access
  - Provide loading, backup, and recovery

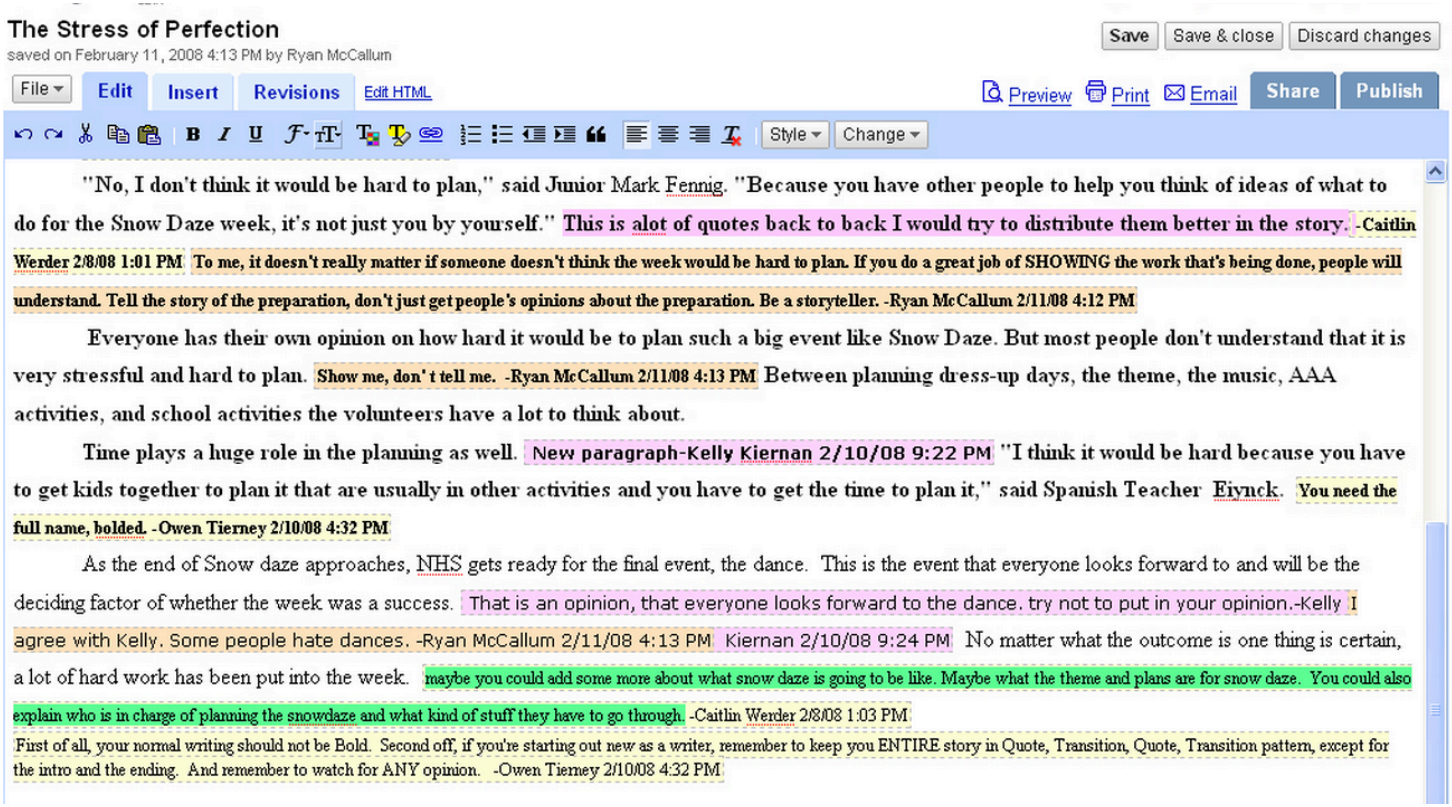
Control access

Different user groups may have different access privileges (Create/Alter, Update, and Retrieve), which are controlled through DBMS security sub-system, 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

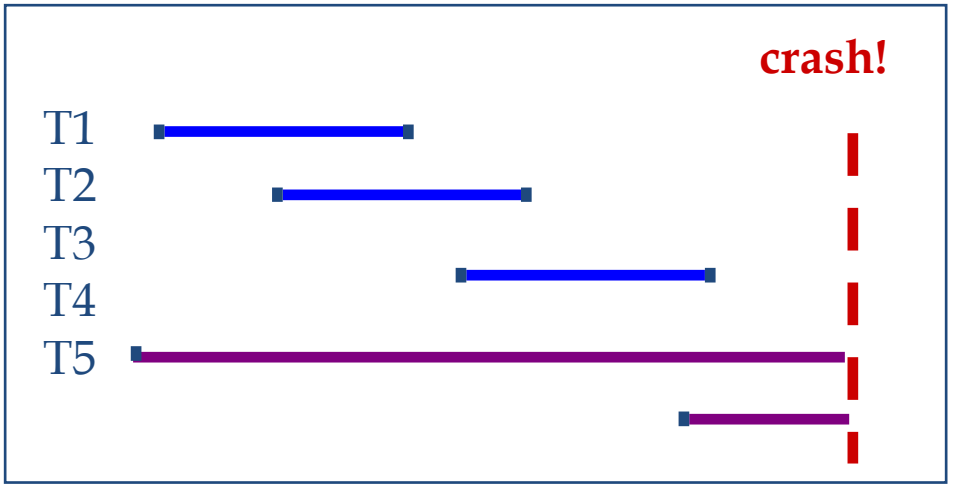
Permit Concurrent Access

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



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.	DBMS
Explain the purpose of having a database.	
Explain the high-level objectives of having a DBMS.	