



INFO20003 Database Systems

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Lecture 01

What are Database Systems?

Week 1



- Data
 - known facts stored and recorded
 - can include: text, numbers, dates, plus images, sound, video, and other complex objects
- Information
 - Data presented in context (can be summarised data)
 - Data that has been processed increasing the users knowledge
- Data vs Information
 - *Data* is known and available; *Information* is processed and more useful

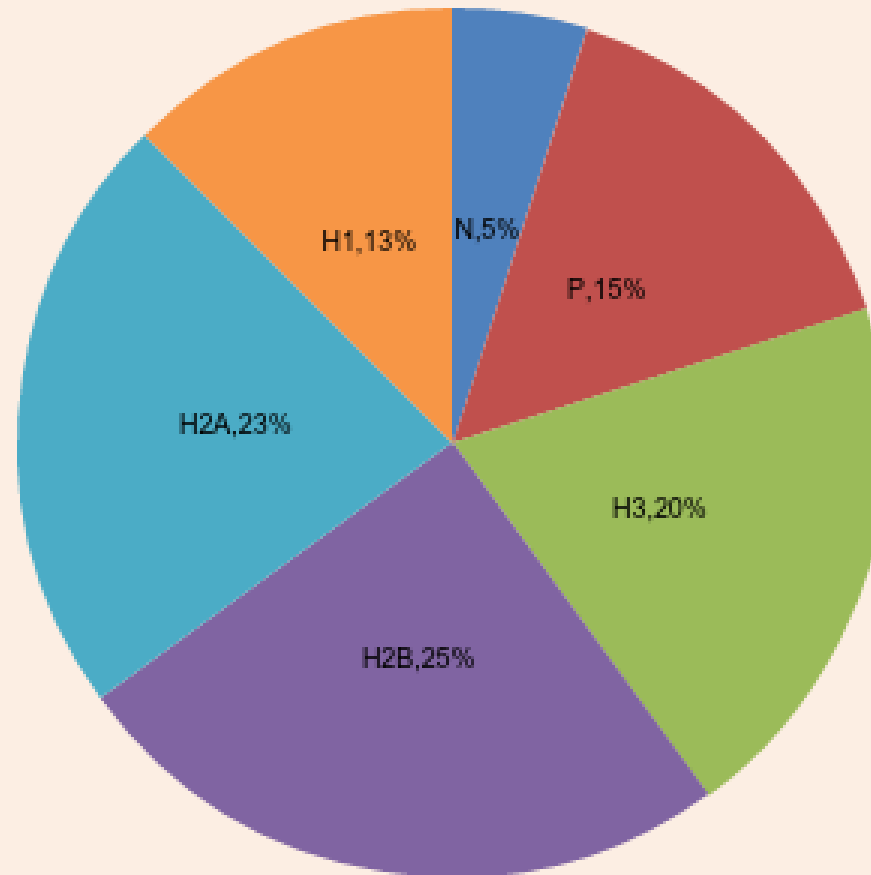
Baker, Kenneth D.	324917628
Doyle, Joan E.	476193248
Finkle, Clive R.	548429344
Lewis, John C.	551742186
McFerran, Debra R.	409723145
Sisneros, Michael	392416582



Database Systems Assignment 4 Marks
Semester 3 2014

<u>Student Name</u>	<u>Student ID</u>	<u>Grade</u>
Baker, Kenneth D.	324917628	H1
Doyle, Joan E.	476193248	H2B
Finkle, Clive R.	548429344	H3
Lewis, John C.	551742186	H2A
McFerran, Debra R.	409723145	P
Sisneros, Michael	392416582	H3

Mark Distribution
Database Systems (Semester 4, 2012)



<u>Name</u>	<u>Type</u>	<u>Length</u>	<u>Description</u>
Course	Alphanum	30	Course ID
Tutorial	Integer	2	Tutorial number
Name	Alphanum	30	Student name

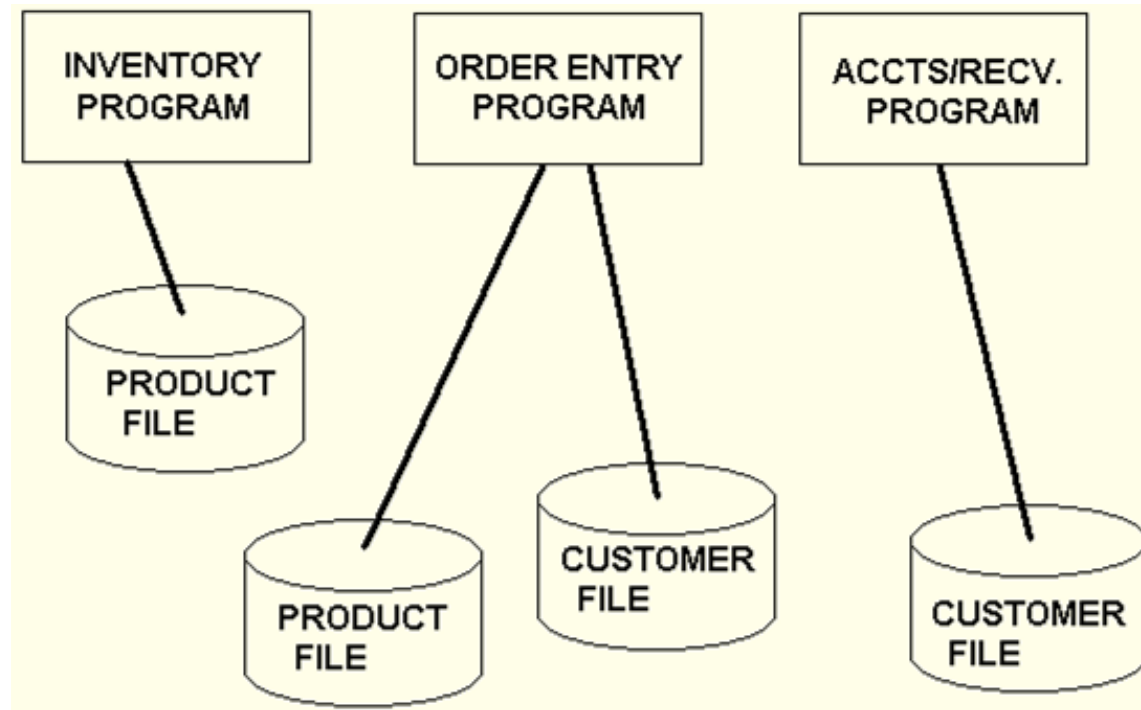
- Can include:
 - structure, rules, constraints
- Why do we need Metadata?
 - Consistency
 - Meaning
- We generate a **data dictionary** as part of the analysis of system requirements

a large, integrated, structured collection of data

- Usually intended to model some real-world enterprise
- Example: a university
 - *Entities* ... such as courses, students, professors
 - *Relationships* ... such as enrollment, teaching



A Database Management System (DBMS) is a software system designed to **store, manage, and facilitate access to** databases.



- What are the problems you can see with this?
- (Diagram adapted from Hoffer p. 42)



- Program-data dependence
 - If the file structure changes, so does the program
 - What if you change data structure for one program
- Duplication of data
 - wasteful, inefficient, loss of data integrity
- Limited data sharing
 - data tied to application, hard/slow to create adhoc reports
- Lengthy development times
 - application has to do low level data management, figure out file format each time
- Excessive program maintenance
 - up to 80% of development time in traditional file based organisations is for maintenance

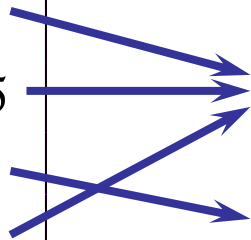
- Manage data in a **structured** way
- Many models (hierarchical, network, etc), but **relational** dominant since ~1980
- Relational Model
 - Rows & Columns forming Relations
 - Keys & Foreign Keys to link Relations

Enrolled

sid	cid	grade
53666	Carnatic101	5
53666	Reggae203	5.5
53650	Topology112	6
53666	History105	5

Students

sid	name	login	age	gpa
53666	Jones	jones@cs	18	5.4
53688	Smith	smith@eecs	18	4.2
53650	Smith	smith@math	19	4.8





- Data independence
 - separation of data and program, application logic
 - central data repository, central management
- Minimal data redundancy
 - redundancy can be controlled (normalization)
- Improved data consistency
 - single store: no disagreements, update problems, less storage space
- Improved data sharing
 - data is shared, a corporate resource, not a necessity for an application
 - external users can be allowed access
 - multiple views of data, arbitrary views of data
- Reduced program maintenance
 - data structure can change without application data changing
- Novel ad hoc data access ‘without programming’
 - SQL



- Difference between Data and Information
- Being able to discuss the advantages of Databases vs File Processing Systems



- The database system lifecycle
 - With a focus on the design stage
 - Conceptual design
 - Logical design
 - Physical design