HERALD COLLEGE KATHMANDU

INTRODUCTION TO DATABASE

WEEK 1

B.Sc. (Honors) Computer Science

UNIVERSITY OF WOLVERHAMPTON
KNOWLEDGE • INNOVATION • ENTERPRISE

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AN INTRODUCTION TO DATABASE

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Introduction to Database for Undergraduate Study
Lecture 1

Introduction and Overview of Module
Introduction to Data, Information and File Systems

AGENDA

- Introduction to your Instructors
- Introduction to the Module
- Week 1 Lecture Coverage
  - File System Vs Database System
  - How important is Database ?
  - How to be a better Database Designer ?

MODULE LEADER AND TUTOR

- Prakash Shrestha (Lecture)
- Mr. Aadesh Tandukar (Tutor)

INTRODUCTION TO THE MODULE

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Module Overview
- What can you learn ?

Learning Objective
- What can you achieve ?

Learning Strategy
- What will be the 'way of learning' ?

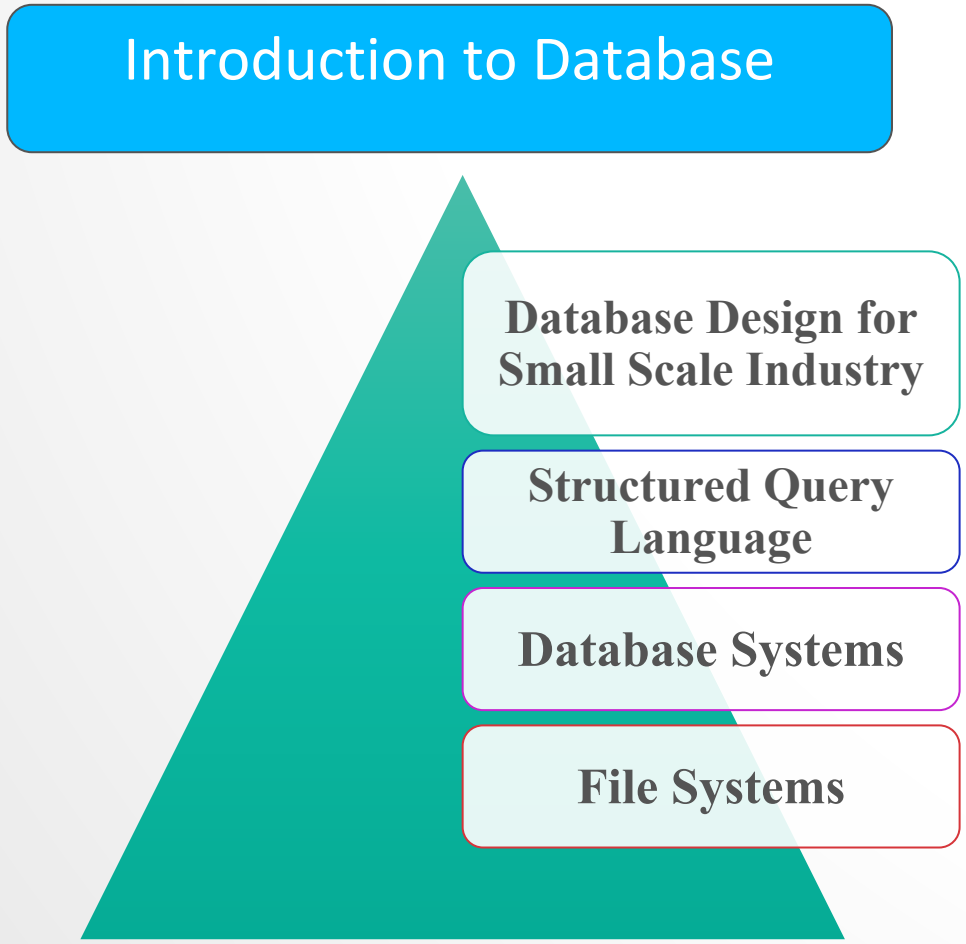
Assessment Overview
- How will be evaluated ?

Overview of Module

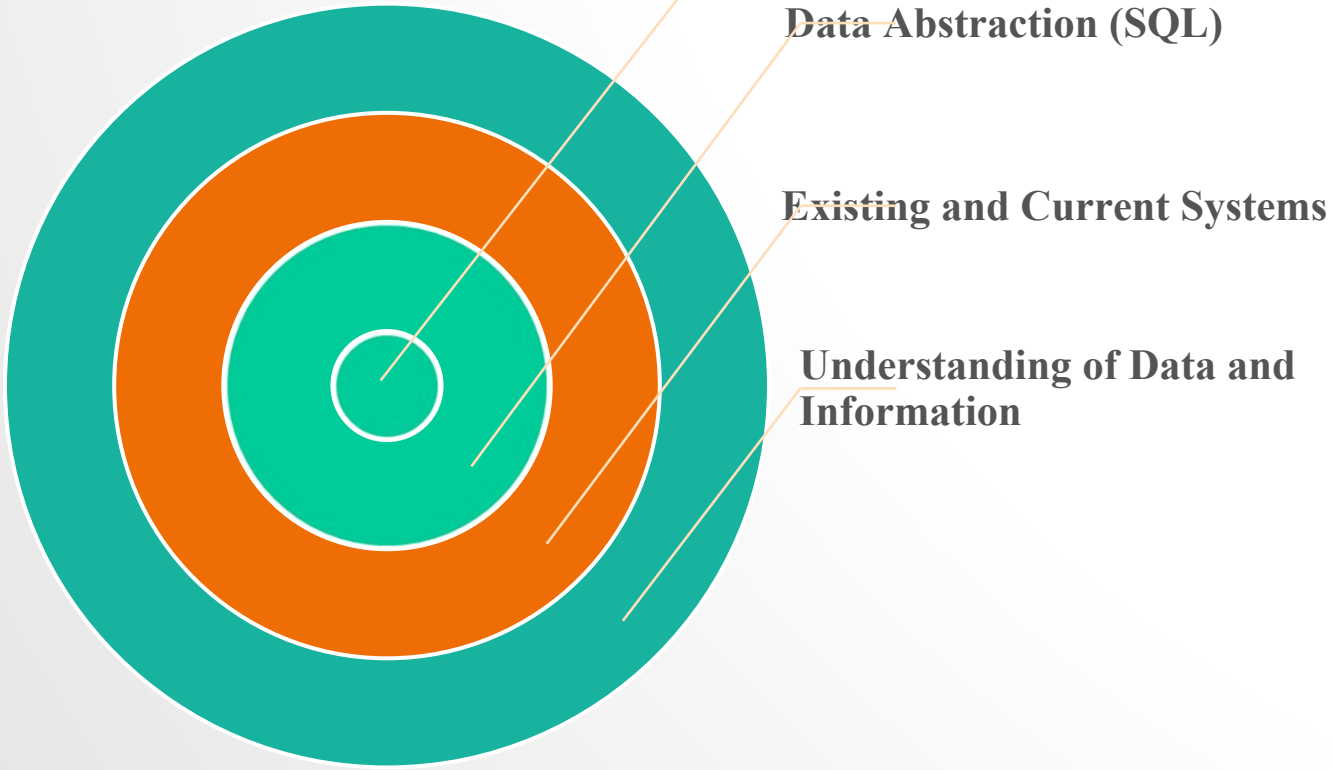
- **Basic Technical Skill for Undergraduate Study**
- **Aim:** Gives basic understanding of database and database technologies for IT Graduates to work on software development projects or as requirement for further education

Application Area	High School / A Levels
Academic	Serves as Pre-Requisite for Advanced Degree (Database Design and Implementation, Advanced Database Systems, Projects)
Industrial	An essential component for software design and development

OVERVIEW


Introduction to Database
Database Design for Small Scale Industry
Structured Query Language
Database Systems
File Systems

Learning Objectives



LEARNING STRATEGY

- **Introduction to Database**
- Taught over 1 semester
- Total 12 weeks of class
- Each week consists of 1 Lecture (1.5 Hours), 1 Tutorial (1 Hour) and 1 Workshop (1.5 Hours)
  - Lecture: Learn to Understand Database Concepts
  - Tutorial: Discuss and Clear Confusions
  - Workshop: Practice the Concepts and Ideas

LEARNING STRATEGY

Theory and Concepts	SQL	Advanced SQL	Further Knowledge
• Week 1 • Week 2 • Week 3 • Week 4	• Week 5 • Week 6 • Week 7 • Week 8	• Week 9	• Week 10 • Week 11

SPECIAL WEEKS
Week 5: Course Work Distribution Week
Week 12: Revision Week
Week 13 and 14: Examination Week

LEARNING STRATEGY

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Attendance for all classes is MUST!

- Database is a Practical Oriented Subject. It is learnt through constant use and practice.
- We want to provide you the environment and platform to practice, improve and apply.

ASSESSMENT DETAILS

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- **Introduction to Database**
- 2 Assessments
- All Assessments are on Individual Basis
- 1st Assessment
  - Course Work (5th Week, 50%)
- 2nd Assessment
  - Unseen Exam (13/14th Week, 50%)

ASSESSMENT DETAILS

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- **Module Grading Standards in the UK**

Range of Marks	Grade	Remarks
70 - 100	A	Excellent: outstanding performance with only minor errors
60 - 69	B	Very Good: above the average standard but with some errors
50 - 59	C	Good: generally sound work with a number of notable errors
43 - 49	D	Satisfactory: fair but with significant shortcomings
40 - 42	E	Sufficient: performance meets the minimum criteria
0 - 39	F	Fail: performance does not meet the minimum criteria and considerable further work is required

ASSESSMENT DETAILS

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Further Information about First Assessment [Course Work]will be provided in Week 5.

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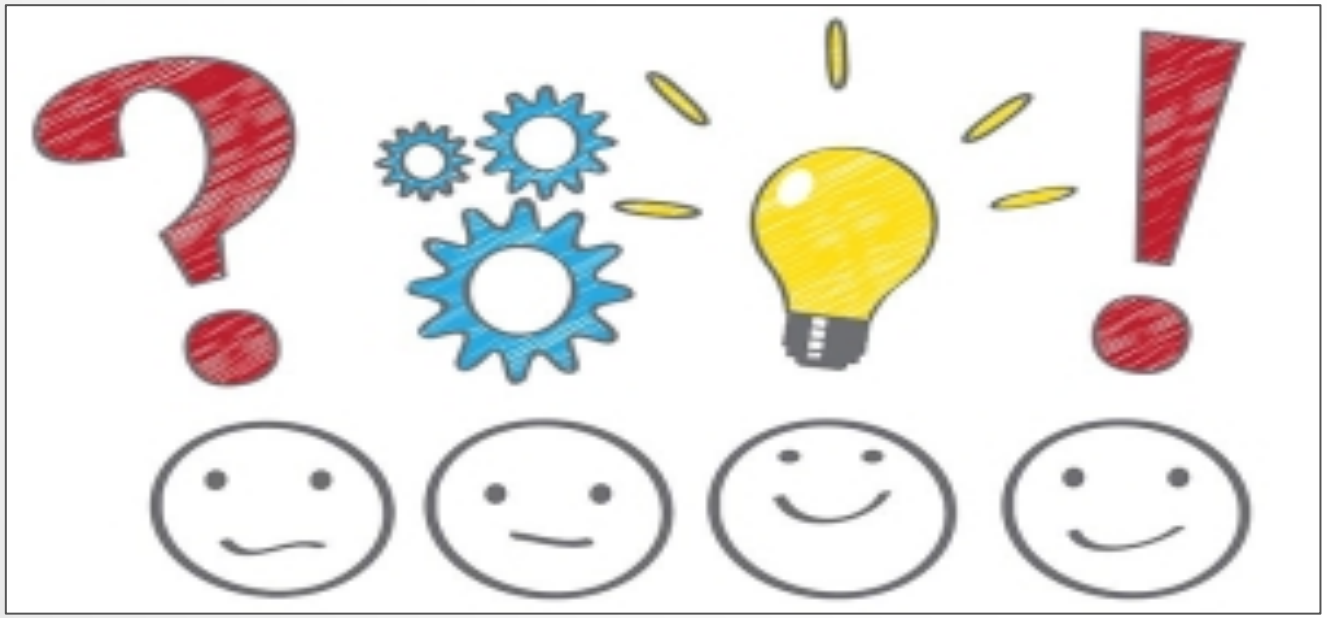
ANY QUESTIONS?



LET'S GET STARTED

An Introduction to **Database**

WORLD OF DATA

WORLD is REPRESENTATION of DATA.

POPULATION
AREA
LANGUAGE
EDUCATION
ECONOMY
TECHNOLOGY USE
AGE

Of Countries are ALL DATA

DATA REPRESENTATION - STUDENTS

Students

Student #	First Name	MI	Last Name	DOB	Gender
888-849-402	Sebastien	B	Porter	02/12/1993	Male
286-022-404	Suzie	D	Hoak	10/05/1997	Female
138-248-300	Antoinette		Clarck	04/10/1993	Female
247-900-002	Koko	P	Domba	02/05/1996	Male
174-302-802	Janet	O	West	06/02/1993	Female
395-484-228	Catherine	L	Chang	06/12/1994	Female
206-022-274	Nehemiah		Dean	12/02/1993	Male
285-902-004	Sherryl	B	Ashburn	10/07/1993	Female
444-736-466	Santos	M	Pacheco	05/05/1994	Male
512-882-805	Mohamed	D	Husseini	01/05/1994	Male
903-627-414	Dean	F	Chen	05/02/1994	Male
728-599-277	Ruby	W	DeGaram	10/11/1995	Female
802-948-008	Carole		Chance	10/22/1997	Female
240-048-427	Justin	G	Vittas	05/04/1997	Male
110-472-462	Ismael	T	Zara	05/25/1996	Male
831-822-852	Anselme	T	Waters	07/23/1997	Male
382-866-277	Brenda	P	Lobo	10/05/1994	Female
666-265-905	Suzanna		Verde	03/12/1994	Female

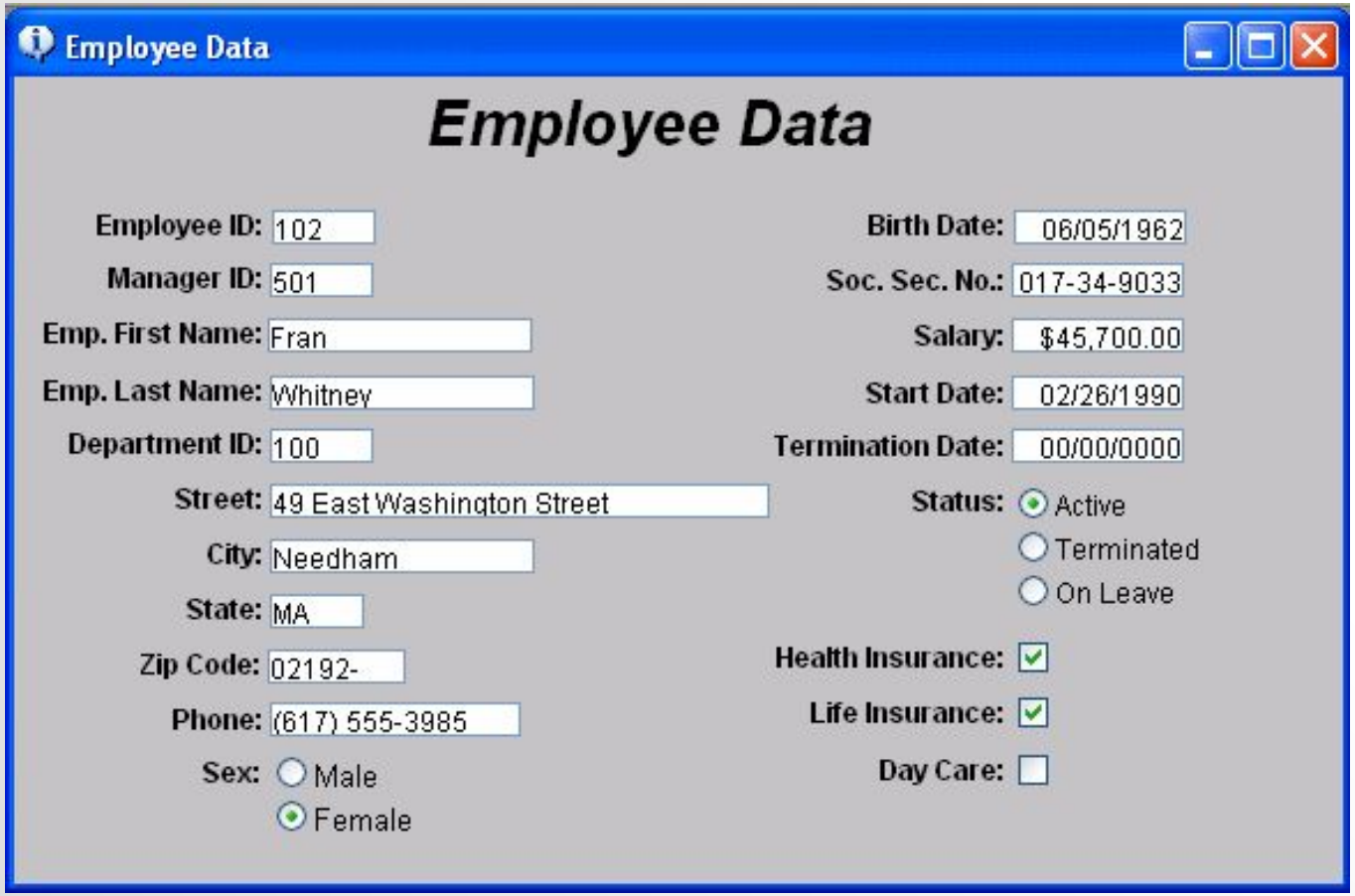
Record: 1 of 164 No Filter Search

STUDENT DATA

STUDENT#
FIRST NAME
LAST NAME
DATE OF BIRTH
GENDER

Are STUDENT DATA

DATA REPRESENTATION - STUDENTS

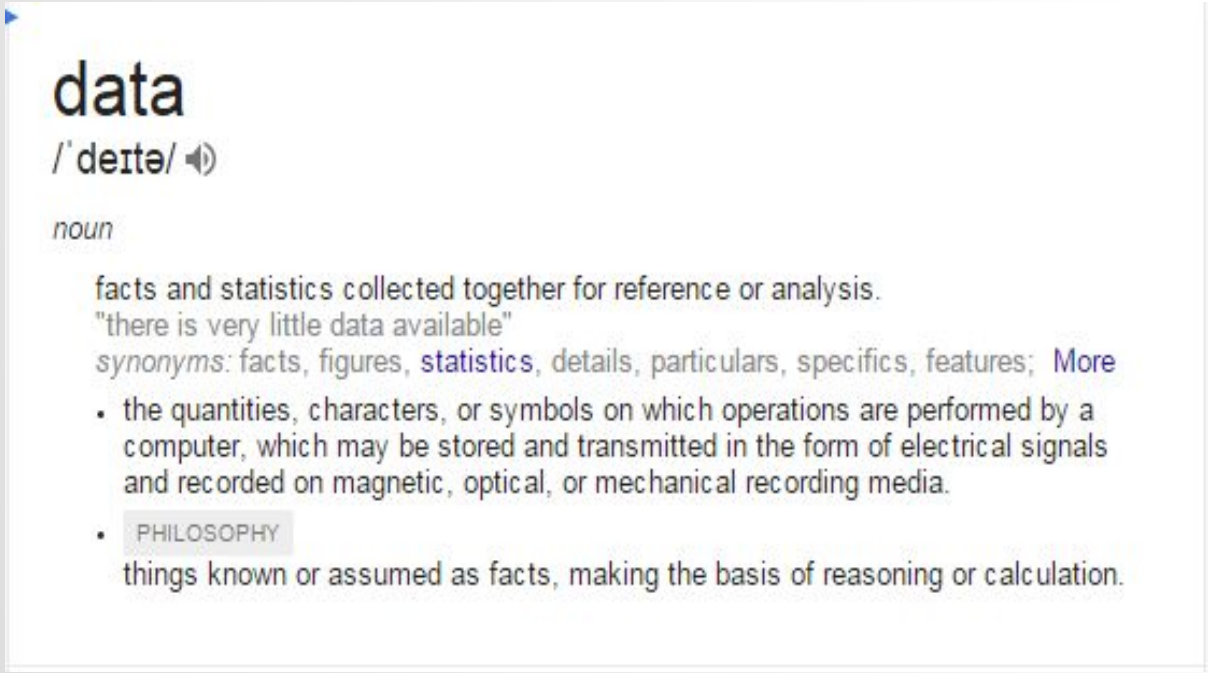


Employee Data Entry

- **ID**
- **Manager**
- **Name**
- **Department**
- ….

ALL DATA

DATA: DEFINE



data

/ˈdeɪtə/

noun

facts and statistics collected together for reference or analysis.
"there is very little data available"
synonyms: facts, figures, statistics, details, particulars, specifics, features; More

- the quantities, characters, or symbols on which operations are performed by a computer, which may be stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media.
- PHILOSOPHY
  things known or assumed as facts, making the basis of reasoning or calculation.

Define: Data Google Result

Factual information (as measurements or statistics) used as a basis for reasoning, discussion or calculation <>the data is plentiful and easily available – H.A. Gleason, Jr>

Information output by a sensing device or organ that includes both useful and irrelevant or redundant information and must be processed

Information in numerical form that can be digitally transmitted or processed

Merriam-Webster dictionary

DATA: REPRESENTATION

Raw Facts

- Gold Price is 500$/10 Grams
- Age of Ryan is 23 Years

Statistics

- Economic Growth of World of 2016 will be 4%
- Climate change will increase temperature by .4 Degrees Celsius

Images

- Road Crossings
- Mountains/Ponds

DATA: VALUE TYPES

What is the area of Nepal ?

- 147181 SQ KM

What is Europe and Asia called together ?

- Eurasia

When is Democracy Day celebrated in Nepal ?

- 7^{th} of Falgun

DATA: VALUE TYPES

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What is the area of Nepal ?

- 147181 SQ KM **[NUMBER]**

What is Europe and Asia called together ?

- Eurasia **[TEXT/STRING]**

When is Democracy Day celebrated in Nepal ?

- 7th of Falgun **[DATE]**

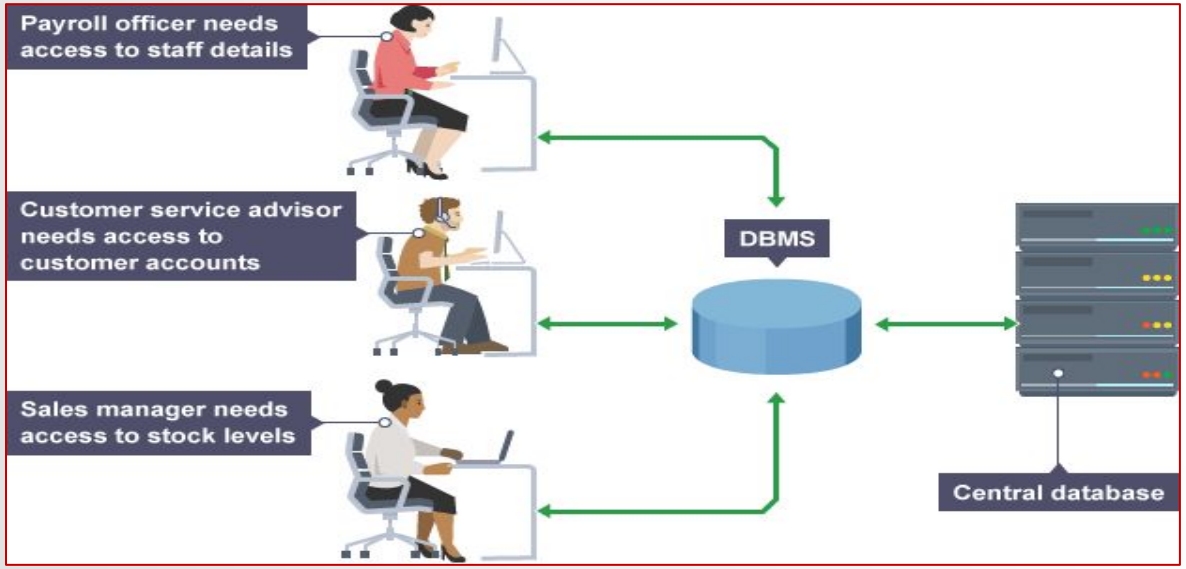
DATABASE

A structured set of data held in computer.

Is a collection of information that is organized so that it can be easily accessed, managed and updated.

A collection of tables, queries, reports, views and other objects

DATABASE MANAGEMENT SYSTEM



Is a system software for creating and managing databases. DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data.

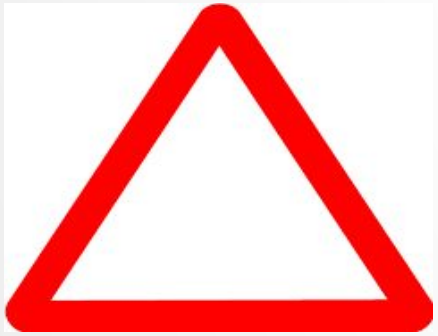
ORACLE

Microsoft SQL Server

IBM DB2

MySQL

INFORMATION - RELEVANCE



What will you do if you see such sign while driving ?

Dilemma because you have no DATA to decide!

INFORMATION - RELEVANCE

What will you do if you see such sign while driving ?

Slippery Road: Control Speed and Drive Slowly

DATA: INFORMATION

information

/ɪnfəˈmeɪʃ(ə)n/

noun

1. facts provided or learned about something or someone.
   "a vital piece of information"
   synonyms: details, particulars, facts, figures, statistics, data; More
2. what is conveyed or represented by a particular arrangement or sequence of things.
   "genetically transmitted information"

knowledge that you get about someone or something : facts or details about a subject

Merriam-Webster dictionary

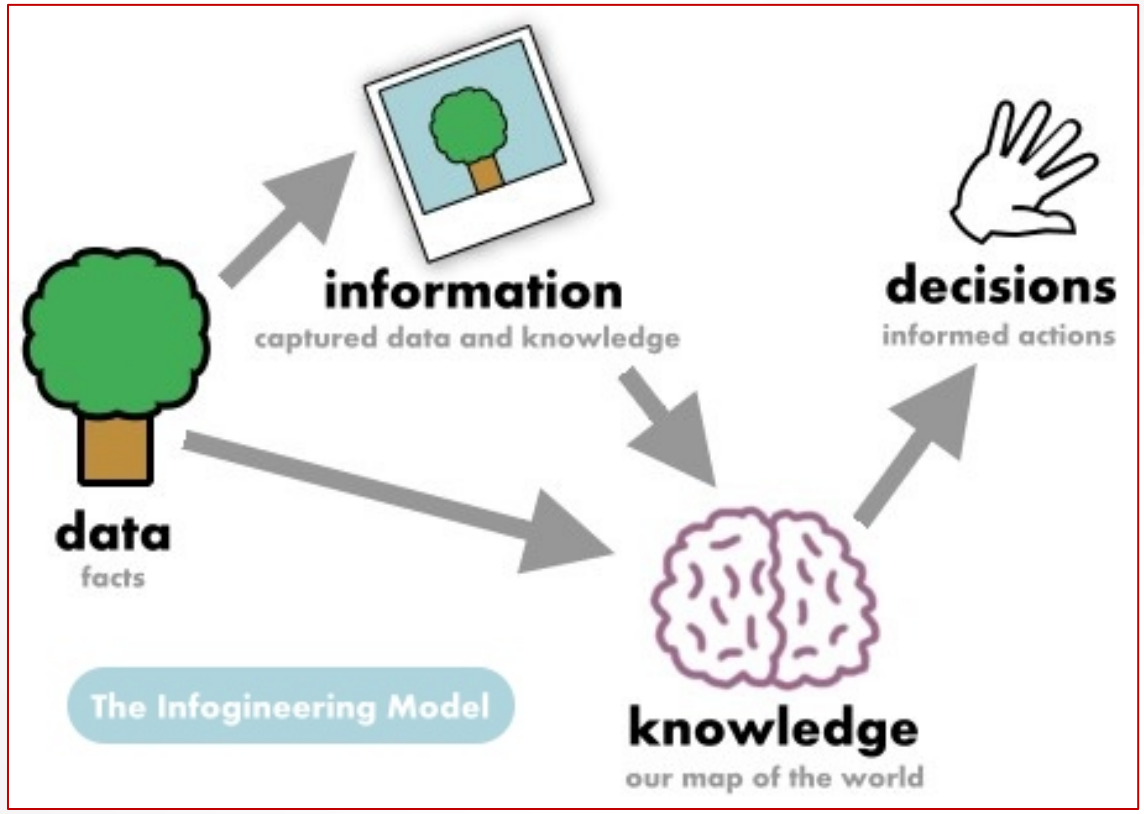
DATA AND INFORMATION

- Raw facts
- No context
- Just numbers or text

- Data with Context
- Processed/Value Added
- Meaningful/Decision Making

DATA AND INFORMATION

- Data: 11214
- Information: 1/12/2014 (Date)
- Information: 1:12:14 (Time)
- Information: NRs 11,214/- (Monthly Salary)



IMPORTANCE OF INFORMATION

Lets answer the following:

- If you had two cans without labels, which would you drink ?

IMPORTANCE OF INFORMATION

- It’s the label which defines the content/data inside the can, hence label is Metadata

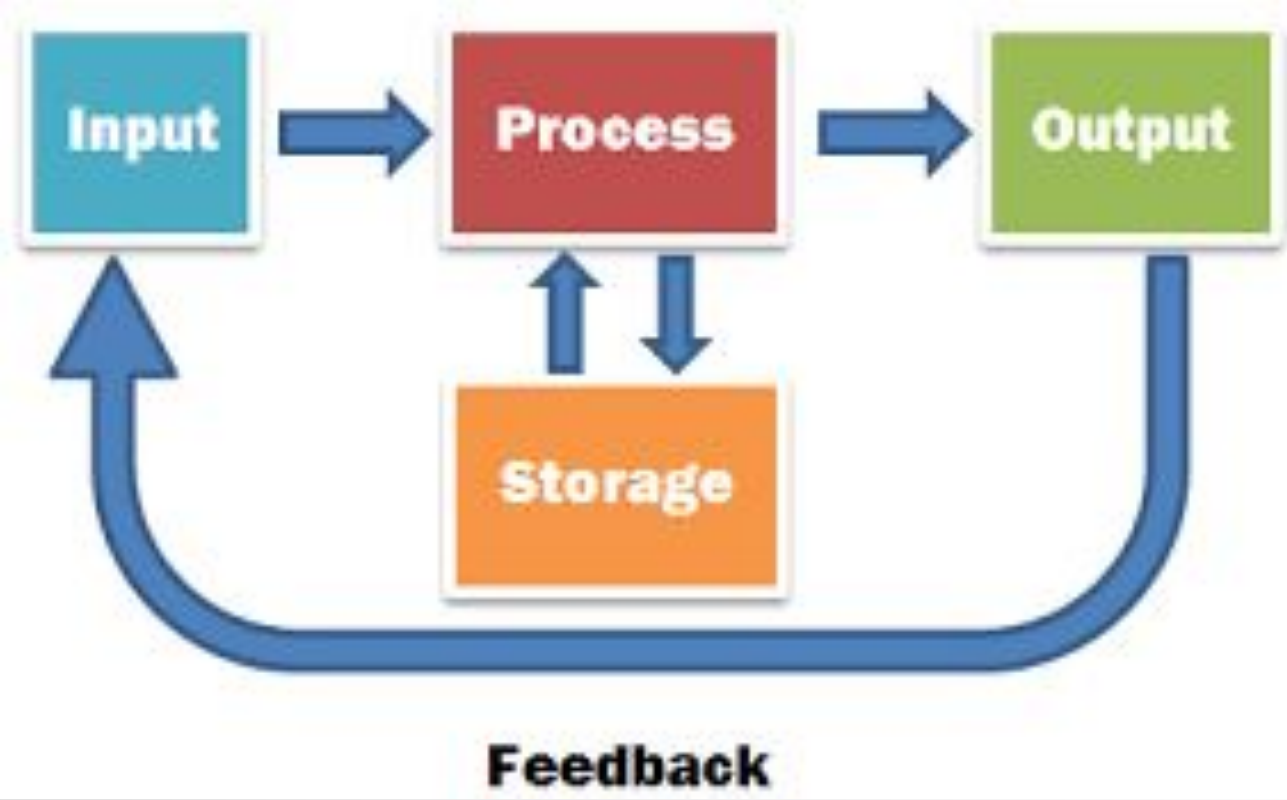
PROCESSING

Primary or Secondary Data

Information for Decision Making

Data is PROCESSED using different algorithms to generate INFORMATION which in turn gives KNOWLEDGE for proper DECISION making.

PROCESSING



Data is PROCESSED using different algorithms to generate INFORMATION which in turn gives KNOWLEDGE for proper DECISION making.

VALUE OF INFORMATION

- The estimates for **Google** and Facebook are imprecise, as the program's creator, Privacy Choice founder Jim Brock, readily admits. "We wanted people to understand, it is a value exchange" when they use these sites, said Brock.
- Privacyfix measures your last 60 days of activity on Google, extrapolates that to a year, and uses a value-per-search estimate. Analysts believed Google was making $14.70 per 1,000 searches in 2010, and possibly less in 2011. Of course, if you spend all your time searching for luxury hotels or mesothelioma lawyers—and then clicking through the advertised links—you're much more valuable than the average user.
- http://arstechnica.com/tech-policy/2012/10/how-much-do-google-and-facebook-profit-from-your-data/

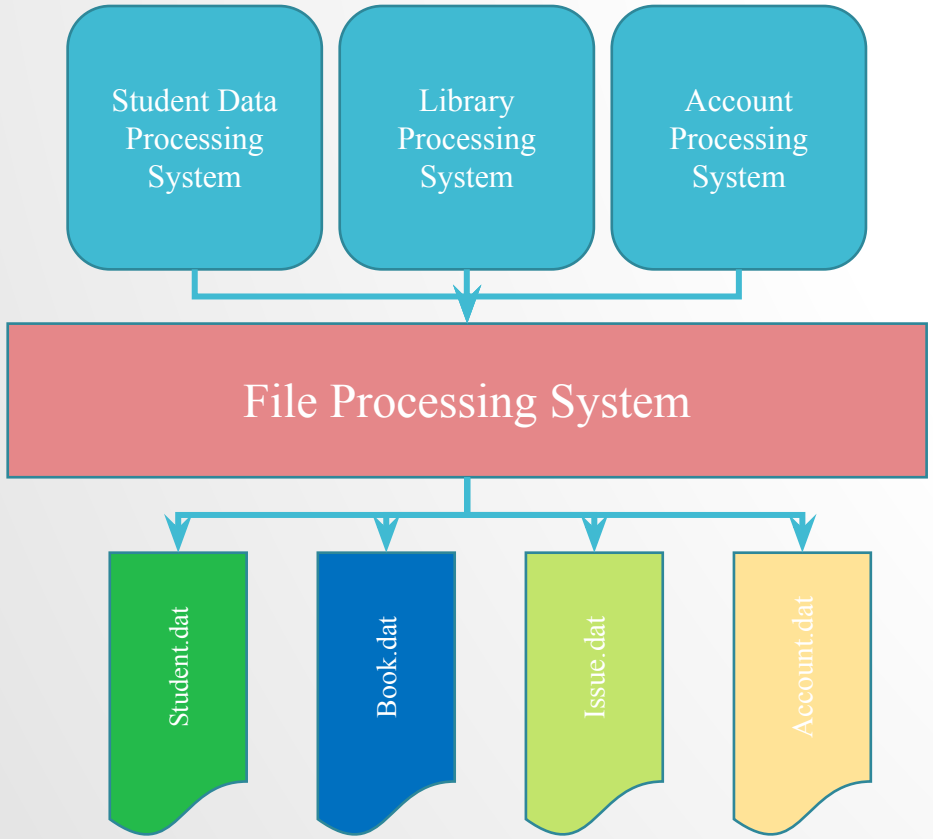
KEY MESSAGE

DATA are raw facts

INFORMATION is important

You need a PROCESS to convert DATA into INFORMATION

FILE PROCESSING SYSTEM



- Information stored as group of records in separate files
- Contains few data files and many application programs
- Each file called Soft File
- Flat file contained the processed information for one specific function

FILES

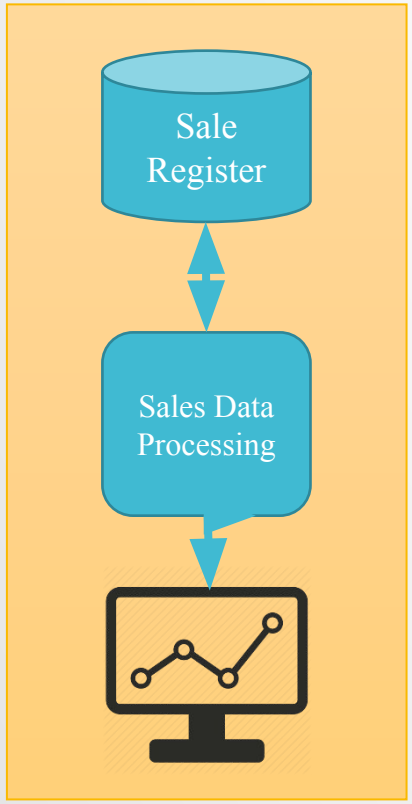
- A collection of records or documents dealing with one organization, person, area or subject (Rowley)
  - Manual (paper) files
  - Computer files
- File Processing System: Is a collection of files and programs that access/modify these files. Typically, new files and programs are added over time (by different programmers) as new information needs to be stored and new ways to access information are needed.

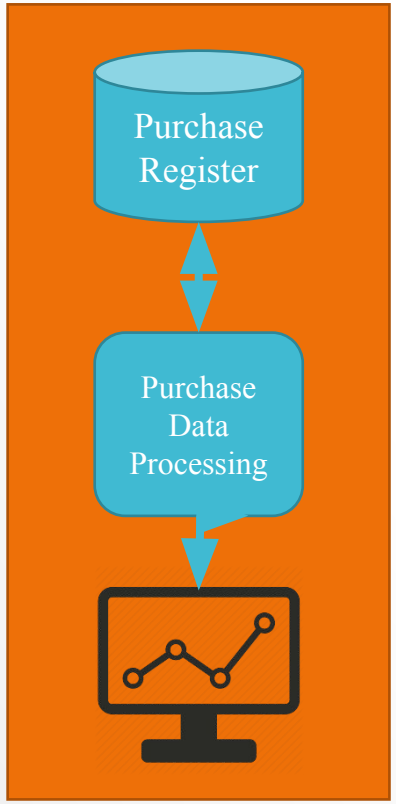
FILES PROCESSING SYSTEM - EXAMPLE

Let's assume, you are paying for groceries with card at the same time your pay check is being deposited

Withdrawal Program	Deposit Program
1. Read balance from checking account file as $51	
	2. Read balance from checking account file as $51
3. Subtract $50 (for groceries)	
4. Update account file (balance:$1)	
	5. Add $100 (as salary)
	6. Update account balance ($151)

FILES PROCESSING SYSTEM - EXAMPLE





- Sales Department maintains a separate file to maintain the Products
- Purchase Department maintains a separate file to maintain the Products
- What happens if they both HANDLE their respective files SEPARATELY ?

FILES PROCESSING SYSTEM - DISADVANTAGES

- Data Redundancy
  - Unwanted/un-necessary repetition of data

  [In our earlier example, PRODUCT data will be repeated in Sales and Purchase files]

- Data Inconsistency
  - Mismatching of same data

  [If Product in Sales data is changed, the same product in Purchase might be unchanged, thus resulting in difference of data for same PRODUCT]

FILES PROCESSING SYSTEM - ADVANTAGES

- Easy to Use
  - Files are easy to create and use
- Cheap
  - They cost comparatively less then DBMS
- Less Technical Skill
  - Might not require technically high skilled resource

KEY MESSAGE

FILE PROCESSING SYSTEM is classical approach of Data Management

FILE PROCESSING SYSTEM doesn't handle SEARCH and RETRIAVAL properly

FILES PROCESSING SYSTEM - RELEVANCE

SUMMARY

- Data
  - Representation
  - Definition
  - Types
- Information
  - Process
  - Importance
  - Relevance
- Systems
  - Database
  - File

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END OF LECTURE FOR WEEK - 1