

A decorative graphic on the left side of the slide, consisting of a network of white lines and circles on a blue gradient background. The lines are vertical and horizontal, with some diagonal segments, and the circles are of varying sizes, resembling a circuit board or a data network.

# INTRODUCTION TO DATABASE

CS3319 – WESTERN UNIVERSITY

A decorative graphic on the left side of the slide, consisting of a network of white lines and small circles on a blue gradient background, resembling a circuit board or a neural network.

# WEEK 1

INTRODUCTION TO DATABASES

# STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Define the following terms: *Data, Database, Mini-World, DBSM*
  - Identify a flat file
  - Find a piece of data and a record within a flat file.
  - Give at least 3 reasons why a DBMS is better than a flat file for storing data

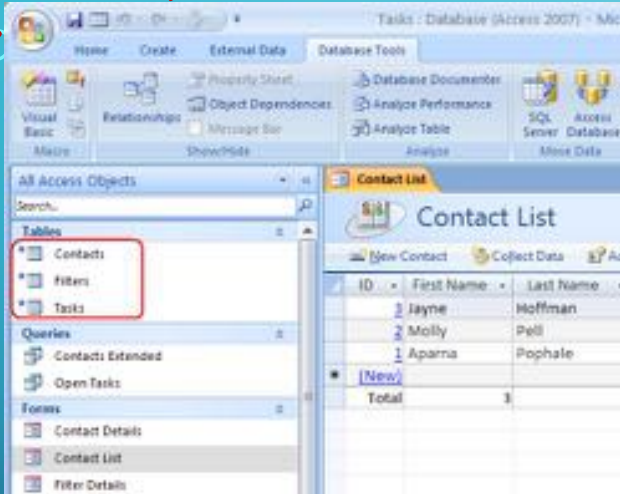
*database manage system*

# WHAT IS A DATABASE?

- Which of the following are databases?

*they're all databases ; databases are related data.*

*access data*



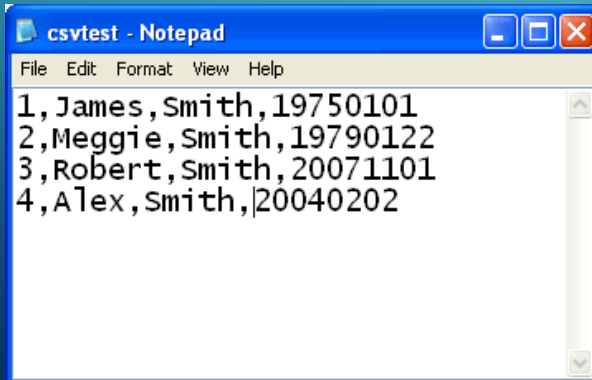
*information*



The screenshot shows a Microsoft Excel spreadsheet with the following data:

Department	Course Num	Student Number	Last Name	First Name	Grade	Program	Email
COMPSCI	4437B	250378006	Simpson	Homer	85	SBSH	hsimps@uwyo.ca
COMPSCI	4437B	250580857	Flanders	Ned	91	SBS4	nfland@uwyo.ca
COMPSCI	4437B	250628733	Simpson	Marge	80	SBS4	msimps@uwyo.ca
COMPSCI	4437B	250659336	Griffin	Peter	88	MBMSH	pgriff@uwyo.ca
COMPSCI	4437B	250669013	Flintstone	Wilma	87	SBSH	wflint@uwyo.ca
COMPSCI	4437B	250669195	Rubble	Betty	85	BIUSX	brubbl@uwyo.ca
COMPSCI	4437B	250680648	McDonald	Ronald	92	BIUSX	rmcdon@uwyo.ca
COMPSCI	4437B	250681141	Maxwell	Ruby	87	ESFSP	rmaxwe@uwyo.ca
COMPSCI	4437B	250696774	Montana	Hannah	88	SBSHX	hmonta@uwyo.ca
COMPSCI	4437B	250697663	Spruce	Cole	92	SBSH	cspruc@uwyo.ca

*these items are related to each other.*



# BASIC TERMINOLOGY

**Data:**

Known facts that can be recorded and have an implicit meaning.

**Database:**

A collection of related data.

**Mini-world:**

A database is a model of a mini world. Some part of the real world about which data is stored in a database. E.g. medical office, a retail business, a library are all mini worlds

**Database Management System (DBMS):**

A software package/system to facilitate the creation and maintenance of a computerized database.

**Database System:**

The DBMS software together with the data itself. Sometimes, the applications are also included.

# LIFE BEFORE DBMS... IN THE OLD DAYS!

- Have you done file I/O? *read/write*

- What is a “flat file”?

- What is a “record”?

- Or “instance”

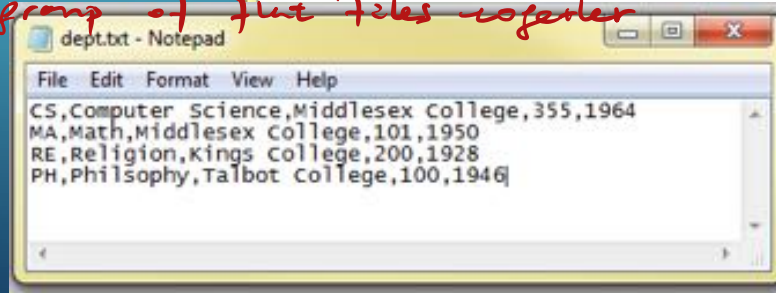
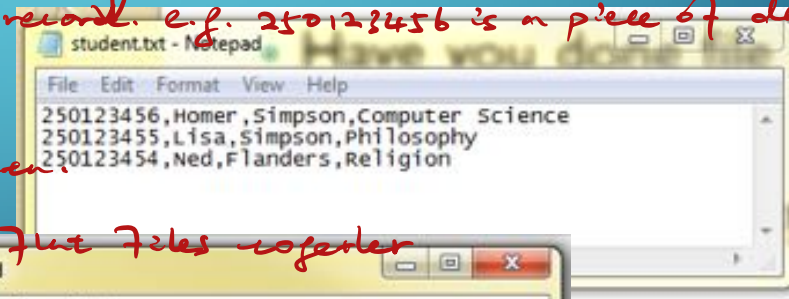
- Identify the following:

- Data : *all fields in a record. e.g. 250123456 is a piece of data.*

- Flat File

- Record : *one row of data.*

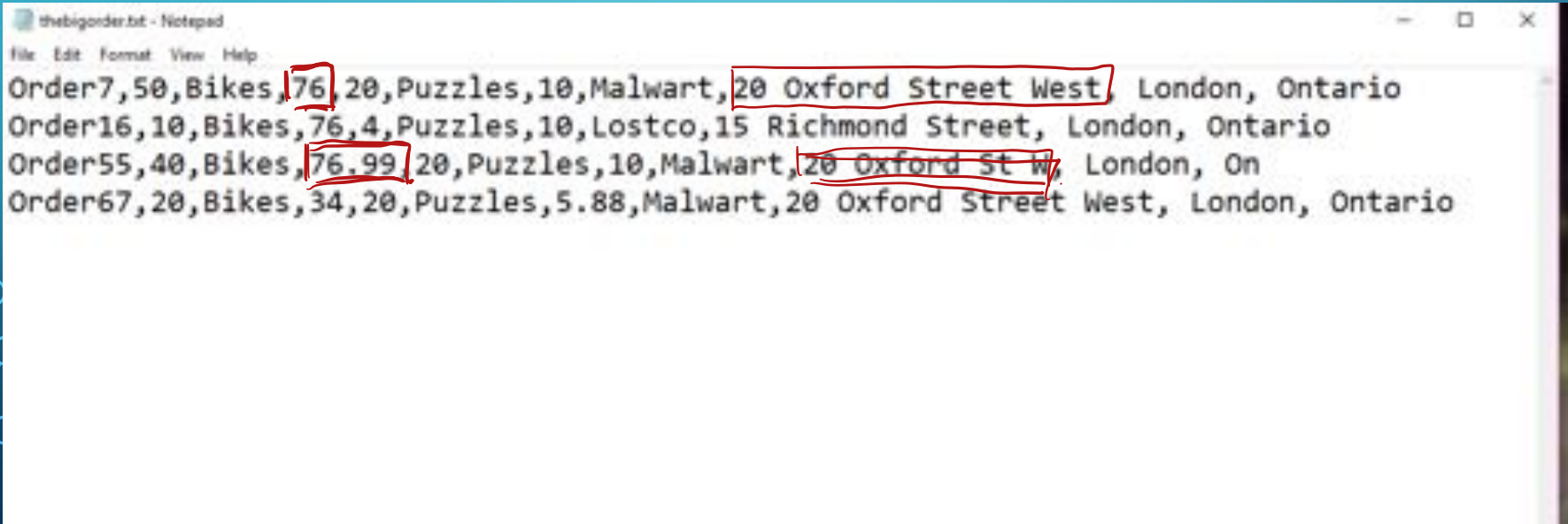
- Database : *group of flat files together*



# WHAT WAS SO BAD ABOUT FLAT FILES?

*inconsistent data.*

- Any ideas? (Or...why are DBMS better than flat files?)



A screenshot of a Notepad window titled 'thebigorder.txt - Notepad'. The window displays four lines of text representing order records. Red boxes highlight specific fields in each line to illustrate data inconsistency: the 'Bikes' count (76), the 'Puzzles' count (20), and the address ('20 Oxford Street West').

```
File Edit Format View Help
Order7,50,Bikes,76,20,Puzzles,10,Malwart,20 Oxford Street West, London, Ontario
Order16,10,Bikes,76,4,Puzzles,10,Lostco,15 Richmond Street, London, Ontario
Order55,40,Bikes,76.99,20,Puzzles,10,Malwart,20 Oxford St W, London, On
Order67,20,Bikes,34,20,Puzzles,5.88,Malwart,20 Oxford Street West, London, Ontario
```



# WHAT IS A DATABASE MANAGEMENT SYSTEM (DBMS)

- Program to help users create, maintain and use a database

## Advantages of DBMS over flat file system:

- Data redundancy/inconsistency reduced
- Isolates the programs from the data
- Provides persistent storage of data between execution of programs/applications
- Multiple users can use and share the data
- More abstract conceptually (views)



- Security, integrity and backups provided
  - Generalized query tools
  - Provides multiple user interfaces
  - Possible to enforce standards since data is centralized
  - Reduced development time
  - Up to date information managed centrally
- Great site if you ever need to learn something → Lynda.com, for example:
    - <https://www.lynda.com/Access-tutorials/Introducing-relational-database-advantages/145932/172960-4.html>

# QUESTION: WHAT ARE SOME DISADVANTAGES OF USING A DBMS OVER A FLAT FILE SYSTEM?

- Flat Files are cheap (actually FREE!) *free database*
- DBMS require trained staff to manage them
- DBMS are initially complex