



هاد الشابتر خاص في تصميم ال is

Information System Management (MIS)

Chapter Five: Part 1 - Database Concepts

database is the heart of any business
system

اهم عنصر بال is هو ال skilled workers بعدين ال
based on the data بتيجي في المرتبة الثانية information
collected

Dr. Baha'eddin Alhaj Hasan
Department of Industrial Engineering

Why DATABASE

- <https://www.youtube.com/watch?v=j09EQ-xlh88>

two types of Database

- Relational Database ← مواد ايج
- non relational Database ندرسه



WHY DATABASES?

Databases are everywhere!

- » **Databases** are accessed every time you go to an Internet site, buy something online, use a search engine, send messages/emails online, play online games, and much much more!
- » Discord, Google, Facebook, Amazon, Twitter, OWL, Student Center, all use databases!



WHY DATABASES?

But why do I need to know about them?

» Need to understand the technology your business is using to make correct decisions.

» **Business use databases to:** اهم الاختلافات بينهم

- ◊ Organize and keep track of things اهم وحدة
- ◊ Automate data tracking and retrieval
- ◊ Allow multiple users to access data concurrently.
- ◊ Keep track of multiple themes

هاد الفرق الأساسي بينهم



MULTIPLE THEMES

General rule:

- » **Single theme:** can store data in a spreadsheet جميعها تتعلق بنفس الموضوع
- » **Multiple themes:** require a database مواضيع مختلفة بقدر ارتباطها ببعض من خلال ال database
- » What's a theme?
 - ♦ Ex: student grades, student emails, student office visits.



يمكن اعتباره ثيم واحد ال customer contact log

L6						
	A	B	C	D	E	F
1	Customer Contact Log					
2						
3	Contact Date	Contact Time	Customer	Purpose	Contact Method	Notes
4	2023-12-04	10:30:00 PM	Brown, Emmett	Product Support	Phone	Had an issue with his flux capacitor, fixed by turning it on and off again.
5	2025-11-22	1:34:00 AM	Brown, Emmett	Sales	Live Chat	Wanted to buy a delorean.
6	2024-01-26	6:23:00 PM	Smith, John	Product Support	Email	Police box had a broken chameleon circuit, customer did not want to fix.
7	2029-05-17	11:42:00 AM	Brown, Emmett	Follow Up	Phone	Follow up sales call about delorean.
8	2025-09-16	4:52:00 PM	Okabe, Rintaro	Product Support	Phone	Crazy ramblings about some kind of gate. Prank call?
9	2020-05-24	7:21:00 AM	Smith, John	Follow Up	Email	Follow up customer service call. Customer's screw driver was out of batteries.
	Contact Log	Orders				

Ready Accessibility: Good to go

وهون تيم واحد و هو علامات الطلاب

spreadsheets

UMIS Chapter 5 Student Grades.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Developer Tell me what you want to do

Clipboard Font Alignment Number Styles Cells Editing

Font: Arial, 10, Bold, Italic, Underline, Text Color, Background Color, Wrap Text, Merge & Center, Number: General, \$, %, +, -, Conditional Formatting, Format as Table, Cell Styles, Insert, Delete, Format, Sort & Filter, Find & Select

Formula Bar: G14

	A	B	C	D	E	F	G	H
1	Student Name	Student Number	HW1	HW2	MidTerm	HW3	HW4	Final
2								
3	BAKER, ANDREA	1325	88	100	78			
4	FISCHER, MAYAN	3007	95	100	74			
5	LAU, SWEE	1644	75	90	90			
6	NELSON, STUART	2881	100	90	98			
7	ROGERS, SHELLY	8009	95	100	98			
8	TAM, JEFFREY	3559		100	88			
9	VALDEZ, MARIE	5265	80	90	85			
10	VERBERRA, ADAM	4867	70	90	92			
11								
12								

Sheet1 Sheet2 Sheet3

Ready 150%

MULTIPLE THEMES

hard to do this (track every things)by just using spreadsheets

لإعداد تجربة من الطلاب

The screenshot shows a web application window titled 'STUDENT'. It contains three distinct sections, each with its own header and data table, illustrating multiple themes within a single interface.

Student Info Section:

Student Name	BAKER, ANDREA
Student Number	1325
HW1	88
HW2	100
MidTerm	78

EMAIL Section:

Date	Message
2/1/2020	For homework 1, do you want us to provide notes on our re
3/15/2020	My group consists of Swee Lau and Stuart Nelson.
* 4/15/2017	

Record: 1 of 2 | No Filter | Search

OFFICE VISITS Section:

Date	Notes
2/13/2020	Andrea had questions about using IS for raising barriers to entry.
*	

Record: 1 of 1 | No Filter | Search

Global Footer:

Record: 1 of 8 | No Filter | Search

MULTIPLE THEMES

- <https://www.youtube.com/watch?v=x4Xt0M1mHbc>

التي يجب ان Database عن spreadsheets ← data consistency , data integrity
true way to tracking the data
(security , speed , Accessibility , flexibility)

relational databases



data consistency
data integrity

And keep tracking of data
flexible

NO
duplicate
information

space

efficiency

which is another way to save space and increase
efficiency.

365 DataScience

relational databases



storing and keeping track of data

retrieval of data
updating of data
efficiency
data consistency
data integrity
speed
security

=



Spreadsheets

extensive analysis

They can store lots of raw data and are excellent
when separating the data from the way it is

Play (Alt + K)

365 DataScience

36:55 / 39:22

1.8x



WHAT IS CONTENT?

الوظيفة الاساسية لاي database تعالج ال content

الي الوظيفة لأي is يحولها ل kwnoledge

Content: Something of value, which can be considered an asset

يعني اشي اله قيمة و اله خاصية الامتلاك

- ♦ Can be stored as data, documents, spreadsheets, presentations, websites, text from blogs, Twitter, or discussion boards, graphics, video files and video logs, audio files, etc.

HOW CAN CONTENT BE ORGANIZED?

Management of content "طريقة تخزين"

- ♦ Indexing, cataloguing, processing, storing bytes

Presentation of content "طريقة عرض"

is part of the content

- ♦ Distributing to the right person, right format بدون تعرف الشخص المعين والوقت المناسب
- ♦ Usually handled by content management system (CMS) نوع من الـ is بييجي

as interface between the end user and database "personal database application"

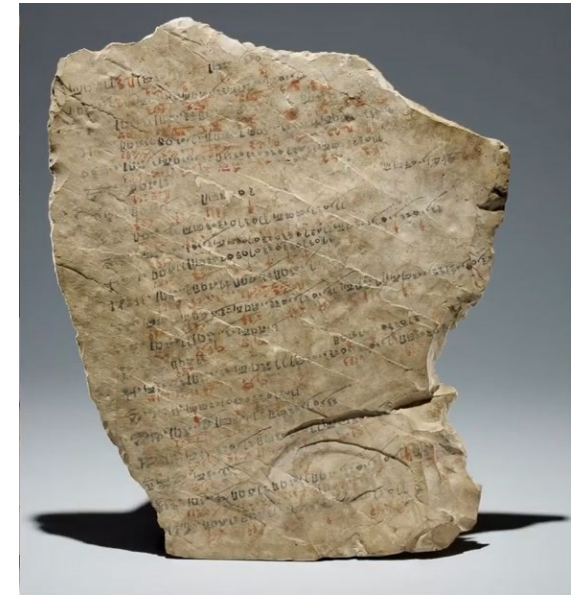


general use is

WORDPRESS

CMS: Information systems whose primary purpose is to provide an easy way to manage and present information, for example a popular blog post content Management system is wordpress. Wordpress makes it easy for blog authors to create edit format and display content without having any understanding of HTML (Hypertext Markup Language) or the database that being used under the hood.

HOW CAN CONTENT BE ORGANIZED?



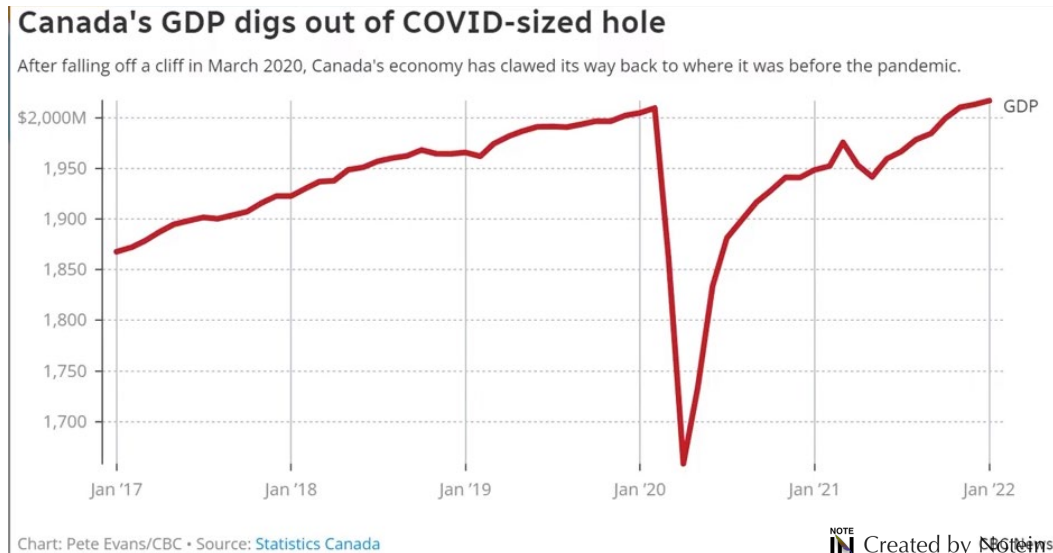
Data stored in the past in filing cabinets. Card catalogs and ledger books
More in past data was saved on rocks.

دفاتر الحسابات الضخمة

Prices	Chained (2012) dollars																
Seasonal adjustment	Seasonally adjusted at annual rates																
Geography	Canada (map)																
Estimates	Q4 2017	Q1 2018	Q2 2018	Q3 2018	Q4 2018	Q1 2019	Q2 2019	Q3 2019	Q4 2019	Q1 2020	Q2 2020	Q3 2020	Q4 2020	Q1 2021	Q2 2021	Q3 2021	Q4 2021
	Dollars																
Final consumption expenditure	1,589,953	1,602,008	1,612,596	1,620,793	1,623,998	1,630,417	1,634,348	1,640,360	1,652,127	1,623,818	1,441,854	1,592,983	1,604,927	1,619,101	1,615,021	1,668,656	1,674,543
Household final consumption expenditure	1,151,676	1,159,463	1,165,460	1,172,344	1,172,238	1,177,374	1,180,001	1,184,106	1,192,898	1,166,164	1,003,922	1,132,979	1,136,311	1,141,610	1,138,821	1,192,886	1,195,840
Goods	518,528	523,136	525,335	528,569	527,820	529,172	531,092	530,511	531,041	515,597	475,615	553,877	554,940	557,697	543,946	556,117	555,178
Durable goods	154,525	156,302	157,398	157,174	157,504	157,369	157,629	156,507	156,411	140,181	121,670	166,351	166,041	165,482	160,385	156,825	157,180
Semi-durable goods	85,195	86,200	86,243	87,162	87,112	87,624	88,663	88,329	88,231	80,577	68,950	90,394	87,763	89,395	86,736	99,638	99,011
Non-durable goods	278,854	280,686	281,736	284,283	283,261	284,246	284,901	285,754	286,466	294,577	284,583	296,744	300,608	302,377	296,369	300,247	299,528
Services	633,260	636,482	640,262	643,918	644,533	648,274	649,015	653,590	661,694	650,243	529,885	581,928	584,176	586,739	597,225	638,819	642,672
Non-profit institutions serving households' final consumption expenditure	29,996	30,224	30,688	30,548	30,844	31,100	31,356	31,668	31,860	32,348	28,360	30,448	31,320	30,544	30,640	31,056	31,516
General governments final	408,714	412,730	416,819	418,296	421,250	422,292	423,336	424,927	427,721	425,432	407,626	429,072	436,527	445,828	444,456	444,530	446,939

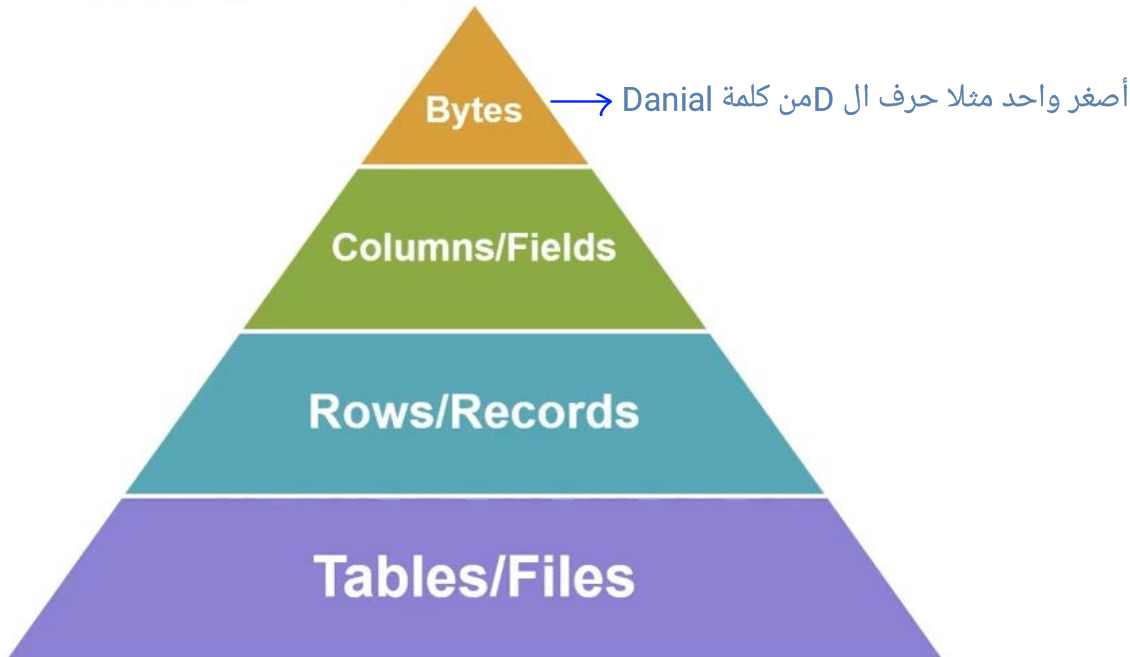
طريقة عرض الداتا هي جزء من الداتا نفسها

Good information has to be presented in good way so it will be useful!



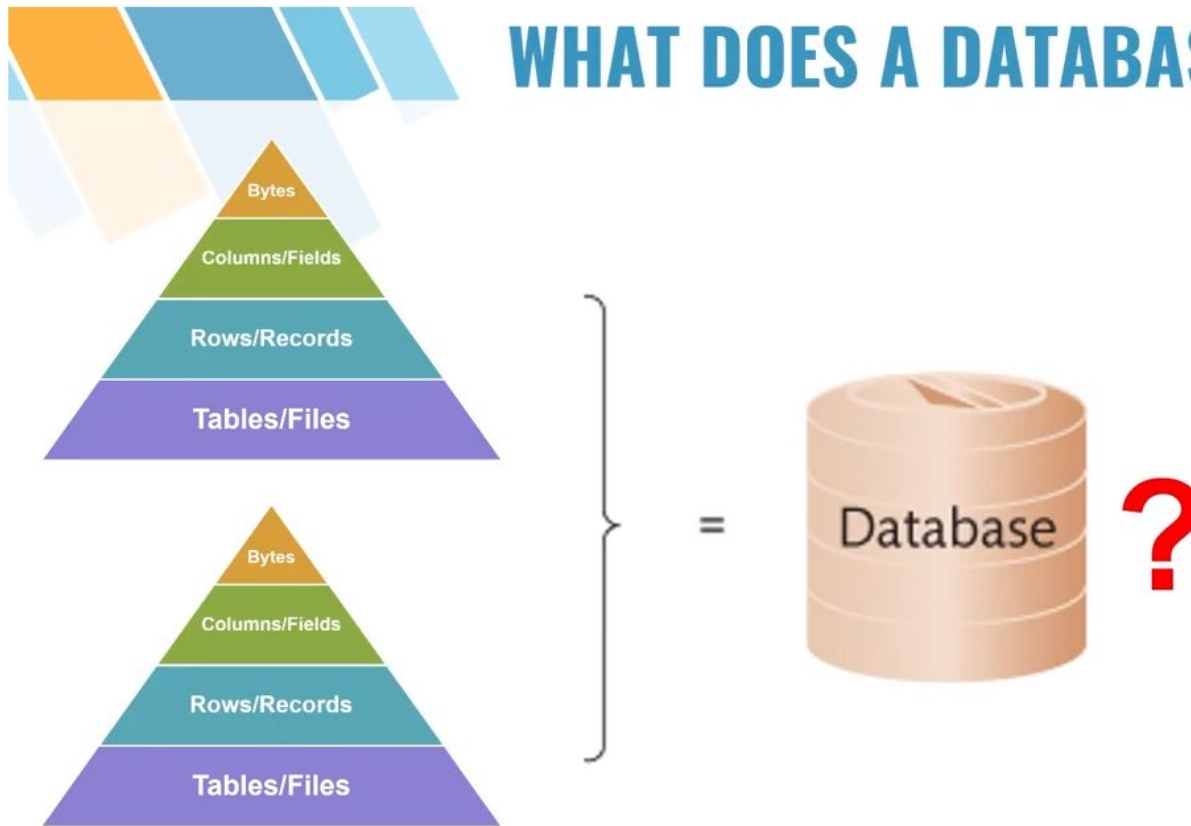
WHAT DOES A DATABASE CONTAIN?

- » **Database:** a self-describing collection of integrated records لازم توضح نفسها في نفسها
- » **Hierarchy** of data elements:

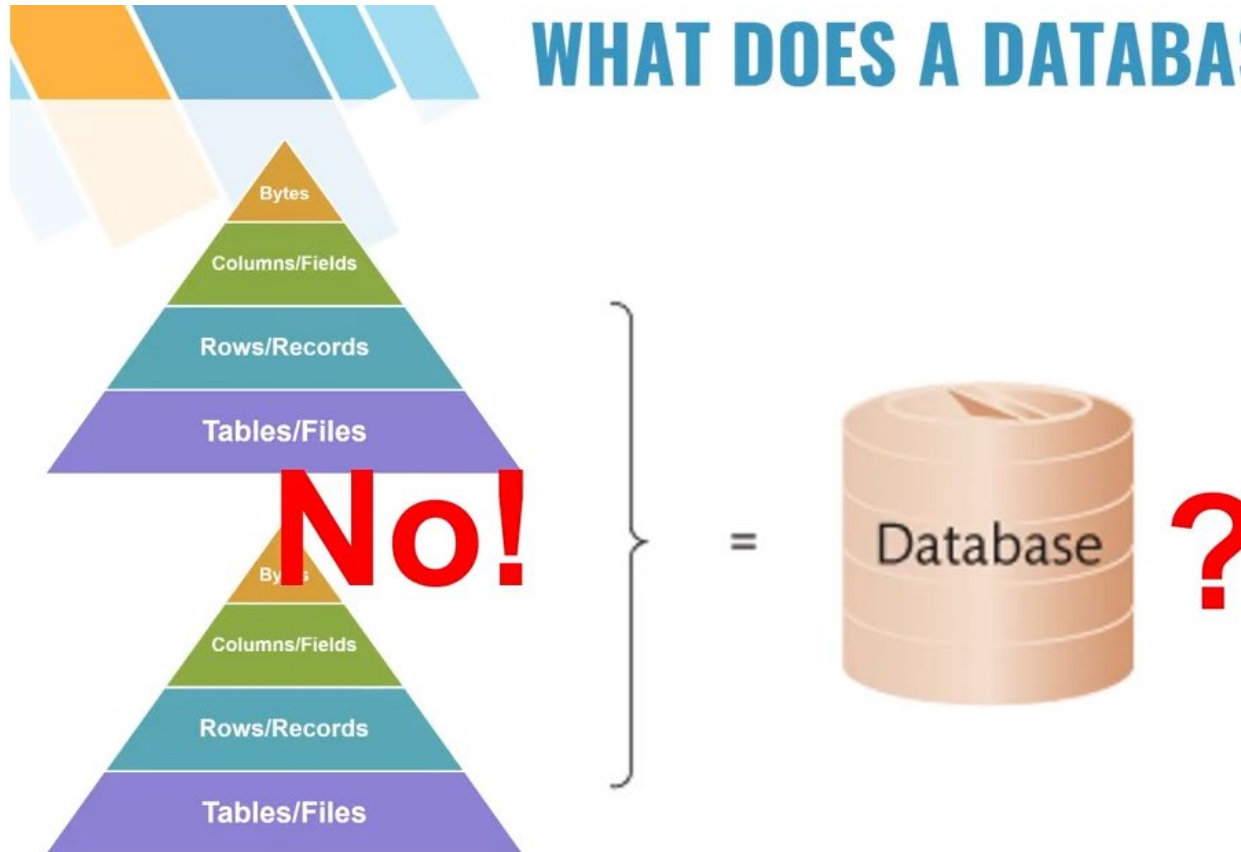


First Name	Last Name	Address	Phone #	Age	Sex	Email
Daniel	Servos	123 Fake St.	555-555-5555	37	Male	dservos5@uwo.ca
Jane	Doe	42 Long Rd.	555-123-4567	56	Female	jdoe@uwo.ca
Joe	Bloggs	135 Short St.	555-765-4321	14	Male	jbloggs@uwo.ca

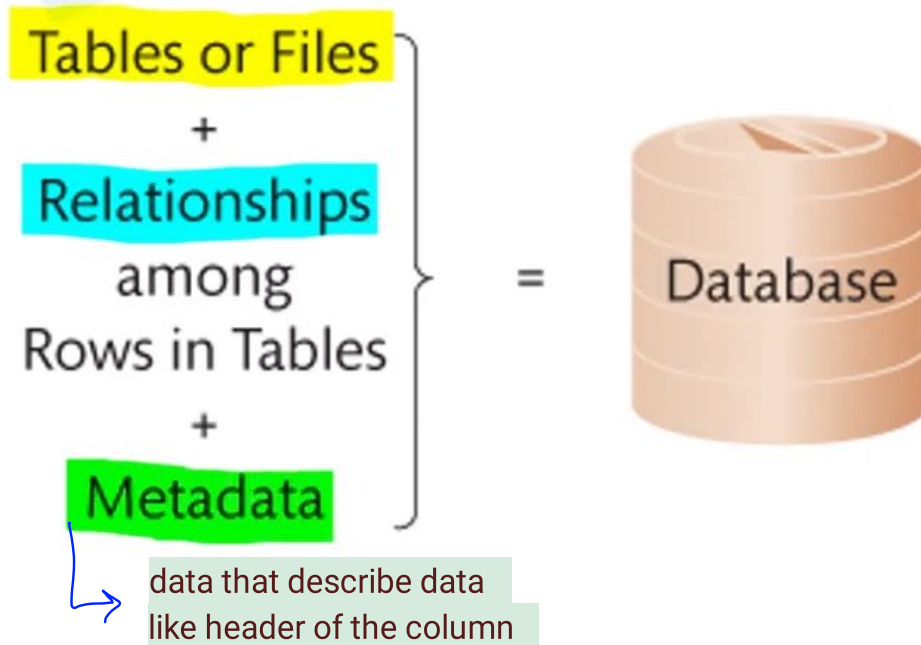
WHAT DOES A DATABASE CONTAIN?



WHAT DOES A DATABASE CONTAIN?



WHAT DOES A DATABASE CONTAIN?



Email Table

Date	Message	Student Number
2/1/2007	For homework 1, do you want us to provide notes on our references?	1325
3/15/2007	My group consists of Swee Lau and Stuart Nelson.	1325
3/15/2007	Could you please assign me to a group?	1644

Student Table

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
1644	LAU, SWEE	75	90	90
2881	NELSON, STUART	100	90	98
3007	FISCHER, MAYAN	95	100	74
3559	TAM, JEFFREY		100	88
4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLY	95	100	98

Office_Visit Table

Date	Notes	Student Number
2/13/2007	Andrea had questions about using IS for raising barriers to entry.	1325
2/17/2007	Jeffrey is considering an IS major. Wanted to talk about career opportunities.	3559
2/17/2007	Will miss class Friday due to job conflict.	4867

one of the most content of any Database

RELATIONSHIPS

track

في جميع الجداول إلى عندي اياهم

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من خلاله بعمل Records أو Reaction

هون هو رقم الطالب غير متكرر

» Primary Keys:

- Fields Column(s) that uniquely identify a row in a table.
- All tables have a primary key.

Q1: What Is the Purpose of a Database?

- Purpose: To organize and keep track of things
- Spreadsheets do that too
 - Keeping lists of only a single theme per worksheet
 - Example: Student test scores in a course
 - Linking and managing multiple worksheets is a real pain
- Databases
 - Keep lists that involve multiple themes
 - Examples: Student grades, grades for all courses in a department, courses offered in all departments, faculty records, and so on

Q2: What Does a Database Contain?

- A self-describing collection of integrated records
- Hierarchy of data elements
 - [Bytes](#)/data are grouped into columns/fields
 - Columns grouped into rows/records
 - Rows are grouped into tables/files
- Collection of tables plus relationships among rows
 - Also includes “[metadata](#)”
 - **Describes the structure of the database and its data**
- A database is a [structured](#) collection of records stored in a computer system so that a [computer program](#) or person using a [query language](#) can consult it to answer [queries](#).

Student Table (a.k.a., File)

Columns, also called fields

Rows, also called records

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
1644	LAU, SWEE	75	90	90
2881	NELSON, STUART	100	90	98
3007	FISCHER, MAYAN	95	100	74
3559	TAM, JEFFREY		100	88
4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLY	95	100	98

Characters, also called bytes

Relationships Among Records

- Database have multiple tables (one for each theme)
- Values in one table may relate to rows/records in other tables
- Keys
 - A column(s) that identify unique row in table
 - Each table has a key
- Foreign keys
 - Are keys of a different table than the one in which they reside
- Relational databases
 - Databases use tables, keys, and foreign keys to create relationships

Example of Relationships Among Three Tables

Email Table

EmailNum	Date	Message	Student Number
1	2/1/2004	For homework 1, do you want us to provide notes on our references?	1325
2	3/15/2004	My group consists of Swee Lau and Stuart Nelson.	1325
3	3/15/2004	Could you please assign me to a group?	1644

Student Table

Student Number	Student Name	HW1	HW2	MidTerm
1325	BAKER, ANDREA	88	100	78
1644	LAU, SWEE	75	90	90
2881	NELSON, STUART	100	90	98
3007	FISCHER, MAYAN	95	100	74
3559	TAM, JEFFREY		100	88
4867	VERBERRA, ADAM	70	90	92
5265	VALDEZ, MARIE	80	90	85
8009	ROGERS, SHELLEY	95	100	98

Office_Visit Table

VisitID	Date	Notes	Student Number
2	2/13/2004	Andrea had questions about using IS for raising barriers to entry.	1325
3	2/17/2004	Jeffrey is considering an IS major. Wanted to talk about career opportunities.	3559
4	2/17/2004	Will miss class Friday due to job conflict.	4867

Example of Relationships Among Three Tables

- These lines are not stored in the database, they are just for illustrative purposes.
- Databases define these relationships through primary and foreign key fields and the values they contain in records.

Metadata

- Database is self-describing
 - Contains descriptions of its data
- Metadata
 - Data that describe data
 - Makes databases more useful
 - Makes databases easier to use
- Describes data by:
 - Data type – text, number, date, etc.
 - Field name
 - Field properties

أي داتا تساعد في فهم الداتا إلى موجودة

Access Metadata Report

C:\Users\Joys\Courses\CIS300\data sets\Exercise 2 Skills.accdb
Table: Annual Sales

Wednesday, September 30, 2009
Page: 1

Properties

DateCreated:	12/10/2006 11:00:18 PM	DefaultView:	2
GUID:	{guid {1C07FCAB-2C95-4AF0-B2F1-9D1CB3B6778A}}	LastUpdated:	12/13/2006 12:06:14 AM
NameMap:	Long binary data	OrderByOn:	False
Orientation:	Left-to-Right	RecordCount:	44
Updatable:	True		

Columns

Name	Type	Size
Last Name	Text	20
AllowZeroLength:	True	
AppendOnly:	False	
Attributes:	Variable Length	
CollatingOrder:	General	
ColumnHidden:	False	
ColumnOrder:	Default	
ColumnWidth:	Default	
DataUpdatable:	False	
DisplayControl:	Text Box	
GUID:	{guid {6BDC3986-D79B-4384-A970-F6C20A520D4C}}	
IMEMode:	0	
IMESentenceMode:	3	
OrdinalPosition:	0	
Required:	False	
SourceField:	Last Name	
SourceTable:	Annual Sales	
UnicodeCompression:	True	
First Name	Text	20
AllowZeroLength:	True	
AppendOnly:	False	
Attributes:	Variable Length	
CollatingOrder:	General	
ColumnHidden:	False	
ColumnOrder:	Default	
ColumnWidth:	Default	
DataUpdatable:	False	
DisplayControl:	Text Box	
GUID:	{guid {19A28BAD-5358-4E10-8DE4-7FE86DB7A75B}}	
IMEMode:	0	
IMESentenceMode:	3	

Q3: What Is a DBMS and What Does It Do?

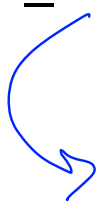
- Database management system (DBMS)
 - Program that creates, processes, and administers databases
 - Usually licensed from vendors
 - Examples: Microsoft Access, Oracle, MySQL, DB2

اكثر من user يستخدم ال database

- DBMS and database are two different things
 - Database is a structured collection of records or data stored in a computer system so a computer program or person using a query language can consult it to answer queries.
 - Database management system (DBMS) is a computer program used to manage and query a database

organisational

بيانات مرتبة

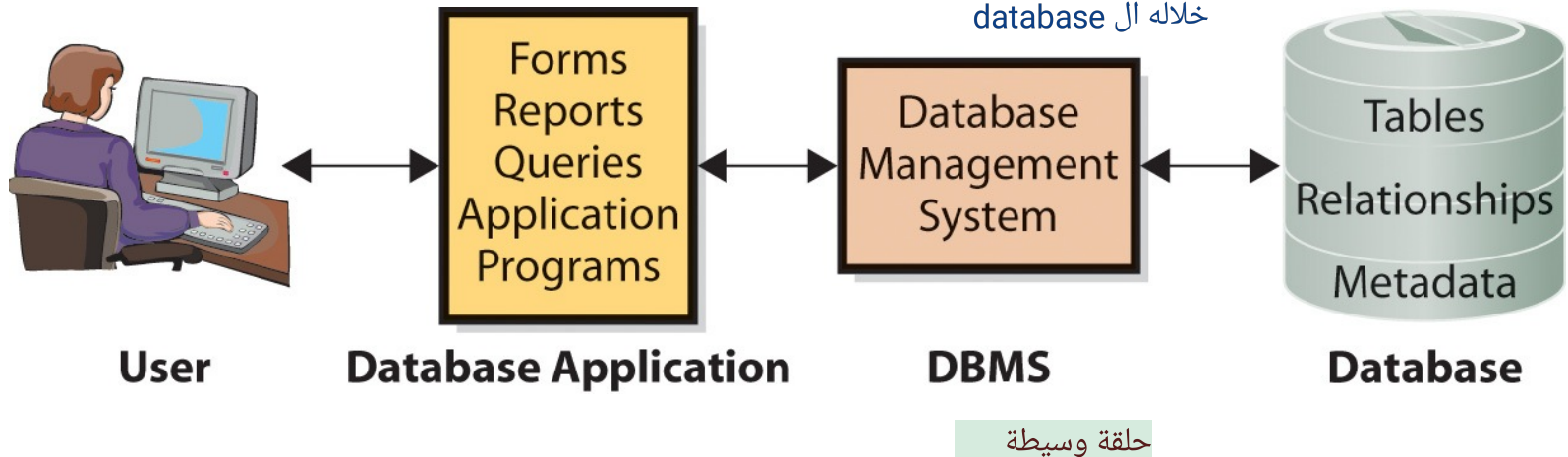


ليقتر يعمل اذيا ذكاء Data interface between user and database برنامج يستعمل

Components of a Database Application System

بس تتحكم في طريقة ال access متى ال user مسموحه شو المعلومات الي مسموحه ياخذها شو نوع المعلومات الي مسموحه يعمل اسئلة عليها

زي البوابة هو البرنامج إلى يعمل من خلاله ال database



Database Management Systems

- DBMS is used to create tables, relationships in databases
- Applications use a DBMS to read, insert, modify, and delete data

- Structured Query Language (SQL) من خلالها بقدر اطلب معلومات من ال database
 - International standard language for querying databases
 - Allows users to interactively interrogate the database, analyze its data and update it according to the users privileges on data
 - Also controls the security of the database

Creating the Database and Its Structure

The screenshot shows the 'EMAIL : Table' design view in Microsoft Access. It contains a table with five fields: EmailNum (AutoNumber, Primary key), Date (Date/Time), Message (Memo), Student Number (Number, Foreign key), and Response? (Yes/No). Below the table is the 'Field Properties' section with tabs for 'General' and 'Lookup'. The 'General' tab is active, showing properties for the 'Response?' field: Format (Yes/No), Caption, Default Value (False), Validation Rule, Validation Text, Required (Yes), and Indexed (No). A help message on the right states: 'A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.'

	Field Name	Data Type	Description
🔑	EmailNum	AutoNumber	Primary key -- values provided by Access
	Date	Date/Time	Date the message is recorded into the database
	Message	Memo	Text of the email
	Student Number	Number	Foreign key to row in the Student Table
▶	Response?	Yes/No	True / false value to indicate if prof has responded

Field Properties

General | Lookup

Format: Yes/No

Caption:

Default Value: False

Validation Rule:

Validation Text:

Required: Yes

Indexed: No

A field name can be up to 64 characters long, including spaces. Press F1 for help on field names.

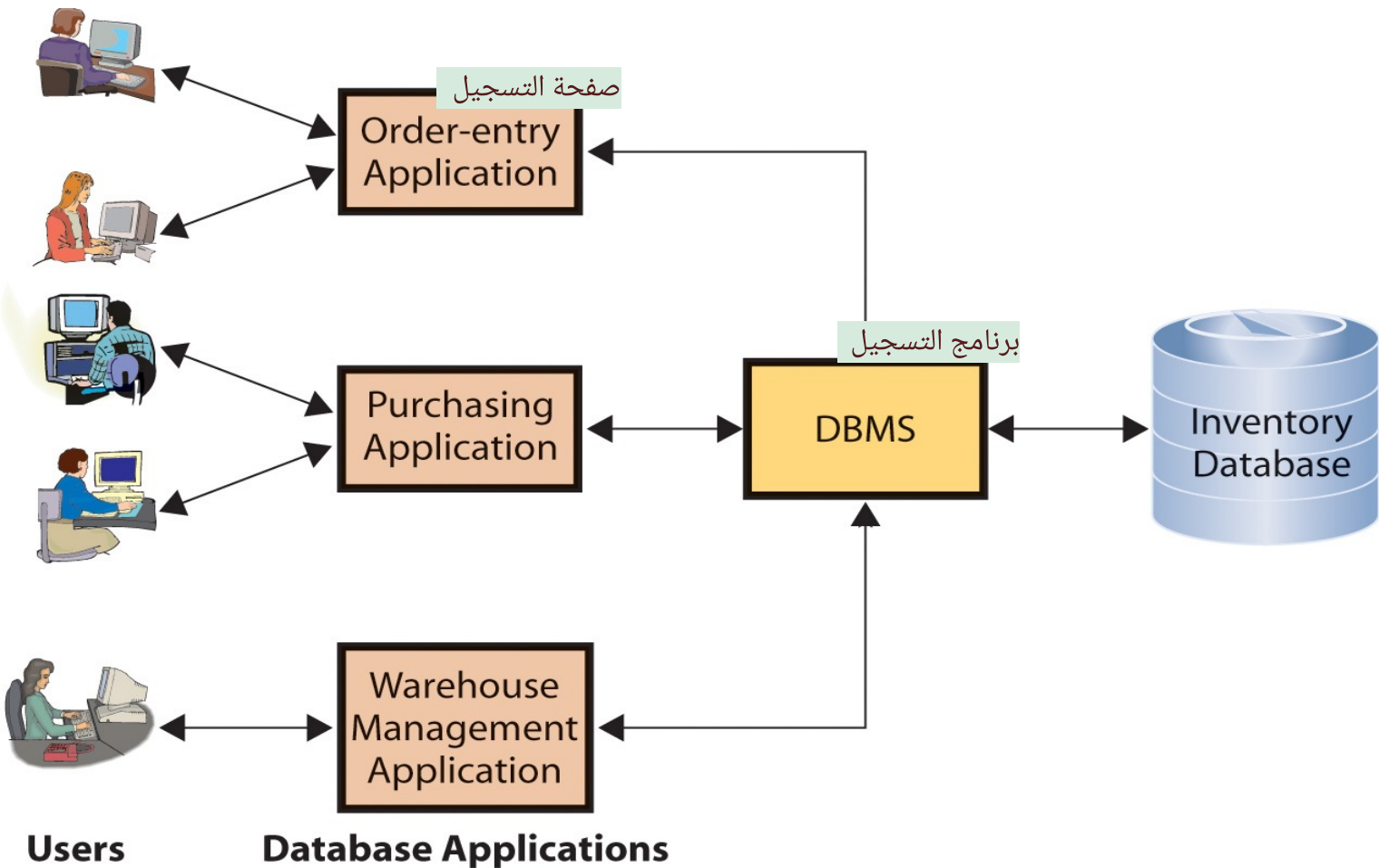
Processing the Database

- DBMS perform four basic operations
 1. Read data
 2. Insert data
 3. Modify data
 4. Delete data
- Structured Query Language (Example)
INSERT INTO Student
([Student Number], [Student Name], HW1, HW2, MidTerm)
VALUES
(1000, 'Franklin, Benjamin', 90, 95, 100)

Administering the Database

- DBMS security features are used to set up user accounts, passwords, permissions, processing limits
 - [Permissions](#) – data access rights for specific users or groups of users
- [Database backup](#) and replication, adding structures, removing unneeded data

Use of Multiple Database Applications



Q4: What Is a Database Application?

- Database application is the software we create that actually utilizes our database.
- Collection of forms, reports, queries, and application programs that process a database
- Databases can have multiple applications
- Applications can have multiple users

طرق متنوعة لإدخال المعلومات
أو إخراجها من الـ Database

Forms, Reports, and Queries

- Forms بدي ادخل داتا مثلا الرقم الجامعي وكلمة السر
 - Used to read, insert, modify, and delete data
- Reports بطلب كشف علامات
 - Show data in structured context
 - May compute values such as Totals, within a report
- Queries بدي اسأل اشئ معين
 - Are a means of getting answers from database data

Forms, Reports, and Queries

The screenshot shows a web application window titled "STUDENT REG" with a "Student Registration" header and the Western University Canada logo. The form contains the following fields and controls:

- Student Num:** Text input with value "SN1".
- Student Name:** Text input with value "Jane Smith2".
- Registration Date:** Text input with value "May 4, 2020".
- Date of Birth:** Text input with value "February 11, 2020".
- Phone Number:** Text input with value "(345) 345-3453".
- Can This Student Graduate?:** Radio button group with "Yes" selected and "No" unselected.
- Faculty:** Dropdown menu with "Arts" selected.
- Navigation:** Four blue buttons with left arrow, checkmark, pencil, and right arrow icons.
- Footer:** "Record: 1 of 10", "No Filter", and "Search" text.

Additional text on the right side of the form includes "Made by Daniel" and a blue button with a trash icon.

Form

Forms, Reports, and Queries

Doctor's Patients

Daniel's Patient Report

Doctor:	Smith			
Last Name	First Name	Phone Number	Address	Account Balance
Davis	Dave	4165557777	54 Blarney Rd., London, ON	\$5.00
Doe	Jack	5195550000	99 Fake St., London, ON	\$35.00
Doctor Total:				\$40.00

Doctor:	Bloggs			
Last Name	First Name	Phone Number	Address	Account Balance
Jones	Alice	5195552323	876 Richmond St, London, ON	\$0.00
Jones	Bob	1235558321	444 Limberlost St, London, ON	\$600.00
Doctor Total:				\$600.00

Doctor:	Wilson			
Last Name	First Name	Phone Number	Address	Account Balance
Bloggs	Joe	1235550011	123 fake St., London, ON	\$0.00
Doe	Jane	4165558473	1151 Richmond St, London, ON	\$1,000.00
Doctor Total:				\$1,000.00

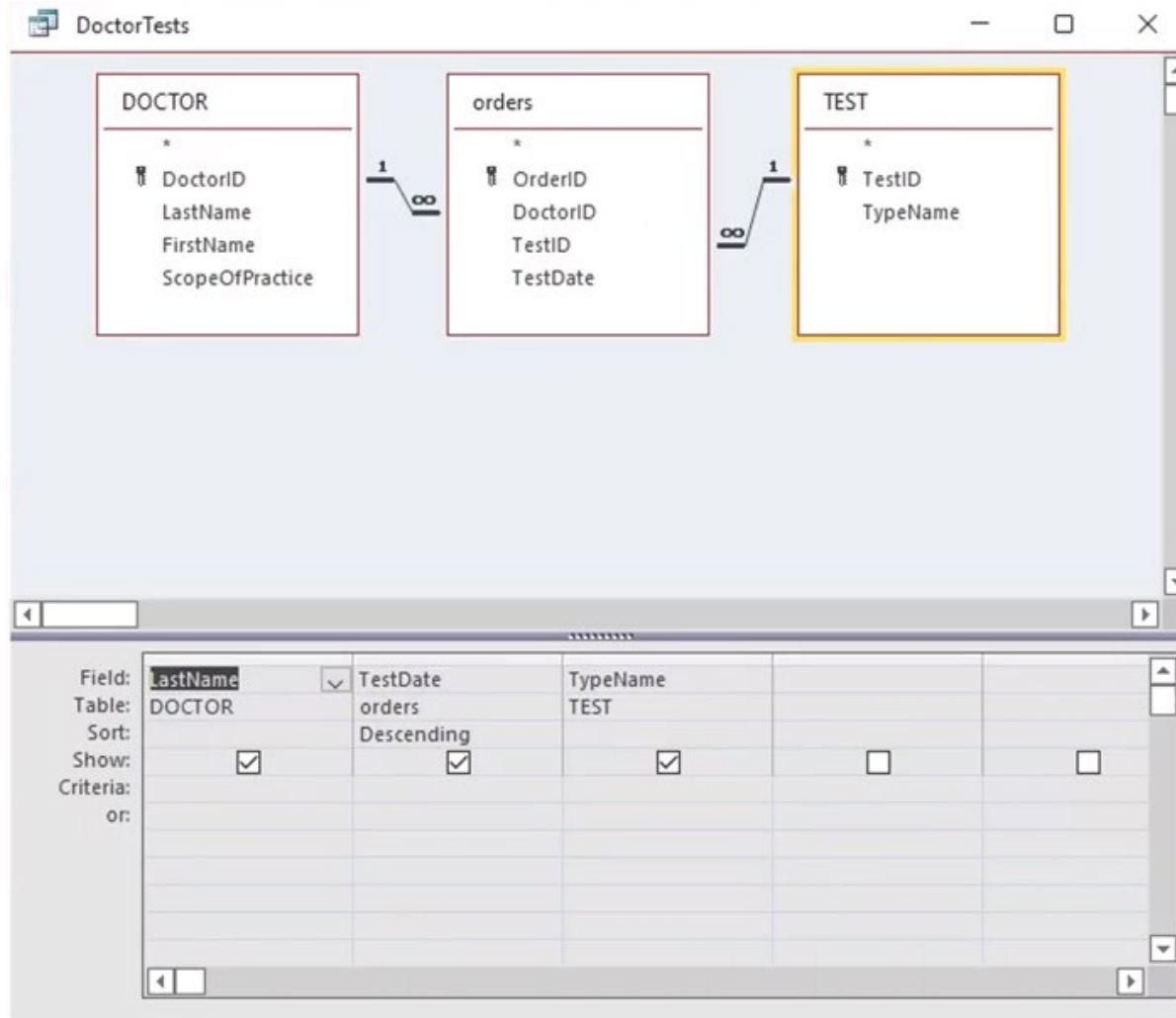
Doctor:	Jones			
Last Name	First Name	Phone Number	Address	Account Balance
O'Brian	Patty	5195552583	36 Blarney Rd., London, ON	\$20.00
Doctor Total:				\$20.00

Total: \$1,660.00

May 27, 2022

Page 1 of 1

Forms, Reports, and Queries



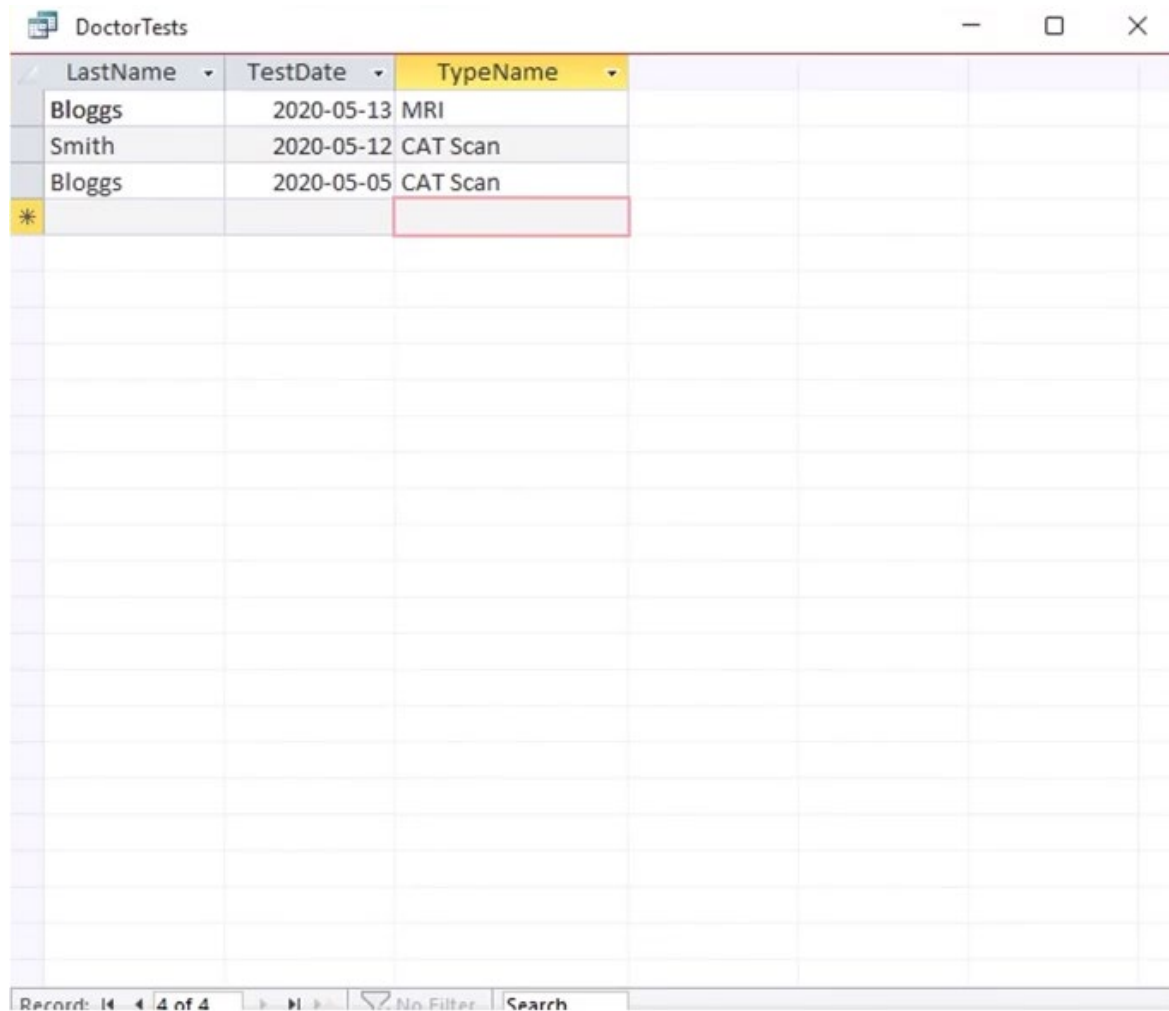
Forms, Reports, and Queries



DoctorTests

```
SELECT DOCTOR.LastName, orders.TestDate, TEST.TypeName  
FROM TEST INNER JOIN (DOCTOR INNER JOIN orders ON DOCTOR.DoctorID = orders.DoctorID) ON TEST.TestID = orders.TestID  
ORDER BY orders.TestDate DESC;
```

Forms, Reports, and Queries



LastName	TestDate	TypeName
Bloggs	2020-05-13	MRI
Smith	2020-05-12	CAT Scan
Bloggs	2020-05-05	CAT Scan
*		

Record: 14 of 4 No Filter Search

Database Application Programs

- » Forms, reports, and queries work for standard functions
- » Application programs provide more robust information
 - ◇ Process logic specific to business need
 - ◇ Enables database processing over Internet
 - ◇ Serves as intermediary between Web server and database
 - ◇ Responds to events
 - ◇ Reads, inserts, modifies, deletes data

Database Application Programs

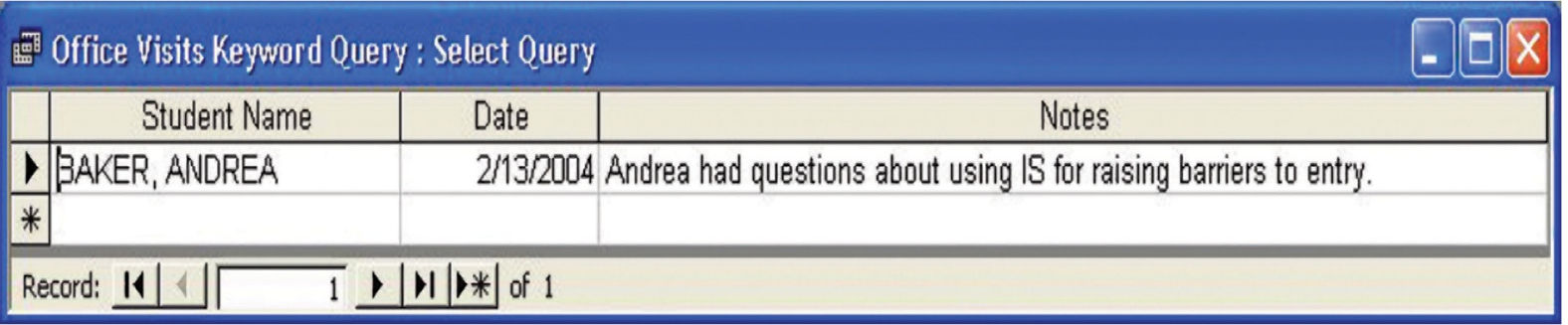
- Application programs
 - Process logic specific to a business need
 - May enable database processing over Internet to:
 - Serve as intermediary between Web server and database
 - Respond to events,
 - Asks DBMS to read, insert, modify, delete data

Example of a Query



A dialog box titled "Enter Parameter Value" with a red close button. It contains a text input field with the text "barriers to entry" and two buttons: "OK" and "Cancel".

a. Form used to enter phrase for search



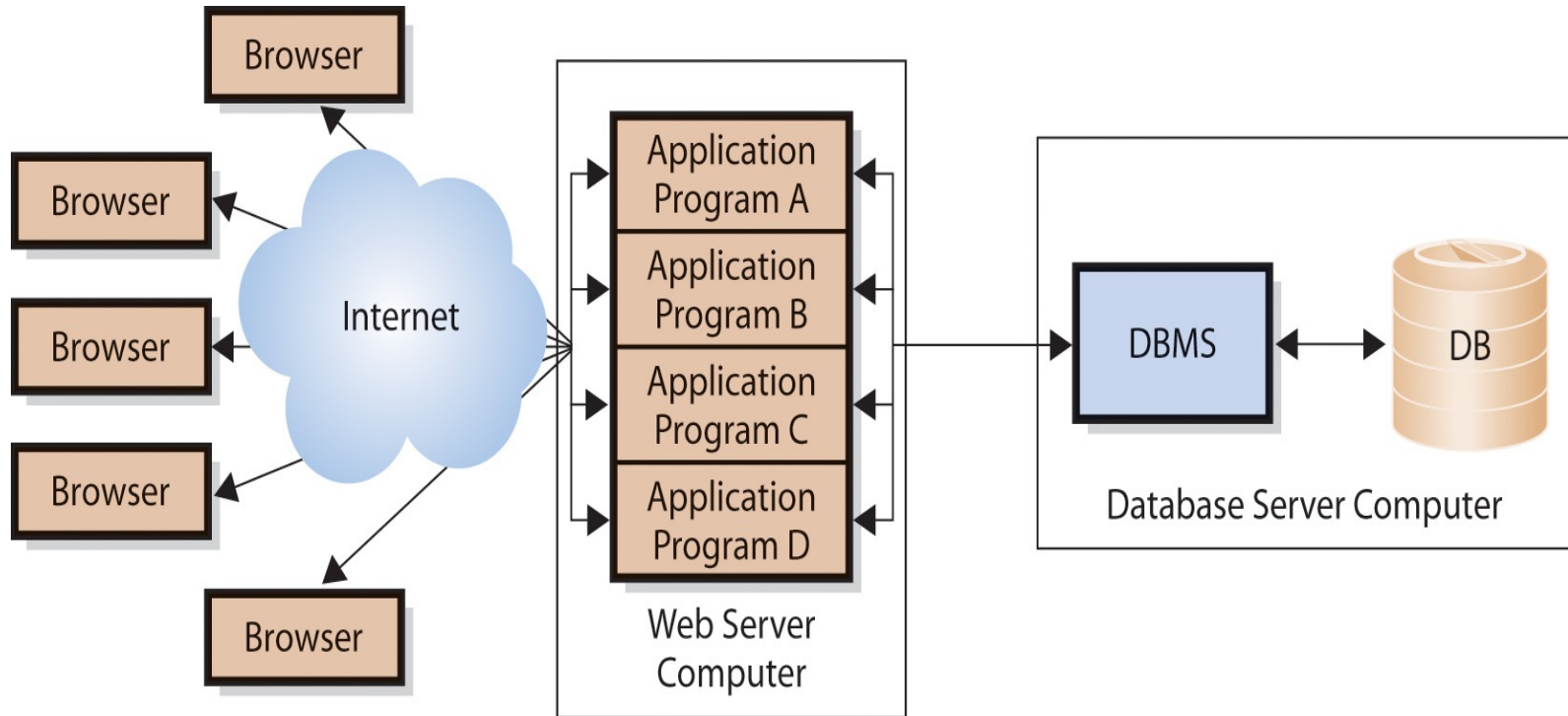
A window titled "Office Visits Keyword Query : Select Query" with a blue header bar and standard window controls. It displays a table with three columns: "Student Name", "Date", and "Notes". The first row contains the data: "BAKER, ANDREA", "2/13/2004", and "Andrea had questions about using IS for raising barriers to entry." Below the table is a record navigation bar showing "Record: 1 of 1" with navigation icons.

	Student Name	Date	Notes
▶	BAKER, ANDREA	2/13/2004	Andrea had questions about using IS for raising barriers to entry.
*			

Record: 1 of 1

b. Results of query operation

Four Application Programs on a Web Server Computer



Multuser Processing Considerations

- Lost-update problem

بدي اسجل مادة وهي سكرت

- Occurs when an update made by one transaction is lost due to an update made by another transaction.
1. Process A reads a customer a record from a file containing account information, including customer's account balance and phone number.
 2. Process B now reads same record from same file, now B has its own copy.
 3. Process A changes account balance in its copy of customer record and writes record back to the file.
 4. Process B—which still has the original value off account balance in its copy of the customer record—updates customer's phone number and writes customer record back to the file.
 5. Process B has now written the old account balance value to the file, causing the changes made by process A to be written over or lost.

first in first out

Multuser Processing Considerations (cont'd)

- Preventing Lost Update problems using:
- Locking بمنع اثنين يشغلوا على نفس المعلومة في نفس الوقت
 - Used to ensure that a transaction does not interfere with any other transaction. Locking prevents the problem of lost update, uncommitted data, and inconsistent data.
 - By preventing another user or process to open a record that is currently being used by another user or process.

Q5: What Is the Difference Between an Enterprise DBMS and a Personal DBMS?

- Enterprise DBMS
 - Processes large organizational and workgroup databases
 - Supports many users (thousands plus)
 - Examples: DB2, SQL Server, Oracle, DB2

يعتمد على عدد ال users

- Personal DBMS
 - Designed for smaller, simpler database applications
 - Supports fewer than 100 users (mostly 1-10 users)
 - Examples: Access, dBase, FoxPro, Paradox, R-Base

Personal Database System

