



Professional Development | An tSeirbhís um Fhorbairt
Service for Teachers | Ghairmiúí do Mhúinteoirí



An Roinn Oideachais
Department of Education



LEAVING CERTIFICATE
COMPUTER SCIENCE

National Workshop 5



Day 1 Session 3

ALT1 – Interactive Information Systems



By the end of this session participants will have ...

used a web application to populate a Firebase database

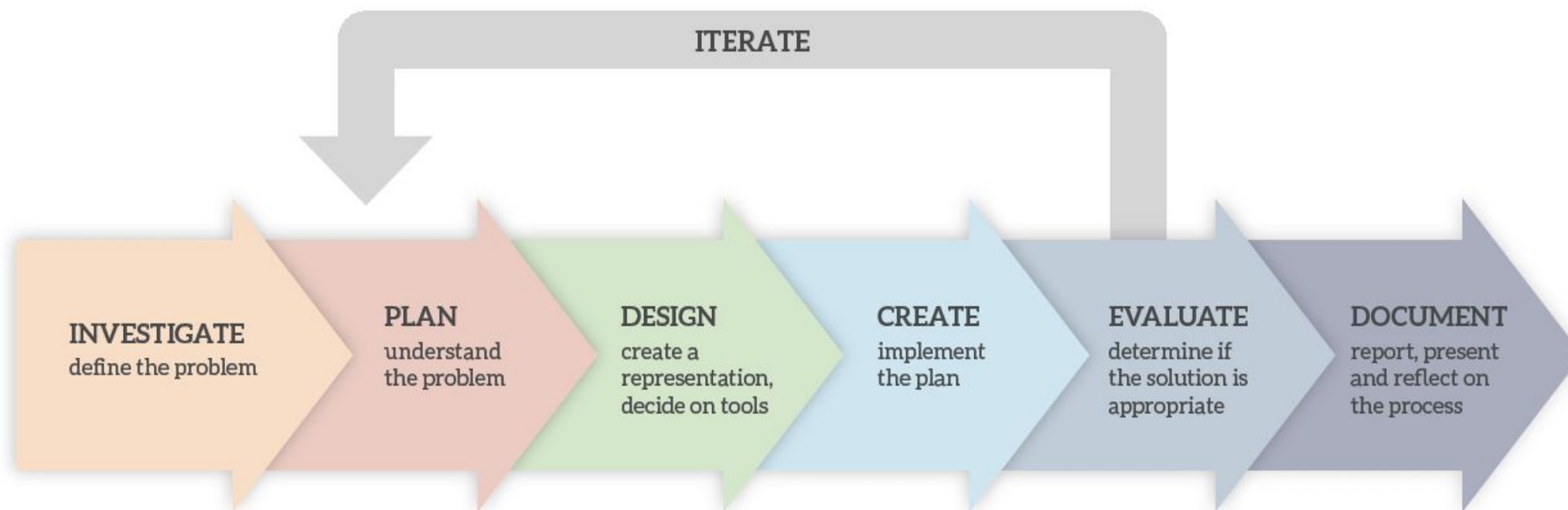
used a web application to populate a ThingSpeak database

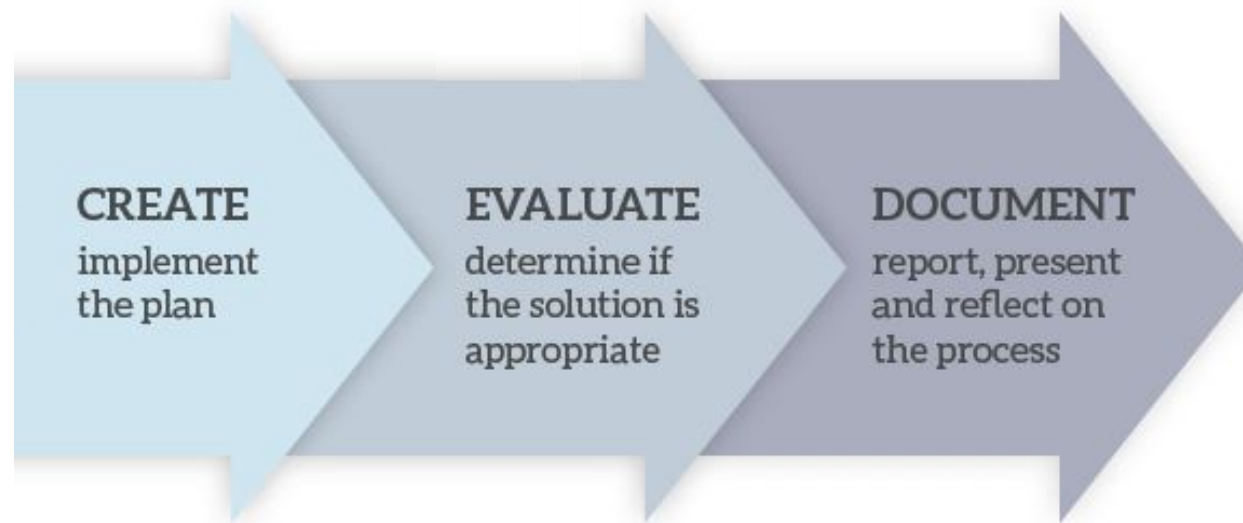
used a web application to access a Firebase database

used a web application to access a ThingSpeak database

enhanced their web development skills in the areas of HTML/CSS, JavaScript and database technologies

acquired additional skills, knowledge and ideas on how they will facilitate ALT1 in their own classrooms





Terminology / Concepts

What is a database?

Database vs. Database Management System

DBMS

Relational

primary key foreign key field record

Databases non

SQL vs. NoSQL relational

System

Architecture client-server

cloud

sqlite

MySQL

Database

MS SQL Server

model front end

MS Access

MongoDB

Base

system Back end system

HTML/CSS

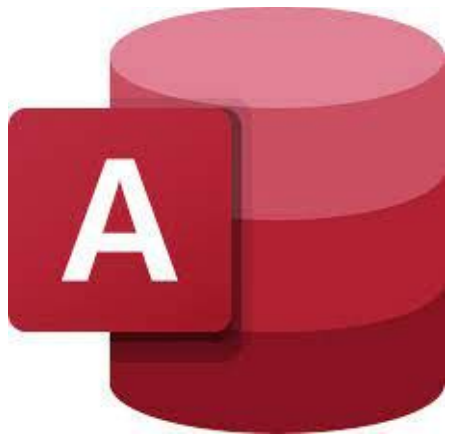
JavaScript

Examples of cloud database solutions - using Firebase and ThingSpeak

Some Database Solutions



Firestore



 **ThingSpeak**



SQL



mongoDB®

Code along - Firebase



Code along - ThingSpeak



Keywords to know

Tick the column that best describes your knowledge in relation to each term/topic

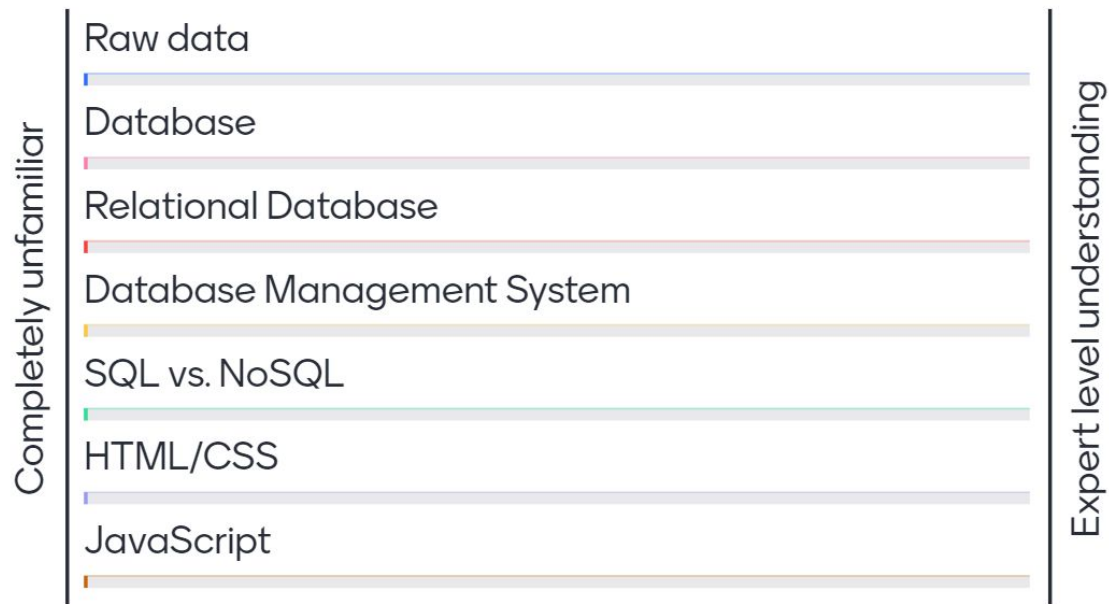
Term/Topic	Completely unfamiliar	Somewhat familiar	Very familiar	Completely familiar
Data (raw data)				
Database				
Relational Databases				
SQL				
NoSQL				
client server model				
Front end vs. backend systems				
HTML				
CSS				
JavaScript				
...				

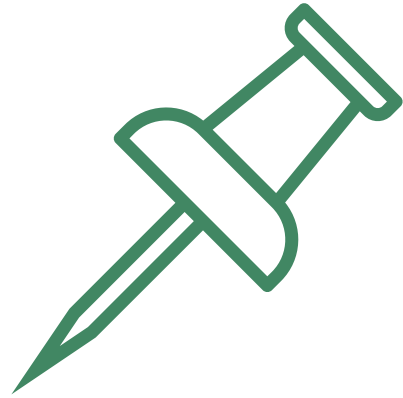
Adapted from An Integrated Approach to Learning, Teaching & Assessment (Page 28)



Go to www.menti.com and use the code 4092 6210

Please rate your own knowledge/understanding with respect to the following terms/topics





Key Message to remember:

Explore and teach the LOs through the lens of ALTs.

There are numerous ways to achieve this.

Database Concepts

- **Database:** A structured collection of related data

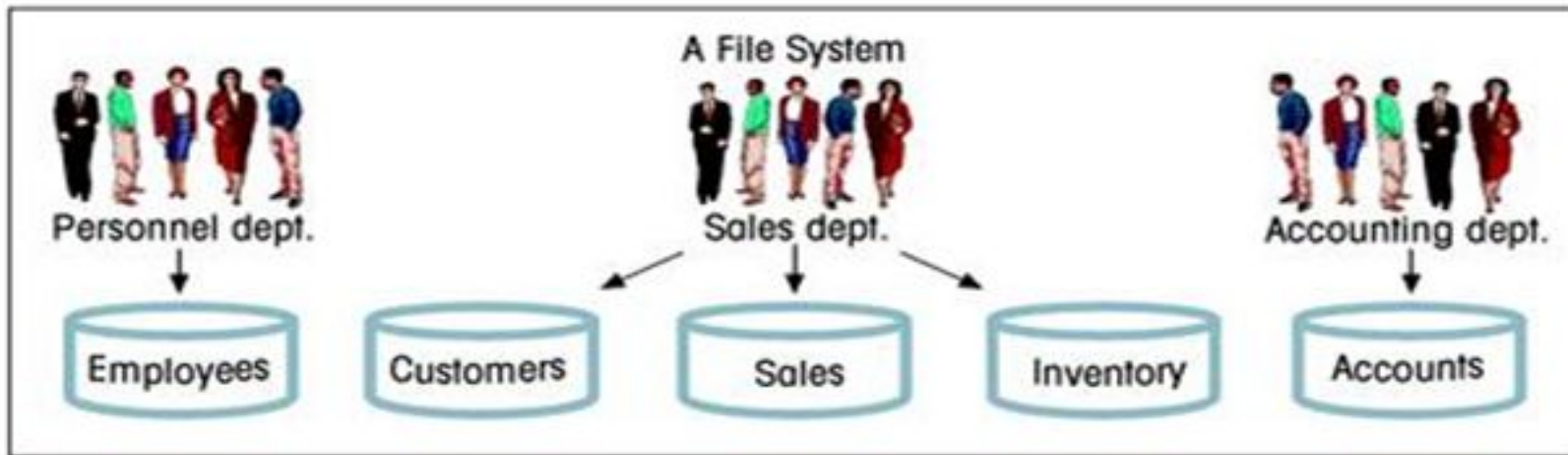
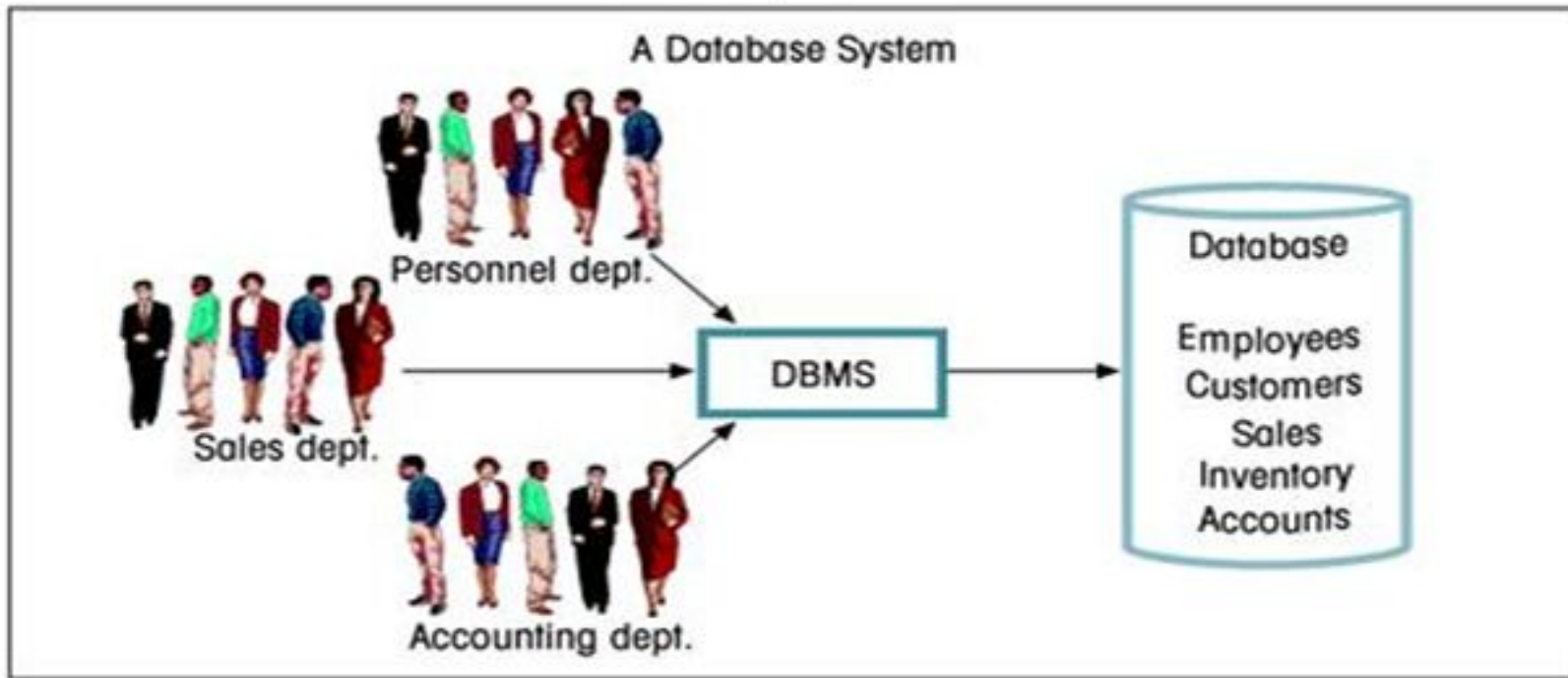
Column

s

Row
s

owner_id	owner_name	address	dog_name	breed	dob	microchip
1	Joe Murphy	1 main st.	rover	labrador	22/11/2011	Y
1	Joe Murphy	1 main st.	fido	poodle	02/02/2020	Y
2	Ada Traore	9 park ave.	fido	jack russell	15/06/2015	N
1	Joe Murphy	1 main st.	champ	greyhound	01/01/2010	Y
2	Ada Traore	9 park ave.	spots	dalmation	24/08/2007	N
3	James Tidy	7 bond st.	buddy	rottweiler	21/10/2012	Y

- Data is stored in **tables** - organised by rows (tuples) and columns (attributes)
- Each row is called a **record**
 - Each attribute value is called a **field**



Database Concepts

- **Table:** A set of data elements (values) organised by rows (records) and columns (values)
- **Attribute:** A characteristic of the data in the table, describing a field or cell in a table.
- **Primary Key:** A unique identifier for a row in a table

Would `dog_name`
be a good PK?

What about `breed`?

dog_id	dog_name	breed	dob	microchip
1	rover	labrador	22/11/2011	Y
2	fido	poodle	02/02/2020	Y
3	fido	jack russell	15/06/2015	N
4	champ	greyhound	01/01/2010	Y
5	spots	dalmation	24/08/2007	N
6	buddy	rottweiler	21/10/2012	Y

Database Concepts

owner_id	owner_name	address	dog_name	breed	dob	microchip
1	Joe Murphy	1 Main st.	rover	labrador	22/11/2011	Y
1	Joe Murphy	1 Main St.	fido	poodle	02/02/2020	Y
2	Ada Traore	9 Park Ave.	fido	jack russell	15/06/2015	N
1	Joe Murphy	1 Main St.	champ	greyhound	01/01/2010	Y
2	Ada Traore	9 Park Ave.	spots	dalmation	24/08/2007	N
3	James Tidy	7 Bond St.	buddy	rottweiler	21/10/2012	Y

- How do add a new customer (unless they order dog)?
- How do we update a record that occurs multiple times?
- How do we ensure we don't delete too much information?

Primary Key

ID	fname	sname	address	...	email	...
1	Joe	Murphy	1 Main St.	...	<u>jmurphy@outlook.ie</u>	...
2	Ada	Traore	9 Park Ave.	...	<u>at@gmail.com</u>	...
3	James	Tidy	7 Bond St.	...	tidy@outlook.ie	...
4	Joe	Murphy	1 Park Ave.	...	murphyj@yahoo.com	...

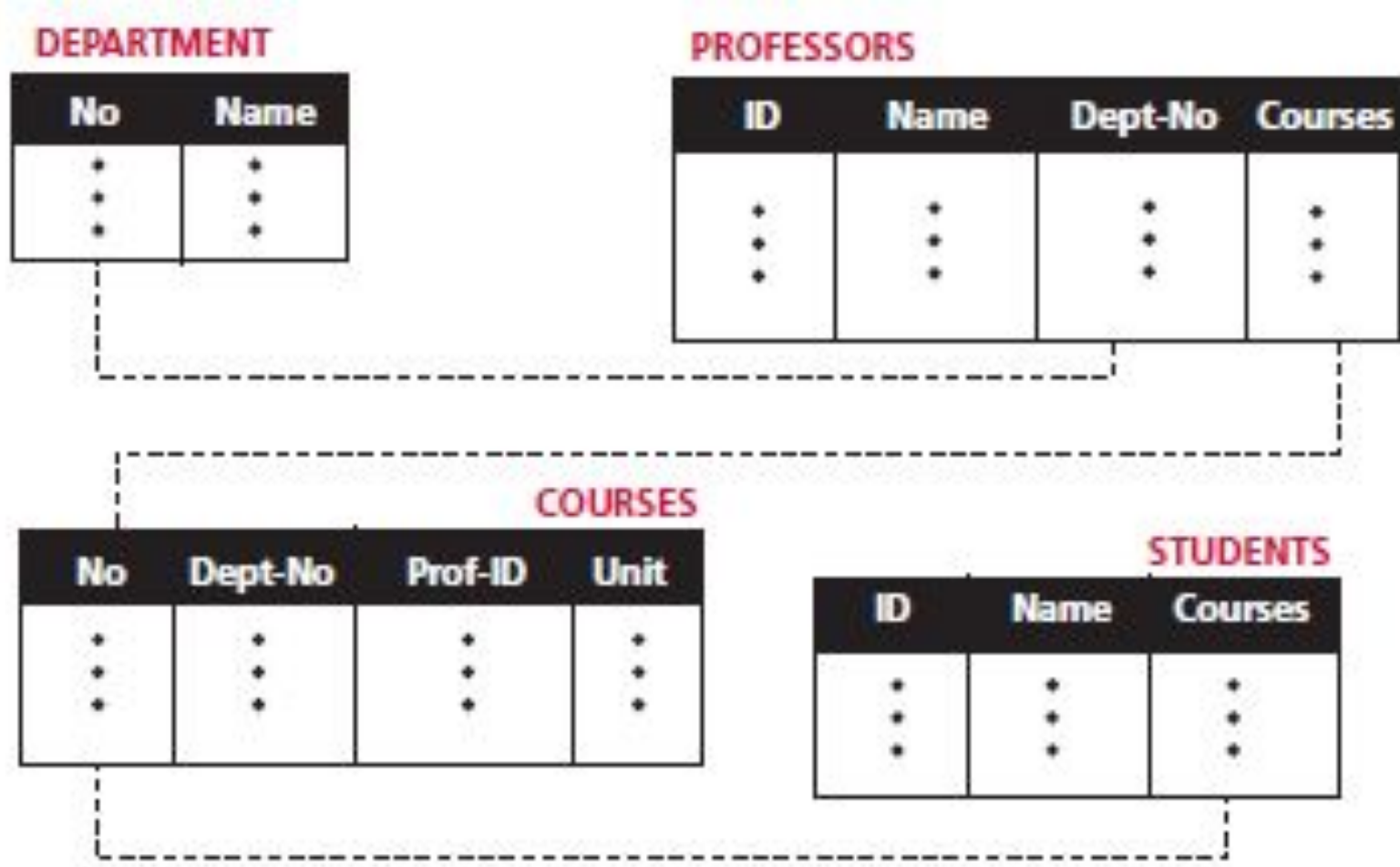
Foreign Key

Foreign Key (FK): An attribute in a table that is used as a primary key in another table.

A FK provides the relationship by linking one table to another

dog_id	name	breed	dob	microch ip	owner_id
1	rover	labrador	22/11/2011	Y	1
2	fido	poodle	02/02/2020	Y	1
3	fido	jack russell	15/06/2015	N	2
4	champ	greyhound	01/01/2010	Y	1
5	spots	dalmation	24/08/2007	N	2
6	buddy	rottweiler	21/10/2012	Y	3

Relational Model

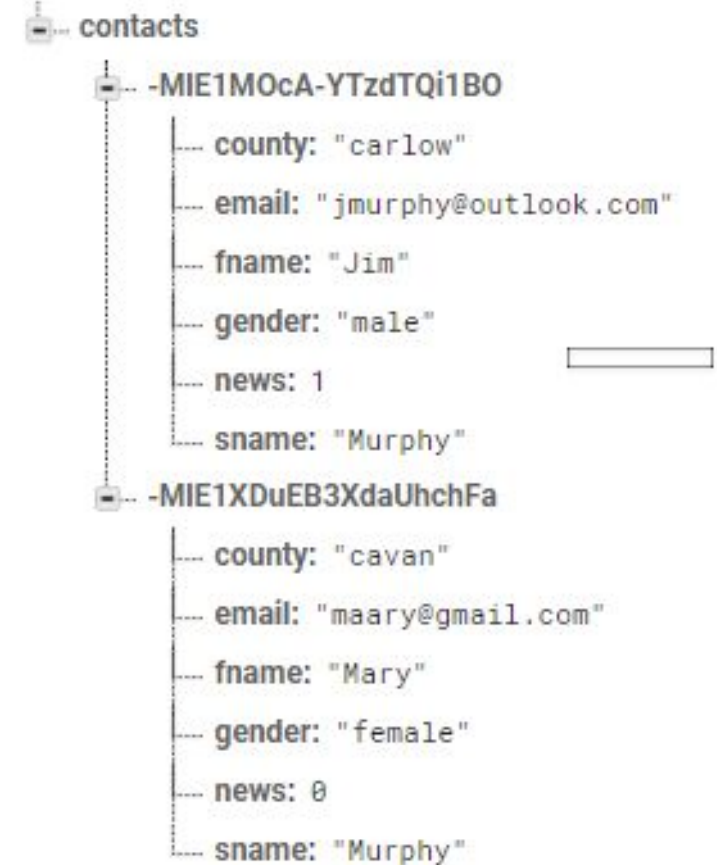


Structured Query Language (SQL) vs. NoSQL

fname	sname	county	gender	email	news
Joe	Murphy	carlow	male	jmurphy@outlook.ie	Yes
Mary	Murphy	cavan	female	maary@gmail.com	No

Relational Model (SQL Based)

pdst-nw5-demo-project-default-rtdb



Cloud Model (NoSQL)

Structured Query Language (SQL)

INSERT

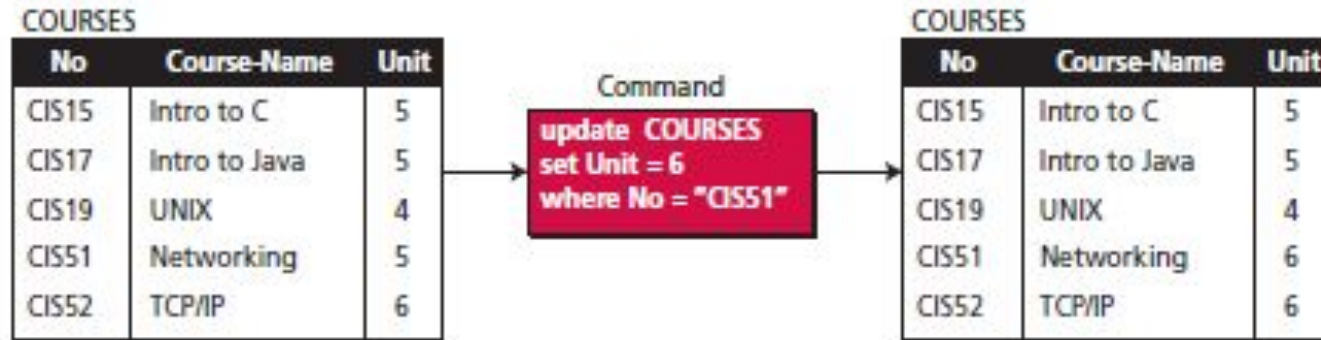


DELETE

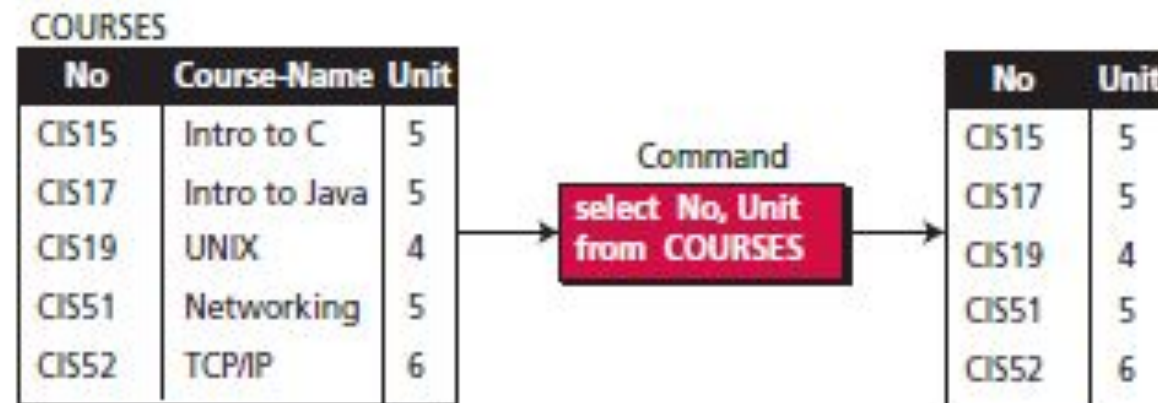
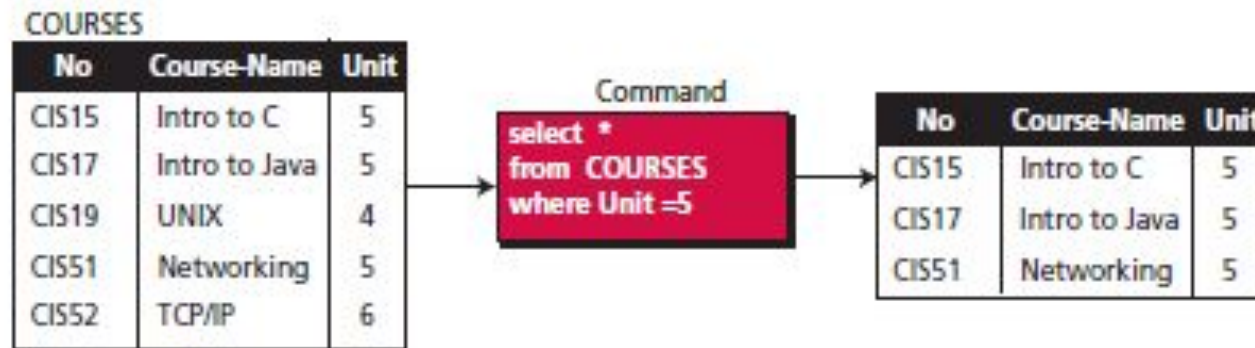


Structured Query Language (SQL)

UPDATE



SELECT





Stretch break



Code along Demo/Tutorial



<https://drive.google.com/file/d/1ILz-fNf7daGu533FNaoK6Y7m8J5-H98v/view>



- **Task 1. Getting Started. Setting up the Home page**

A screenshot of a web browser window. The browser tab is titled 'NW5 Demo'. The address bar shows the URL 'jeng-nw5-demo.glitch.me/index.html'. The webpage content includes navigation links for 'Home', 'Contact Us', and 'Contact Us (v2)'. The main heading is 'My first webpage'. Below the heading, there are several paragraphs of text demonstrating HTML formatting: 'This text is bold italics underline nothing', 'This text is bold and italics', 'Notice how white spaces are ignored!!', and a quoted sentence '“This text is a quote”'. A block quote follows: 'This text is a block quote'. Below this is a table titled 'Price of Fruit' with columns for 'Fruit' and 'Price'. The table lists Apple (€0.25), Banana (€1.00), and Pineapple (€2.00), with a total of €3.25. The footer of the page reads 'Copyright © 2021 lccs'.

Price of Fruit

Fruit	Price
Apple	€0.25
Banana	€1.00
Pineapple	€2.00
Total	€3.25

Copyright © 2021 lccs



- **Task 1.** Getting Started. Setting up the Home page
- **Task 2.** Create a Contact Us page

[Home](#)

Simple Contact Us Page (v1)

Type your email address here

Submit Data



- **Task 1.** Getting Started. Setting up the Home page
- **Task 2.** Create a Contact Us page
- **Task 3.** Setup Firebase



- **Task 1.** Getting Started. Setting up the Home page
- **Task 2.** Create a Contact Us page
- **Task 3.** Setup Firebase
- **Task 4.** Save contact data to Firebase



[Home](#)

Simple Contact Us Page (v1)

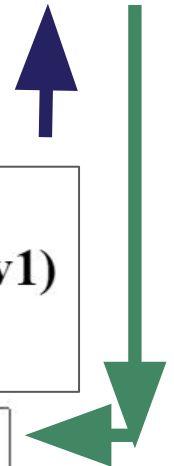


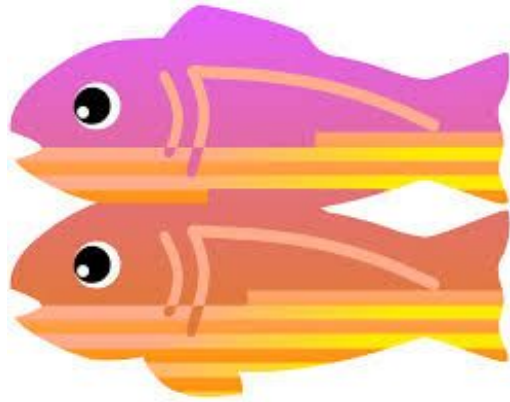
- **Task 1.** Getting Started. Setting up the Home page
- **Task 2.** Create a Contact Us page
- **Task 3.** Setup Firebase
- **Task 4.** Save contact data to Firebase
- **Task 5.** Read (and display) data from Firebase

[Home](#)

Simple Contact Us Page (v1)

```
joeenglish@pdst.ie  
joe.butlersbridge@gmail.com  
joe.butlersbridge@gmail.com  
xyz  
computerscience@pdst.ie  
jack.butlersbridge@gmail.com  
jmurphy@outlook.com  
maary@gmail.com
```





index.html - guttural-noodle

flavio-my-nice-p... **Live**

< New Project ✨

- node-app**
Create a Node app built on Express
- node-sqlite**
A Node app with an SQLite database to hold data.
- webpage**
Your very own web page

```
html>  
"en">  
Hello!</title>  
harset="utf-8">  
ttp-equiv="X-UA-Compatible" conte  
ame="viewport" content="width=dev  
port the webpage's stylesheet -->  
el="stylesheet" href="/style.css"  
port the webpage's javascript fil  
src="/script.js" defer></script>  
there!</h1>
```

Open #!/remix/hello-express on this page in a new tab "remix/hello-express" in a new tab

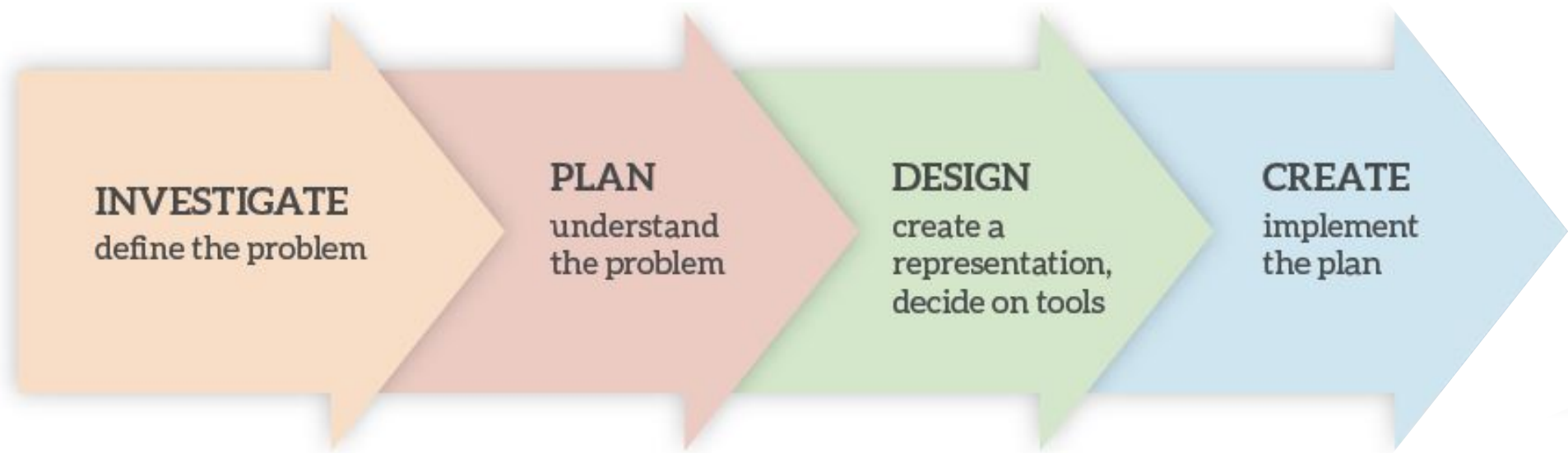


Day 1 Session 3

Create



Group Activity
Groups will work on the Design phase of ALT1



The Design Process



CREATE
implement
the plan

The Design Process

Welcome to the Book Club website



Read the latest book reviews:

I found Text and Tests a super read.
T n T 2 was particularly brilliant.

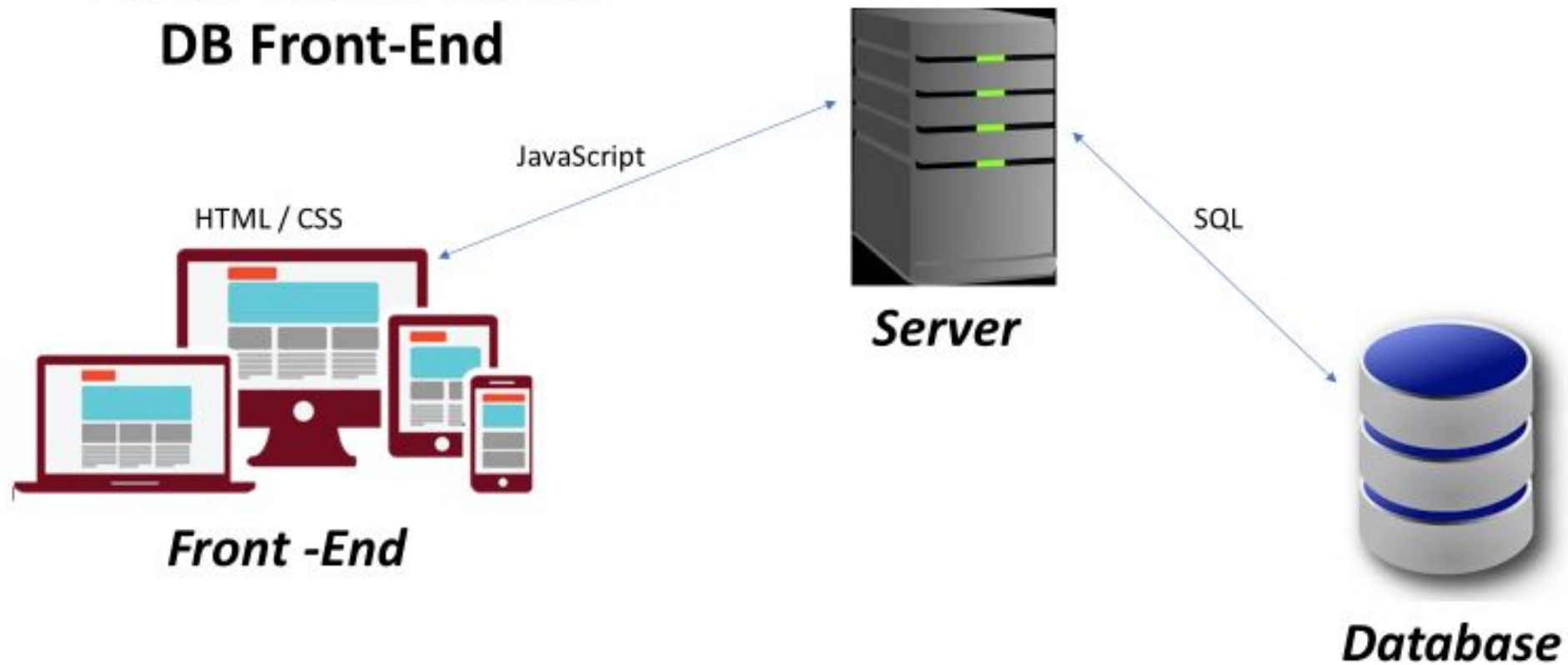


[Book_club.odt](#)
Size: 4.06KB

See link to the latest book suggestions. Feel free to make your own: [Book Suggestions](#)

<https://luxuriant-boom-cannon.glitch.me>

Client-Server Model DB Front-End



Ireland Women's Hockey Team



Base

- Book Club
 - 1-table
 - > 1 table

Book Club – Database design

- Fields

ID	FName	LName	Email	Age	Phone	Booking_ID	Date due	Book_Name	Book_ID	Fee_paid	O/D

Book Club - Tables

Book_club (2).odb - OpenOffice Base

File Edit View Insert Tools Window Help

Database

Tasks

- Create Table in Design View...
- Use Wizard to Create Table...
- Create View...

Tables

- Bookings
- Books
- Student_Details

Student_Details - Book_club (2) - OpenOffice B

File Edit View Insert Tools Window Help

StudentID	first Name	last Name
1	T	McG
2	S	O'N
3	F	D

Books - Book_club (2) - OpenO

File Edit View Insert Tools V

Book ID	Book Name
1	Treasure
2	Bible
3	Textn Tests

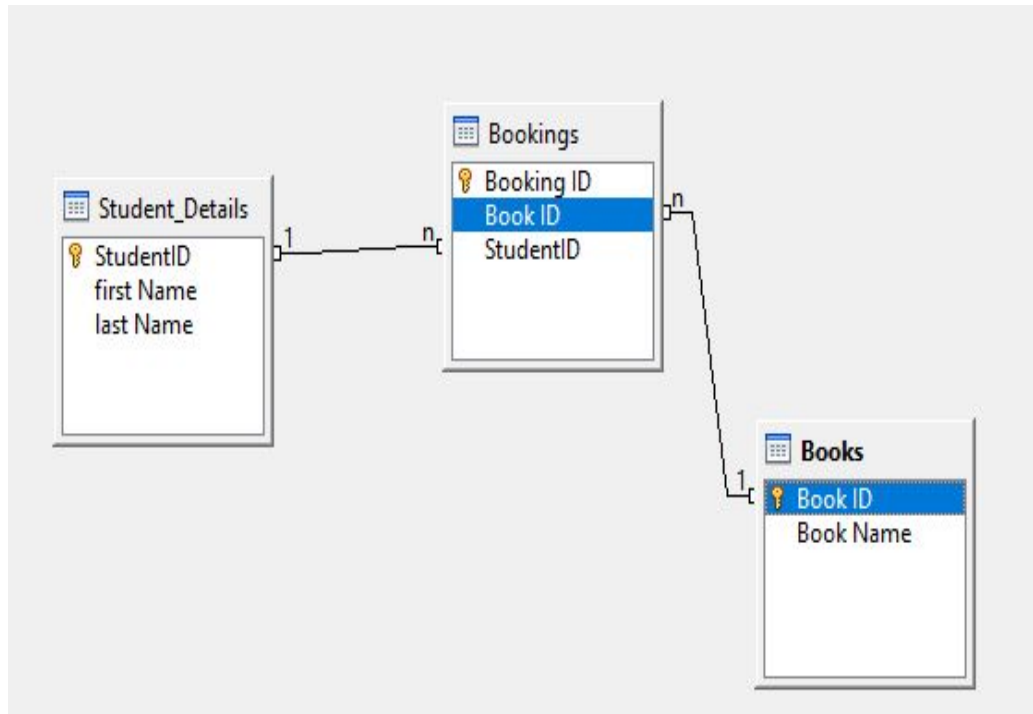
Bookings - Book_club (2) - OpenOffice Base:

File Edit View Insert Tools Window Help

Booking ID	Book ID	StudentID
101	1	2
102	2	1
103	3	1

Relationships / Queries

- Relationships



Queries

You want to get the first name and the Book IDs and Book Names for books borrowed by the Student with StudentID 1.

File Edit View Insert Tools Window Help

	first Name	Book ID	Book Name
▶	T	2	Bible
	T	3	TextnTests

Record 1 of 2

Bookings

Field	first Name	Book ID	Book Name
Alias			
Table	Student_Details	Bookings	Books
Sort			
Visible	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Function			
Criterion	'T'		
Or			

Welcome to the Book Club website



Read the latest book reviews:

I found Text and Tests a super read.
T n T 2 was particularly brilliant.



[Book_club.odt](#)
Size: 4.06KB

See link to the latest book suggestions. Feel free to make your own: [Book Suggestions](#)

<https://luxuriant-boom-cannon.glitch.me>

Link to Suggestions

- <https://luxuriant-boom-cannon.glitch.me/>



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