Business Data Management

Tutorial 1 – Part A – Introduction to database fundamentals

Case Study: Mobile Phone Retailer

A friend that works for a business that sells mobile phones has asked for your help in setting up a database for her employer. They have already come up with a design for the tables, with consideration to the following data storage and reporting needs:

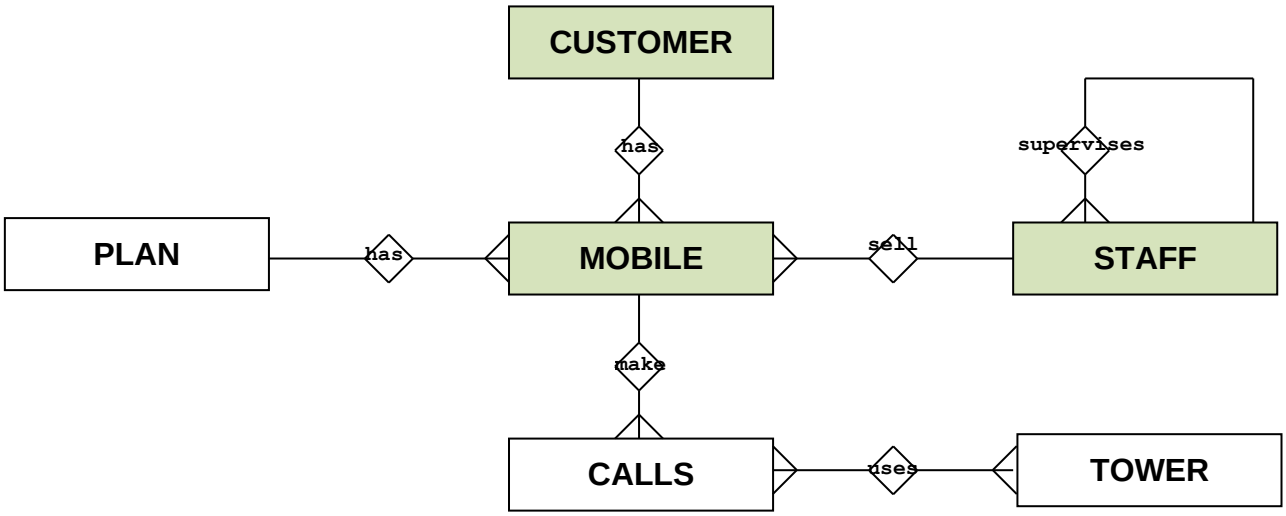
- Details about customers, including billing address. Calls made by customers, including date and time of call, duration of call and number called.
- The customer's mobile phone number and mobile phone plan. Corporate customers purchase more than one mobile phone for employees.
- Report on customer calls for a particular month, showing peak and off peak calls made.
- Mobile phone network usage report over a 24 hour day, to help plan special deals.
- Each mobile phone plan sold may also include specific extras, like call waiting, call diversion, voice mail…etc.
- A job needs to be schedule to create customer bills on a monthly basis.

The focus of this database is on the core business data, i.e. the mobile phone customers and the recording of the services provided to them. As the business sells only Telstra mobile phones, some of the data for the tables will be provided by Telstra and imported directly into the database (eg: Connect & Calls). Other tables will be managed by the business (eg: Customer & Staff).

Relational Model

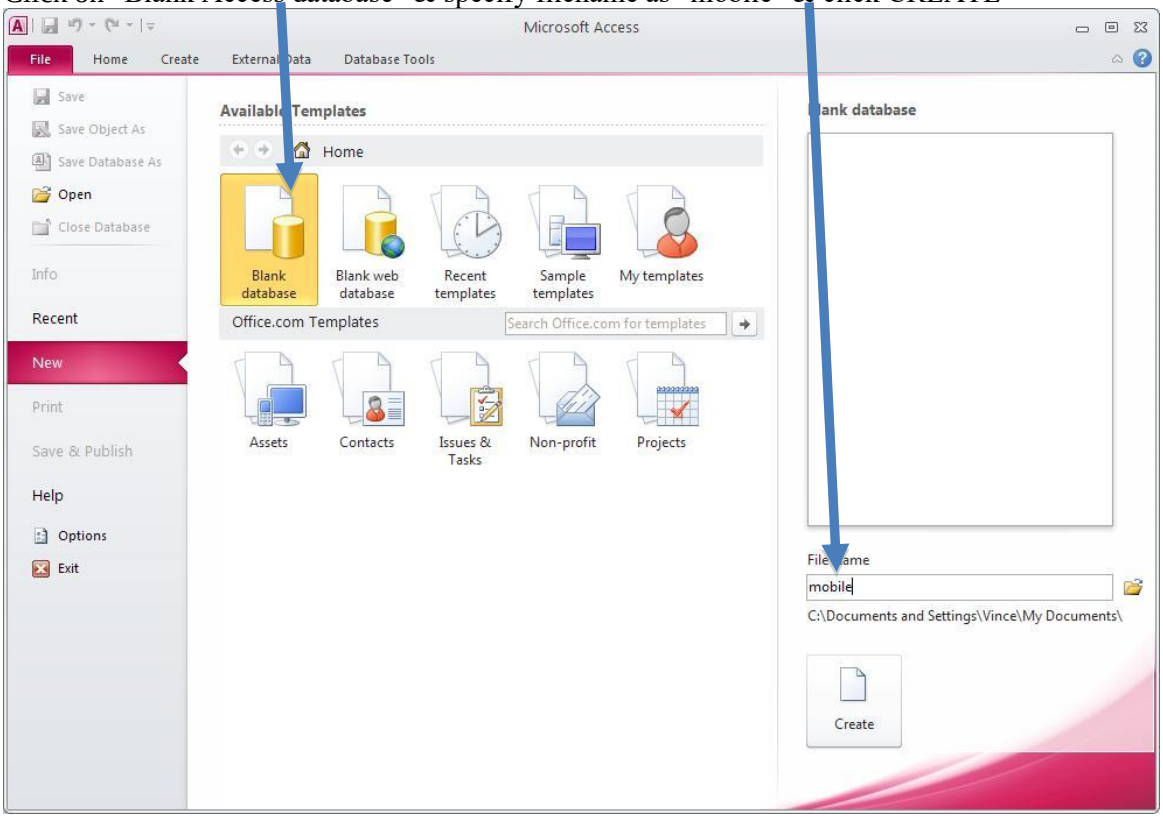
CUSTOMER	CALLS	MOBILE	STAFF	TOWER	CONNECT
CustomerID	CallsID	MobileID	StaffID	TowerID	ConnectID
Surname	MobileID	PhoneNumber	Surname	Location	TowerID
Given	PhoneNumber	BrandName	Given	Bandwidth	CallsID
Dob	CallDate	Joined	Sex	MaxConn	
Sex	CallTime	Cancelled	Joined		
PhoneHome	CallDuration	PlanName	Resigned		
PhoneWork		PhoneColour	Address		PLAN
PhoneFax		CustomerID	Suburb		PlanName
Address		StaffID	Postcode		ConnectFee
Suburb			Phone		PeakFee
State			SupervisorID		OffPeakFee
Postcode			Commission		WeekendFee
			RatePerHour		

Entity-Relationship Diagram

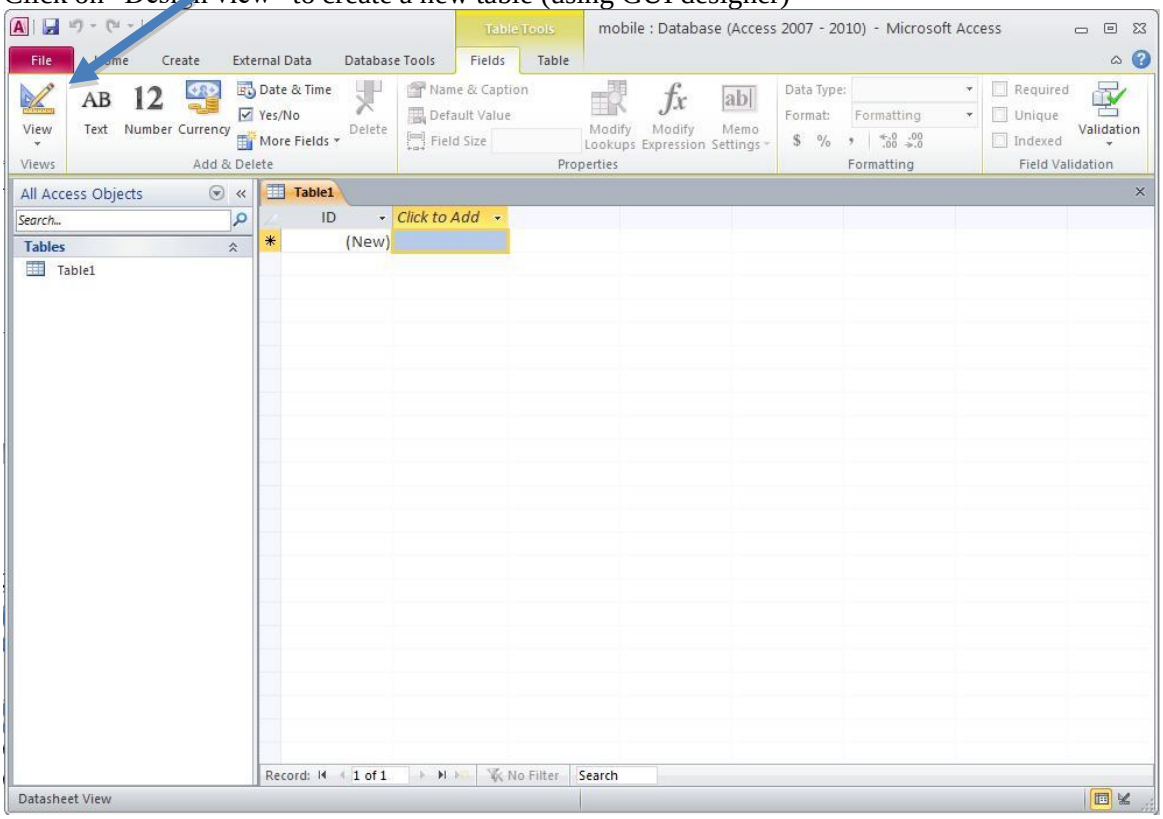


Exercise – create my first database

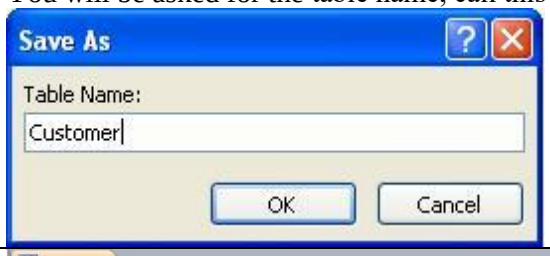
This tutorial will provide a quick overview of the various aspects of this course. We will use a very basic database environment, Microsoft Access, which will be used in other courses, but once in this course. It will provide familiarisation with database lingo and various database concepts that will be discussed during the semester. Only the "CUSTOMER", "MOBILE" and "STAFF" table will be setup in this tutorial.

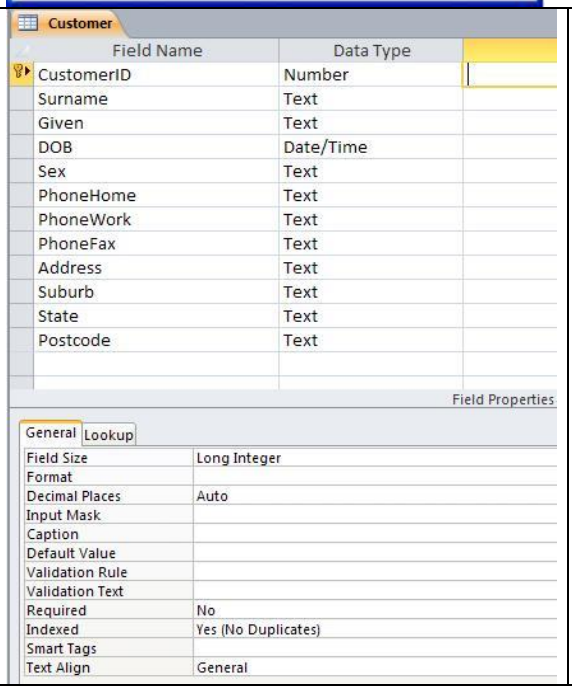
1.	Find and Start Microsoft Access from the program files menu on START menu.
2.	Click on "Blank Access database" & specify filename as "mobile" & click CREATE 

3. Click on “Design view” to create a new table (using GUI designer)



4. You will be asked for the table name, call this table “Customer”



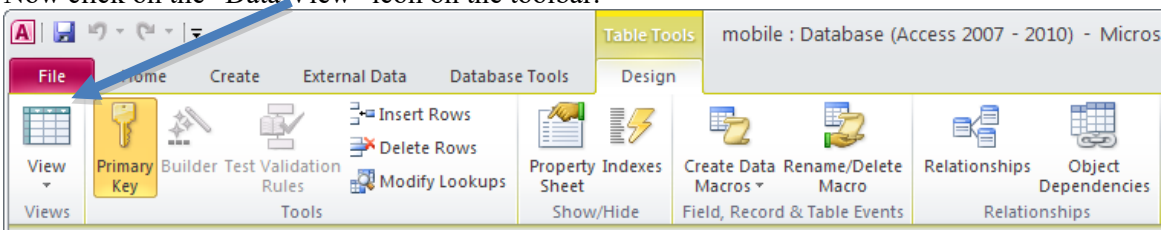
5. 

Specify the following fields for this table:

Field name	type	size
customerID	Number	
surname	Text	40
given	Text	40
dob	Date	
sex	Text	1
phoneHome	Text	20
phoneWork	Text	20
phoneFax	Text	20
address	Text	100
suburb	Text	20
state	Text	3
postcode	Text	5

6. The "CustomerID" field should have a key in the left column. This signifies a primary key field. If it does not have , then click on CustomerID row and click the key button on toolbar, this makes the CustomerID field the primary key for this table.

7. Now click on the "Data View" icon on the toolbar.

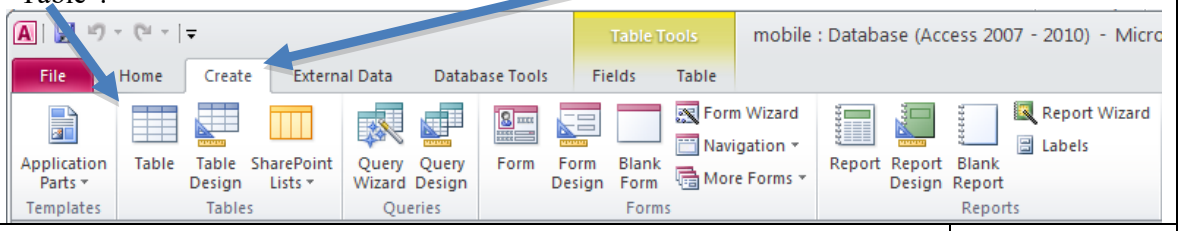


8. Insert the data shown above into the "Customer" table (leave other fields NULL).

Customer

CustomerID	Surname	Given	DOB	Sex	PhoneHome	PhoneWork	PhoneFax
20002	RAJOO	THINH MINH	31/05/1938	M	7842728	8251837	6955849
20004	PHONG	JERZY MIROSLAW	30/09/1951	M	3193758	7605475	4712175
20006	CHOW	SOW LIM	23/01/1943	F	2982091	8987299	3858354
*							

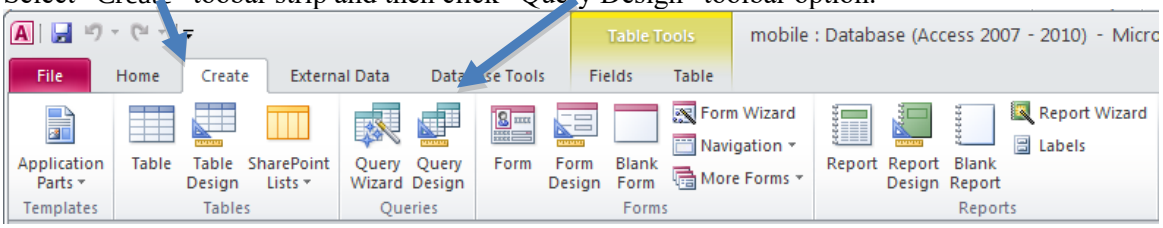
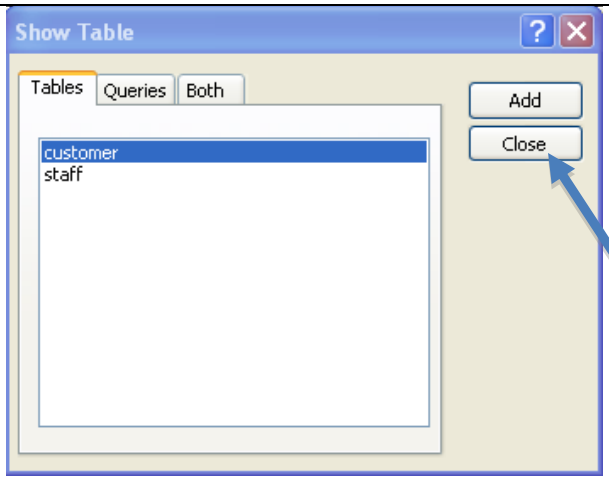
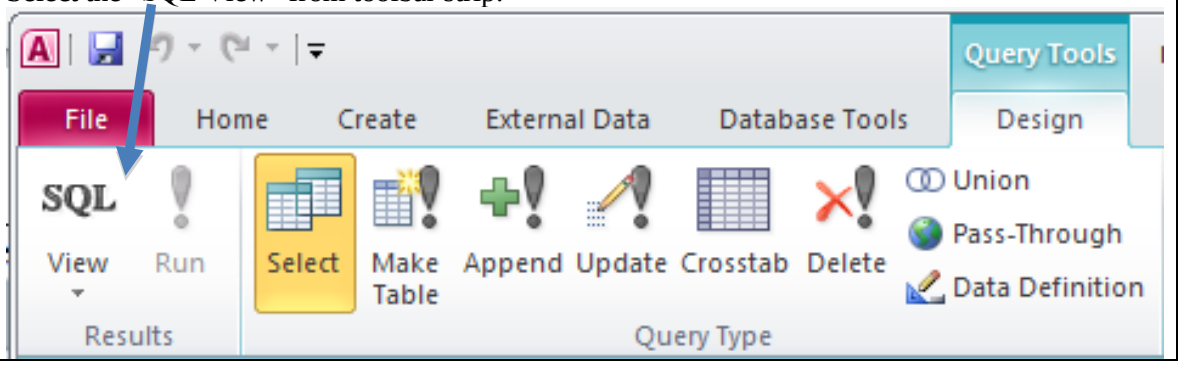
9. Let's create another table called "Staff", by Clicking on the "Create" toolbar strip and then click "Table".



10. Create a new table called "Staff" (using "Design View" done in steps 3-8)

Use Steps 3-8

Field name	type	size
StaffID	autoNumber	
Surname	Text	40
Given	Text	40
Joined	Date	
Resigned	Date	
Commission	Number	
SupervisorID	Number	

11.	Put the following data into this new table: Customer Staff StaffID Surname Given Joined Resigned Commissior SupervisorID 1 HOLDEN HARRY 18/07/1991 15 2 FORD FRED 2/03/1999 10 1 3 FLINSTONE WILMA 29/11/1992 12 1 4 WAYNE BRUCE 3/09/1993 8 1 5 NEWTON ISAAC 13/05/1992 14 1 6 MERCEDES PAUL 1/03/1994 6/05/1994 7 2 7 COOK JAMES 7/02/1992 14/09/1993 11 2 8 KENT CLARKE 18/01/1992 5 1 9 COOL JOE 17/03/1992 10 2 10 ROCKFORD PETER 21/08/1992 12 1 (New)	
12.	Need to create one more table "mobile" BUT we will do this one without using the nice GRAPHICAL front end provided by Access (like in previous examples). We will write an SQL statement to create this table.	
13.	Select "Create" toobar strip and then click "Query Design" toolbar option. 	
14.	 Hit the "Close" button.	
15.	Select the "SQL View" from toolbar strip. 	

16. Customer | Staff | Query1

```
create table mobile
(
MobileID        int not null primary key,
PhoneNumber     varchar(20),
BrandName       varchar(40),
Joined          date,
Cancelled       date,
PlanName        varchar(20),
PhoneColour     varchar(20),
CustomerID      int,
StaffID         int
);
```

Type in the following query into the empty SQL query form (as shown on left):

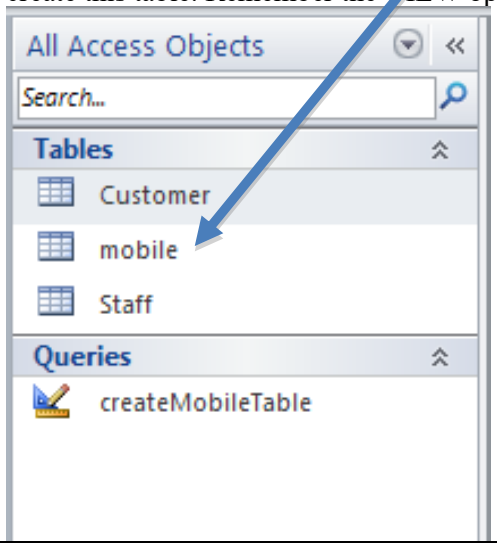
```
create table mobile
(
    MobileID        int not null primary key,
    PhoneNumber     varchar(20),
    BrandName       varchar(40),
    Joined          date,
    Cancelled       date,
    PlanName        varchar(20),
    PhoneColour     varchar(20),
    CustomerID      int,
    StaffID         int
);
```

Note: no comma at the end of last field, i.e. StaffID

17. Execute this query by clicking the  RUN button on the toolbar

18. Close this window (by click the X on the query window – top left) and save query with the name "createMobileTable"

19. Checkout this new table "mobile"… double-click on the new table "mobile" and then click the "Design View" and checkout the field definitions, they match the SQL query that you wrote to create this table. Remember the VIEW options are under the "Home" toolbar strip.

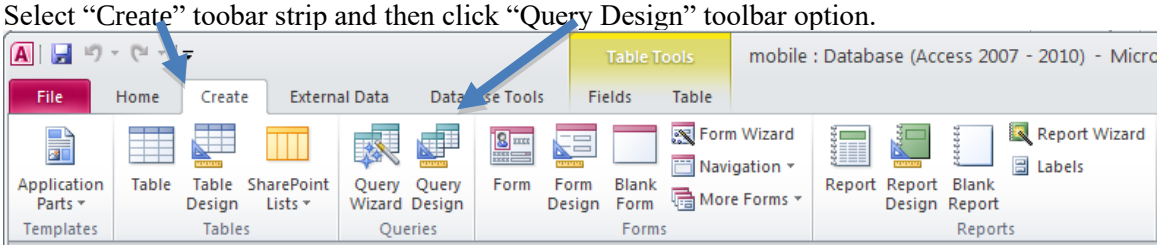
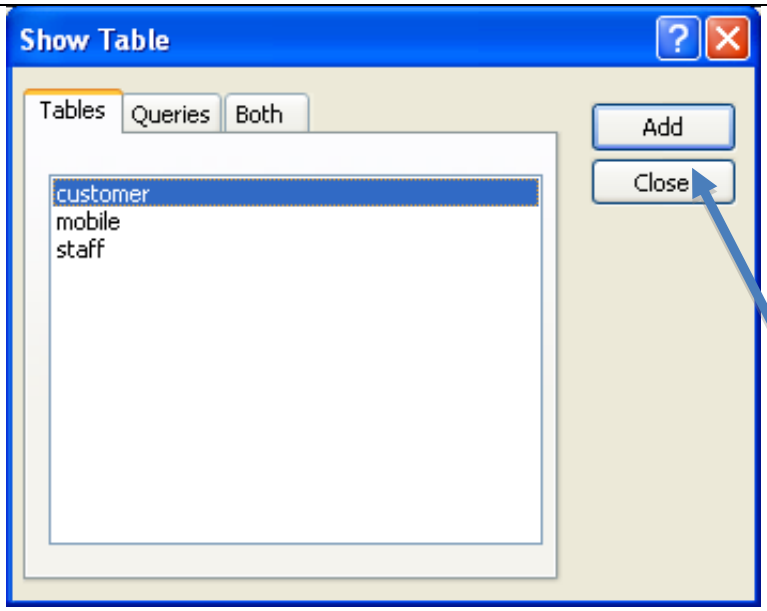


20. Click on the "Data View" toolbar option for the "mobile" table to insert records. Insert the following:

Customer | Staff | mobile

MobileID	PhoneNumb	BrandNan	Joined	Cancelled	PlanName	PhoneColou	CustomerID	StaffID
1	040123342	Nokia	4/01/2008		W10	Blue	20002	5
2	041288382	Motorola	5/01/2008		W40	Pink	20004	4
3	031288484	Nokia	5/01/2008		W10	Black	20002	5
*								

NOTE: Not all the tables have been created and populated in this tutorial.

21.	Finally let us write some simple SQL query; Select “Create” toobar strip and then click “Query Design” toolbar option. 
22.	 Hit the “Close” button.
23.	Select the “SQL View” from toolbar. 
24.	Type in and execute (by clicking the  button on the toolbar) the following queries, ONE at a TIME, you can save these queries if you want!
25.	List all the “Female” mobile phone customers, show the surname and given name only:
	SELECT surname, given **FROM customer** **WHERE sex = 'F'**
	Result:

26.	Show all the staff that earn more than 12% commission:
	SELECT * FROM staff WHERE commission > 12;
	Result:
27.	How many staff does Fred and Harry supervise:
	SELECT supervisorid, count(*) FROM staff GROUP BY supervisorid;
	Result:
28.	List all the customer who have a mobile phone, showing the name of the customer and their mobile phone number:
	SELECT surname, given, phoneNumber FROM customer INNER JOIN mobile ON customer.customerID = mobile.customerID;
	Result:

Summary

This tutorial has provided an overview of the various core components of a database, and an insight into what we will be focusing on this semester. There are various terms and concepts that have been presented and will be covered more thoroughly during the semester. Understanding these terms and concepts are key aspects in being able to effectively communicate these ideas within an ICT project with other ICT professionals.

- Database Structure
  - Table
  - Record
  - Field
- SQL Query
  - CREATE TABLE
  - SELECT … FROM … WHERE
- Data Model
  - ER Diagram
  - Relational Model
  - Business Rules and Assumptions

What to do Next….

Do **Part B** of tutorial 1 – "SQL Primer". This will get you connected to the database server we have setup to use for this course.