Swinburne University of Technology

TAFE

Certificate in Dynamic Website Design

CITP0102M

Build a Database

Database Design Notes
An Introduction to Access for Multimedia Programming

These notes are a brief introduction to Microsoft Access. They are designed to develop a level of understanding sufficient to use an Access database.

These notes assume the user is familiar with at least one Microsoft software product.

1. What is a database and how is it structured?

A database could be viewed as a systematically organized collection of related data that allows specific data to be easily added, deleted, altered, and retrieved.

The older “paper-based” databases like doctor’s records, the telephone book, and sales catalogues have been replaced (or can be) by software termed “Database Management Systems” or DBMS. These not only allow the same processes as a paper based database, but also allow the user to create databases from scratch, add, remove, and edit data, view the data, retrieve specific pieces of data, and display and print out specific data, without the cumbersome drawbacks of paper based record keeping. A DBMS can even be “automated”, to some extent, allowing for businesses to produce a database that can be tailored to their specific needs and modes of operation, and that minimizes the chance of data being “damaged” by the user.

Most commonly such databases are not just one big collection of data. They would contain data that is organized into separate tables, each of which stores the data on a specific aspect of the database. To connect the tables to one another, a common area of data links each pair of tables.

This structure has been devised to minimize the amount of data that needs to be entered into a database, or added when editing or modifying. It also enables the more efficient retrieval of data. It is known as a Relational Database System. Clearly such a system has a number of advantages over the older “paper-based” systems in terms of speed, storage capacity, ease of updating, and the ease and speed of access to needed data.

Database Terminology

Think of a sales catalogue for a moment, and how an organization might run a mail order service for selling catalogue items. The organization’s database could have three tables. One table listing each catalogue item and its size, weight and price, one table listing each customer and their relevant details, and one table recording each sale which uses some customer data and some catalogue item data from the other two tables.

The table for customers would consist of rows of customer names, addresses, telephone numbers and so on. The columns would be headed as first name, surname, street, suburb, postcode, and so on.

The sales items table would consist of rows of item names, descriptions, size, weight, price, availability with appropriate column headings.
The sales table would contain a reference to the customer, say a customer number, some reference to the required catalogue item, say an item number and some sales data like the number of items, total cost and delivery details. It thus “connects” the other two tables together, relating each customer with their purchase items.

Formally each column is referred to as a field, as the column contains the same data (e.g. Postcode) for each row in the table. The rows are called records as they represent data for all the fields for that entry. A collection of records is called a table. A collection of tables is called a database.

<table>
<thead>
<tr>
<th>Surname</th>
<th>First Name</th>
<th>Suburb</th>
<th>Postcode</th>
<th>Phone No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smith</td>
<td>John</td>
<td>Mentone</td>
<td>8976</td>
<td>9876 6543</td>
</tr>
<tr>
<td>Jones</td>
<td>Barry</td>
<td>Greensborough</td>
<td>1234</td>
<td>7654 6789</td>
</tr>
<tr>
<td>Stone</td>
<td>Nick</td>
<td>Brunswick</td>
<td>5432</td>
<td>7896 4532</td>
</tr>
<tr>
<td>Brown</td>
<td>Nigel</td>
<td>Upwey</td>
<td>9865</td>
<td>2345 6789</td>
</tr>
</tbody>
</table>

So, in summary, the information entered into a database is called **data**. Each table column is called a **field**, and each table row a **record**. A set of records makes up a **table** and a number of **related tables** make up a database. In Microsoft Access, there are not only **fields**, **records** and **tables**, but **queries** – a way of retrieving specific data, **reports** - a way of printing out formatted data, **forms** – a way of usefully presenting the data in a table for inputting and viewing data, and **macros** and **modules**, of which we have no immediate use.

For Access then a **database** consists of a set of related **tables**, **queries**, **reports**, **forms**, **macros** and **modules**. This list, together with **pages**, constitutes the list of Access Database Objects.

### Designing a Database

There are numerous books on this topic. We will only briefly touch on it, as we have no direct interest in it, at this time. As in many designing, building or constructing processes, there are a number of recognized steps in designing a database. A simple five-step process might consist of:

1. Clarify and analyze the problem.
2. Establish all the required fields of data.
3. Establish the number and structure of the tables required.
4. Establish primary keys and relate the tables as required.
5. Check that the database meets the original specifications.

As we work through the various topics in this course we will do so by constructing a database about a TAFE College. Assume that the design process has been completed and the given database structure is a reasonable one.
The database will have three tables, tblTeachers, tblDepartment and tblSubjects. The three-character prefix is an established convention. The three tables will contain the fields listed below:

**tblTeacher**
- Name
- Address
- Home Phone
- Mobile Phone
- Position Title
- Employment Basis
- Time Fraction
- Nominal Hours
- Pay Rate
- Department
- Campus

**tblDepartment**
- Department Name
- Head
- Department Phone
- Department Fax

**tblSubject**
- Subject Name
- Subject Field
- Subject Hours
- Points
- Text
- Cost
- Assessment1
- Assessment2
- Assessment3
- Department
- Coordinator

Before we can move on to link our tables and start adding data, there are a few points we need to cover. Every table needs a field, which has a unique value for every record. This field/s is called the **primary key** field/s. So even if we have two subjects, with the same name, hours, text, etc, we can distinguish them, by their value in at least one field. Sometimes a field suggests itself as the primary key. Department Name for instance seems a good candidate in tblDepartment. However we might need 4 or 5 fields in tblTeacher to be able to distinguish between two teachers with the same name, same position title, employment basis, pay rate and so on. Hence some tables have multiple field primary keys.

One way around this problem of multiple field primary keys is to give a number, or code of some sort, to each record in a table. Adding a “Counter” field to an access database table is popular, as is inventing some sort of code for staff members (staff code), subjects (subject code) or students (student number). We will adopt this latter approach for this database.

So our final version of the three tables will be:

**tblTeacher**
- Teacher ID
- Name
- Address
- Home Phone
- Mobile Phone
- Position Title
- Employment Basis
- Time Fraction
- Nominal Hours
- Pay Rate
- Department
- Campus

**tblDepartment**
- Department Code
- Department Name
- Head
- Department Phone
- Department Fax

**tblSubject**
- Subject Code
- Subject Name
- Subject Field
- Subject Hours
- Points
- Text
- Cost
- Assessment1
- Assessment2
- Assessment3
- Department
- Coordinator
The underlined fields are the primary key fields for each table. You can see that the Department Code field links tblTeacher, tblDepartment and tblSubject.

**Relationships between Tables**

To cut a long story short, it makes sense to say that each Department has many teachers, so the relationship between tblDepartment and tblTeacher will be described as One To Many. Similarly, as each Department has many Subjects, the relationship between tblDepartment and tblSubject will also be described as One To Many. Other relationships such as, One To One, Many To Many and Many to One are also possible. So, finally we can draw up a picture of our database, its tables, fields and relationships.

<table>
<thead>
<tr>
<th>tblTeacher</th>
<th>tblDepartment</th>
<th>tblSubject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher ID</td>
<td>Department Code</td>
<td>Subject Code</td>
</tr>
<tr>
<td>Name</td>
<td>Department Name</td>
<td>Subject Name</td>
</tr>
<tr>
<td>Address</td>
<td>Head</td>
<td>Subject Field</td>
</tr>
<tr>
<td>Home Phone</td>
<td>Department Phone</td>
<td>Subject Hours</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>Department Fax</td>
<td>Points</td>
</tr>
<tr>
<td>Position Title</td>
<td></td>
<td>Text</td>
</tr>
<tr>
<td>Employment Basis</td>
<td></td>
<td>Cost</td>
</tr>
<tr>
<td>Time Fraction</td>
<td></td>
<td>Assessment1</td>
</tr>
<tr>
<td>Nominal Hours</td>
<td></td>
<td>Assessment2</td>
</tr>
<tr>
<td>Pay Rate</td>
<td></td>
<td>Assessment3</td>
</tr>
<tr>
<td>Department Code</td>
<td></td>
<td>Department Code</td>
</tr>
<tr>
<td>Campus</td>
<td></td>
<td>Coordinator</td>
</tr>
</tbody>
</table>

tblTeacher is a table of teacher data. It has TeacherID as its primary key, and is related to tblDepartment, in a Many To One relationship, via the Department Code field. TblDepartment is a table of departmental data, and is related to both tblTeacher and tblSubject, in One To Many relationships, via the Department Code field. TblSubject is a table of subject data, and is related to tblDepartment, in a Many To One relationship, via the Department Code field.

Let’s call the Database SuperTafe. That is SuperTafe.mdb in Access.

2. **Constructing SuperTafe in Access**

We will use the database we developed in section 1 – SuperTafe – to work through the table construction, and data entry processes. It is extremely important that you enter the data accurately. Whichever way you type in a word the first time, you must continue to type it in, in exactly the same way each subsequent time. To type in inconsistent spellings will have you searching through the tables, at a later stage, looking for the different spelling. This is generally considered not to be much fun.

Start up Access and create a new database. Call it SuperTafe(.mdb)

We will create the three tables. Double click on “Create table in Design View”.

Firstly we will create the Department table,
The field names can be obtained from the lists above. The five fields are all of type Text, and both Department Code and Department Name require a Validation Rule and Validation Text to restrict what can be entered as valid data. These are entered in the Field Properties Window below the field list.

**Department Code:**
Validation Rule: In("STDMA","STDCO","STDEC","STDHO","STDEN","STDPH")
Validation Text: Must be one of STDMA, STDCO, STDEC, STDHO, STDEN or STDPH.

**Department Name:**
Validation Text: Must be one of Mathematics, Computing, Economics, Hospitality, Engineering or Philosophy.

Field sizes are 6, 20, 25, 10 and 10 respectively. Make Department Code the Primary Key, by highlighting that field in the Design View, and clicking on the key in the Toolbar. A key will appear beside the field name, Department Code. Now save the table as tblDepartment and close it.

Enter the following data in tblDepartment. When entering data you are viewing the table in the datasheet view.

<table>
<thead>
<tr>
<th>Department Code</th>
<th>Department Name</th>
<th>First Name</th>
<th>Last Name</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>STDMA</td>
<td>Mathematics</td>
<td>Ada Lovelace</td>
<td>9000 1234</td>
<td>9000 1235</td>
</tr>
<tr>
<td>STDCO</td>
<td>Computing</td>
<td>Elle Gorythm</td>
<td>9000 1244</td>
<td>9000 1245</td>
</tr>
<tr>
<td>STDEC</td>
<td>Economics</td>
<td>Marg Roofer</td>
<td>9000 1254</td>
<td>9000 1255</td>
</tr>
<tr>
<td>STDHO</td>
<td>Hospitality</td>
<td>Basil Faulty</td>
<td>9000 1264</td>
<td>9000 1265</td>
</tr>
<tr>
<td>STDEN</td>
<td>Engineering</td>
<td>John Peacock</td>
<td>9000 1274</td>
<td>9000 1275</td>
</tr>
<tr>
<td>STDPH</td>
<td>Philosophy</td>
<td>Ludwig Wittgenstein</td>
<td>9000 1284</td>
<td>9000 1285</td>
</tr>
</tbody>
</table>

Save the table again.
Now for the teacher table –

**tblTeacher**

All the field names are provided above. All are of type Text except for Time Fraction, Nominal Hours and Pay Rate. Teacher ID is the primary key.

**Position Title:**
Default: Tutor
Validation Rule and Text - one of Tutor, Teacher, Advanced Teacher, Demonstrator & Text.

**Employment Basis:**
Default: On Going
Validation Rule and Text - one of On Going, Part Time or Sessional.

**Time Fraction:**
Number
Default value: 0
Validation Rule <= 1 and Text,
Field Size – Single.

**Nominal Hours:**
Long Integer
Default Value 0
Validation Rule and Text: < 41 plus

**Pay Rate:**
Currency
Default Value: 0.

**Department Code:**
Must be one of the listed codes.
Use Lookup as well.

**Campus:**
Must be one of Seasprout, Highmount, Bedlam and Lakeside.
Use Lookup as well.

**To use Lookup:**
Go to required field in Design View and click in Data Type Column.
From the Drop down list select Lookup Wizard
Click on “I will type in the values I want”
Key in required stuff
Click Finish
Save table

Save tblTeacher.
**Enter the following data in tblTeacher.**

<table>
<thead>
<tr>
<th>Name</th>
<th>School</th>
<th>Position</th>
<th>Address</th>
<th>Phone</th>
<th>Contact</th>
<th>Email</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lois Kent</td>
<td>TPH01</td>
<td>Advanced Teacher</td>
<td>908 Nietsche Close Altona</td>
<td>041 678 976</td>
<td>9101 2134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilbur Likeness</td>
<td>TPH02</td>
<td>Advanced Teacher</td>
<td>966 Evil Avenue Bacchus Marsh</td>
<td>041 863 777</td>
<td>9101 2134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stavros Patollos</td>
<td>TPH03</td>
<td>Advanced Teacher</td>
<td>1 Appain Way Resevoir</td>
<td>041 001 990</td>
<td>9009 9009</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grace O'Farnery</td>
<td>TPH04</td>
<td>Advanced Teacher</td>
<td>79 Vision View Victoria</td>
<td>041 000 111</td>
<td>9101 1010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tathiana Tideman</td>
<td>TPH05</td>
<td>Advanced Teacher</td>
<td>31 Weekly Way Sunshine</td>
<td>041 123 123</td>
<td>9999 1111</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brian Clapham</td>
<td>TPH06</td>
<td>Advanced Teacher</td>
<td>65 Old Street Geelong</td>
<td>041 760 098</td>
<td>9090 1234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alain Lieven</td>
<td>TPH07</td>
<td>Advanced Teacher</td>
<td>21 Years Rd Bulla</td>
<td>041 098 765</td>
<td>9543 1234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary Slaughter</td>
<td>TPH08</td>
<td>Advanced Teacher</td>
<td>303 Beauty Place Somerton</td>
<td>041 003 008</td>
<td>9069 6096</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joan Jones</td>
<td>TPH09</td>
<td>Advanced Teacher</td>
<td>101 Ryan Rd Eltham</td>
<td>041 912 219</td>
<td>9765 3214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Julia Pace</td>
<td>TPH10</td>
<td>Advanced Teacher</td>
<td>100 Bent St Vermont</td>
<td>041 765 123</td>
<td>9333 4444</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mary Chilton</td>
<td>TPH11</td>
<td>Advanced Teacher</td>
<td>87 Red Rd Ivanhoe</td>
<td>041 710 765</td>
<td>9654 3606</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petr Lebeau</td>
<td>TPH12</td>
<td>Advanced Teacher</td>
<td>12 Smith St Brighton</td>
<td>041 090 080</td>
<td>9080 8090</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elle Phant</td>
<td>TPH13</td>
<td>Advanced Teacher</td>
<td>87 Walk Way Walkerville</td>
<td>041 001 002</td>
<td>90101 9876</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jon Fourier</td>
<td>TPH14</td>
<td>Advanced Teacher</td>
<td>21 Yea Rd Yarram</td>
<td>041 001 001</td>
<td>9101 1010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jessica Advocato</td>
<td>TPH15</td>
<td>Advanced Teacher</td>
<td>99 Long St Nunawading</td>
<td>041 710 765</td>
<td>9654 3606</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anthony Gangly</td>
<td>TPH16</td>
<td>Advanced Teacher</td>
<td>21 Wobbly Rd Wulgulmerang</td>
<td>041 760 098</td>
<td>9090 1234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kathleen Youndhushi</td>
<td>TPH17</td>
<td>Advanced Teacher</td>
<td>45 Oak Street Geelong</td>
<td>041 760 098</td>
<td>9090 1234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maria Mafi</td>
<td>TPH18</td>
<td>Advanced Teacher</td>
<td>21 Years Rd Bulla</td>
<td>041 760 098</td>
<td>9090 1234</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lamin Seafool</td>
<td>TPH19</td>
<td>Advanced Teacher</td>
<td>21 Years Rd Bulla</td>
<td>041 760 098</td>
<td>9090 1234</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(End of data entry.)
Now for the subject table –

**tblSubject.**

Field list is as above. All fields are Text except for Subject Hours, Points, and Cost. Subject Code is the primary key.

**Subject Field:**
Must be one of Mathematics, Computing Economics, Hospitality, Engineering or Philosophy. Use Validation.

**Subject Hours:**
Long Integer. Default Value 20, Validation <=120.

**Points:**
Long Integer. Default 0, One point per 10 hours.

**Assessment1, 2,3:**
Must be one of Written Assignment, Practical Assignment, Examination or Oral Exam. Use Lookup.

**Department Code:**
Must be one of the Departments from the Department table. Use Lookup.

**Coordinator:**
Allow zero length.

Save tblSubject.
<table>
<thead>
<tr>
<th>Subject</th>
<th>Type</th>
<th>Code</th>
<th>Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>tblSubject 1</td>
<td>Written Assignment</td>
<td>001</td>
<td>1,2,3,...And the Rest.</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 2</td>
<td>Written Assignment</td>
<td>002</td>
<td>Basic Maths</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 3</td>
<td>Written Assignment</td>
<td>003</td>
<td>Basic Statistics</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 4</td>
<td>Written Assignment</td>
<td>004</td>
<td>Business Ethics – Myth or Reality</td>
<td>20</td>
</tr>
<tr>
<td>tblSubject 5</td>
<td>Written Assignment</td>
<td>005</td>
<td>Economic Sanity and Rational Insanity</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 6</td>
<td>Written Assignment</td>
<td>006</td>
<td>Economic Rationalism – Oxymoron ?</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 7</td>
<td>Written Assignment</td>
<td>007</td>
<td>The Marx Engel's Reader</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 8</td>
<td>Written Assignment</td>
<td>008</td>
<td>The Meaning of Life</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 9</td>
<td>Written Assignment</td>
<td>009</td>
<td>The Meaning of Meaning</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 10</td>
<td>Written Assignment</td>
<td>010</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 11</td>
<td>Written Assignment</td>
<td>011</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 12</td>
<td>Written Assignment</td>
<td>012</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 13</td>
<td>Written Assignment</td>
<td>013</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 14</td>
<td>Written Assignment</td>
<td>014</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 15</td>
<td>Written Assignment</td>
<td>015</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 16</td>
<td>Written Assignment</td>
<td>016</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 17</td>
<td>Written Assignment</td>
<td>017</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 18</td>
<td>Written Assignment</td>
<td>018</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 19</td>
<td>Written Assignment</td>
<td>019</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 20</td>
<td>Written Assignment</td>
<td>020</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 21</td>
<td>Written Assignment</td>
<td>021</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 22</td>
<td>Written Assignment</td>
<td>022</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 23</td>
<td>Written Assignment</td>
<td>023</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 24</td>
<td>Written Assignment</td>
<td>024</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 25</td>
<td>Written Assignment</td>
<td>025</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 26</td>
<td>Written Assignment</td>
<td>026</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 27</td>
<td>Written Assignment</td>
<td>027</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 28</td>
<td>Written Assignment</td>
<td>028</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 29</td>
<td>Written Assignment</td>
<td>029</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 30</td>
<td>Written Assignment</td>
<td>030</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 31</td>
<td>Written Assignment</td>
<td>031</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 32</td>
<td>Written Assignment</td>
<td>032</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 33</td>
<td>Written Assignment</td>
<td>033</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 34</td>
<td>Written Assignment</td>
<td>034</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 35</td>
<td>Written Assignment</td>
<td>035</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 36</td>
<td>Written Assignment</td>
<td>036</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 37</td>
<td>Written Assignment</td>
<td>037</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 38</td>
<td>Written Assignment</td>
<td>038</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 39</td>
<td>Written Assignment</td>
<td>039</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 40</td>
<td>Written Assignment</td>
<td>040</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 41</td>
<td>Written Assignment</td>
<td>041</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 42</td>
<td>Written Assignment</td>
<td>042</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 43</td>
<td>Written Assignment</td>
<td>043</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 44</td>
<td>Written Assignment</td>
<td>044</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 45</td>
<td>Written Assignment</td>
<td>045</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 46</td>
<td>Written Assignment</td>
<td>046</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 47</td>
<td>Written Assignment</td>
<td>047</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 48</td>
<td>Written Assignment</td>
<td>048</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 49</td>
<td>Written Assignment</td>
<td>049</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 50</td>
<td>Written Assignment</td>
<td>050</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 51</td>
<td>Written Assignment</td>
<td>051</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 52</td>
<td>Written Assignment</td>
<td>052</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 53</td>
<td>Written Assignment</td>
<td>053</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 54</td>
<td>Written Assignment</td>
<td>054</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 55</td>
<td>Written Assignment</td>
<td>055</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 56</td>
<td>Written Assignment</td>
<td>056</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 57</td>
<td>Written Assignment</td>
<td>057</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 58</td>
<td>Written Assignment</td>
<td>058</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 59</td>
<td>Written Assignment</td>
<td>059</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 60</td>
<td>Written Assignment</td>
<td>060</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 61</td>
<td>Written Assignment</td>
<td>061</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 62</td>
<td>Written Assignment</td>
<td>062</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 63</td>
<td>Written Assignment</td>
<td>063</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 64</td>
<td>Written Assignment</td>
<td>064</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 65</td>
<td>Written Assignment</td>
<td>065</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 66</td>
<td>Written Assignment</td>
<td>066</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 67</td>
<td>Written Assignment</td>
<td>067</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 68</td>
<td>Written Assignment</td>
<td>068</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 69</td>
<td>Written Assignment</td>
<td>069</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 70</td>
<td>Written Assignment</td>
<td>070</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 71</td>
<td>Written Assignment</td>
<td>071</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 72</td>
<td>Written Assignment</td>
<td>072</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 73</td>
<td>Written Assignment</td>
<td>073</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 74</td>
<td>Written Assignment</td>
<td>074</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 75</td>
<td>Written Assignment</td>
<td>075</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 76</td>
<td>Written Assignment</td>
<td>076</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 77</td>
<td>Written Assignment</td>
<td>077</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 78</td>
<td>Written Assignment</td>
<td>078</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 79</td>
<td>Written Assignment</td>
<td>079</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 80</td>
<td>Written Assignment</td>
<td>080</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 81</td>
<td>Written Assignment</td>
<td>081</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 82</td>
<td>Written Assignment</td>
<td>082</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 83</td>
<td>Written Assignment</td>
<td>083</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 84</td>
<td>Written Assignment</td>
<td>084</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 85</td>
<td>Written Assignment</td>
<td>085</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 86</td>
<td>Written Assignment</td>
<td>086</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 87</td>
<td>Written Assignment</td>
<td>087</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 88</td>
<td>Written Assignment</td>
<td>088</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 89</td>
<td>Written Assignment</td>
<td>089</td>
<td>Modern Systems Theory</td>
<td>8</td>
</tr>
<tr>
<td>tblSubject 90</td>
<td>Written Assignment</td>
<td>090</td>
<td>Bridges</td>
<td>3</td>
</tr>
<tr>
<td>tblSubject 91</td>
<td>Written Assignment</td>
<td>091</td>
<td>Food handling standards</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 92</td>
<td>Written Assignment</td>
<td>092</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 93</td>
<td>Written Assignment</td>
<td>093</td>
<td>The Health Act 2001</td>
<td>40</td>
</tr>
<tr>
<td>tblSubject 94</td>
<td>Written Assignment</td>
<td>094</td>
<td>The New Economy: Zero Growth</td>
<td>6</td>
</tr>
<tr>
<td>tblSubject 95</td>
<td>Written Assignment</td>
<td>095</td>
<td>The New Tax Steal</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 96</td>
<td>Written Assignment</td>
<td>096</td>
<td>The Wealth of Nations</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 97</td>
<td>Written Assignment</td>
<td>097</td>
<td>The Viscosity of common liquids</td>
<td>4</td>
</tr>
<tr>
<td>tblSubject 98</td>
<td>Written Assignment</td>
<td>098</td>
<td>Steady as she goes: Waiting Techniques</td>
<td>5</td>
</tr>
<tr>
<td>tblSubject 99</td>
<td>Written Assignment</td>
<td>099</td>
<td>The boxed Beer collection</td>
<td>1</td>
</tr>
<tr>
<td>tblSubject 100</td>
<td>Written Assignment</td>
<td>100</td>
<td>The Anarchist Cookbook</td>
<td>4</td>
</tr>
</tbody>
</table>
3. Linking Database Tables

At this stage we could leave the tables “unlinked”, or unrelated, and, in some ways, this would make it easier to edit and modify the database. We could edit or modify any table without reference to any other table. So, even though the same data about a teacher, subject or department was being changed on one table, it would remain “as it was” on other tables. While this makes changes easier, it is profoundly illogical, leading to conflicting, if not contradictory data, in the same database.

So, we will connect, or link, the tables now, ensuring that any change to data on one table, must be reflected in similar changes to the same data on other tables.

Given the brief discussion of linking above, we can now link the three tables in the database, as described there.

Select Tools, Relationships, from the menu bar, then add all three tables and close the Show Table dialog box. Drag the table boxes down until all fields are displaying and no scroll bars are present. Department Code happens to be a field common to all three tables, so we will use it to link the three tables. It is not always the case that all tables have one field in common. In most cases, each pair of tables share a common field, and linking is not based on one common field across all tables.

You should have the three tables displayed in a window. Make sure tblDepartment is the center table. Place the mouse on the Department Code field in tblSubject, hold down the LMB, and drag the icon for the field across to the Department Code field in tblDepartment. Let the mouse button go.

The Edit Relationships dialog box appears and you click on the Enforce Referential Integrity checkbox. Don’t worry about any other check boxes at this stage. Click on Create and the dialog box should disappear and a linking line will appear between the two tables. The tblSubject end will have a “8” near it, and the tblDepartment end will have a “1” near it. Repeat for the pair of tables, tblTeacher and tblDepartment. A similar line with a “1” and a “8” at either end should appear.

If it doesn’t work like this, and Access refuses to enforce referential integrity, then somewhere in your collection of data, is at least one inconsistency. You will need to resolve this to be able to move on. Access may suggest in which table/s the problem lies. It may even assist to print out the table/tables and start the search. Your teacher may be able to assist. **Do not move on until Referential Integrity can be enforced.**

Referential Integrity

Enforcing referential integrity assists in ensuring the consistency of the data in all tables. To enforce it, as I hope you have seen, we must have the linking fields containing the same type of data, each table having a primary key and all the tables must be related.
The effect of this process is to prevent you from deleting a record by mistake (or where the data is on another table as well), making inappropriate updates (altering data on one table, but not altering the same data on another), or adding “wrong” data. Generally speaking it is to prevent you creating data inconsistencies.

Relationships - other options

There are some other options in the “Edit Relationships” dialog box. The Relationship Type will list One To Many or One To One or whatever Access decides is being constructed. This should not be an issue, as the relationship types are obvious in this example.

Join Type can be used to affect the data displayed with related tables. Not of any importance to us.

Cascade Update Related Fields can be useful if you are say, wanting to change the Mathematics Department to the Mathematics and Statistics Department. Changing the name in the Department table – the “One” table - would then automatically change every use of it in the other two tables – the “Many” tables.

Cascade Delete Related Fields works similarly but has an obvious danger. If you deleted the Mathematics Department from the Department (“One” table), all related records would be deleted from the other two tables. A trifle dangerous. Use the Help facility or all of MSDN to find out more about the various options and their effect on the database.

Editing Data

In this section we will do a range of editing operations on the database. As I am assuming you have some knowledge of and, skill in using Microsoft software, I will not spell out in detail how to perform each operation.

Adding records to a table

Exercise

Add each of the Heads of Department to tblTeacher. You will have to create another Position Title, - Head of Department. The Employment Basis will be On Going, the Time Fraction 1.0, the Nominal Hours will be 40, the Pay Rate will be $100.00, and the campuses will be as follows:

Mathematics and Philosophy will be at Bedlam, Computing and Hospitality will be at Lakeside, Economics will be at Highmount and Engineering at Seasprout.

The other data is up to you, but make it consistent with what is already there.
Exercise

Each subject needs a co-coordinator, so we will add a Teacher ID to each subject in the “Coordinator” Field. There are 36 subjects and 32 teachers. With tblTeacher in Teacher ID order and tblSubject in Subject Code order. No Head of department co-ordinates a subject. In Computing, Engineering and Philosophy assign one subject, in turn from the subject table to the first two teachers. Then two subjects in sequence to the last two teachers. In Economics and Hospitality each teacher in turn is assigned one subject, in turn. Finally, in Mathematics neither tutor is assigned a subject to co-ordinate. Others have subjects assigned in table order. Add the appropriate teacher to the Coordinator field of tblSubject.

Find

While this can be useful facility to locate a particular piece of data, it is most often used in conjunction with Replace, so that specific pieces of data can be updated. For instance, finding a specific person, to update their contact details.

Replace

Highlight the Pay Rate column in the tblTeacher. Select Edit, Replace. You will note that the Replace dialog box has a number of options. Examine these to see that various ways in which you could achieve the above replacement. Select the correct ones for the task below.

The TAFE Teaching service has been awarded a well-earned 10% pay rise. You need to alter tblTeacher to reflect this. Using the Replace option replace each $50 with $55, each $60 with $66, each $75 with $82.50 and each $100 with $110. You will need to type in to the Replace dialog box, the exact “text” to be found and the exact “text” to be replaced. Save the database.

Sort

The data in each of the tables can be listed in a variety of ways or orders. Often it is just the order in which they have been entered or the order of the primary key field, especially if it is numeric. However, from time to time, it may be necessary to re-arrange the data in some other order. You could sort alphabetically for instance.

Exercise

Open SUPERTAFE and display any table. See if you can sort the data alphabetically on an appropriate field. Then try a numeric sort, but not on any code. Try a currency or other numeric field.
Deleting records

As staff and subjects come and go, it would seem sensible to be able to add and delete both. We have seen how to add records, only deletion remains. However, referential integrity requires us to make sure of certain things before we delete a record. If a teacher is used on the subject table as say the subject co-coordinator, then that record would have to have the teacher’s name removed before his record on the tblTeacher could be removed. Similarly, if it were decided to amalgamate two departments and then remove each of them from tblDepartment, before adding in the new Department, all references to them would need to be removed from tblTeacher and tblSubject first.

Removing a single record is however, very simple. Highlight the record in the table and press the Delete key. Access will prompt you to make sure that is what you want to do, then delete it. To delete multiple records use the Shift or Ctrl keys in the conventional manner.

Data protection

You can password protect your database in Access. Open Access but not any particular database. File, Open, and highlight the desired database. Select Open Exclusive from the drop down menu next to the Open button. The database will open. Select Tools, Security, Set Database Password. Key in your password twice as indicated. Click on OK. Close and open the database to check the working of your password. Oh, by the way, passwords are case sensitive. See if you can remove the password.

A principal method of protecting your database is to back up the database on a separate disk or computer. You should do that regularly.

4. Altering the Database Structure

Sometimes we forget aspects of the database, sometimes we use the wrong data type, and sometimes we receive additional information, but in all cases we need to change some aspect of the design of the database.

Some alterations are quite straightforward and can be readily carried out. Others however, have implications for the rest of the database and need to be carried out with caution. For instance, changing a data type might cause loss of data. Deleting a field might cause the loss of some required data. Changing a field name, that has been used in a query, might render the query senseless.

You have already added a field to a table, the Head of Department Position Title, which was not included in the original list. We simply added it to the Validation Rule, and Validation Text properties of the Position Title field. This was a simple example of structural alteration of a database.
Exercise

It would be nice to alter the Time Fraction field in tblTeacher so that it displays one decimal point. All our “1.0” are showing as “1”s. Is this possible? See if you can alter the number displayed to bring about this change.

Exercise

Delete Demonstrator, in the Position Title field of tblTeacher, as it is not used.

Adding a field to a table

Go to the design view for the tblDepartment and add a new field for Campus. Add a Lookup to enable a campus to be selected. See tblTeacher, or above, for each Head of Department's location.

Moving fields

Fields can be moved in either the Design or Datasheet view. If you want the move to be permanent, it makes sense to move it in Design view. Highlight the field you want to move, by clicking in the top of it, when the mouse pointer is a thick arrow. Hold down the LMB and move the field to the new location. Let go the mouse button. Save the altered table.

In tblTeacher, swap the locations of the two telephone fields.

Changing field names and data types

The field in tblTeacher, “Pay rate”, is not quite accurate. It really needs to be renamed to “Training Cost” as it is the charge that is made for the teacher undertaking non-timetabled teaching or training. Change this now!

Modifying field properties

Nominal Hours in tblTeacher is displaying two decimal places. As all figures in this field will always be whole numbers, alter the numerical data type so that no decimal places display.

Deleting a field

We don’t want to do this, though it might be nice to have only two assessment fields, so we won’t. However, as you can guess, a field is deleted in design view, by highlighting the field and then selecting, clicking or whatever a delete button somewhere.

What we have covered is a very simple look at structural alterations. Much more is possible. New tables can be created from already existing ones, data can be imported from various files and many more alterations can be achieved on existing tables.
5. Queries on Single Tables

There are a number of different types of queries. The ones we will create are called select queries. They are used to select, or extract, specific information from the database. There are also “make-table”, “update”, “append”, “delete” and “crosstab” queries.

Initially we will just query one table, to keep things fairly simple. Queries are created in a design view and display in a Datasheet view, just like tables. The data the query produces is called a dynaset, as it will absorb any data alterations each time it is run - dynamic. When you save a query you save the query design, not the specific data output or dynaset.

There are several ways to create a new query. Open the SUPERTAFE and click on the Queries button. Click on the “New” button or click “Create query in design view”. Don’t use the wizard.

Query Example 1

The “Show Table” dialog box will appear and you select (add) the tables you require. Initially we will add the tblTeacher table. Highlight tblTeacher, click “Add”, and then click “Close”. TblTeacher will appear in the top of the Select Query window. If you want to see everything displayed, in as much detail as possible, maximize the window and drag the center break down till all the fields in the table can be displayed. Drag the bottom of the table to do so.

For this example we will construct a query that tells us all the details of the teachers at the Bedlam campus. We will need all the fields from the table. This can be achieved by either double clicking on the “*” at the top of the table field list or individually double clicking every field. The former is neater, the latter clearer.

Now go to the column in the grid (Query Design Grid) that contains the field “Campus”. In the row labeled “Criteria” type in the word “Bedlam”. So, you are asking the query to display all the details of each teacher who works at the Bedlam campus. Run the Query by clicking “!” or Query, Run, or click on the “Datasheet View” Icon. You should get a dynaset that contains the full details of 10 people. Check that you have this correct. Save the query if you like.

You can order the dynaset by clicking in the Sort row in the appropriate column. For instance click in the Sort row in the Teacher Name column and select Ascending. Run the query again. This time the records will be arranged in alphabetic order of the teacher names.

Query Example 2

This query will use tblSubject to list the subjects that cost more than $150.00 (to complete as a non-resident student). Open a new query and Add tblSubject. This time we will just require the Subject Code, Subject Name, Subject Field and, of course Cost. In the Criteria row of the Cost column type > 150 and run the query. You should get 7 records in the dynaset. Check that you have the same records as someone else.
Now go back to the query design grid and unclick the ticked checkbox in the “Cost” column and “Show” row. Run the query again. This time the cost field, and its values, will not display. You will still have the same 7 records displaying in the dynaset, just no cost values displayed this time.

This time go back to the design view and arrange the dynaset in ascending order of cost. Run the query. Then arrange them in the order of Cost (ascending) within Subject Field. This will give the order CO001, CO002, EN002, HO002, MA005, MA002, MA001. The Subject Field is the primary order field, so it must be to the left of the Cost field in the QBE grid.

**Query Example 3**

This query seeks to list all full time (Time fraction = 1.0) teachers at the Seaspray campus. So tblTeacher, say Teacher ID, Teacher Name, Position Title, Time Fraction and Campus fields. Enter the criteria for Time fraction (= 1) and run the query. You should get 25 records in the dynaset. Enter the criteria for campus (Seasprout) and run it again. You should get 6 records in the dynaset.

**How do I do queries?**

From the above you can see, even with these simple examples, that there is a method to successfully completing a query. The following might be a reasonable approach:

Read and understand the question.
Select the appropriate table/s.
Decide which fields will be used and/or displayed.
(Run the query. If you are using one table you should get the same number of records in the dynaset as are in the table)

Include ONE of the required criteria.
Run the query. You should get less, or at most the same number of records as above.

Include another of the criteria and run the query.
The number of records should decrease or, at worst, stay the same.

Continue until all criteria are used.
If you make an error, it should be easy to find, as it will be because of the last criteria you have added.
Query “Operators”

In a query it is often required to specify an interval, an inequality, a similarity, inclusion and other things. The following are just a few examples of how this might be done in Access.

- To specify the month of June: BETWEEN 01/06/02 AND 30/06/02
- To specify at least $1000: >=1000
- To specify less than 500 kms: <500
- To specify before 30th September: <30/09/02
- To specify all names starting with A: LIKE “A*”
- To specify all names ending in Y: LIKE “*Y”
- To specify other than blue: NOT Blue
- To specify Red, White or Blue: In(Red, White, Blue)
- To specify a value equals 10: =10 or just 10
- To specify any value between 19 and 38: BETWEEN 19 AND 38
- To specify any value outside of 19 to 38: <19 OR >38

If you are required to find cars that are yellow OR 4WD, then the two criteria “yellow” and “4WD” should be entered on two separate Criteria rows, in their appropriate columns. If you are required to find cars that are yellow AND 4WD, then the two criteria should be entered in the same row, under there appropriate columns.

Query Example 4

Construct a query that lists all Mathematics subjects, which go for at least 60 hours, cost more than $100 and have no written assignment as part of their assessment. Just display the Subject Code and Subject Name fields.
You should just get MA001 and MA002.

Query Example 5

Construct a query that lists the IDs and Names of all teachers who work less than full time, whose Training Rate is at least $60.00 and who aren’t at Highmount. You should get three records in the dynaset, TMA01, TEN01 and THO04.

6. More Complex Queries (Multiple tables and Calculations)

In this section we will look briefly at queries requiring multiple tables, and some of the mathematical functions made available by using the “Totals” button.
Query Example 6

Construct a query that lists the name of all full time teachers and the name of their department. You will need two tables, tblTeacher and tblDepartment. Add both to the query. Ensure that the line, indicating a relationship between the tables, is also present.

Double click on Teacher Name in tblTeacher and Department Name in tblDepartment. Run the query. You should get 38 records, one for each staff member. Sort them in alphabetic, by Teacher Name order.

Query Example 7

The same as for query 6, only we don’t want the Heads of Department to appear in the dynaset. So, how do we exclude them? Add the Position Title field to the query. In the first line of the criteria section type “Not Head of Department”. Make sure this field does not display when the query runs. Run the query, 32 records, none of which lists a Head of Department.

Query Example 8

Which department/s has the most full time teachers? This can be achieved by counting the number of full time teachers in each department. First of all we will just list all full time teachers. Open a new query and add tblTeacher and tblDepartment. Add the Time Fraction, Department Name and Teacher Name fields to the QBE grid. Type “1” in the criteria row, under the Time Fraction column. Run the query. You should get 25 records.

Now we need to group them by department and then count the number in each department. Click on the Totals button (S) and re-run the query. The records are now grouped by department alphabetically. You will also notice that a row has been added to the QBE grid. It is labeled “Total”. If you click to the right of the words “Group By”, a drop down list of available operations will appear. Note the operations available. In the Teacher Name column select the operation “Count”. Run the query.

Here, at last, is your answer.

Note the order in which the fields were added to the QBE grid. They have been added in a specific order, in terms of the question being asked. Also note the field that is “counted”. This relates closely to the way the question was originally asked.

Query Example 9

What is the number of effective full time teachers in each department. This figure can be calculated by adding up the Time Fractions for all members of each department. Try it yourself and base it on the previous query. The answers are:
Query Example 10

Develop a query that lists the Teacher ID’s of the “teachers” in the Mathematics Department that co-ordinate a subject, along with the subject they co-ordinate. Subject Name, Department Name, Co-coordinator.

Query Example 11

Is it possible to develop a query that lists each subject and the name of its coordinator? If not, what changes would be required to the database to enable this result to be achieved?

Query Example 12

The College is required to produce a list of staff, organized by department, with each staff member’s time fraction, the total EFT figure for each department and the total EFT figure for the college. Now you can fiddle with a query for quite a while, but you won’t get all this information. However, you will get some of it. Specifically, you won’t get the two totals.

So what we will do is develop the query as far as we can, save it as qryEFTs and then consider further matters. Develop and save the query.

Close down the query and click on the Reports button. Click on “create report using Wizard”. There is a small combo box below this selection section that allows you to choose a table or query to base your report on. Click on the down arrow and select qryEFTs.

In the first screen move all three fields across in the order they are in. The numeric field must be last. On the next screen you wish to view the data by department. On the next screen you want to group by Department. On the next screen click the Summary Options button and check the Sum checkbox only. Exit that screen and the one you got to it from. Next a stepped report will be best for this data. Next select a suitable style. Then click the Finish button to display the report you have constructed.

We could improve a few things on this report. The number of decimal places in the sum/s is too great and the odd bit of text could be omitted. If you are feeling adventurous, go to the report Design View and see what you can achieve.

The important point is that while some information can be extracted from a database using a query, some (organization of that) information cannot. The Report feature has been used to do some grouping under headings and calculation of summary information. Reports can do more that this, of course.
7. Reports

Generally speaking, in order to produce the data required for a report, we first construct a query that produces the underlying information. A Report is then produced, based on this query. You saw this process in the previous example. Sometimes, however, a table contains all the necessary data, as it stands. For instance if we wanted a list of all staff, their postal address and their phone numbers, then tblTeacher would be a perfect basis for this.

There are a number of options available in the development of your Report. Using the Report Wizard, in the first instance, leads you through these options, giving some indication of their various effects. You might like to try different options at each stage just to see what they do. Working from the Design View, as we have been doing for queries, requires some prior knowledge of Access Reports, and is not recommended at this stage. We will only use to Design View to modify Reports created by the Wizard.

Report Exercise 1

Develop the above mentioned report based on the 4 fields from tblTeacher. Select the Report Wizard, select tblTeacher and used a Block style for this report.

Report Exercise 2

We could in fact, produce a mailing list of the above list of teachers. This time select Label Wizard and produce a “Mailing Label” Report of the same data, less the phone numbers. It might not look perfect, but that is a consequence of our database structure. What changes would we need to make to tblTeacher to be able to produce “normal” mailing labels?

Report Exercise 3

Produce a report that lists all subjects, grouped alphabetically, by department, also grouped alphabetically, which includes the subject coordinator, subject cost and subject hours. Total the hours for each Department only. Save the query as qrySubjects and the report as rptSubjects.

Now get rid of the label and data for “Grand Total”, by deleting them in the Report Design View. Also delete the line that starts “Summary for “Department Name”...”. Then change the label “Sum” to “Department Total” and move it over to under the Cost column of data. Save again.

Report Exercise 4

Produce a Report that lists all staff members grouped under their Position Titles. Include their Department and their time fraction. For each Position Title, display the number of EFT Teachers, and a Total, just for each department. Make sure all numbers are accurately labeled.
Report Exercise 5

Produce a report that lists each subject, the Department (Name) it belongs to, its Text book and its co-coordinator. Group the subjects by Department, and list them alphabetically within each Department.
Summary Exercise

The major set of information missing from the SuperTafe database, is information about classes. Which classes are offered at which campuses, in which term, and taken by which teacher. You are to develop a new table, tblClasses, to do this.

You will work out what fields are needed, the primary key field/s and the relationship between this table and the rest of the database. Read all the following information before developing your table. The Report requirements will influence the structure of your database.

Table content:

You are to use as many existing fields as possible, and as few new fields as possible.

Teachers are required to teach between 700 and 800 hours per year. Closer to 800 is preferred. Teachers generally like the hours evenly distributed across the four terms. Heads of Department teach 400 to 500 hours per year under similar conditions.

Using the subjects in tblSubjects, allocate classes to teachers, using all subjects at least once. Each subject can only be offered once per term per campus. Teachers teach at on their home campus only. Subject co-coordinators teach the subject they co-ordinate at least once per semester. Semester is terms 1 and 2, while semester 2 is terms 3 and 4. Obviously teachers only teach subjects from their own department.

Produce the following reports utilizing data from the new database with the additional table, tblClasses. You will need to create a query on which to base each report.

1. A listing of all subjects arranged by department, and the number of times each subject is taught over the year.
2. A report on which subjects are offered, in each term, within each department, at each campus.

Campus 1

Term 1

Department 1
Subject 1
Subject 2

Department 2
Subject 1
Subject 2

Department ....

Term 2

Department 1

…and so on.
3. A report on each teacher's subjects, arranged by term and including the hours for each subject, including a term and year total.

Teacher 1

Term 1
Subject 1 40  
Subject 2 60  
Subject 3 80  
Total Term Hours 180

Term 2
Subject 1  
Subject 2  
.........

Term 3
Subject 1  
Subject 2  
.........

Term 4
.........
Subject n  
Total Term Hours ***

Total Year Hours ***

Teacher 2

......and so on.
Conclusion

Well, this covers the basics of Access, though it could be argued that a short section on Forms would be useful. You might like to produce a few forms, maybe by using the Help section to guide you. For those of you familiar with Visual Basic, they will be very familiar.

Assessment

When you have completed all the above exercises, ask your teacher for the assignment for the subject you are studying. There is also a test for those who successfully complete the assignment. Good luck.