Arts Resource Centre

Teaching with Technology Workshop Series

Spreadsheet and Database Basics

Date: Wednesday, October 22, 2003, 3:00-5:00pm

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Database and Spreadsheet

Part 1: Database - Access

1. Introduction

A **database** is a collection of related information. A **spreadsheet** is a tabular display of (primarily) numerical information.

Differences between database and spreadsheet:
Both a database and a spreadsheet are capable of managing related information, and displaying it in tabular form. A **spreadsheet** is good at calculations of numeric data, and the creation of charts and graphs; a **database management system** is good for selective data retrieval, and data restructuring; it does not offer a very wide range of recalculating, statistical, or graphical facilities.

Example of a database: library catalogue www.library.ualberta.ca

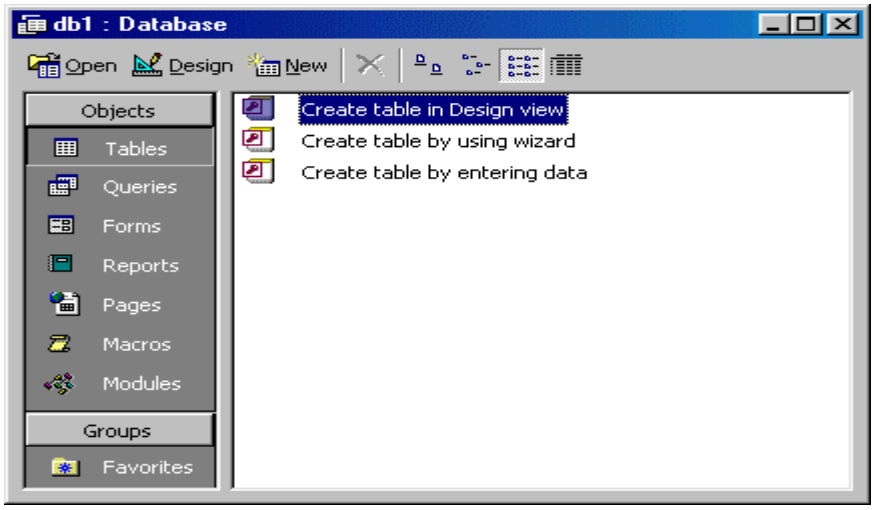
2. Create an Access Database

2.1 Creating a blank database

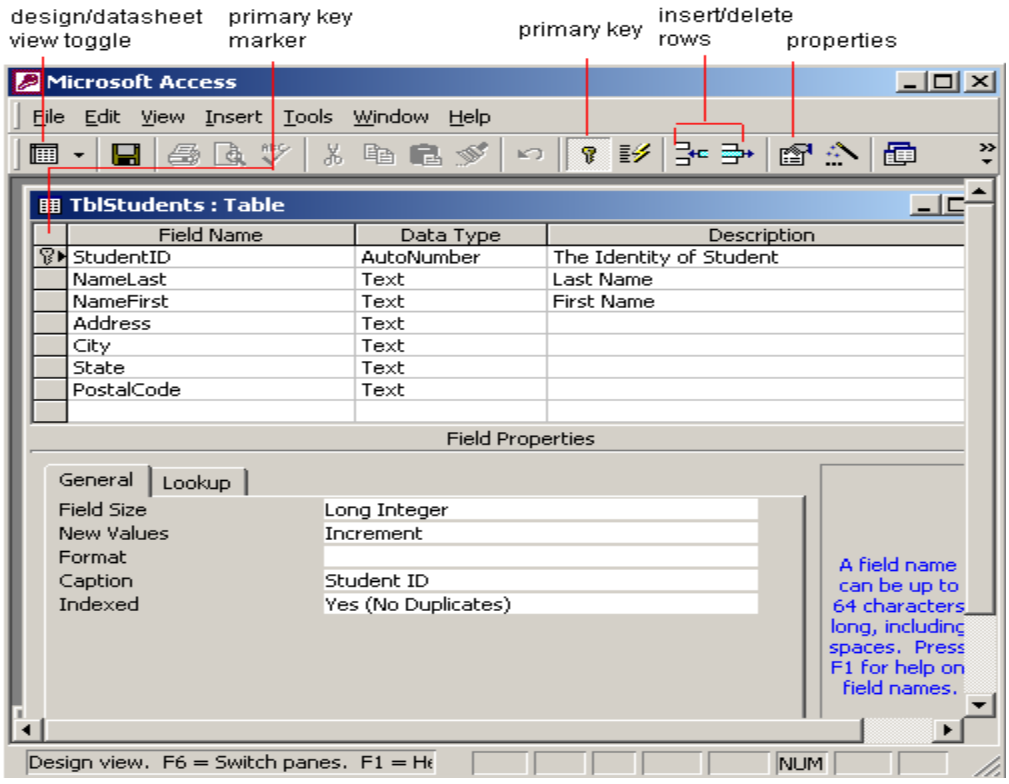
- After opening Access, you will be presented a window. Select the first option to create a new database.
- You must save an Access database before you start working on it.
- Find the folder where the database will reside in the **Save in** drop-down menu
- Type the name of the database in the **File name** line and click the **Create** button

2.2 Creating a table in design view (TblStudents)

- A **table** is a grouping of related data organized in fields (columns) and records (rows) on a datasheet. Many tables can be stored in a single database.
- A table is similar to the way an Excel worksheet stores information in a workbook



- **Design View** provides the tools for creating fields in a table.
- A **field** is a column on a datasheet and defines a data type for a set of values in a table.
- The window is divided into two parts: a top pane for entering the field name, data type, and an optional description of the field, and a bottom pane for specifying field properties.



Data types

Data Type is the type of value that will be entered into the fields.

- ***Text*** - The default type, text type that stores up to 255 characters.
- ***Number*** - Store number.
- ***Date/Time*** - A date, time, or combination of both.
- ***AutoNumber*** - When a new record is created, Access will automatically assign a unique integer to the record in this field.

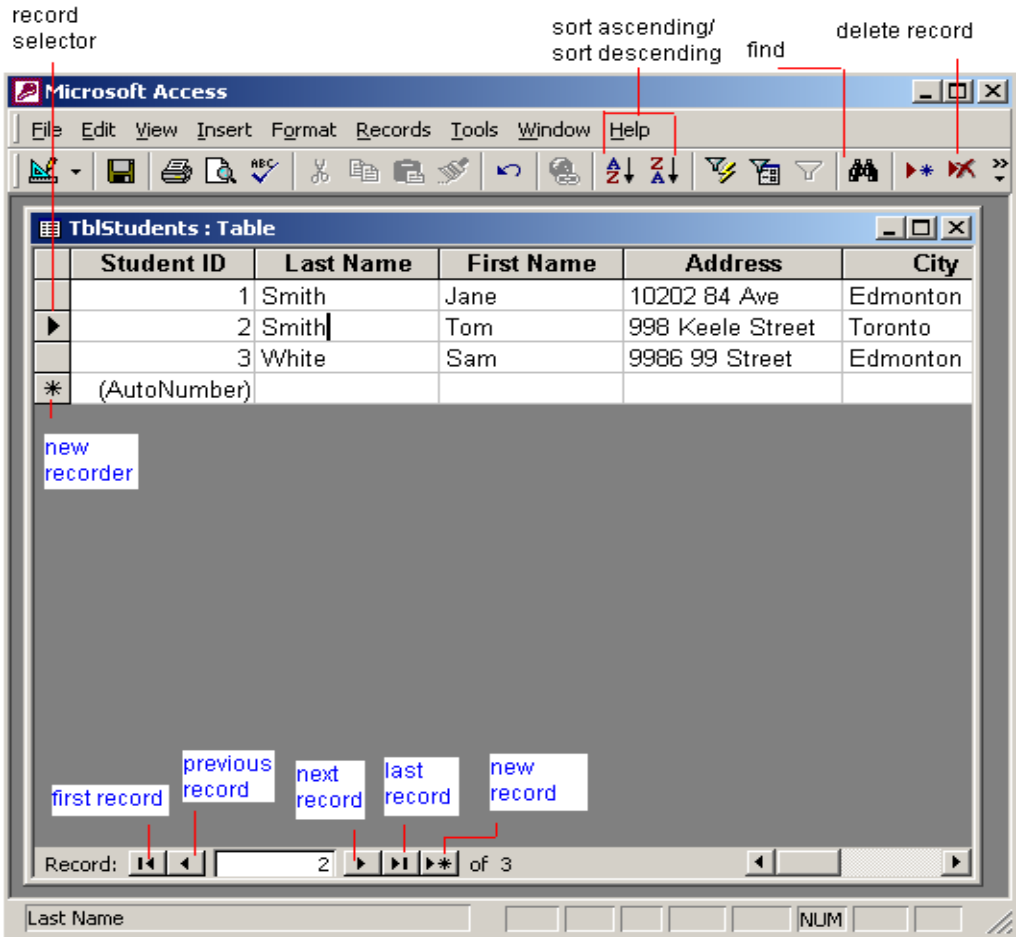
- A **record** in a row on a datasheet is a set of values defined by fields. In a mailing list table, each record would contain the data for one person as specified by the intersecting fields.
- **Description** (optional) - Enter a brief description of what the contents of the field is.
- **Field Properties** - Select any pertinent properties for the field from the bottom pane.
- **Primary key** - Every record in a table must have a primary key that differentiates it from every other record in the table. The primary key field designates which field in the table contains data unique to each record. For example, in a list of students, the student number should be the primary key, since no two students will share the same student number (while they may share the same first name, last name, etc.). The primary key field will be noted with a key image to the left.

3. Using datasheet to input data

The datasheet allows you to enter data into the database.

Adding records

Add new records to the table in datasheet view by typing in the record beside the asterisk (*) that marks the new record. You can also click the new record button at the bottom of the datasheet to skip to the last empty record.



Editing records

Place the cursor in the record that is to be edited and make the necessary changes.

Deleting records

Place the cursor in any field of the record row and click the **Delete Record** button on the datasheet toolbar.

Check spelling

Select **Tools|Spelling** from the menu bar to activate the spell checker and make corrections just as you would using Word or Excel.

Print a datasheet

Datasheets can be printed by clicking the Print button on the toolbar or by selecting **File|Print** to set more printing options

4. Table Relationships

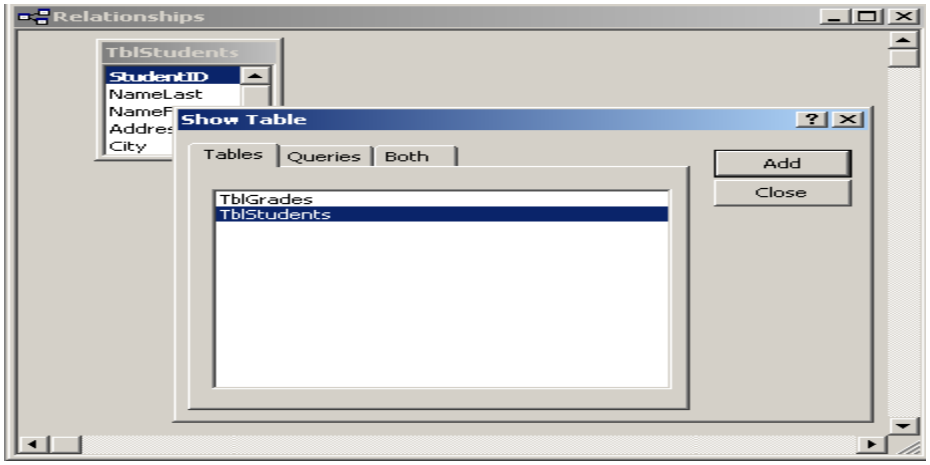
Creating another table: TblGrades

Declaring table relationships

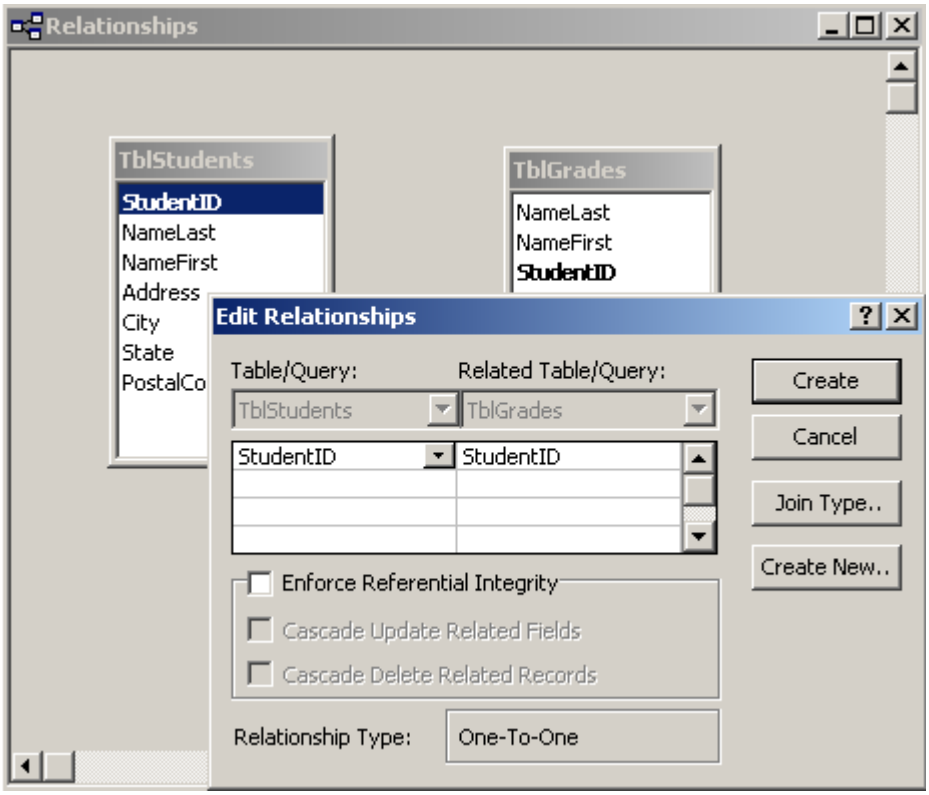
To prevent the duplication of information in a database by repeating fields in more than one table, table relationships can be established to link fields of tables together. Follow the steps below to set up a relational database:

- Click the **Relationships** button on the toolbar. 

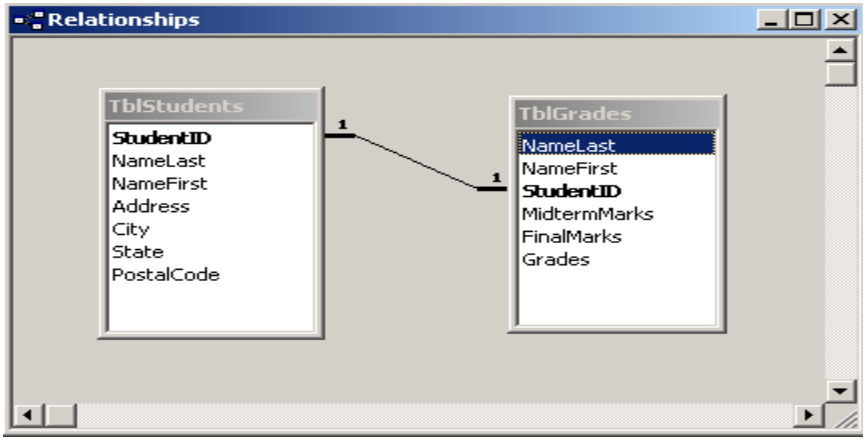
- From the **Show Table** window, double click on the names of the tables you would like to include in the relationships. Then click **Close**.

- 

To link fields in two different tables, click and drag a field from one table to the corresponding field on the other table and release the mouse button. The **Edit Relationships** window will appear. Check the **Enforce Referential Integrity** box to ensure that the relationships are valid and that the data is not accidentally deleted when data is added, edited, or deleted. Click **Create** to create the link.



- A line now connects the two fields in the Relationships window.



Three types of relationships:

one-to-one (e.g. student information and student grades in one course)
one-to-many (e.g. professors and courses they are teaching)
many-to-many: unable to exist in Access (e.g. students and courses)

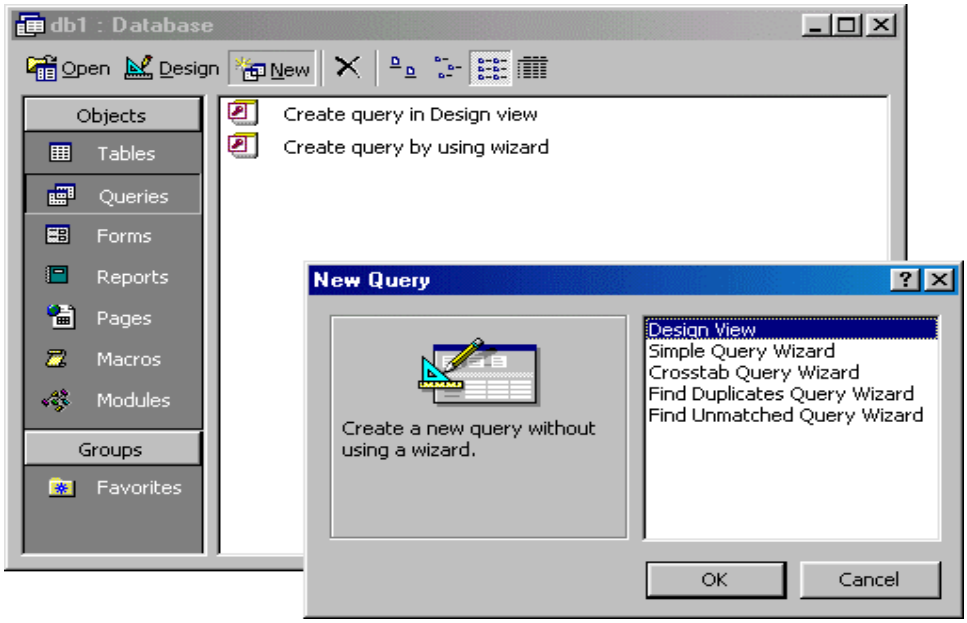
5. Queries

Queries select records from one or more tables in a database so they can be viewed, analyzed, and sorted on a common datasheet.

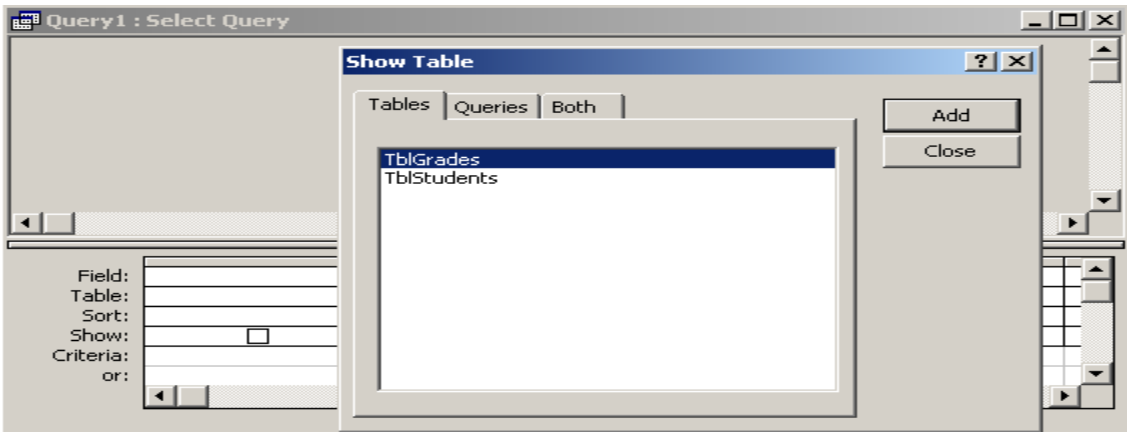
Create a query in design view

Follow these steps to create a new query in Design View:

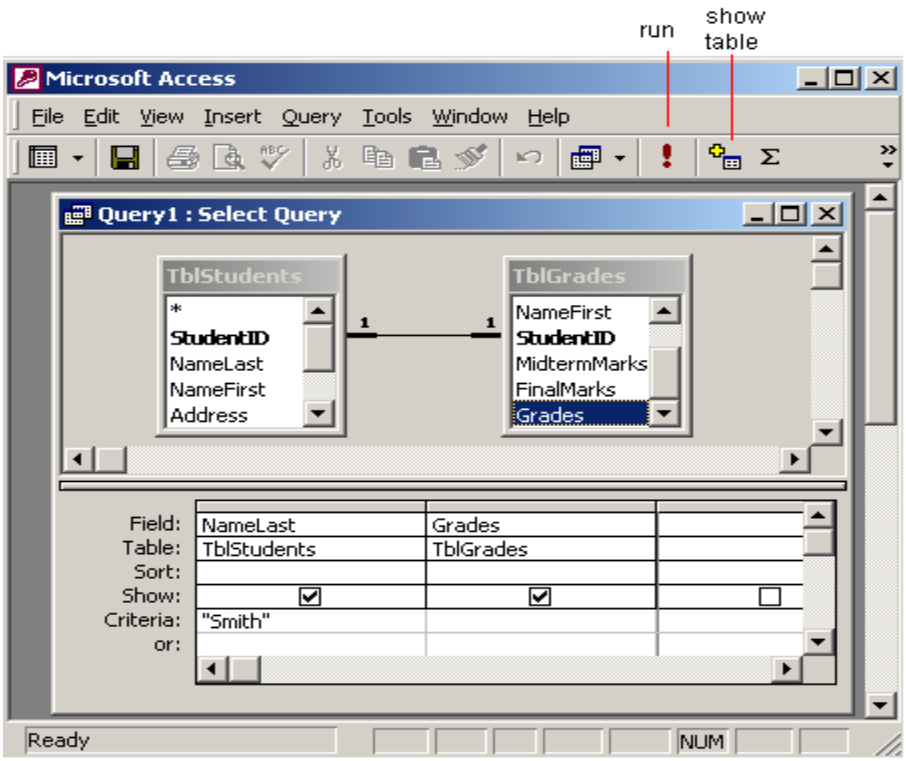
- From the Queries page on the Database Window, click the **New** button.



- Select Design View and click **OK**.
- Select tables and existing queries from the **Tables** and **Queries** tabs and click the **Add** button to add each one to the new query.
- Click **Close** when all of the tables and queries have been selected.



- Add fields from the tables to the new query by double-clicking the field name in the table boxes.
- Enter the criteria for the query in the **Criteria:** field.



- After you have selected all of the fields and tables, click the **Run** button on the toolbar.
- Save the query by clicking the **Save** button.

Delete a query

Click the table's title bar and press the Delete key on the keyboard.

Part 2: Spreadsheet - Excel

1. Sorting

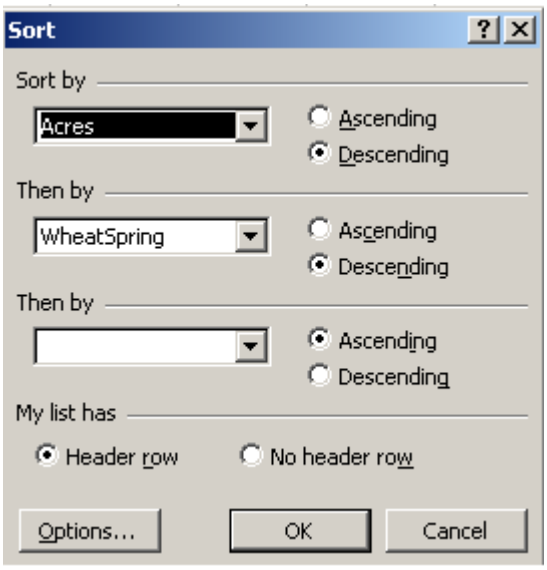
Basic Sorts 

A basic descending or ascending sort bases on one column, highlight the cells that will be sorted and click the **Sort Ascending** (A-Z) button or **Sort Descending** (Z-A) button on the standard toolbar.

Complex Sorts

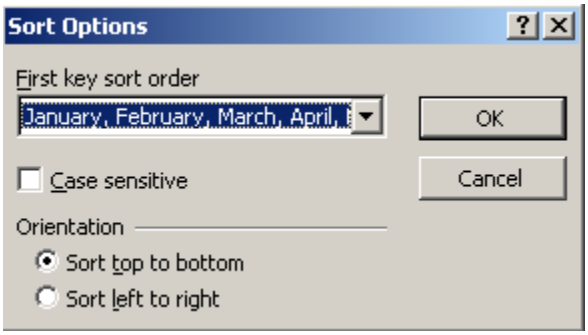
To sort by multiple columns, follow these steps:

- Highlight the cells, rows, or columns that will be sorted.
- Select **Data|Sort** from the menu bar.
- From the **Sort** dialog box, select the first column for sorting from the **Sort By** drop-down menu and choose either ascending or descending.
- Select the second column and, if necessary, the third sort column from the **Then By** drop-down menus.



- If the cells you highlighted included the text headings in the first row, mark **My list has**...**Header row** and the first row will remain at the top of the worksheet.
- Click the **Options** button for special non-alphabetic or numeric sorts such as

months of the year and days of the week.



- Click **OK** to execute the sort.

2. Filtering

A **filter** is used to select records that meet specific criteria and temporarily hide all the other records.

Applying an AutoFilter

To set up an AutoFilter, select any cell in the worksheet and choose Data → Filter → AutoFilter. Excel reads every record in the worksheet and creates a filter criteria list for each field. Click the drop-down arrow that appears next to a field name to access the field's criteria list.

Workshop

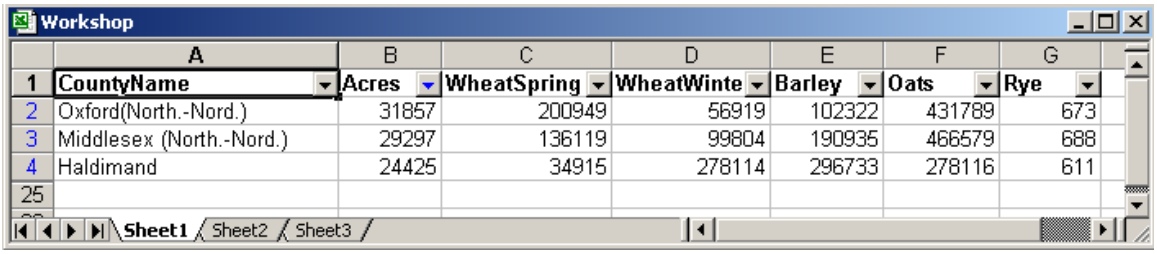
	A	B	C	D	E	F	G
1	CountyName	Acres	WheatSpring	WheatWinte	Barley	Oats	Rye
2	Oxford(North.-Nord.)	31857	200949	56919	102322	431789	673
3	Middlesex (North.-Nord.)	29297	136119	99804	190935	466579	688
4	Haldimand	24425	34915	278114	296733	278116	611
5	Oxford(South.-Sud.)	23545	161451	73548	187373	424069	357
6	Middlesex (East.-Est.)	22321	88241	90858	220666	625098	1091
7	Lambton	20075	99630	91602	142697	523283	1078
8	Norfolk (North.-Nord.)	17980	10113	155938	125380	211760	7294
9	Monck	16731	15682	133066	54118	183462	1864
10	Brant (South or West)	16553	35122	152319	115657	154207	5268
11	Kent	16452	14735	237182	217182	31080	408
12	Elgin (East.-Est.)	15685	13905	162444	152174	410481	4721
13	Essex	15299	29943	164481	56345	488466	37860
14	Bothwell	15001	10867	177208	103352	312353	1051
15	Middlesex (West.-Ouest.)	14847	47065	97968	75101	331120	342
16	Welland	14045	13528	123179	55459	199075	981
17	Wentworth (South.-Sud.)	13989	34678	162671	176053	233499	852
18	Norfolk (South.-Sud.)	13583	5128	137523	101648	183719	6008
19	Brant (North or East)	13569	16106	173208	164241	156257	1293
20	Lincoln	12637	25599	125064	66111	127520	666
21	Elgin (West.-Ouest.)	11354	5726	130285	103149	266027	11
22	Wentworth (North.-Nord.)	11278	10684	141645	106178	218080	873
23	Niagara	2697	2184	24606	11342	37185	213
24	Lodon	57	132	100	346	1299	0
25							

Sheet1 Sheet2 Sheet3

Click the drop-down arrow next to the column heading to choose AutoFilter criteria.

The default criteria setting in each field is All, which means that the contents of the field are not being used to filter the records.

When you apply a filter, all the records not included in the subset are hidden. The number of records found and the total number of records in the worksheet are displayed in the status bar. Each record retains its original row number; the row numbers of filtered records appear in blue. The drop-down arrow for the filtered field turns blue to show that it is being used to filter the worksheet.



Records displayed as filter results keep their original row numbers.

To open the AutoFilter list in a column, either click the filter arrow or select the column heading with the AutoFilter arrow and press Alt+↓.

Set the criteria using each field's drop-down list. Only records that meet all the criteria you select will be included in the filtered subset.

To display the entire database, change the filter criteria for all filtered fields back to All or choose **Data → Filter → Show** All to reset the filters in all columns.

3. Producing Charts with Chart Wizard

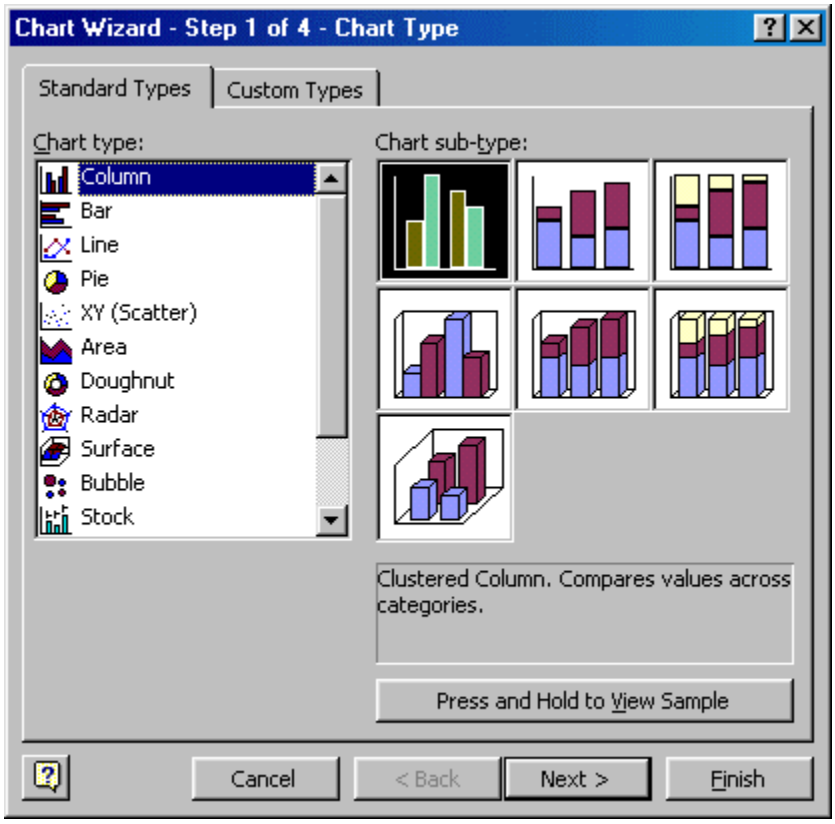
Charts allow you to present data entered into the worksheet in a visual format using a variety of graph types.

- Enter the data into the worksheet and highlight all the cells that will be included in the chart including headers.

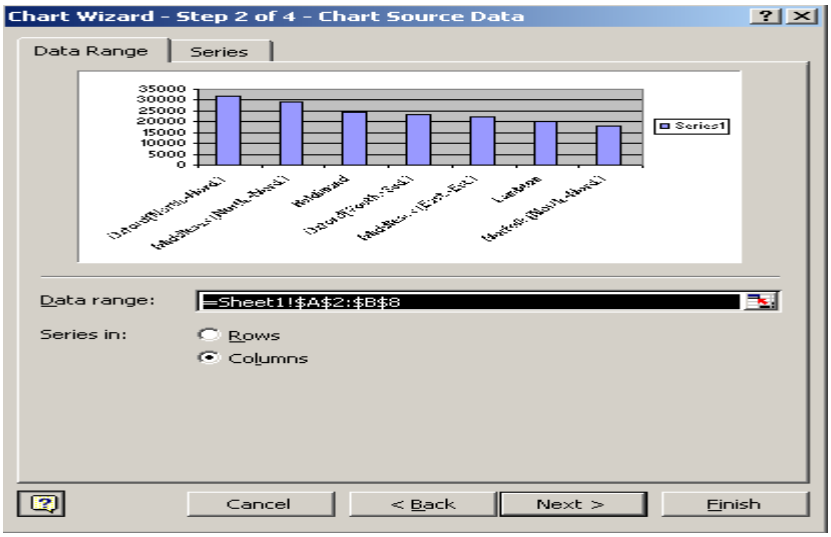
	A	B	C
1	CountyName	Acres	WheatSpring
2	Oxford(North.-Nord.)	31857	200949
3	Middlesex (North.-Nord.)	29297	136119
4	Haldimand	24425	34915
5	Oxford(South.-Sud.)	23545	161451
6	Middlesex (East.-Est.)	22321	88241
7	Lambton	20075	99630
8	Norfolk (North.-Nord.)	17980	10113

- Click the Chart Wizard button on the standard toolbar to view the first **Chart Wizard** dialog box.

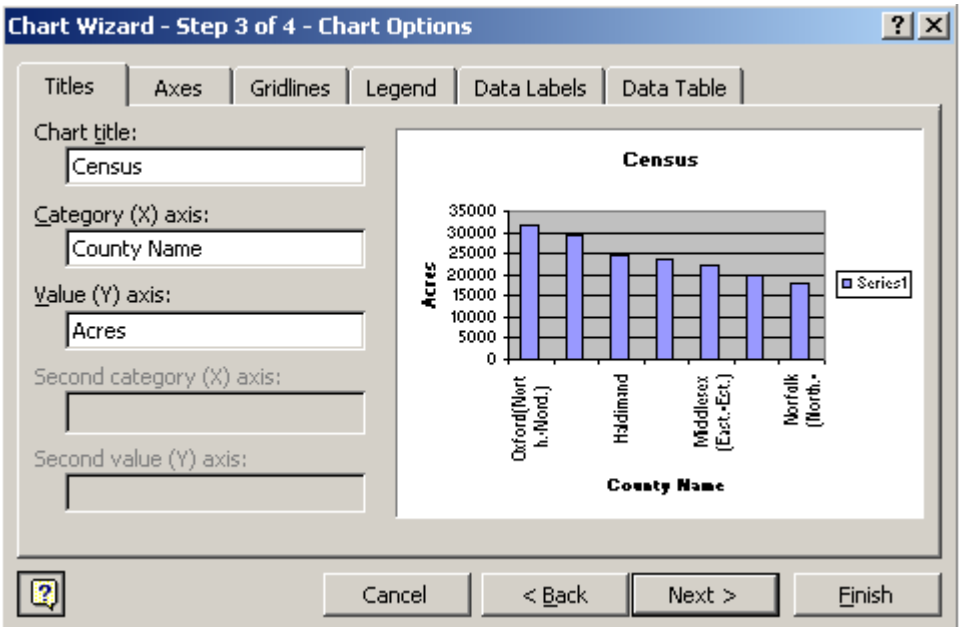
- **Chart Type** - Choose the **Chart type** and the **Chart subtype** if necessary. Click **Next**.



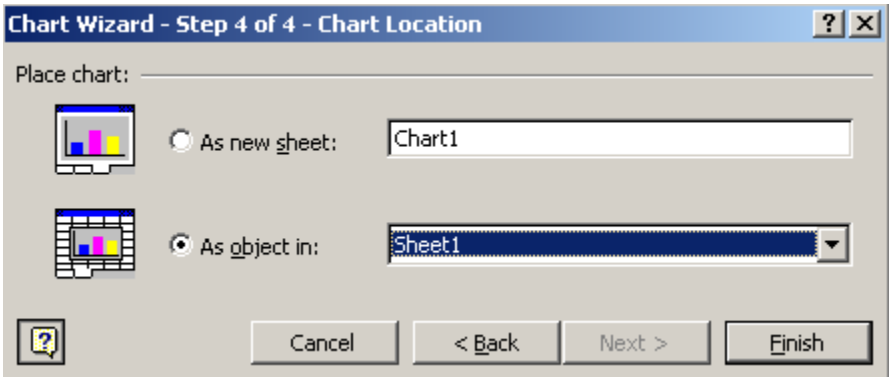
- **Chart Source Data** - Select the data range (if different from the area highlighted in step 1) and click **Next**.



- **Chart Options** - Enter the name of the chart and titles for the X- and Y-axes. Other options for the axes, grid lines, legend, data labels, and data table can be changed by clicking on the tabs. Press **Next** to move to the next set of options.

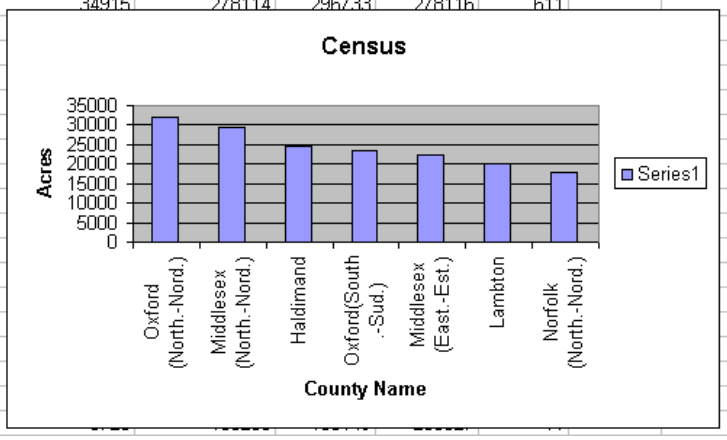


- **Chart Location** - Click **As new sheet** if the chart should be placed on a new, blank worksheet or select **As object in** if the chart should be embedded in an existing sheet and select the worksheet from the drop-down menu.



- Click **Finish** to create the chart.

	A	B	C	D	E	F	G
1	CountyName	Acres	WheatSpring	WheatWinte	Barley	Oats	Rye
2	Oxford(North.-Nord.)	31857	200949	56919	102322	431789	673
3	Middlesex (North.-Nord.)	29297	136119	99804	190935	466579	688
4	Haldimand	24425	34915	278114	296733	278116	611
5	Oxford(South.-Sud.)	23545					
6	Middlesex (East.-Est.)	22321					
7	Lambton	20075					
8	Norfolk (North.-Nord.)	17980					
9	Monck	16731					
10	Brant (South or West)	16553					
11	Kent	16452					
12	Elgin (East.-Est.)	15685					
13	Essex	15299					
14	Bothwell	15001					
15	Middlesex (West.-Ouest.)	14847					
16	Welland	14045					
17	Wentworth (South.-Sud.)	13989					
18	Norfolk (South.-Sud.)	13583					
19	Brant (North or East)	13569					
20	Lincoln	12637					
21	Elgin (West.-Ouest.)	11354					

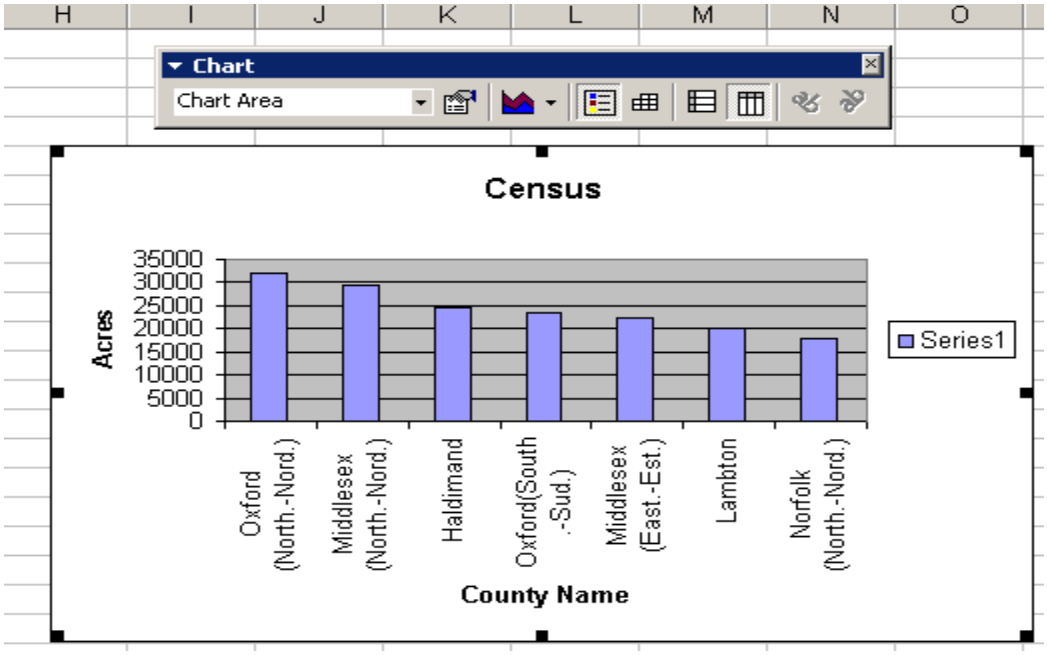


Resizing the Chart

To resize the chart, click on its border and drag any of the eight black handles to change the size.

Moving the Chart

Select the border of the chart, hold down the left mouse button, and drag the chart to a new location.



Part 3: Practice

1. Create two tables:

TblProfessors

Field Name	**Data Type**
ProfessorID	AutoNumber
FirstName	Text
LastName	Text

TblCourses

Field Name	**Data Type**
CourseID	Text
CourseTitle	Text
ProfessorID	Number
RoomNumber	Text

Note: please include Huco 520 into your tables as CourseID

2. Populate them.
3. Create relationships between them.
4. Create one query which will search which professor will teach Huco 520.