

# Getting Started With Access 2003

## Understanding Relational Databases

data = valuable asset

need to store, maintain, retrieve, and present vital business data

advantages of using a DBMS:

- duplicate data is minimized
- data entry faster and easier
- information retrieval faster and easier
- view/sort information multiple ways
- information is more secure
- information can be shared

## Learning Database Terminology

entity (nib)

data hierarchy

byte

field

record

table

database

creating relationships among tables

use a *common field* to connect related data that is stored in different tables

primary key

foreign key

## Relational Database Management System (RDBMS)

use to store data in structured tables, maintain, retrieve and present

we will use Access to:

- create new database file
- create new tables
- add and delete records
- change field values so they're up-to-date
- create queries to manipulate and retrieve data to answer questions
- sort data
- create forms

## Working with the Database Window

Database Window holds 7 types of Access objects:

- **Table** (Unit A, B, E)  
an object that *stores data* in rows (records) and columns (fields)
- **Query** (Units B, F)  
an object that asks a question about table data  
can select data from multiple tables (if they have a common field!)
- **Form** (Unit C)  
an object you use to enter/change/view data *on the screen* in custom layout, usually one record at a time
- **Report**  
an object you can use to *print* data in a custom layout
- **Data Access Page**  
an object that is a special type of Web page designed for viewing and working with data from an Internet or intranet
- **Macro**  
an object containing a list of actions you want *Access* to carry out
- **Module**  
an object that stores Visual Basic programming instructions written to automate, customize, and enhance a database

all these objects are stored in a single **.MDB** file

## Navigating Records

Datasheet view

see the table's *data*

can view, add, edit, delete a table's records



rows = records and columns = fields

[Tab]

[Ctrl]+[End]


[Ctrl]+[Home]

## Entering Records

New Record button   
record's row selector  (nib)

## Editing Records

navigate to existing record and edit the field values so they're current and up-to-date

pencil symbol 


a record's data is saved to disk when: (nib)

- move to another record
- close the table's datasheet
- Record | Save Record

what does the Save button  do?

[Ctrl]+[']

[Esc] vs. Undo

Delete Record button   
can't Undo

## Previewing and Printing a Datasheet

printing a *datasheet* is a “quick and dirty” way to print a table's records

very few formatting options

Reports (Unit D) are a more powerful and flexible way to print data from 1 or more tables

Print Preview

Page Setup

portrait vs. landscape page orientation

## Getting Help

virtually identical to the other online Help systems we've seen before

## Closing a Database and Exiting Access

how close a table

how exit *Access*?

saves .MDB file to disk

also closes any open objects (table, form, etc.)

## Printing a Table's Structure (nib)

Tools | Analyze | Documenter | click Tables tab | click box to left of table | click OK | click Print button in Preview toolbar

Our Final exam will be after *Access* Unit F.  
Use *Word* to develop an *Access* crib sheet and update it after each unit.

## Using Tables and Queries

### Organizing Fields

#### Planning a Related Tables

1. determine desired outputs
2. determine required inputs
3. identify fields for each table and field data types
  - generally data for each *entity* placed in a separate table
  - each field is a characteristic of an entity
    - avoid storing values that can be calculated from other fields
    - store the smallest, logically meaningful level of data as separate fields
  - use a descriptive field name (eg: FirstName)
    - spaces are allowed, but not encouraged
4. identify a primary key for each table
5. use foreign keys to build one-to-many relationships between tables

### Modifying a Table

use Design View to see/modify a table's *field structure*  
add or remove fields, change field properties

in the unit:

- added a new field
- renamed 3 fields
- removed a Caption
- moved a field

### Creating a Table

**table = structure + contents**

each record in a table has the same *field structure*

2 views of a table:

- Design View
  - view the table's *structure*
  - create or modify the structure of a table and the properties of its fields
- Datasheet View
  - view the table's *data*
  - view, add, delete, edit a table's records
  - by default, a table shows *all* records and *all* fields, sorted in primary key sequence
  - rows = records and columns = fields

use the View button to switch between these views

2 main ways to create a new table:

- Use the Table Wizard  
used in this unit  
builds a table based on an existing sample table
  
- Build manually in Design view (Unit E)  
Tables tab | New button  
Table Design pane on top and Field Properties pane beneath  
[F6] to navigate between panes

define a table's *structure* by specifying each field's:

- name
- data type (see below)
- description  
where do they appear?
- properties
  - Caption
  - Default Value
  - Field Size (Unit E)
  - Format (Unit E)
  - Input Mask (Unit E)
  - Validation Rule (Unit E)

Access' main data types: (page 371)

- **AutoNumber**  
Access automatically supplies the value by incrementing the previous value  
typically used to effortlessly obtain primary key value
- **Text**  
for non-numeric text entries  
field size can be set to  $\leq 255$  bytes (default = 50 bytes)
- **Memo**  
for longer, free form text entries, typically sentences or paragraphs  
 $\leq 64,000$  total width
- **Number**  
for numeric fields that are non-monetary  
can be used for calculations  
many different types of Number fields
- **Date/Time**  
important in many business applications  
Access can store dates for the years between 100 to 9999  
can be used for calculations
- **Currency**  
for storing monetary values  
can be used for calculations
- **Hyperlink**  
represents the address of an Internet location or of a file on a specified drive
- **Yes/No (logical)**  
presence/absence of an attribute
- **OLE object**  
objects from other applications (eg: graphic, Excel spreadsheet, sound clip)

**In-class practice:** create a new table in Design view

## Formatting a Datasheet

Format Datasheet toolbar

Format | Font... to set font and font size

Format | Datasheet... for gridlines and color

File | Page Setup... for margins and page orientation

## Understanding Sorting, Filtering, and Finding

when working in a datasheet you can

- Sort  
display records in ascending or descending sequence
- Filter  
temporarily display only the a subset of records that meet your criteria
- Find  
similar to Word's

Standard Toolbar buttons 

## Sorting Records

by default, a table's records are sorted in primary key sequence

data may be easier to interpret if records are displayed sorted by another field(s)

sorting does not physically rearrange the order of the records *stored* in the table, it only affects how the records are *displayed*

Sort Ascending & Sort Descending buttons 

Sorting on More than One Field (Clues to Use, 383)

can sort by multiple *adjacent* columns

consider using a second sort field when the primary sort field has duplicate values and you want to control how they're sorted among themselves

primary sort field is left-most of the sorting fields

secondary sort is next sort field to the right, etc.

## Finding Records

Find 

similar to *Word's*

better than scanning yourself!

many options

Match Case

Any Part of Field    Whole Field    Beginning of Field

the Find dialog box can be moved out of the way

steps:

- 1) click in search field to be searched
- 2) click Find button
- 3) supply value to find and options

similar to *Word's*

faster and more accurate than scanning yourself!

many options: Any Part of Field    Whole Field    Beginning of Field

the Find dialog box can be moved out of the way

Replace (nib)

similar to *Word's*

best suited to changing *multiple* occurrences of one field value with another

## Filtering a Table

a set of *criteria* used to show a *subset* of the records

used to narrow the focus to specific records

Access displays only the records that match the criteria you specify

you can filtering when using a table, a query, or a form

a filter acts like a temporary (unsaved) query

Filter By Selection 

immediately creates and applies a filter that shows only the records that have the same field value as the selected field

i.e., *exact* matches

steps:

1. select an instance of the value you wish to use as criterion
2. right click
3. Filter by Selection

what on-screen feedback indicates that a filter is being applied?

Filter By Form 

allows you to specify more than one criterion  
allows you to specify criterion with a range of values

steps:

1. click Filter By Form button
2. fill in criteria
3. click Apply Filter button

Apply Filter button 

only those records meeting the criteria are shown

Remove Filter button 

removes the filter in the active datasheet or form

## Creating a Query

review: datasheets show *all* records and *all* fields in primary key sequence

**Select Query** (*Access* has many other types of queries)

an object used to view, analyze and edit data from one or more tables

*Access* selects and displays the records meeting your criteria

more flexible and powerful than a filter

think of a query as a *saved* filter

with a Select Query, you can:

- choose which *fields* to see – place desired fields onto grid
- choose which *records* to see – specify criteria; the key to designing queries
- make changes to table data
- sort records more flexibly
- select data from multiple tables (Unit F)
- perform calculations involving field data (Unit F)

2 views of a Query (there is another):

- Design view
  - create a new query or modify existing query's *structure*
  - record selection criteria, which fields to display, sorting options
- Datasheet view
  - add/edit/view records

## Creating a New Query

method used here:

- 1) Click Query object
- 2) click New Query using Wizard
- 3) select fields
- 4) click Finished

## Running a Query

Run query button (nib) 

*dynaset* (nib)

*dynamic* view of a *set* of records selected & sorted as the query specifies

can enter new records, modify records, delete records in the dynaset  
the changes affect underlying tables

## Modifying a Query in Design View

Field List

shows the fields available in the table(s) serving  
the query's data source

can drag fields onto the query design grid

what happened when you double-clicked a field?



as

## Criteria rows

criteria control which *records* are selected for processing

the query selects only those records meeting the criteria

can specify *multiple* criteria (here and Unit F)

### AND

when conditions are placed on the *same* criteria row, *all conditions* on that row  
must be true for the record to be selected for the dynaset

### OR

when conditions appear on *different* criteria rows, *at least one* row must be true  
for the record to be selected for dynaset

each row is evaluated separately from other rows

# Using Forms

## Planning a Form

- determine the purpose of the form
- determine the form's record source
  - if form's data comes from one table, base the form on that table
  - if form's data comes from more than one table, base the form on a *query*
- preliminary layout of the form
  - a form can be designed to resemble a paper form to facilitate data entry
- select appropriate types of *controls*
  - label, text box, image, checkbox

## Creating a Form

### Form

an object you use to view, enter, change, and delete records on-screen in a *custom layout*, usually one record at a time

datasheets are too limited

steps used here to create a new form using the Form Wizard:

1. Form
2. Create form using wizard
3. specify source of data (table or query)
4. choose fields to include on form
5. select layout (columnar, tabular, datasheet, etc.)
6. select style (Clouds, Pattern, Standard, Stone, etc.)
7. specify title (used as name when form is saved)

record navigation buttons



## Form Basics

2 main views of a form:

- Form View
  - view, add, delete, edit records
- Design View
  - see/change the form's *layout*
  - can change placement of fields, add/remove fields, graphics, change colors, etc.

### Toolbox

used to add new unbound controls to a form



### Field List

shows fields available in the form's underlying record source (table or query)  
 drag a field and drop onto form  
 places a *bound* text box and label



3 sections discussed here (ACCESS C-13):

- **Form Header**  
appears at the top of the form  
frequently used for logo, company name, command buttons
- **Detail**  
used to display the data fields for each record in the underlying table or query
- **Form Footer**  
appears at the bottom of the form  
frequently used for command buttons, instructions

controls

everything on a form is some type of control

egs: text box, label, image, checkbox

each control is placed in a *section* of the form

3 categories of controls:

- **bound control**  
displays field data (i.e., has a field as its Control Source property)  
eg: a text box that displays the contents of the Title field
- **unbound control**  
used to decorate the form (not display field values)  
eg: a label that displays the word Title  
eg: a line or rectangle
- **calculated control**  
has a formula or expression as its source of data  
eg: text box w/Control Source as =[Retail]-[Wholesale]  
eg: text box w/Control Source as =Date()

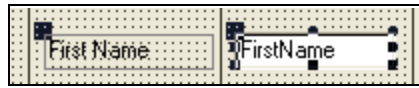
## Selecting Multiple Controls

3 ways to select multiple controls

- [Shift]+click
- [Ctrl]+click
-

## Moving and Resizing Controls

move handles



sizing handles



index finger pointer  
purpose?



open hand pointer  
purpose?




double-headed arrow pointer  
purpose?



how move a selected text box *and* its associated label together?

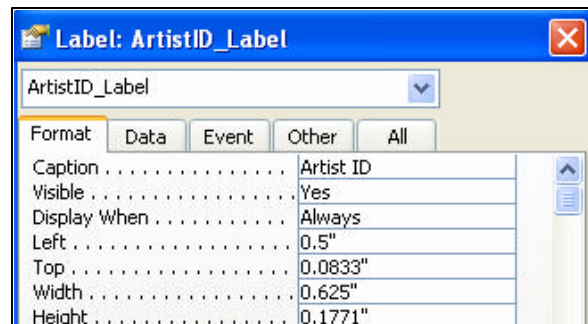
how move *only* the selected text box, but *not* its associated label?

## Modifying Labels

Properties button 

opens the Properties sheet  
used to see/change properties  
for the selected object(s)


some properties are common to all  
types of controls, others apply to only  
certain control types



Caption property  
specifies the text displayed in a *label* control  
on the Format tab

right-aligned caption text in all labels

## Inserting an Image

Image button 

just as in PowerPoint (Insert | Picture | From File...)

opens a dialog box so you can navigate to the file containing the graphic

places an Image control on the form to display a static picture

## Using Text Boxes for Calculations

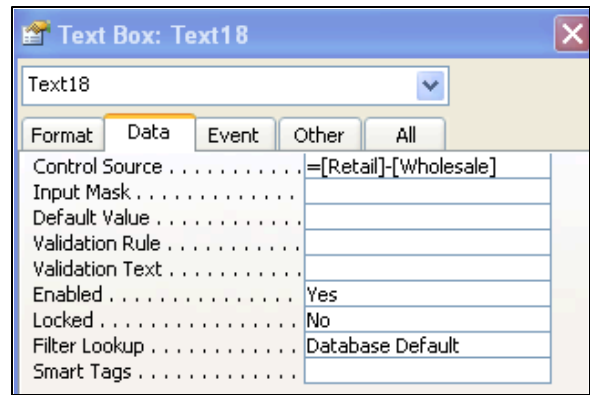
ControlSource property (nib)

on the Data tab

used to specify what appears in a control (eg: text box or check box)

here: added a new text box control and set its Control Source to `=[Retail]-[Wholesale]`

what happened when you changed an item's Retail value?



Format property

on the Format tab

use to customize the way a control's contents are *displayed and printed*

several predefined formats (dates, times, numbers);

can create a custom format eg: mm/dd/yyyy

here: changed Profit text box's Format to Currency

## Modifying the Tab Order

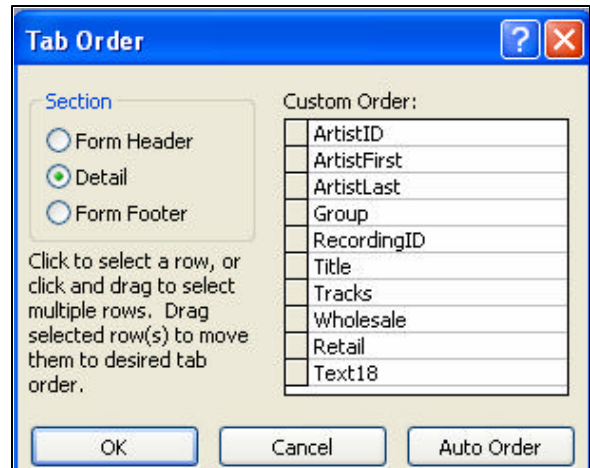
the sequence in which controls receive the focus as a user presses [Tab] to navigate the controls on a form

View | Tab Order...

to refine the form's tab navigation sequence

generally use after moving or adding controls

each form *section* has its own tab order



## Entering and Editing Records

use a form to view/enter/edit/delete records

New Record button 

Edit Record (pencil) symbol 

Printing a Single Form

File | Print... | Selected Record(s) | OK

## Modifying the Database Structure

### One to Many Relationships

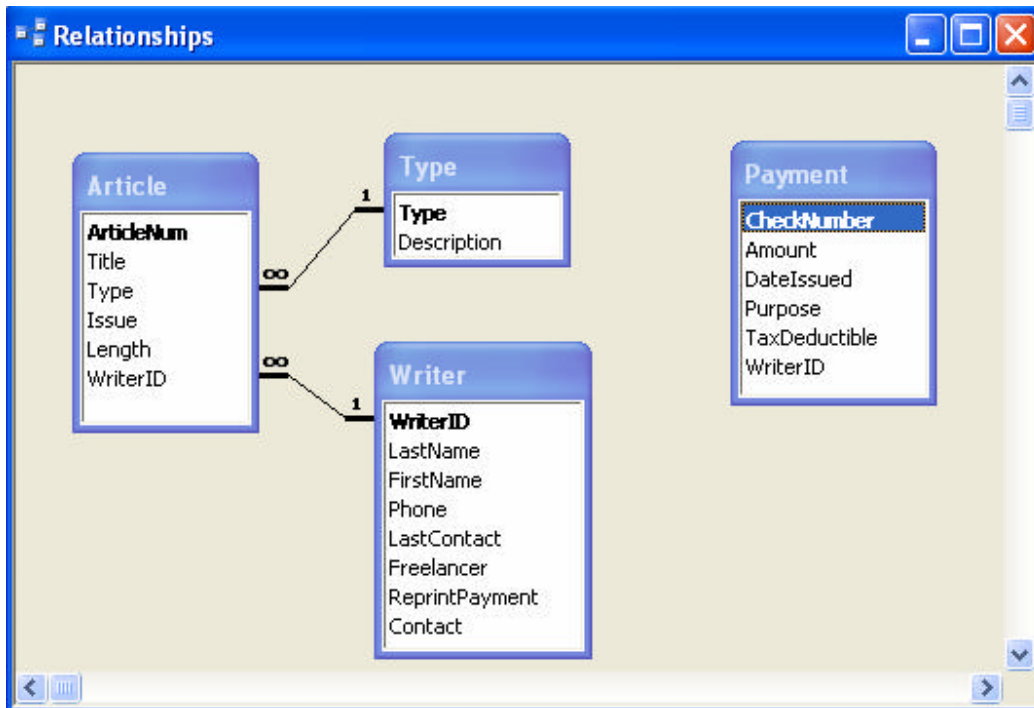
the most common type of inter-table relationship

each record in table A can have *many* matching records in table B but each record in table B has no more than *one* matching record in table A.

egs: each *Writer* can write many *Articles*, but each *Article* is written by 1 *Writer*

each *Writer* can receive many *Payments*, but each *Payment* is made to 1 *Writer*

implementation: include the primary key of the *one* table as a foreign key in the *many* table



### Creating One-to-Many Relationships

Relationships button 

opens the Relationships window

used to define/view relationships between tables

drag the primary key from the *one* table & drop it on the foreign key in *many* table

## Enforcing Referential Integrity (CLUES TO USE, E-7)

each foreign key in the *many* table must match the primary key of a record in the *one* table  
*no unmatched foreign keys*

keeps data in related tables “in synch” by preventing *orphaned records*

referential integrity issues:

- when **add or edit** a record in the *many* table and specify a value for the foreign key, there must already be a record with the same value in the *one* table’s primary key field  
eg: the *WriterID* in each *Article*, must match a writer in the *Writer* table
- can’t **delete** a record from the *one* table if any matching records exist in the *many* table  
eg: can’t delete a *Writer* record if any *Article* records exist for that writer
- can’t **change** the primary key of a record in the *one* table if any matching rows exist in the *many* table  
eg: can’t change a *Writer*’s *WriterID* if any *Articles* use that *WriterID*

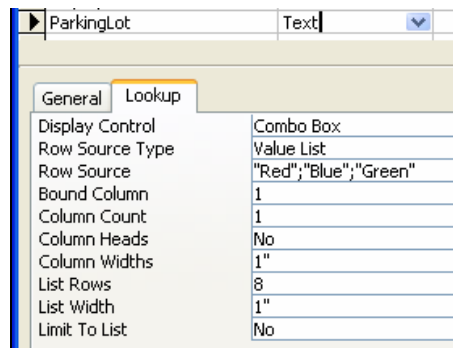
## File | Print Relationships

creates a report object that illustrates the inter-table relationships

## Creating Lookup Fields

sets field properties that allow a user to choose a value from a list

the listed values are selected from a predefined list or from another table



DateHired	EmployeeNo	ParkingLot
03/22/1998	134703883	Blue
08/20/1998	173485873	Green
08/06/1998	222334400	Red
01/03/1997	234567800	Blue
07/01/1998	321008888	Green
04/04/1998	333333333	

helps ensure *data integrity* since the user must pick an item from the list

**Modifying Text Fields**  
**Modifying Number and Currency Fields**  
**Modifying Date/Time Fields**  
**Modifying Field Validation Properties**

Properties used here:

- **Field Size**  
sets the maximum size for data stored in a field  
  
here: changed *FieldSize* for several text fields to 30  
changed *Hours* from Long Integer to Byte
- **Input Mask**  
makes data entry easier and controls the values a user can enter into a field  
  
here: *EmployeeNo* field had an Input Mask of **000-00-0000;;\_**
- **Decimal Places**
- **Description**  
text that appears in the Status Bar when a field has the focus
- **Format**  
select from several predefined formats or create a custom format  
  
here: changed *Attended* field to format of **mm/dd/yyyy**
- **Validation Rule**  
an expression that limits the values that can be entered into a field  
  
is evaluated when user leaves the field  
if the expression evaluates as TRUE, *Access* will store the value  
if the expression evaluates as FALSE, *Access* rejects the value and displays  
either the Validation Text message or a standard error message  
  
here: *Attended* field's Validation Rule set to **>#01/17/2004#**
- **Validation Text**  
message that is displayed when a user enters a value that violates the Validation Rule  
  
here: *Attended* field's Validation Text set to **Date must be on or after 01/17/2004**

## Creating Multiple Table Queries

### Building Select Queries

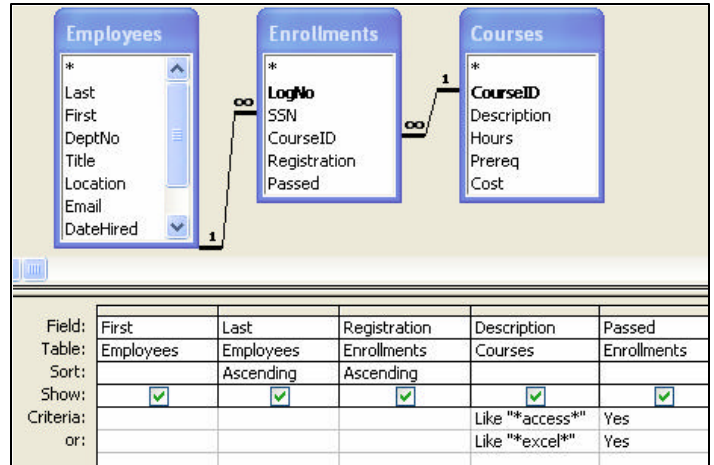
#### Field List

shows the fields available in the tables serving as the query's data source

can drag fields onto query design grid

what happens when you double-click a field in the Field List?

how can you *remove* a field from the Design Grid?



### Sorting a Query on Multiple Fields

when no sort fields are specified, records are displayed in *primary key* sequence

query results may be easier to interpret if its rows are sorted

Access allows up to 10 different sort fields

Sort row on query design grid

Ascending or Descending

leftmost sort field on QBE grid is the *primary* sort field, any sort field to its right is the *secondary* sort field, etc.

when do you need to specify a *secondary* sort field?

may need to drag fields to new locations on the QBE grid to control sorting

### Setting Comparison Criteria

criteria control which *records* are selected for processing

the query selects only those records that meet the criteria

dates are enclosed within # # eg: #12/25/2005#

text is enclosed within double quotes " " eg: "Trollen"

text fields are not case sensitive (by default)

Commonly used types of criteria: (TABLE F-1, ACCESS F-7)

- **Exact Match**  
a record's field value must *exactly* match the specified criteria value  
eg: ="Fernandez" in *Last* field
- **Range Of Values**  
a record is selected if its field contains a value within the range of the values listed  
eg: > #1/1/2003# in a *HireDate* field  
eg: <= 1000 in a *CreditLimit* field
- **Is Null**  
a record is selected if its field *lacks* a value  
eg: Is Null in *EmailAddress* field
- **Like and wildcards**  
a record's field value must match specified *pattern*  
wildcards provide flexibility  
\* wildcard represents any sequence of characters, letters or digits  
  
eg: Like "\*"access\*" in *Description* field

### Developing AND Criteria

when 2 or more conditions are placed on the *same* criteria row, **all conditions** on that row must be true for the record to be selected for the dynaset

### Developing OR Criteria

when conditions appear on *different* criteria rows, **at least one** row must be true for the record to be selected for dynaset

each row is evaluated separately from other rows

### Creating Calculated Fields

appears in the query results dynaset but is *not* stored in an underlying table

you don't need to *store* the calculated result since the query will always calculate the *current* value whenever the query is run.

multi-word field names *must* appear in brackets

**&**

concatenation operator (nib)  
performs string addition

eg: =[LastName] & ", " & [FirstName]

