

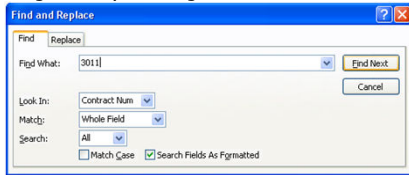
Tutorial 3 Maintaining and Querying a Database



Finding Data in a Table



- Must navigate to a record before view/delete/change it
- Find is a great way to navigate to a record



- But... Find can't:
 - show matching records as a **subset** (it jumps from record to record)
 - find records based on **multiple** field values

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Updating a Database

- A database is useful only when it's contents are accurate and up-to-date
- Maintaining a database involves
 - **inserting** new records
 - **updating** existing records
 - first navigate to the record, then edit its field values
 - Navigation mode vs. Editing mode
 - [F2] to toggle between modes
 - **deleting** records
 - navigate to the record, click Record Selector | Delete button | Yes
 - confirmation dialog box...generally can't Undo a record deletion
 - **issue**: if referential integrity is set, can't delete a record if it has matching child rows in a related table... unless the Cascade Delete option is set
 - manually deleted child rows using the subdatasheet, then deleted parent row

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Practice Time

- Open the Writer table and enter one of your friends as a new writer.
- Use Find to navigate to your own record, then change your Last Contact to today's date and your Reprint Payment Amount to \$222.22.
- Delete the newly entered record for your friend.
- Try to delete Valerie Hall's record. Do you understand why you receive an error message?

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Displaying Related Records in a Subdatasheet

- Subdatasheet
 - when tables have a defined One-to-Many relationship, the primary (one) table can display sub-datasheets showing records from the child (many) table
 - view/insert/update/delete related records stored in another table
 - Figure 3-4 page AC 115
 - Access automatically creates a sub datasheet for the **One** table in a **One-to-One** or **One-to-Many** relationship
- steps to change what the subdatasheet displays
 1. Design View
 2. Open Table's Properties sheet
 3. Subdatasheet Name property



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Introduction to Queries

- Select Query (other types of queries in Tutorials 5 & 9)
 - used to view, analyze and edit data from 1 or more tables
 - Access selects and displays the records meeting your **criteria**
- With Select queries, you can:
 - choose which **fields** to see – place desired fields onto grid
 - choose which **records** to see – specify **criteria**
 - sort records more flexibly
 - perform calculations
 - pull data from **multiple** related tables
 - make **changes** to data in tables
 - use a query as **source of data** for forms, reports or another query

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Query Views (another in Tutorial 10)

- Design View
 - create/modify query's **structure**
 - specify which fields to display, which records to display, how to sort, perform calculations

- Datasheet View
 - view the set of records that answers the question you posed
 - generally also able to add/edit/delete records

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
The Query Design Window

- Query By Example
 - to specify fields, record selection criteria, sorting, table joins
- Field List
 - methods of placing fields onto the grid:
 - drag each field separately (or double-click)
 - when you want a different order than fields appear in the table
 - double-click Field List title bar, then click and drag one onto grid
 - places every field in a column, in order they appear in the table
 - double-click the * in the Field List
 - places * in a single column, representing all fields
 - is fast... but can't use sort or record selection criteria
- Show check box
 - purpose?
 - vs. deleting the field from the grid

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Creating and Running a Query

- Can create via Query Wizard or Design View
-  button
 - executes the query, then displays query's results in Datasheet View
- Updating Data Using a Query
 - Select Queries generally produce a **dynaset**
 - a **dynamic** view of a **set** of records
 - can insert/update/delete rows in a dynaset and the changes are stored in the underlying table
- Practice Time
 - Create a query that shows each article's title, type, issue date, and length. Save as **qryArticles** when working correctly.

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Creating a Multi-Table Query

- The resulting query results can have fields from any of the joined tables
- Practice Time
 - create a query that shows each article's title, type, and the author's first name, last name and phone. Save as `qryArticlesAndWriters` when working correctly.
- Cautions with multi-table queries
 - when a row in one table doesn't match any rows in the other, it isn't shown in the query results (Inner Join, lib)
 - don't include unnecessary tables
 - don't include tables that lack a join line
 - Cartesian Product (nib)

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Sorting Data in a Query

- By default records are **displayed** in primary key sequence
- Query results may be easier to interpret if **sorted** by another field(s)
- Sorting does **not** physically rearrange the order the records **stored** on disk, it only affects how the records are **displayed** in the query results
- Indexes can speed up sort operations (Tutorial 9)

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Sorting Data in a Query

- Sorting Data in the Query Results Datasheet
 - A-Z Z-A sort options available via AutoFilter list at top of column
 - this technique can sort based on only a single column
- Sorting in Query Design View
 - click in Sort row, then select Ascending or Descending
 - Access allows up to 10 different sort fields
 - each can be either Ascending or Descending
 - unique vs. non-unique sort fields
 - leftmost sort field is **primary** sort, sort field to right is **secondary...**
 - may need to drag fields to new locations on the grid
 - Demo:
 - Modify `qryArticlesAndWriters` to sort by type.
 - Modify to sort primarily by type and secondarily by length, with longest articles on top.

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Practice Time

1. Modify `qryArticlesAndWriters` to sort by only last name.
2. Modify `qryArticlesAndWriters` to sort primarily by type, and secondarily by title (i.e., sorted by title within type). Save as `qryArticlesAndWriters` when working correctly.
3. Create a query that shows each writer's last name, first name, and freelancer status (not necessarily in that order), sorted primarily by freelancer status, secondarily by last name, then by first name. Save as `qryWritersByFreelancer` when working correctly.

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Filtering Data

- Filter
 - shows a **subset** of records in an open datasheet or form
 - **temporarily** shows a subset of records
- Filter By Selection 
 - filters records based on a selected field value (or portion thereof)
 - steps:
 - 1) open the datasheet (or form)
 - 2) navigate to a record containing desired data
 - 3) select the field that serves as the value to match
 - 4) click Selection button list arrow
-  Filtered in Navigation Buttons
- Toggle Filter button 
 - click to revert to the full set of records

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Defining Record Selection Criteria

Session 2

- Condition
 - a criterion that controls which **records** are selected
 - consists of a **comparison operator** and a **value** (page AC 132)
- Are placed in the Criteria row(s)
 - date values are enclosed within # # e.g.: `<#12/25/05#`
 - text values are enclosed within " " e.g.: `= "Trollen"`
 - case **insensitive** by default
- Indexes can speed up execution of queries that perform joins and use conditions (Tutorial 9)

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Record Selection Criteria

- **Exact Match (=)**
 - a record is selected for the results set only if its field value **exactly** matches the specified value
 - Practice Time:
 - Create a query that shows each article's title, type, issue, and length.
 - Modify it to display only political articles.
 - Modify it to display only articles written by author S260. Save as `qryExactMatch` when working correctly.

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Record Selection Criteria

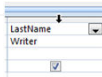
- **Range of Values Match (<, <=, >, >=, Between... And)**
 - a record is selected for the results set only if the field value has a value within the specified range
 - Practice Time:
 - Create a new query that shows each article's title, type, issue, and length and displays only articles between 1500 and 2000 words.
 - Modify *previous query* by removing existing criteria, then display only articles written during the 1980's. Save as `qryRangeMatch` when working correctly.
- **Is Null (nib)**
 - a record is selected for the query results only if the field lacks a value
 - Practice Time:
 - Create a new query that shows each writer's last name, first name, last contact date and phone but only for writers who have no phone number listed. Save as `qryWritersWithoutPhone` when working correctly.
- Additional selection criteria in Tutorial 5

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Deleting a Field Moving a Field

- **Field Selector**
 - use to select a field in order to delete or move it
- How move a field to new location on design grid?
- Purpose of Show check box?
- How remove a field from the design grid?



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Changing a Datasheet's Appearance

- Home tab | Font group
 - controls to change font, point size, etc.
- Datasheet Selector 
 - purpose?
- Resizing a Datasheet column
 - double-click the right column boundary to provide best-fit
 - drag a column boundary
 - how did you change all column widths at once?
 - changing a column's width vs. Field Size property
- Changing Background Color
 - Themes Gallery

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Defining Multiple Selection Criteria for Queries

- Combine two or more simple conditions using logical operators (AND, OR)
- AND
 - place conditions on the **same** Criteria row
 - **all** conditions on the row must be true for the record to be selected
 - demo: query to display business articles shorter than 1500 words
- OR
 - place conditions on **different** Criteria rows
 - **at least one** of the **condition rows** must be true for the record to be selected
 - demo: query to display business articles or articles shorter than 1500 words
 - demo: display any article if it is a business article from the 1980's or a law article longer than 1700 words.

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Practice Time

1. Create a query that shows each article's title, type, issue, and length that is either of type business or law. Save as `qryLawOrBus` when correct.
2. Modify it to display any article that is either type business or law and each article shown must be shorter than 1500 words. Save as `qryShortLawOrBus` when correct.
3. Modify it to display any non-political article that is longer than 1000 words provided it was written by either writer S260 or L130 and provided it was written before the 1990's. Save when working correctly. Save as `qryMultipleCriteria` when working correctly.

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Creating a Calculated Field

- A misnomer!
 - a field is a column of data **stored** in a table
 - **calculated column** appears in query results but is **not stored** in a table
- Calculated Column
 - an **expression** that Access evaluates and displays in the query results
 - eg: Late Fee: [Invoice Amt]*0.03
 - multi-word field names must be enclosed within [brackets]
 - where do you place the expression on the grid?
 - don't store calculated values that are derived from fields that you do store
 - wastes space
 - would need to update the calculated value when the other field changes
 - **transitive dependency** (lib)
 - since you can calculate the value on the fly, you don't need to store it

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Practice Time

- A condensed version of each article is to be written. Goal is 80% of article's original length. Show each article's title, length and condensed length. Save as **qryCalculated** when correct.
 - Goal: [Length] * .80
- Modify the previous query to show the author's full name (eg: Trolen, Tom). Save as **qryConcatenate** when correct.
 - Author: [LastName] & ", " & [FirstName]
- Concatenation operator (Tutorial 5)
 - & symbol
 - performs string addition

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Calculated Column Practice

- Modify the previous query to include the writer's freelancer status.
- The Yes/No values for Freelancer field are confusing. Add a new calculated column to indicate writer type using the words Freelancer and Staff as appropriate. Save as **qryIIF** when correct.
 - Writer Type: IIF([Freelancer]=Yes, "Freelancer", "Staff Writer")
- Immediate If Function (Tutorial 5)
 - Returns one of two values, depending on a tested condition
 - IIF(condition, value_if_true, value_if_false)

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Practice Time

- Modify the previous query to display only articles published in May. Save as `qryDatepart` when correct.
 - Month: `Datepart("m", [Issue])` and then add a criterion `=5`
- Datepart Function (msb)
 - returns an integer containing the specified part of a given date
 - `Datepart(interval, date)`
 - yyyy Year q Quarter m Month ww Week
 - y Day of year d Day w Weekday
 - h Hour n Minute s Second

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Formatting Query Columns

- Column Headings in a Query
 - can specify a different column heading by citing it at beginning of field list box expression
 - eg: `Days Late: [Payment Date] - [Due Date]`
- Column Properties
 - properties control an object's appearance and behavior
 - right-click a column | Properties...
 - egs: Caption, Format, Decimal Places, Description, others
- Practice Time:
 - Modify `qryCalculated` to have the Goal column include a comma and no decimal digits. Save as `qryCalculated` when correct.

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Using Aggregate Functions

- Arithmetic operations performed to summarize records
 - examples: average, count, sum, min, max
- Can be performed in a query or a table's datasheet
- Datasheet View  Totals
 - adds Totals row at bottom of datasheet with list box for each field
 - list box shows summaries appropriate for the field's data type
- Query Design View  Totals
 - adds Totals row on grid for Sum, Avg, Min, Max, Count, etc.
 - running the query produces a single row with aggregates displayed rather than showing field details of each record
 - need a separate column for each SUM, AVERAGE, etc.

Contract Amt Statistics			
Minimum Contract Amount	Average Contract Amount	Maximum Contract Amount	
\$300.00	\$27,391.80	\$252,000.00	



Using Aggregate Functions

- Practice Time
 - create a new query that shows the number of articles, the average length, total number of words, and length of the longest. Save as `qryAggregates` when correct.

- As with any query, aggregate functions operate on the set of records that meet the query's criteria
 - what if no selection criteria are specified?
- Set **Totals** to **Where** and add criteria to impose record selection criteria in an aggregates query (nib)
 - demo: have `qryAggregates` process only the business articles

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Using Record Group Calculations

- Group By option
 - forms subgroups based on a specified field
 - produces a summary row for **each value** of the grouping field(s)
 - demo: modify `qryAggregates` to summarize for **each month**

Contract Amt Statistics	Minimum Contract Amount	Average Contract Amount	Maximum Contract Amount
	\$300.00	\$27,391.80	\$252,000.00

Contract Amt Statistics By City	City	Minimum Contract Amount	Average Contract Amount	Maximum Contract Amount
	Battle Creek	\$6,500.00	\$90,750.00	\$252,000.00
	East Grand Rapids	\$5,000.00	\$28,300.00	\$38,000.00
	East Lansing	\$15,500.00	\$17,250.00	\$19,000.00
	Grand Haven	\$10,500.00	\$10,500.00	\$10,500.00
	Grand Rapids	\$2,250.00	\$31,119.23	\$52,500.00
	Holland	\$1,500.00	\$12,170.83	\$35,000.00



Practice Time

- Copy `qryAggregates` and paste as `qryAggregates2`. Modify to provide the same summary for **each type of article**. Save as `qryAggregates2` when correct.

- Copy `qryAggregates` and paste as `qryAggregates3`. Modify to summarize by **freelancer status**. Save as `qryAggregates3` when correct.

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