An Introduction to Microsoft Access

Lecture Script

1. Introduction

Open Database: Northwind.mdb

Select "File" then "Open Database"

Note file extension .mdb

Discuss Access UI

An Access database consists of one or more **tables**

Queries can be defined to retrieve information from the tables

Forms can be specified to provide a nicer, graphical user interface for entering and viewing data stored in tables or generated by queries

Reports can be defined in order to nicely format and print the contents of tables and the output of queries

Macros and **modules** containing Visual Basic code can be written to provide additional functionality to a database application.

View Relationships

Select "Tools" then "Relationships…"

The Northwind Traders database keeps track of the day-to-day operations of a small food distribution company. The company stocks **products** provided by **suppliers**. Products are grouped into **categories.** Its **employees** service **customers** who place **orders.** Every order has an order header and one or more **order detail** records. Each order detail record contains information about one item ordered. Orders are shipped to customers using one out of a set of **shippers** that the company works with.

You can get an overview of the database, its tables, queries, forms and reports by selecting "Show Me" from the top-level menu.

The lines in the relationships view represent relationships among tables. Typically, they join together a field in one table, which refers to a field in another table. Lines are created manually by clicking the first field and the dragging to the second field.

2. Tables

Open Table (For example: Employees)

Double-clicking a table shows content in table view

Similar to Excel or other spreadsheet
Add rows at end

Add "employee" data about Prof. Dellarocas, the TAs, etc. (notice that some field can be specified as "required fields" and the system does not complete record entry unless they have been filled in; example: First Name, Last Name)

Although it's easy to add more rows, can't add columns (e.g. add a column "stock options" in the Employees table)

Rows = data records, database **content**
Columns = fields, part of database **design**

Switch to design view

Select "View" then "Design View"
Every field has a Name, a Data Type and a Description
The lower right part of the screen provides context-sensitive help on the element that the cursor is on. More help can be obtained by pressing F1.
There are several different data types that a field can have

Text, Number, Date/Time, Currency, Autonumber…

Properties of data types

Formatting (e.g. birth date field)
Validation rules (e.g. birth date field)

Indexing:

Users can optionally instruct Access to create an index on any field of any table

Pros: faster to find and retrieve data

Cons: slower to enter and save data

Primary key:

Every table must have a field whose value uniquely identifies each record in the table (e.g. the SSN for people, the ISBN for books, etc.)
That field is called the primary key and is marked in the fields list with a key icon

Create New Table (Example: A students table)

Use wizard and select a table template that comes close (e.g. customers table)

Selectively add fields from the table template

Id, first, last, e-mail

Show in table view to add sample record

e.g. Ben Lee, yoongl@mit.edu

Show in design view to create from scratch

Import Table from Excel

Select "File" then "Get External Data" then "Import"

Select an Excel filename

Wizard walks you through details and eventually generates a new Access table which contains the data contained in the Excel spreadsheet

Export Table to Excel

Right-mouse-click on a Table, select "Save As/Export"

3. Queries

Access uses SQL as its query language. In addition it supports a graphical front-end that allows easier specification of queries and automatically translates them into SQL

Simple Queries

Create query to list employee names (click "Queries" tab in the main Access window, click the "New" button, select "Design view" – there is also an option to use a wizard for semi-automatically generating some simple queries)

Explain sections of design view screen

Upper half of screen lists all the database tables that participate in the query (all the tables you would list in the FROM clause of SQL)

Lower half of screen lists all the fields of the above tables that are either being displayed or participate in some way in the selection, grouping or aggregation of the final query output

Example: Employees table, first and last fields
Run

To run a query, select "View" then "Datasheet View"

Save as query

If you attempt to close the query design window then the system asks for a name to save the query under

Query is saved under the "Queries" tab

Query views

Double-clicking a query runs it and opens it in "Datasheet View"
Select "View", "Design View"
Select "View", "SQL View"

Modify query to sort by last name

Click on the "Sort" row of the Design View

Modify query to find USA employees

Drag and Drop "Country" field into lower half of screen
Click on "Criteria" row of "Country" field and enter "USA"
Deselect the "Show" check mark

Remove criteria

Modify query to find employees hired after 1/1/93

Drap and Drop "HireDate" field into lower half of screen
Click on "Criteria" row of "HireDate" field and enter > 1/1/93

Modify query to AND the USA criteria

As before, insert the USA criterion
By default criteria on different fields are "ANDed" together

Modify query to OR the USA criteria

Move the USA criterion to the row marked "or"

Show SQL for AND vs. OR

Joins

Create query to find all customers who placed an order in a given time frame (e.g. 1/1/95 - 12/31/95)

Goto to Queries tab/Click New/Select Design View/Add Customers table and Orders table
Access does automatic join based on the relationships that have been encoded by the designer (shown as connecting lines on the screen)
Select customer, order date, enter "between 1/1/95 and 12/31/95" in "criteria" row for order date
If a field contains more text than is visible, open a Zoom window (Shift F2) to read it
Run, show SQL
Save query to use in Totals section

Modify query to find customers who placed at least one order for a given product

add Order Detail and Products tables, set product name = "Tofu" as a selection criterion

OPTIONAL: Ask students to find all employees who handled an order for a specific customer (e.g. "North/South")

Totals (name for queries using aggregate functions)

Select "View" then "Totals". This inserts a row in the lower half of the screen which allows us to define one aggregate function per field selected

Construct a query which calculates average unit price over all products

select unit price from products table, select "Totals", select "Avg" in the Total row

OPTIONAL: Generate unique list of customers who placed an order in a given time frame

(group by, where on order date, and select count as aggregate function on order ID)

Number of products supplied by each supplier (join products and suppliers, group by suppliers, count products)

Order subtotals (join orders and order details, group by order ID, sum total = unit price*quantity*(1-discount))

Show SQL for alias

OPTIONAL: Nested queries (e.g. create query based on prior query to get total revenues)

NOTES: