Databases Using MS Access
Part III

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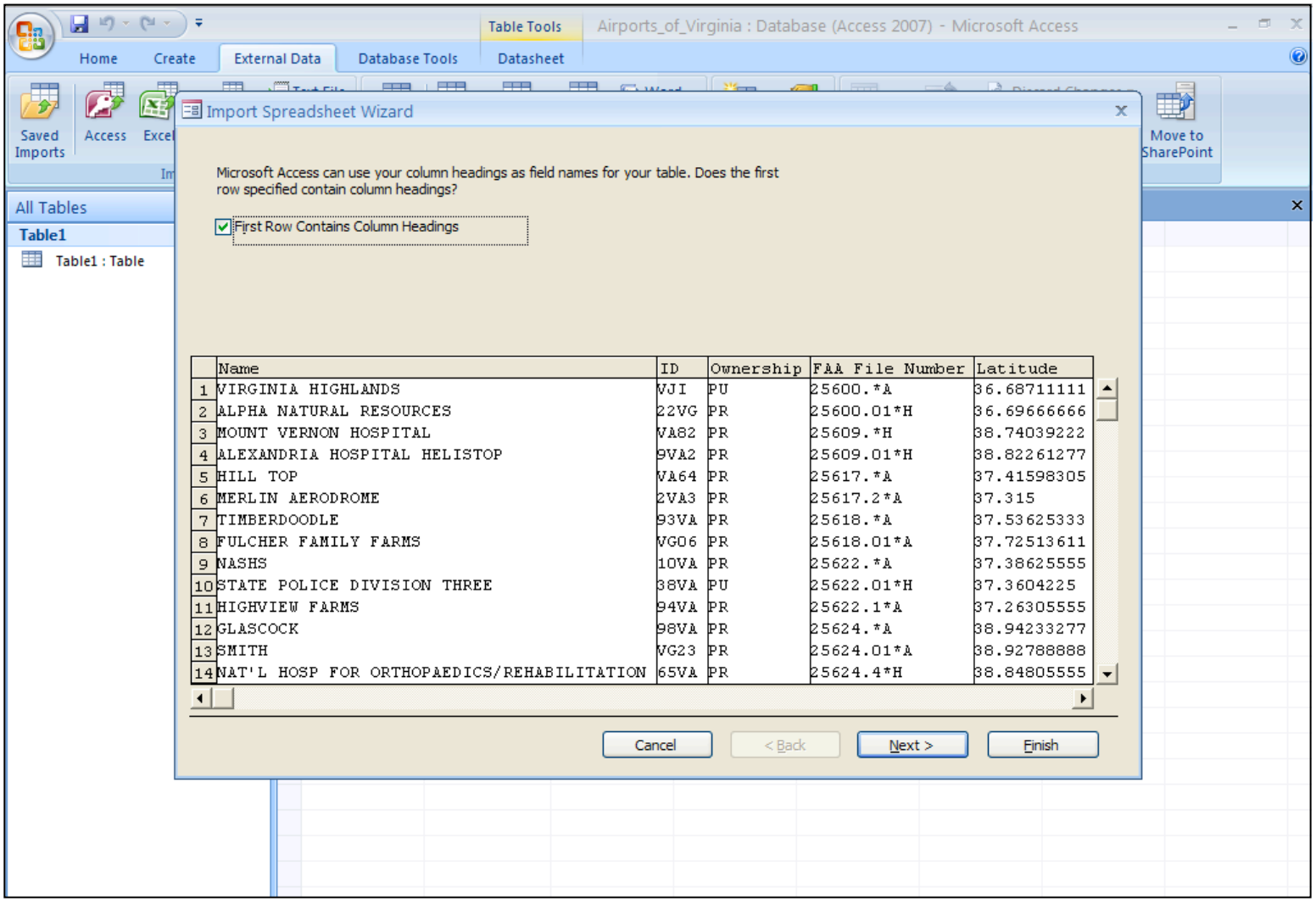
Importing Data into Access

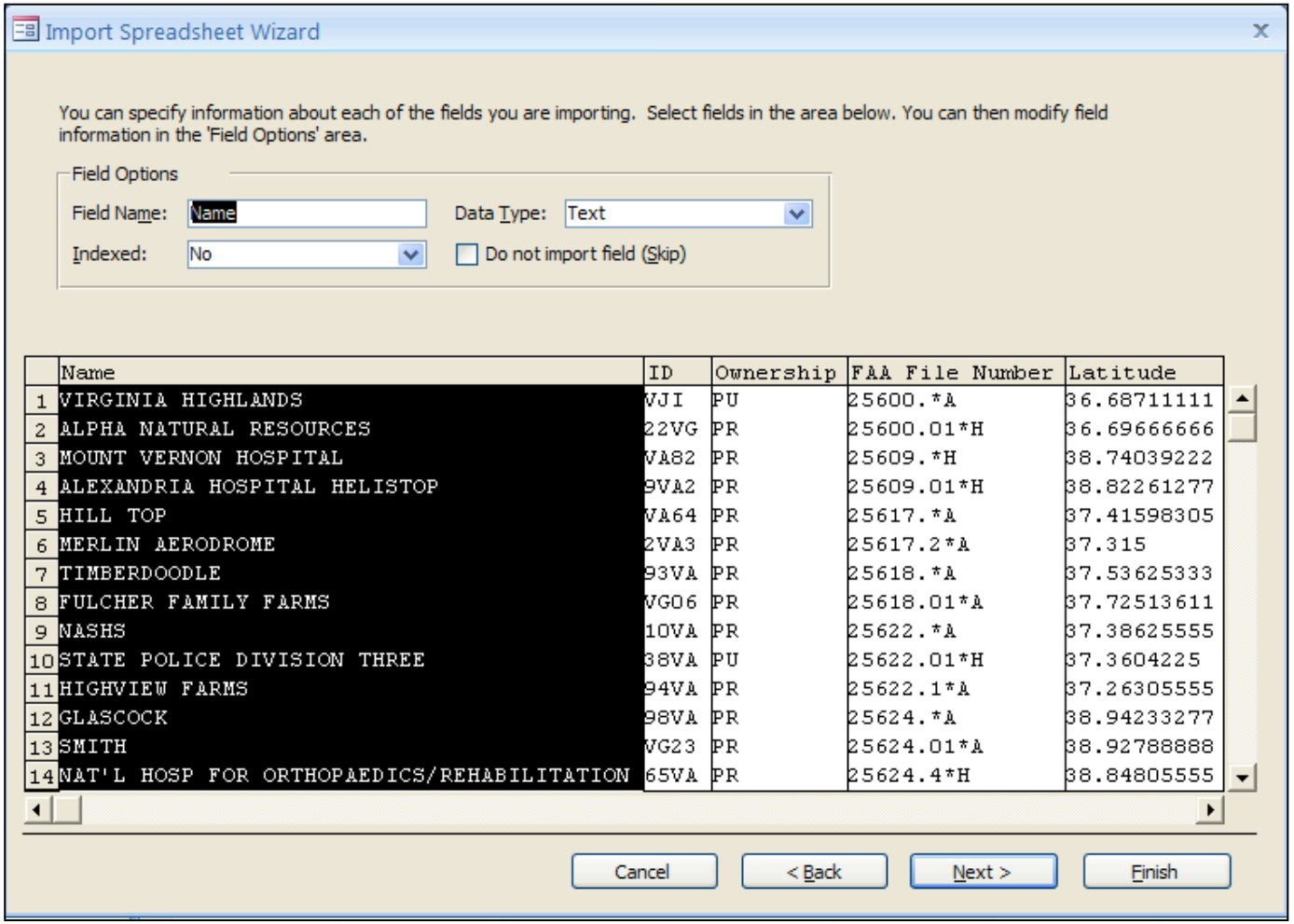
- Can import data from many sources (like Excel or text files)



	Name	ID	Ownership	FAA File Number	Latitude
1	VIRGINIA HIGHLANDS	VJI	PU	25600.*A	36.68711111
2	ALPHA NATURAL RESOURCES	22VG	PR	25600.01*H	36.69666666
3	MOUNT VERNON HOSPITAL	VA82	PR	25609.*H	38.74039222
4	ALEXANDRIA HOSPITAL HELISTOP	9VA2	PR	25609.01*H	38.82261277
5	HILL TOP	VA64	PR	25617.*A	37.41598305
6	MERLIN AERODROME	2VA3	PR	25617.2*A	37.315
7	TIMBERDOODLE	93VA	PR	25618.*A	37.53625333
8	FULCHER FAMILY FARMS	VG06	PR	25618.01*A	37.72513611
9	NASHS	10VA	PR	25622.*A	37.38625555
10	STATE POLICE DIVISION THREE	38VA	PU	25622.01*H	37.3604225
11	HIGHVIEW FARMS	94VA	PR	25622.1*A	37.26305555
12	GLASCOCK	98VA	PR	25624.*A	38.94233277
13	SMITH	VG23	PR	25624.01*A	38.92788888
14	NAT'L HOSP FOR ORTHOPAEDICS/REHABILITATION	65VA	PR	25624.4*H	38.84805555

Importing Data into Access

- As you import data, you can specify the data types for each field of the data to import



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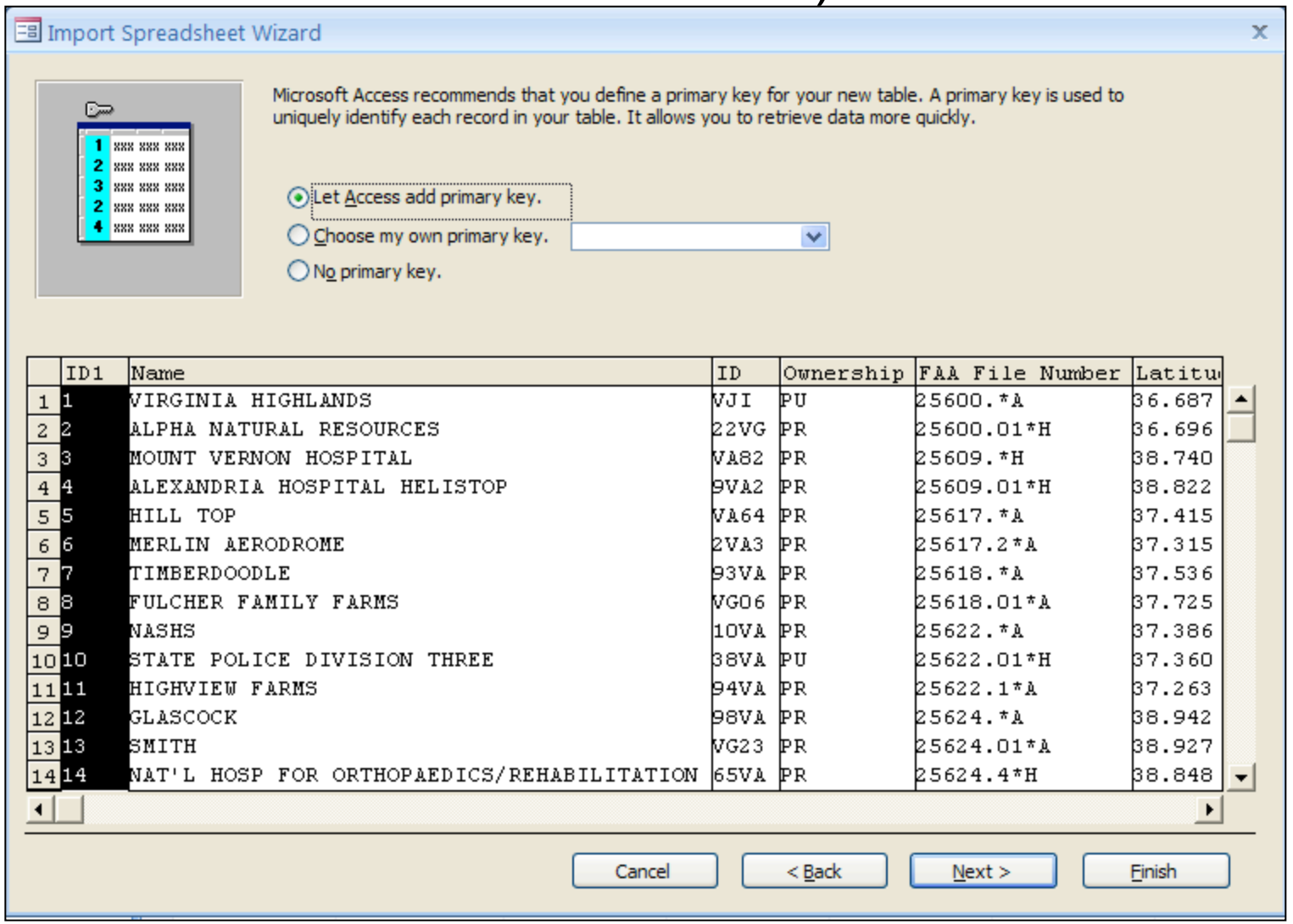
6	MERLIN AERODROME	2VA3	PR	25617.2*A	37.315
7	TIMBERDOODLE	93VA	PR	25618.*A	37.53625333
8	FULCHER FAMILY FARMS	VG06	PR	25618.01*A	37.72513611
9	NASHS	10VA	PR	25622.*A	37.38625555
10	STATE POLICE DIVISION THREE	38VA	PU	25622.01*H	37.3604225
11	HIGHVIEW FARMS	94VA	PR	25622.1*A	37.26305555
12	GLASCOCK	98VA	PR	25624.*A	38.94233277
13	SMITH	VG23	PR	25624.01*A	38.92788888
14	NAT'L HOSP FOR ORTHOPAEDICS/REHABILITATION	65VA	PR	25624.4*H	38.84805555

Importing Data into Access

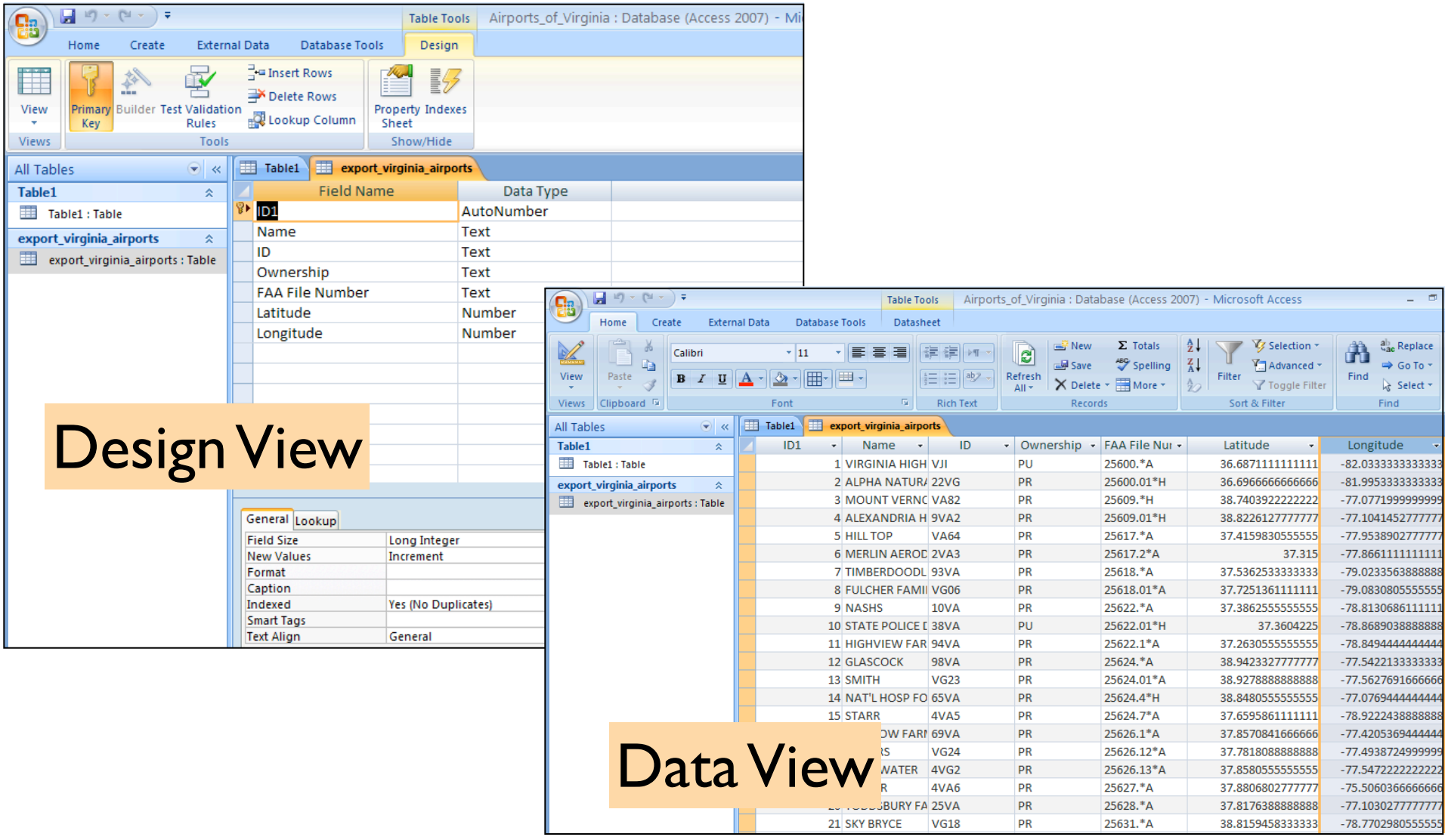
- Selecting the Primary Key of the data (I am letting Access define a new column for me)



	ID1	Name	ID	Ownership	FAA File Number	Latitu
1	1	VIRGINIA HIGHLANDS	VJI	PU	25600.*A	36.687
2	2	ALPHA NATURAL RESOURCES	22VG	PR	25600.01*H	36.696
3	3	MOUNT VERNON HOSPITAL	VA82	PR	25609.*H	38.740
4	4	ALEXANDRIA HOSPITAL HELISTOP	9VA2	PR	25609.01*H	38.822
5	5	HILL TOP	VA64	PR	25617.*A	37.415
6	6	MERLIN AERODROME	2VA3	PR	25617.2*A	37.315
7	7	TIMBERDOODLE	93VA	PR	25618.*A	37.536
8	8	FULCHER FAMILY FARMS	VG06	PR	25618.01*A	37.725
9	9	NASHS	10VA	PR	25622.*A	37.386
10	10	STATE POLICE DIVISION THREE	38VA	PU	25622.01*H	37.360
11	11	HIGHVIEW FARMS	94VA	PR	25622.1*A	37.263
12	12	GLASCOCK	98VA	PR	25624.*A	38.942
13	13	SMITH	VG23	PR	25624.01*A	38.927
14	14	NAT'L HOSP FOR ORTHOPAEDICS/REHABILITATION	65VA	PR	25624.4*H	38.848

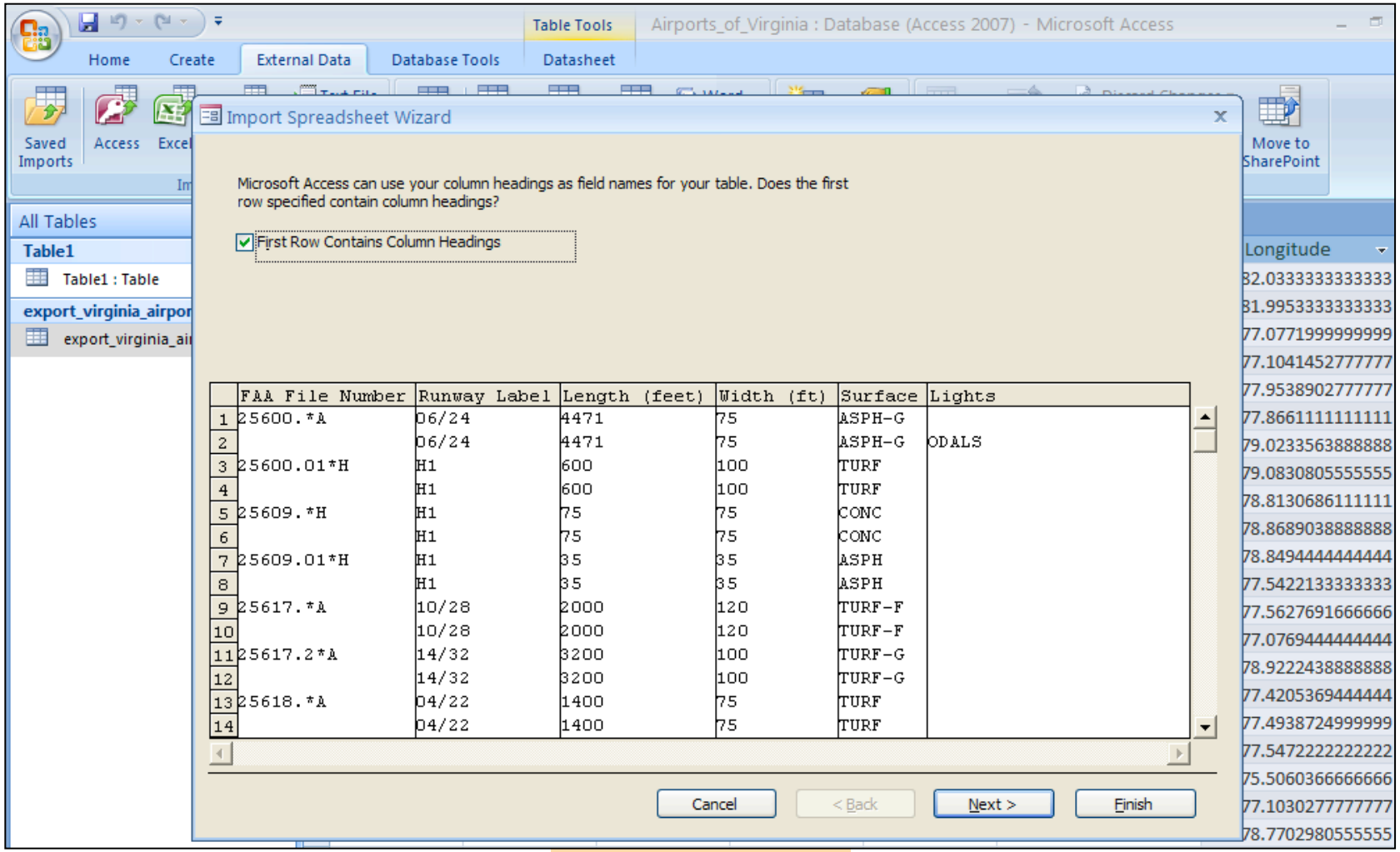
Importing Data into Access

- Imported Virginia Airports Excel file



Importing the Runways Excel File

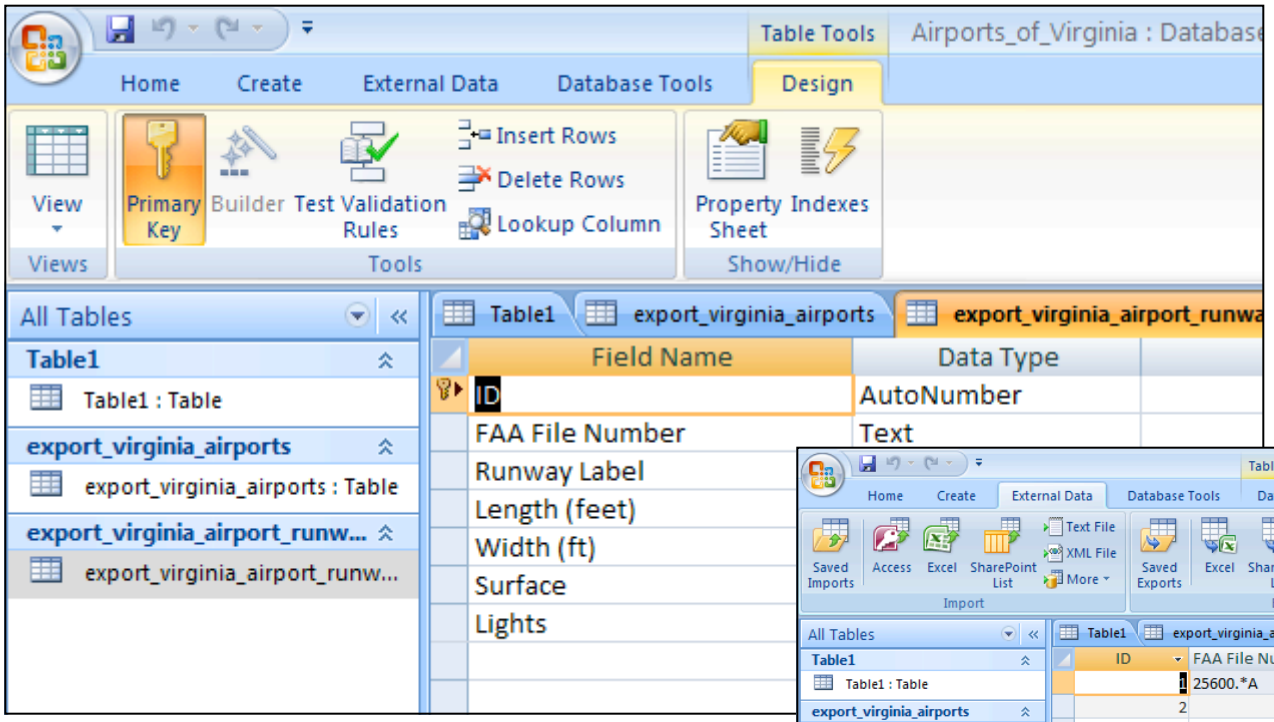
- Import a second file containing runways at the Virginia Airports



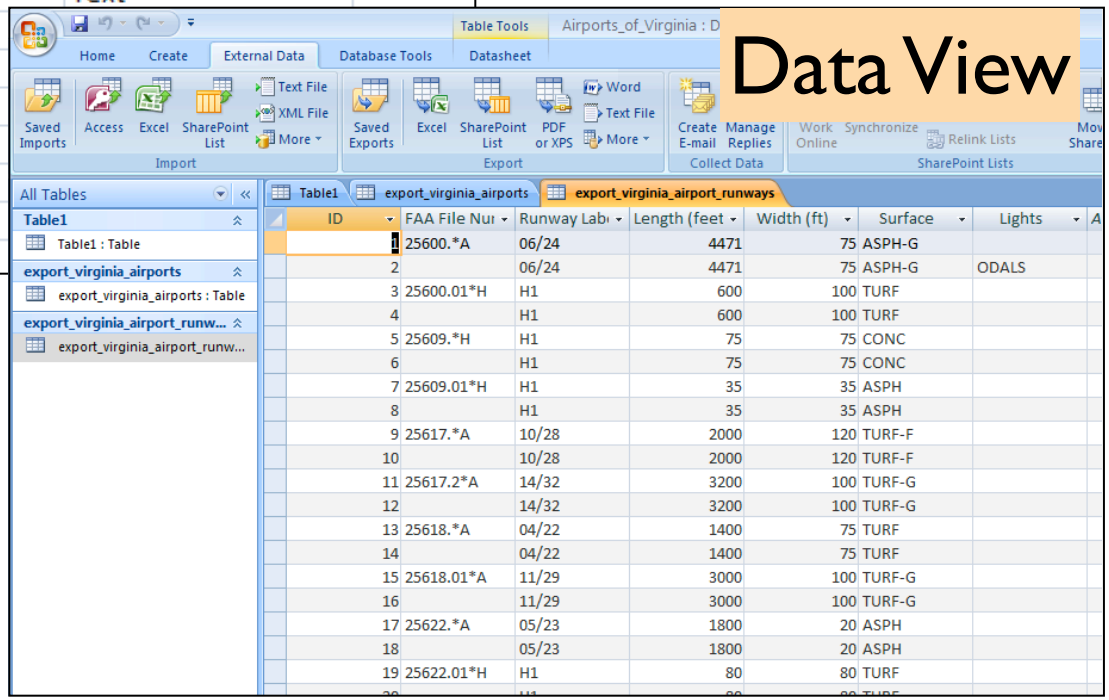
	FAA File Number	Runway Label	Length (feet)	Width (ft)	Surface	Lights
1	25600.*A	06/24	4471	75	ASPH-G	
2		06/24	4471	75	ASPH-G	ODALS
3	25600.01*H	H1	600	100	TURF	
4		H1	600	100	TURF	
5	25609.*H	H1	75	75	CONC	
6		H1	75	75	CONC	
7	25609.01*H	H1	35	35	ASPH	
8		H1	35	35	ASPH	
9	25617.*A	10/28	2000	120	TURF-F	
10		10/28	2000	120	TURF-F	
11	25617.2*A	14/32	3200	100	TURF-G	
12		14/32	3200	100	TURF-G	
13	25618.*A	04/22	1400	75	TURF	
14		04/22	1400	75	TURF	

Imported Runway File

- Imported Virginia Airports Runway Excel file



Design View



Data View

Exporting Data Out of Access

- Once we have done wonderful things we our database, we need to produce useful reports or perhaps export data to other applications such as at Matlab, Excel or JMP (a Statistical software)
- The choices to produce data out are:
  - Access reports
  - Access export data capability

Access Reports

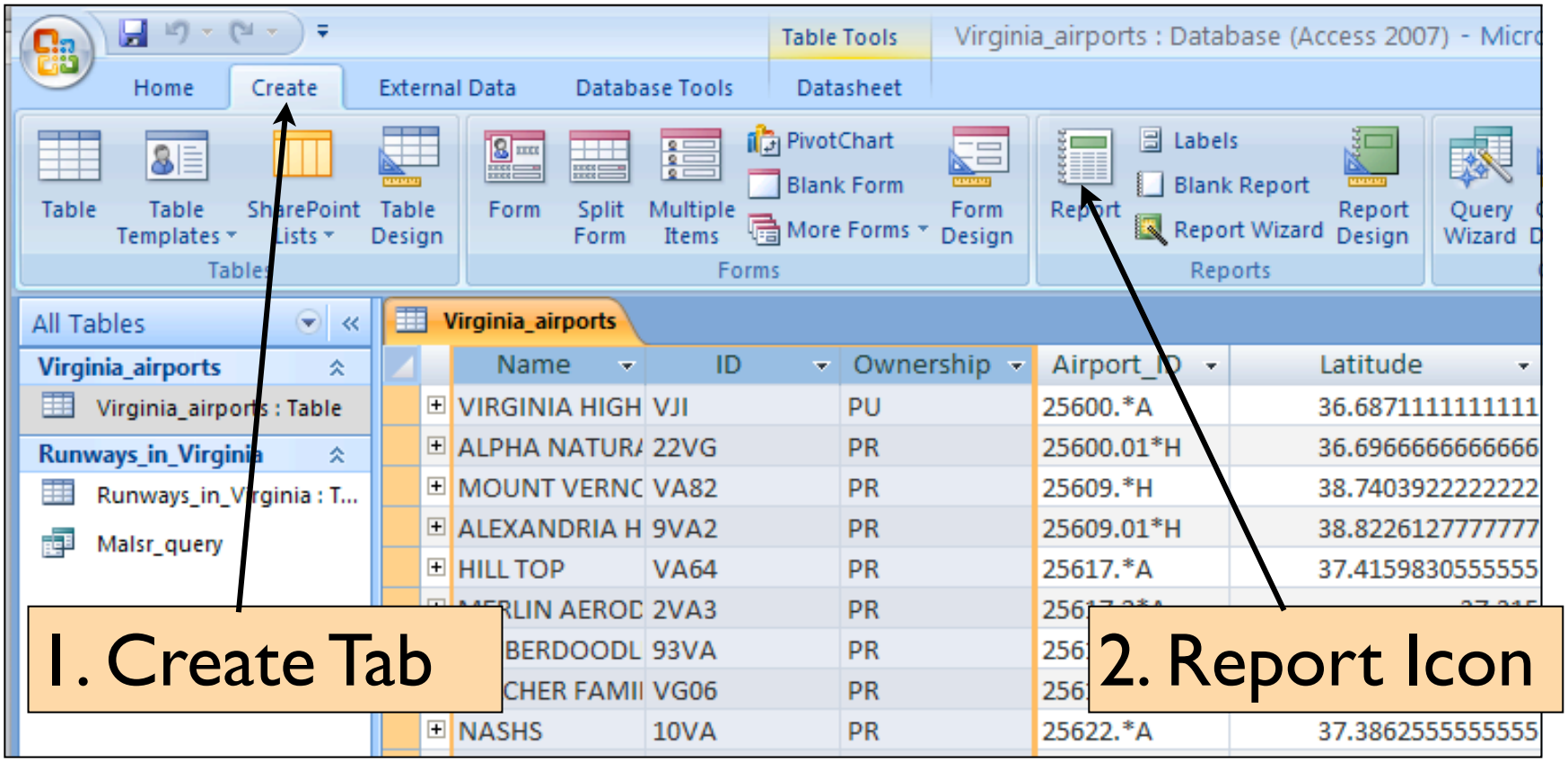
- Useful to print hard copies of your database elements
- Can generate professional-looking reports for printing
- Can be used to communicate with other non-Access users
- Can be used to debug or validate your database

Access Reports - The Basics

- Useful to print hard copies of your database elements
- Can generate professional-looking reports for printing
- Can be used to communicate with other non-Access users
- Can be used to debug or validate your database
- Reports are Access objects and they can be customized

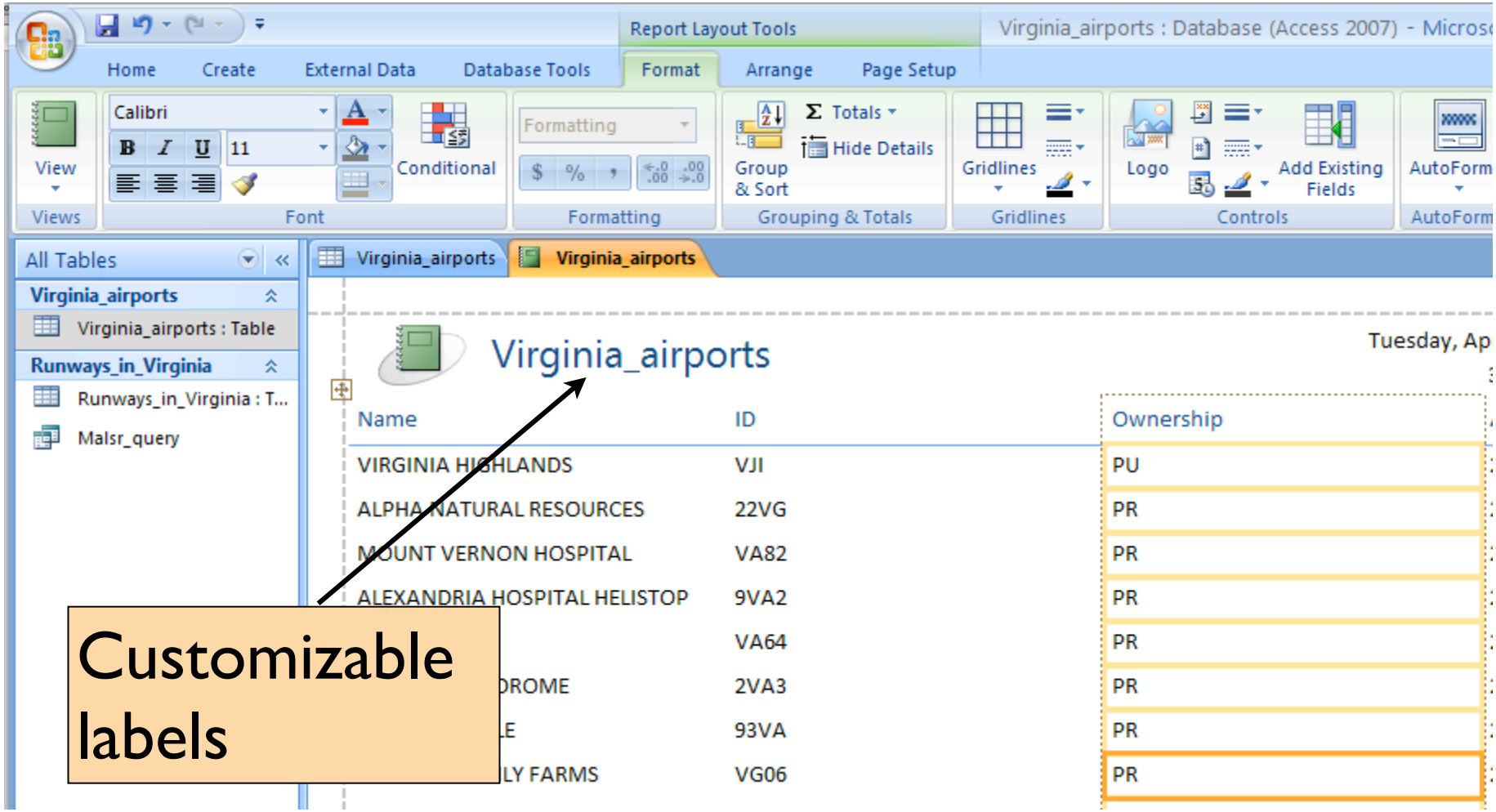
Access Reports - One Click Report

- Access provides ready-made formats to produce a simple one click report
- This is simple but lacks customization



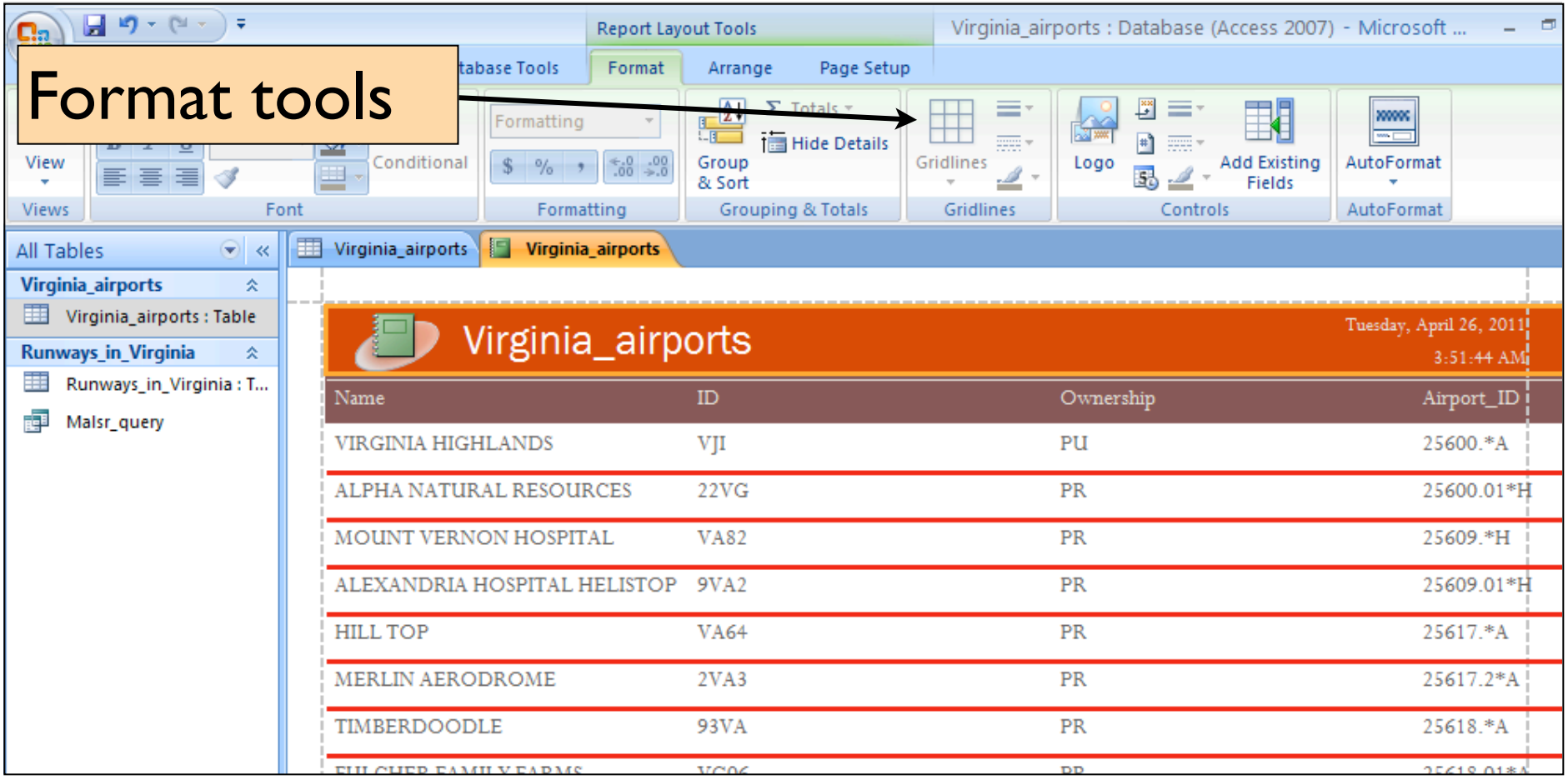
Access Reports - One Click Report

- A basic report is produced with the Access table (or part of the table) selected)



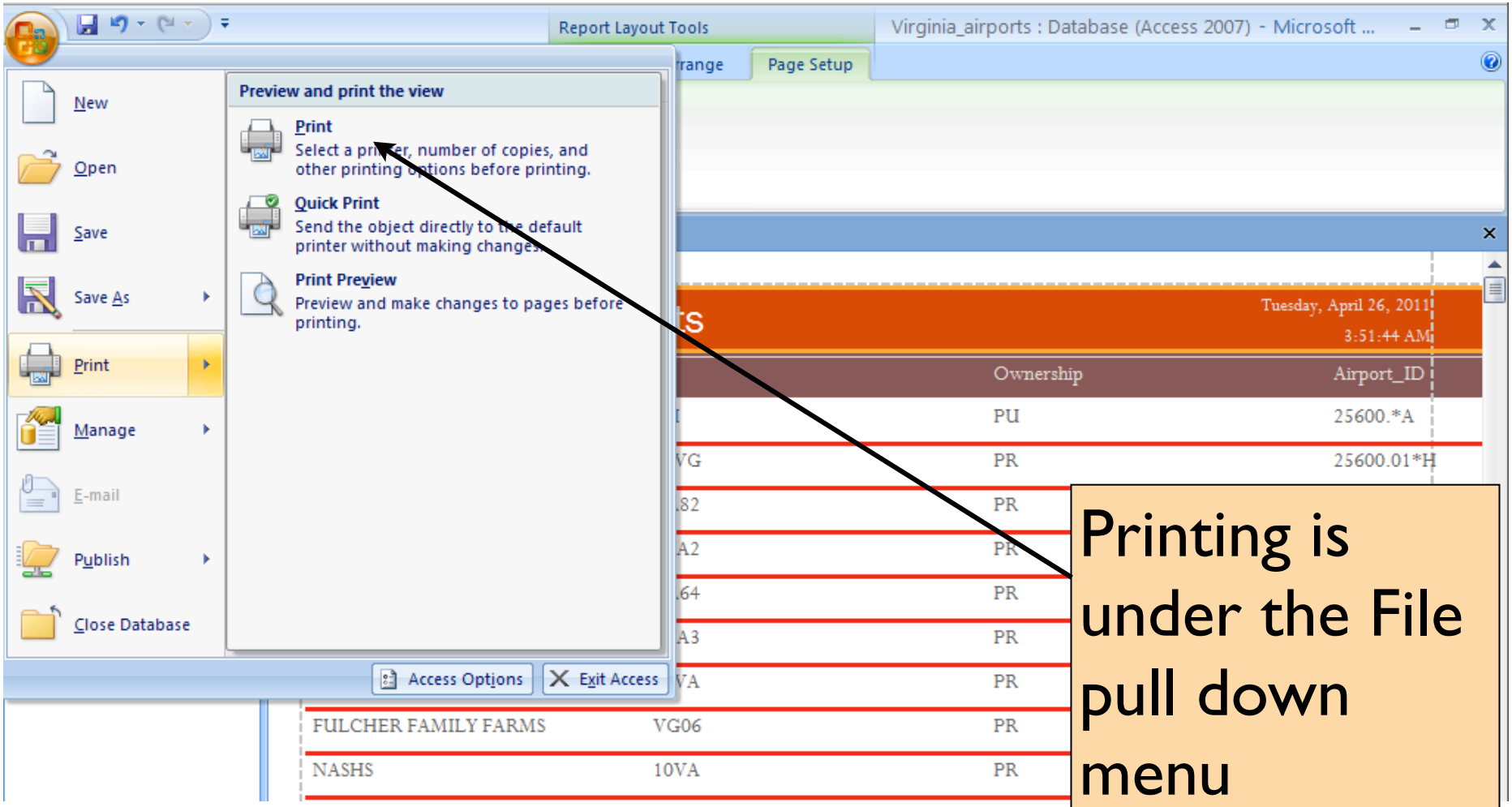
Access Reports - One Click Report

- Use the formatting Icons to customize the report as needed



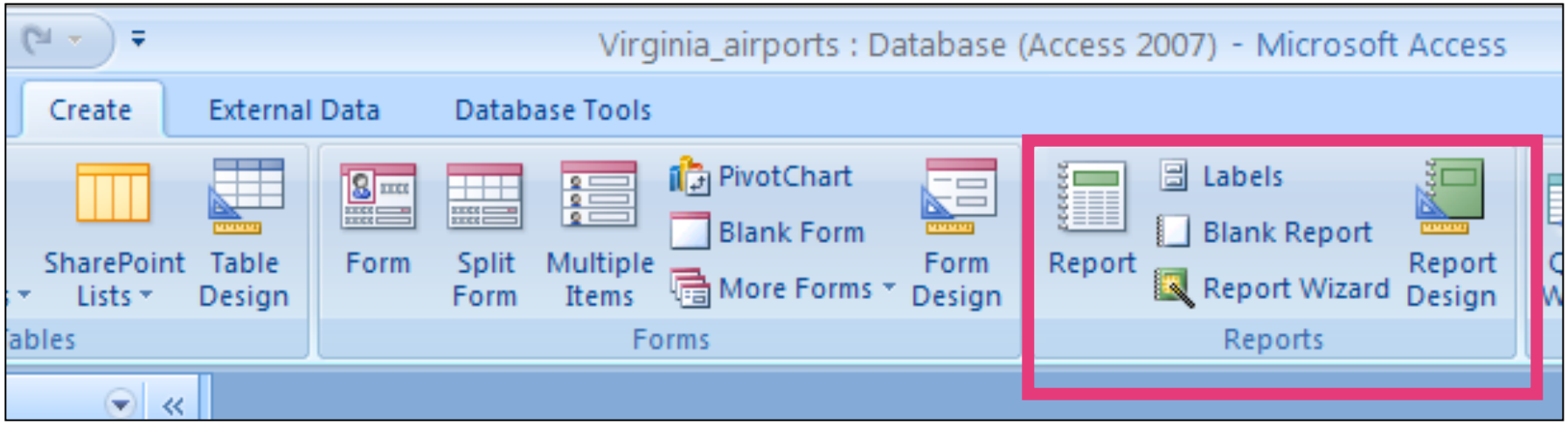
Access Reports - Printing

- Before printing the report always Preview



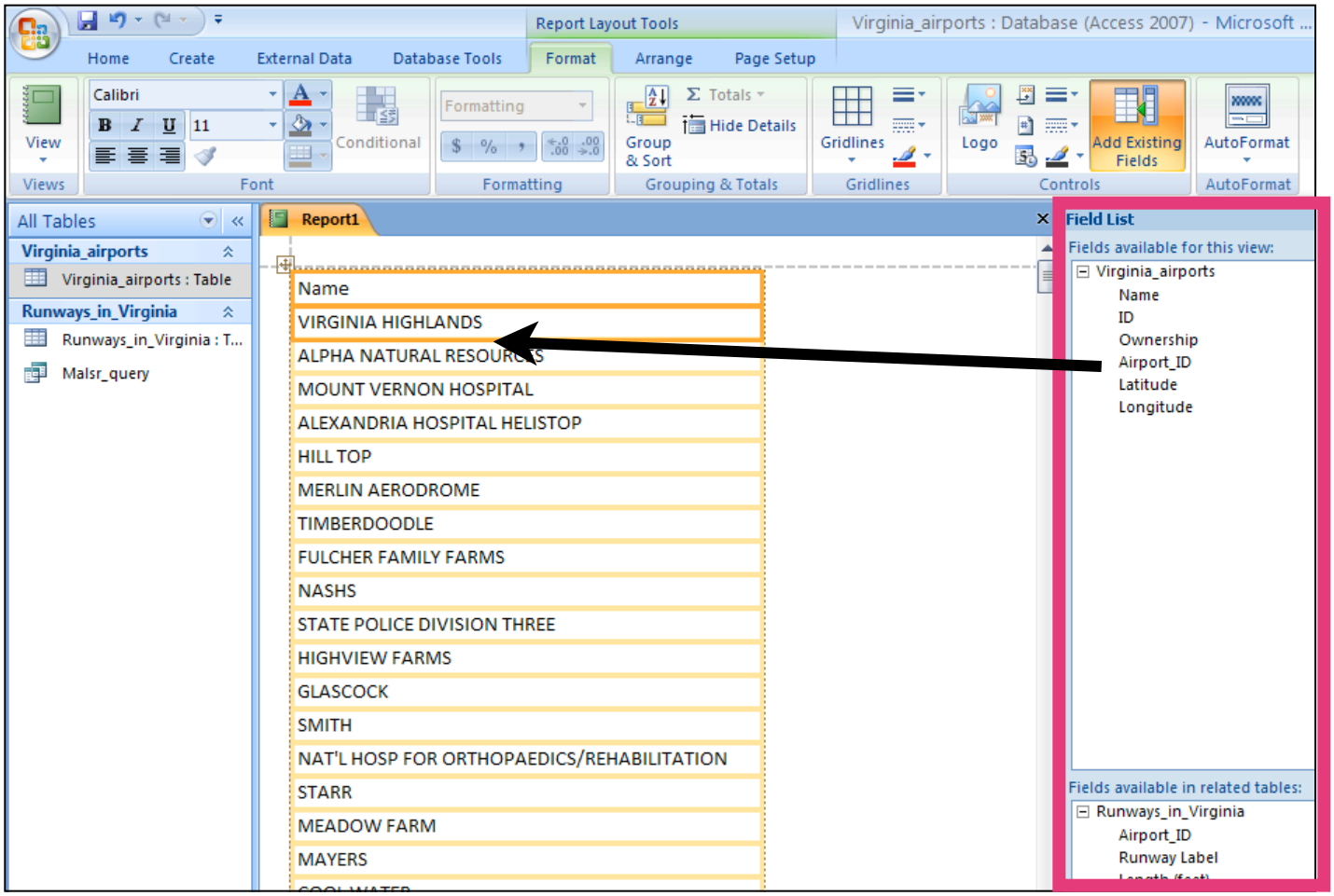
Access Reports - Custom Reports

- You can create custom reports starting from a blank report and adding the elements that you need
- Use the Create > Reports > Blank Report
- Access also provides a Report Wizard



Access Reports - Custom Report

- Just select the tables and the fields of those tables to be used in the report
- You can format the table using the formatting tools



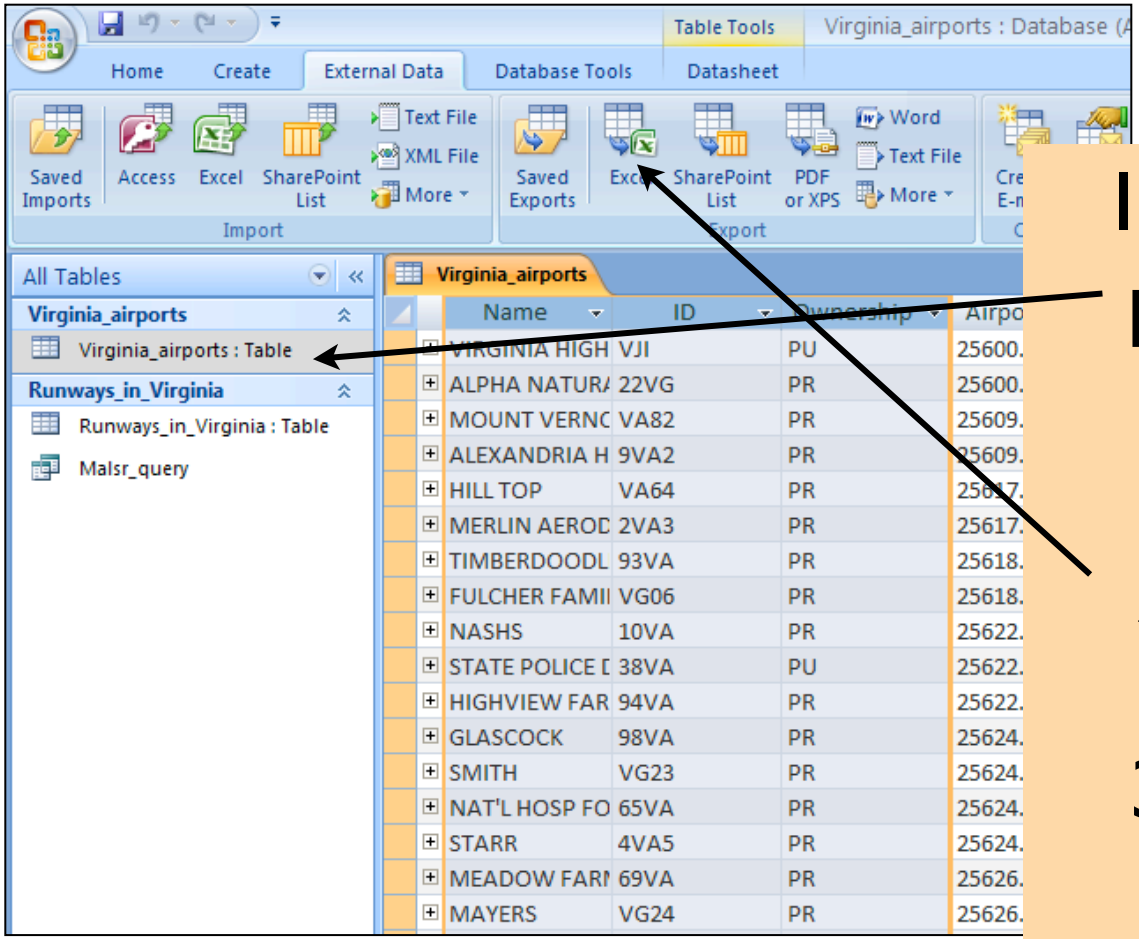
Access Export Capabilities

- Natural way to review, share or present data generated in Access
- Reports can be formatted professionally
- Various output formats are possible:
  - Text files
  - Excel file
  - Word files
  - HTML (to publish the file to the web)
  - PDF or XPS
  - XML (Extensible Markup Language)

You can also export Access Tables to other Access database applications

Access Export Data Wizard

- Suppose I want to export the Access Table Virginia Airports to an Excel file



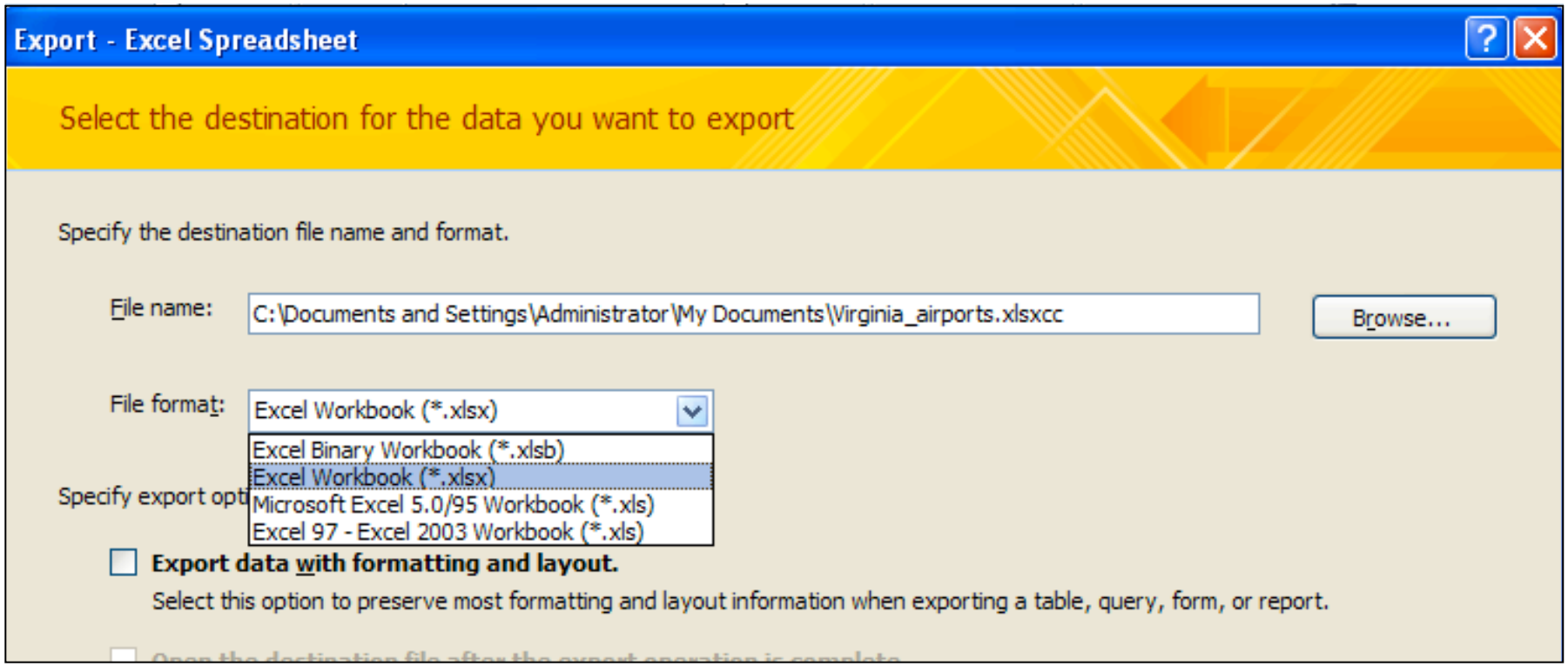
1. Select the table (or part of the table) to be exported

2. Select the format

3. Follow the simple instructions

Access Export Data Wizard

- Exporting the Access Table Virginia Airports to an Excel file
- Note multiple Excel sub-formats (.xls, .xlsx, .xlsb)



Sample Access Report (PDF Format)

New River Valley (PSK)

Dublin, Virginia

AIRPORT INFORMATION	
ROLE / CLASSIFICATION INFORMATION	
VATSP Classfication (2008):	General Aviation Regional
NPIAS Role (2008):	General Aviation
Study Classification:	General Aviation Regional (1/2 mile visibility)
ACTIVITY INFORMATION	
Based Aircraft (2007):	33
Annual Operations (2020):	9995
Annual Enplanements (2020):	n/a
DEVELOPMENT INFORMATION (2008)	
Critical Airport Reference Code (Existing):	B-II
Critical Airport Reference Code (Proposed):	C-III
Airport Layout Plan (Original):	December, 1996
Airport Layout Plan (Revision):	n/a
Proposed Development (from ALD): - Upgrade to C-III - - - - -	

AERONAUTICAL SURVEY INFORMATION

Runway End	Survey Type	Survey Date
all	OC-PSK 5084	1986

AVAILABILITY OF COMMUNICATION / NAVIGATION / WEATHER AIDS	
Available Weather Reporting:	AWOS-III
Common Traffic Advisory Frequency:	122.7
Clearance Delivery:	RTR

Nearby Navigational Aids:

PULASKI	VORTAC	116.8	PSK	035°/ 3.4 NM TO FIELD
BLUEFIELD	VORTAC	110	BLF	115°/ 26.6 NM TO FIELD
TECH	NDB	368	TEC	258°/ 13.8 NM TO FIELD
WOODRUM	VOR	114.9	ODR	257°/ 35.2 NM TO FIELD
ROANOKE	VORTAC	109.4	ROA	251°/ 31.6 NM TO FIELD
BLUEFIELD	VORTAC	110	BLF	115°/ 26.6 NM TO FIELD
PULASKI	VORTAC	116.8	PSK	035°/ 3.4 NM TO FIELD

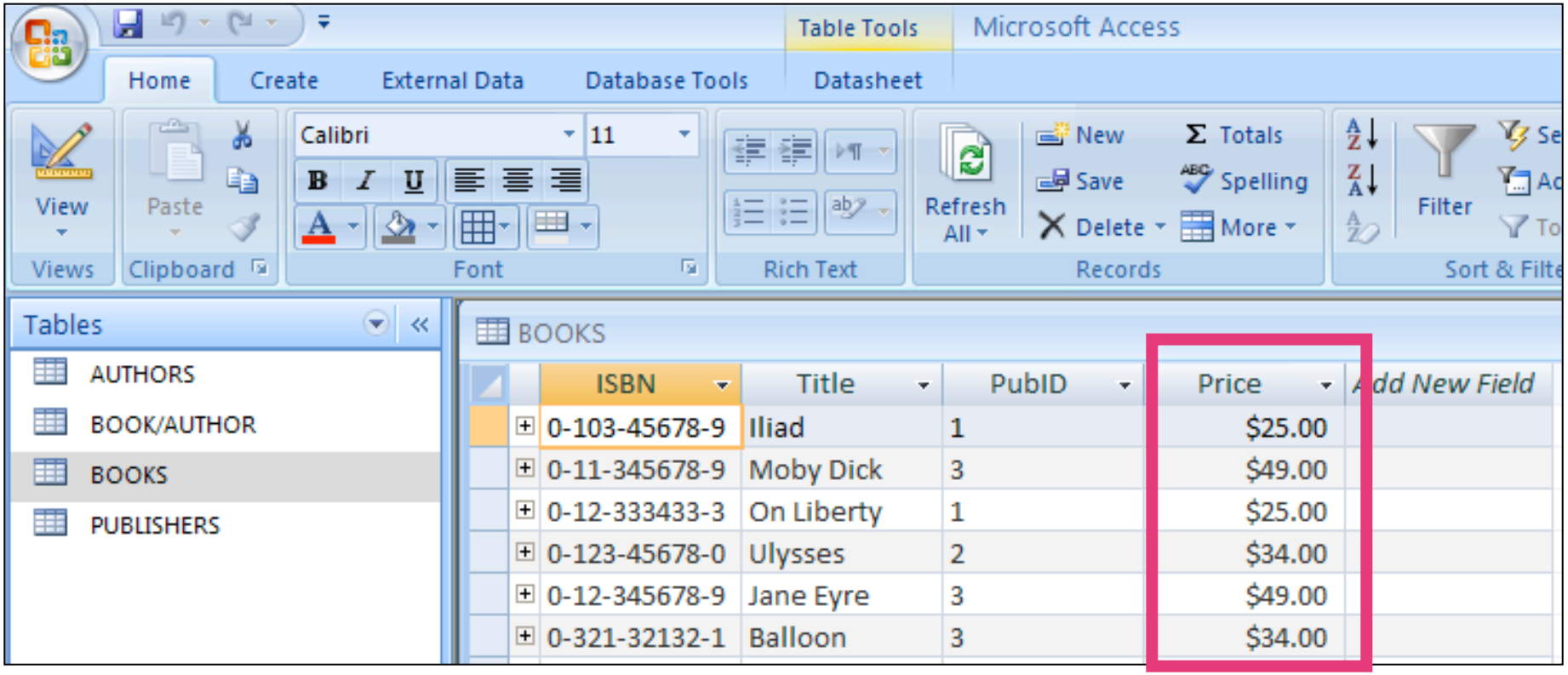
- Access report taken form a Virginia Airports study done at the Air Transportation Systems Lab
- Note: database includes graphical elements

Access and Calculations

- Simple way to extend the power of Access
- Access can do calculations using “Calculated Fields”
- Calculated fields require:
  - Field name
  - Expression to apply to that field
- Calculated fields can be done as a **query**

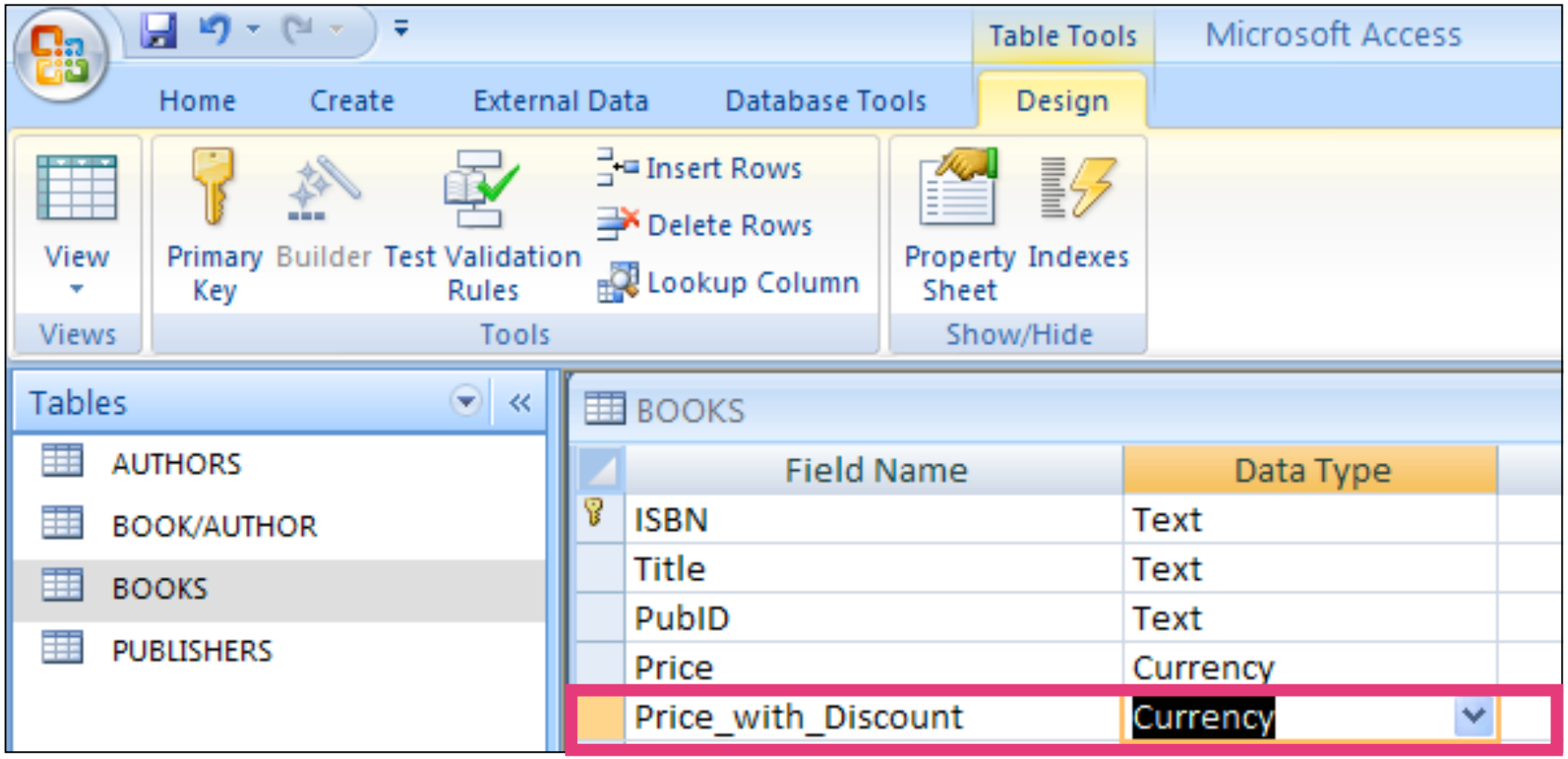
Access Calculated Field Example

- Suppose that I want to add a 10% **discount** to the books in the myBooks v4 database
- Use a calculated field in a query



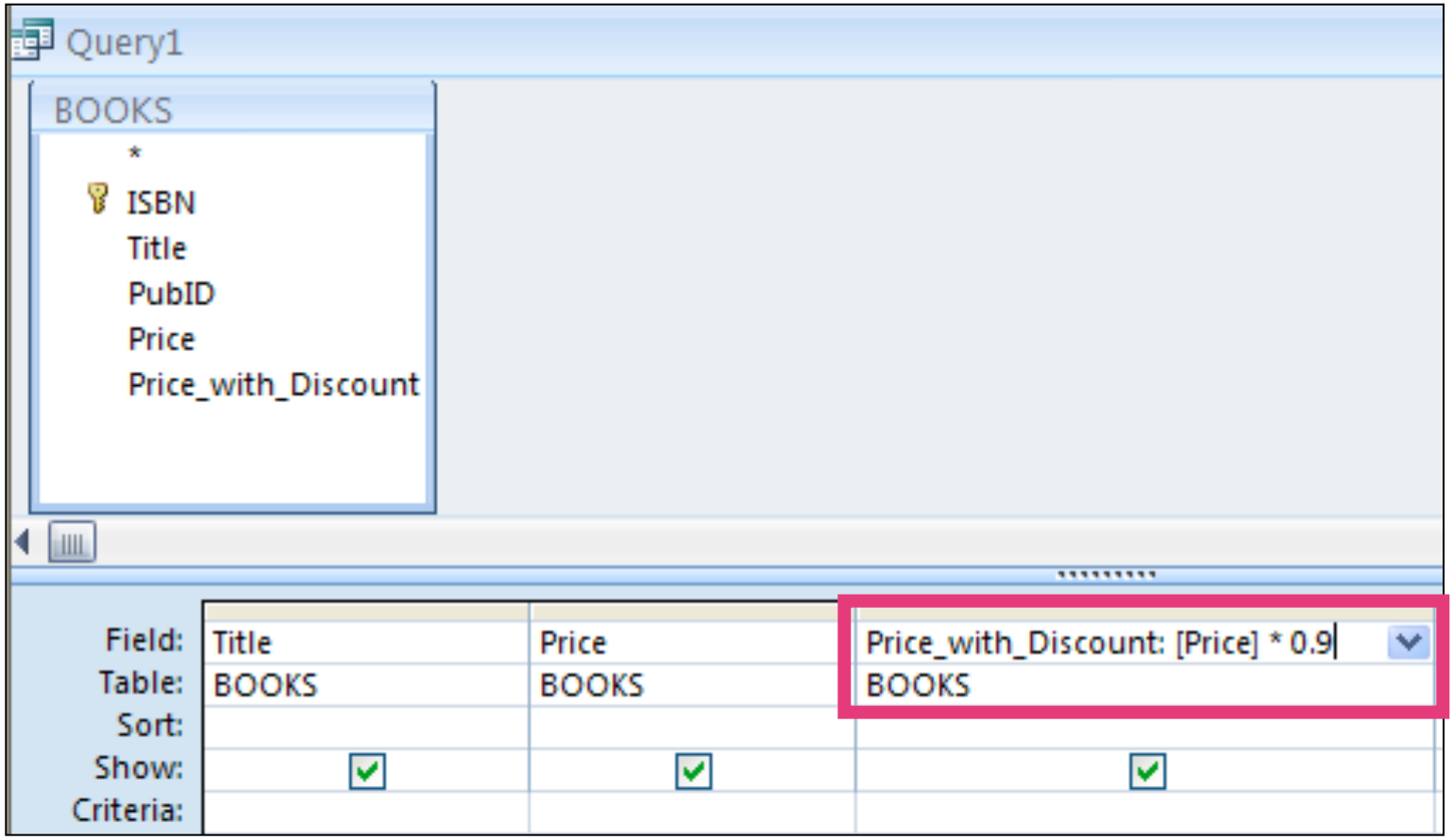
Access Calculated Field Example

- Start with the Design View of the Table where the Calculated Field is to be added
- I used Price_with_Discount as the new field



Access Calculated Field Example

- Now start a new query using the standard Query Design tool in Access
- Use the previously define Price_with_Discount as the calculated field field



Access Calculated Field Example

- Output of simple Calculated Field (after Query)

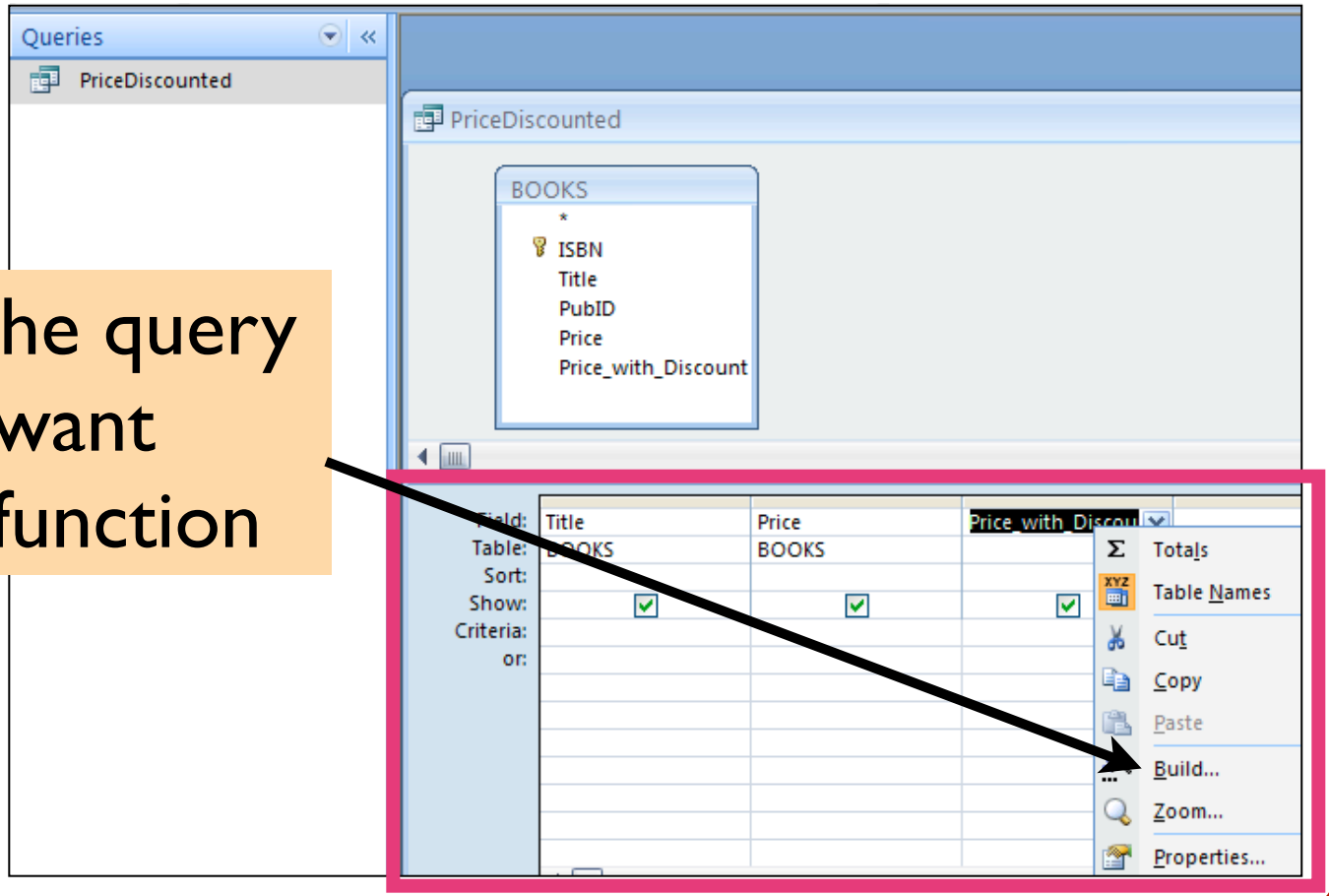
Query1

Title	Price	Price_with_Discount
Iliad	$25.00	22.5
Moby Dick	$49.00	44.1
On Liberty	$25.00	22.5
Ulysses	$34.00	30.6
Jane Eyre	$49.00	44.1
Balloon	$34.00	30.6
Main Street	$22.95	20.655
MacBeth	$12.00	10.8

Access Calculation Expression Builder

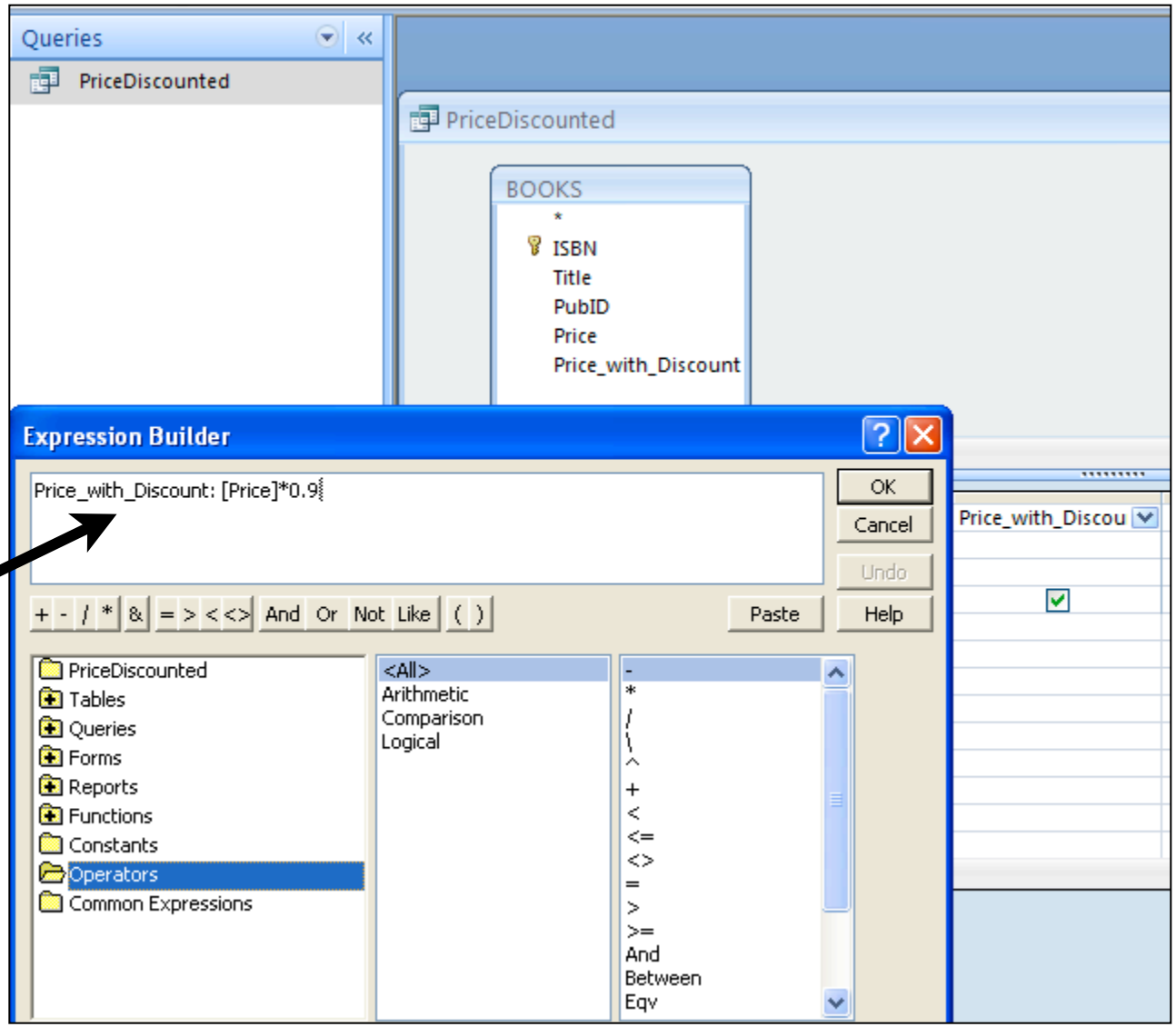
- Use Access Functions to build more complex expressions in new fields
- Functions can be opened from a Query in Design View

Right click on the query where we want to design the function



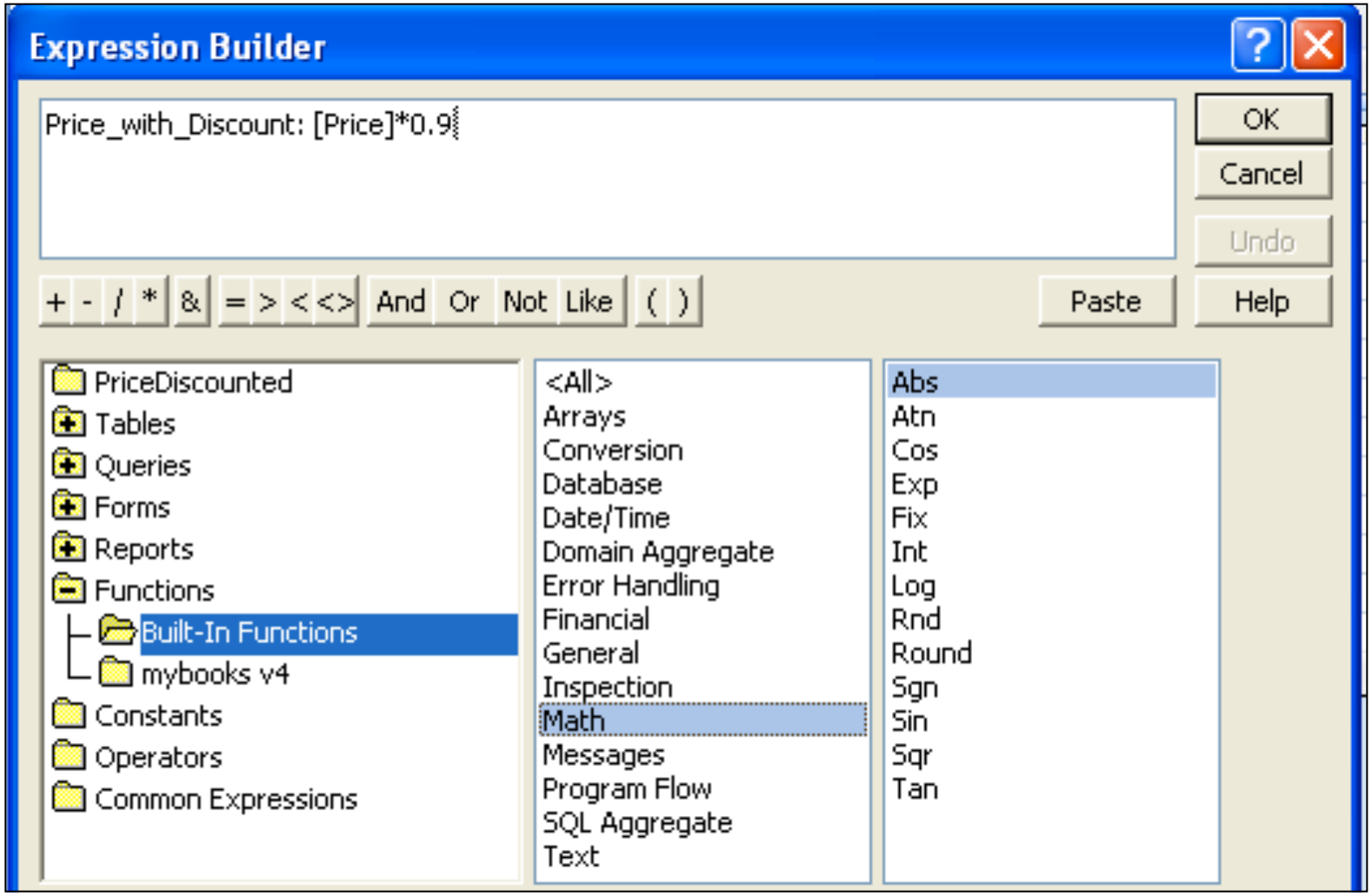
Access Calculation Expression Builder

- Build the expression as needed
- Note: here we show the previously defined expression in the calculated field



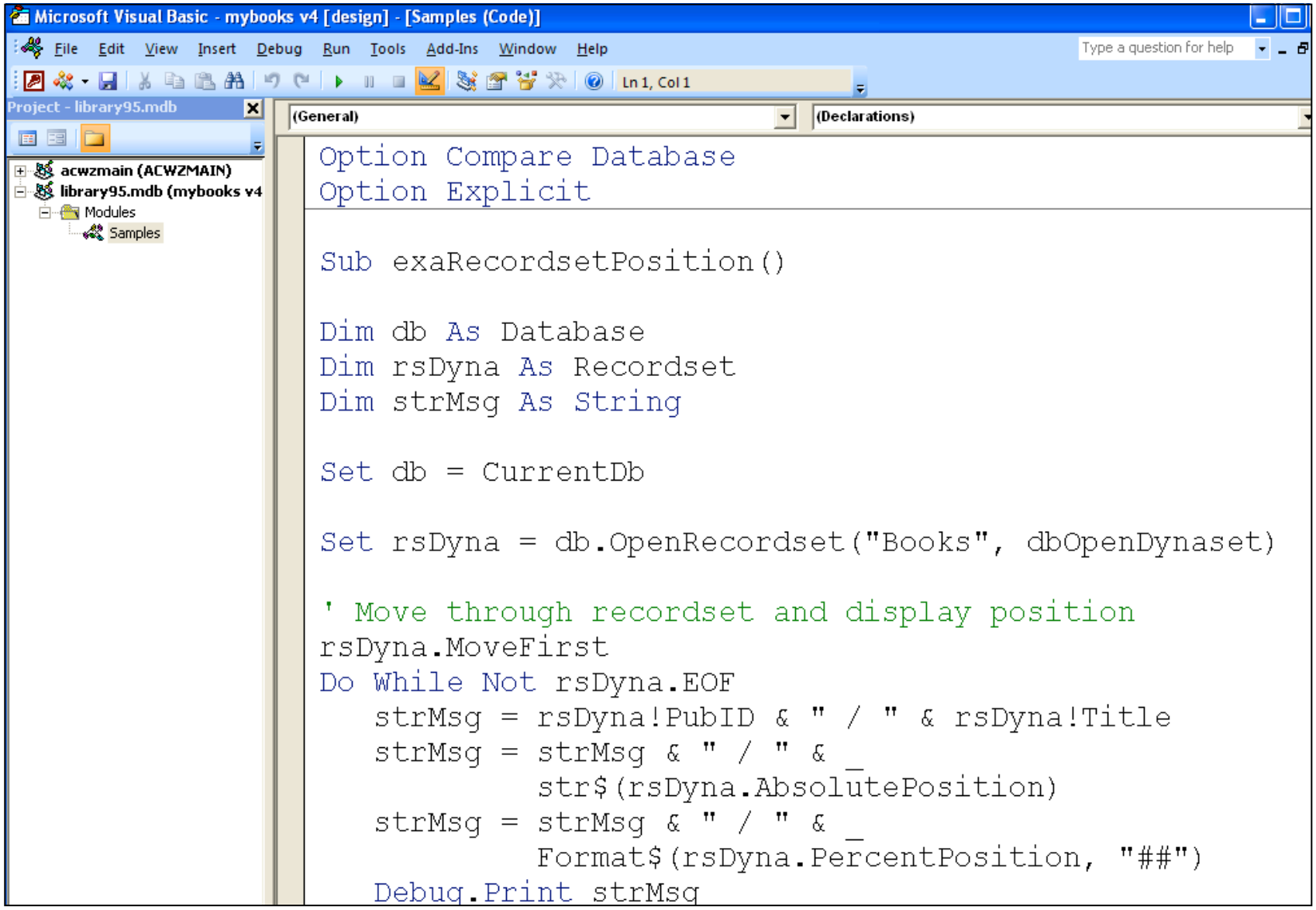
Access Calculation Expression Builder

- The usual built-in functions found in Excel can be found in the Expression Builder



If You Need More Power

- Use VBA within Access! (check Database Tools)

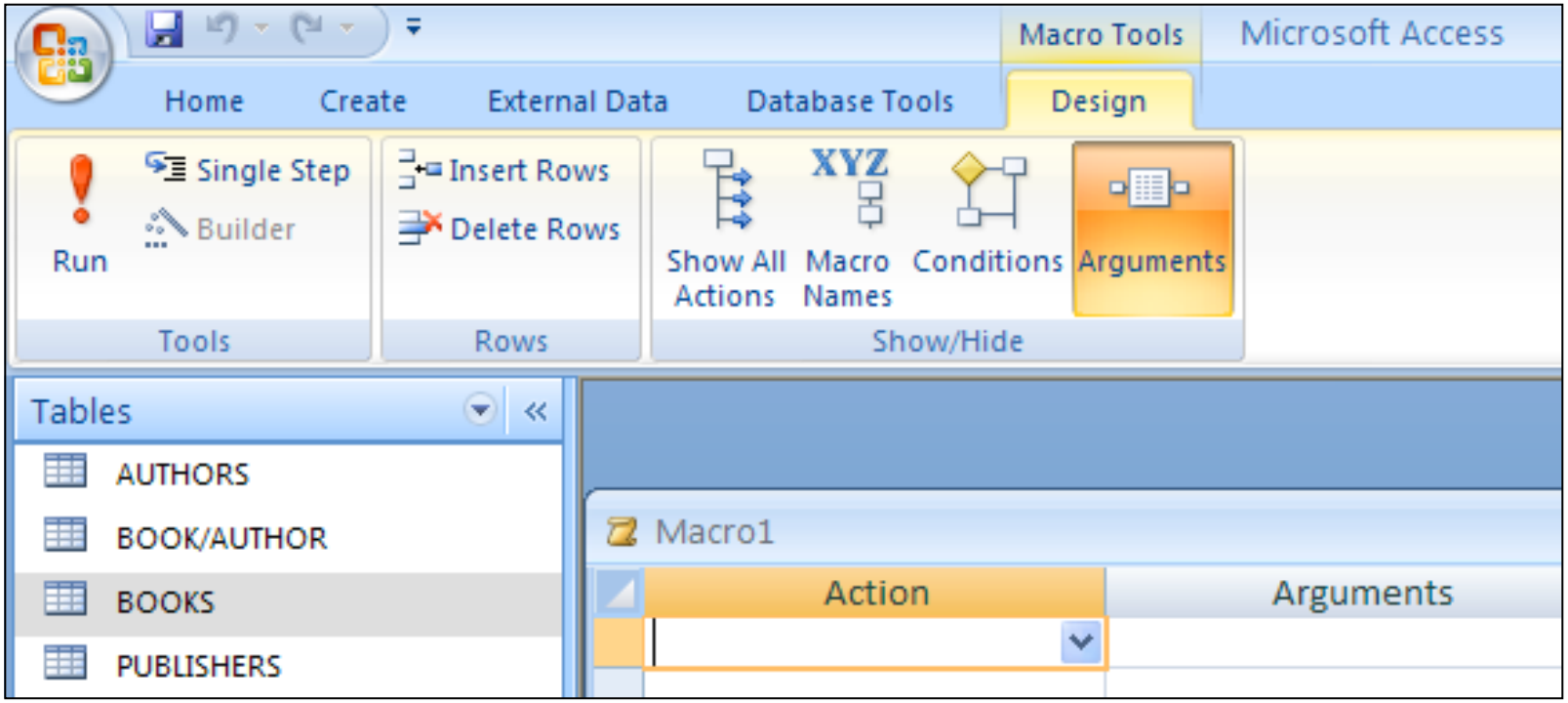


If You Need to Automate your Tasks

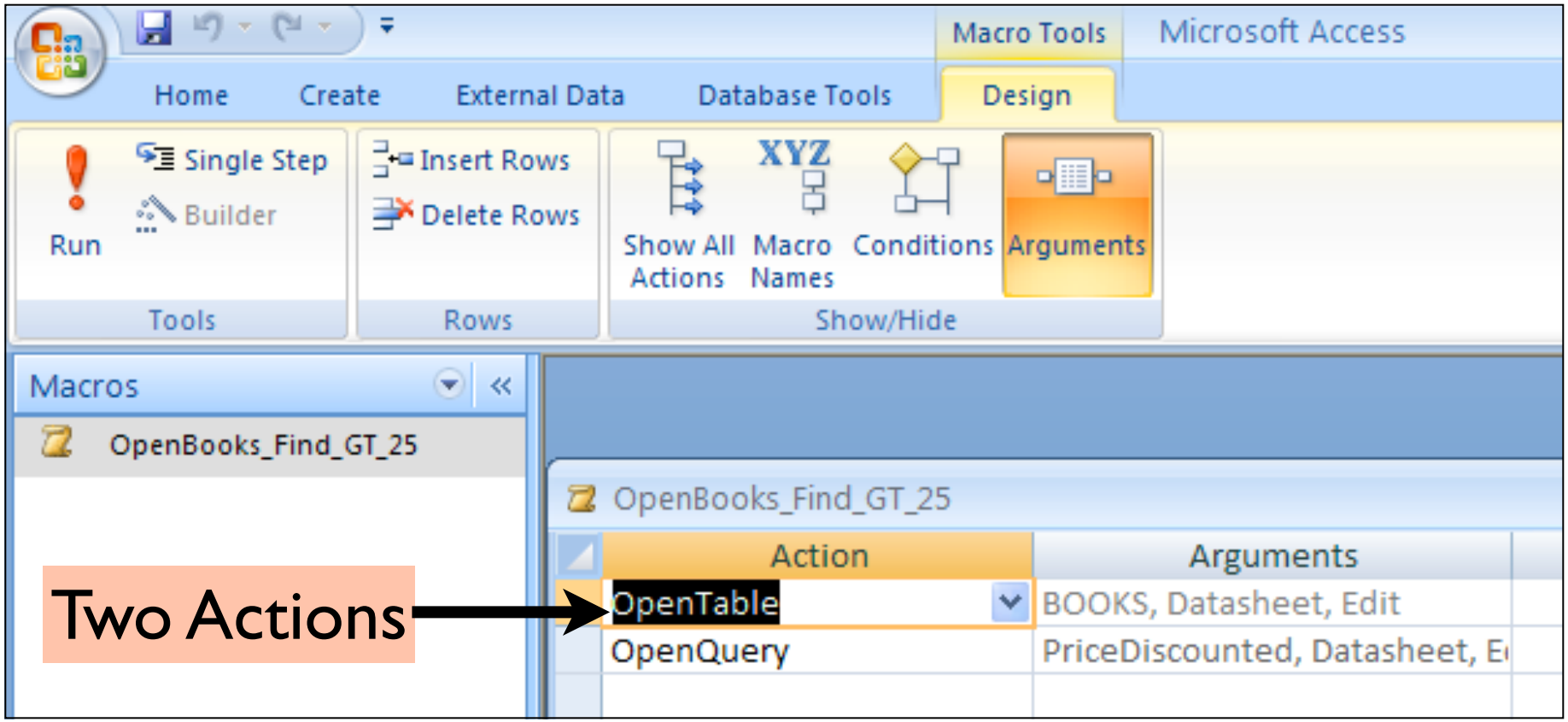
- Use Macros within Access
- Check Database Tools
- Macros function just the same as in Excel
- Automate a task
- Make conditional changes to the database analysis, etc.

Simple Macro - Open a Table and Query

- Basic Macro Interface
- Define actions and arguments for those actions

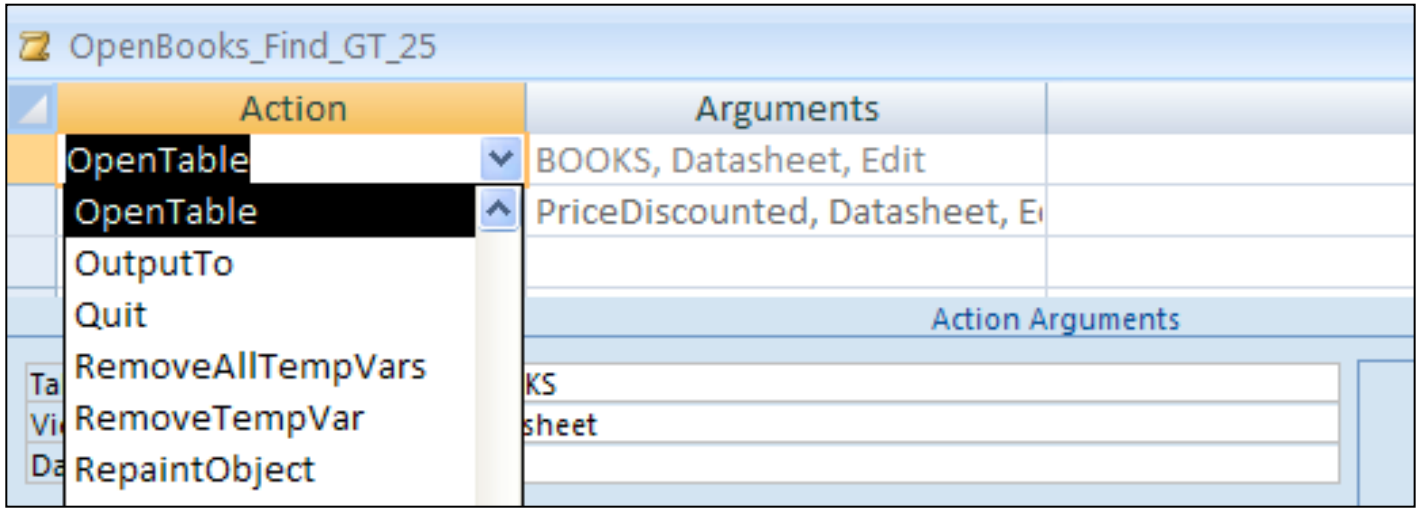


Simple Macro - Open a Table and Query Database to Apply the Query PriceDiscount

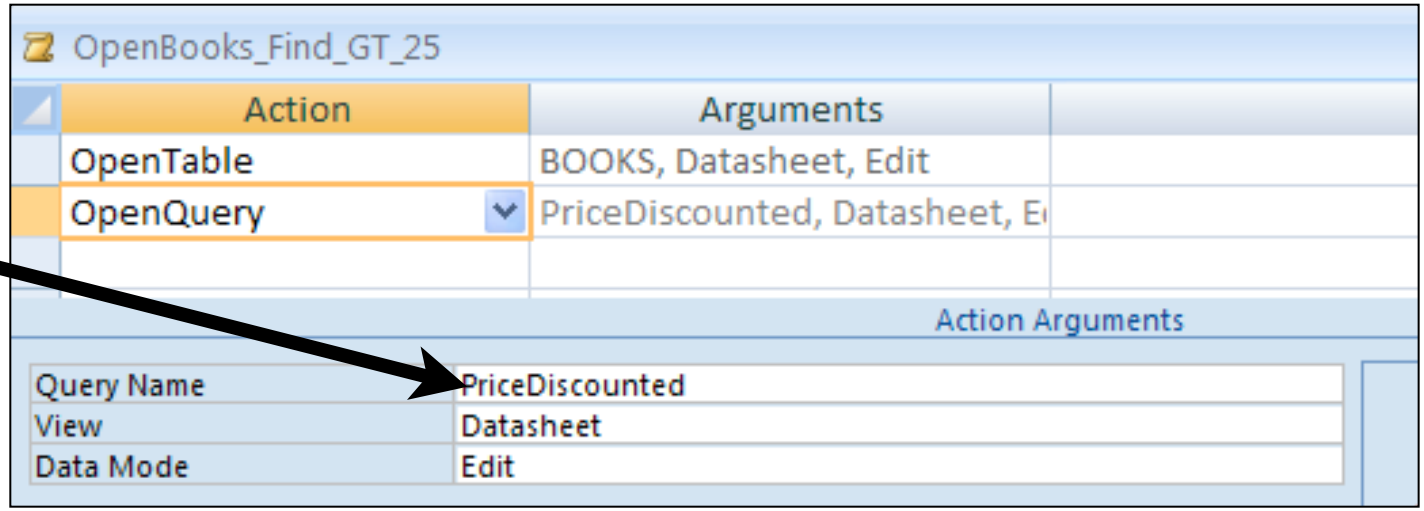


Simple Macro - Open a Table and Query Database to Apply the Query Discount

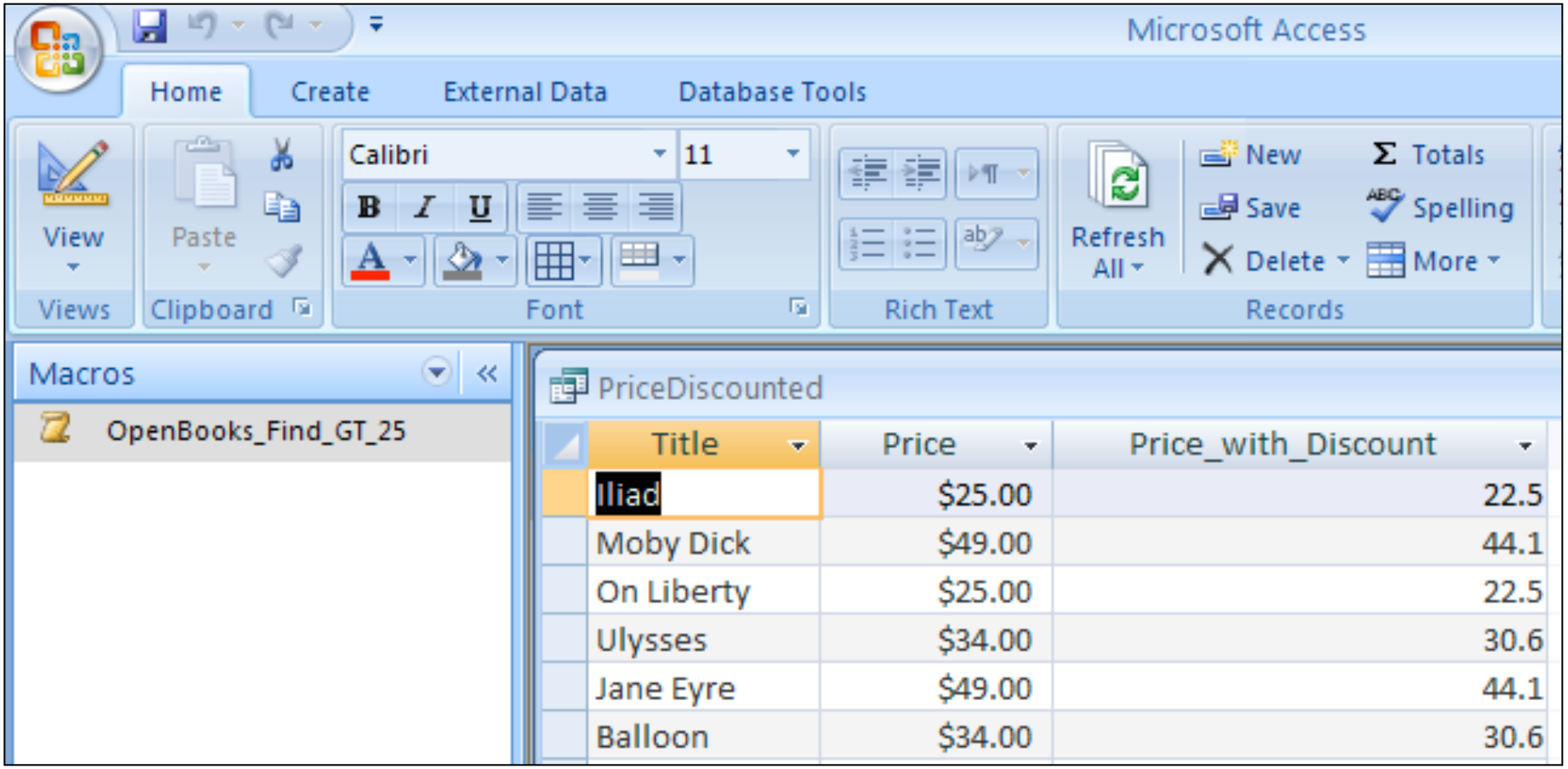
Action 1
Open
Table Books



Action 2
Apply Query
PriceDiscount

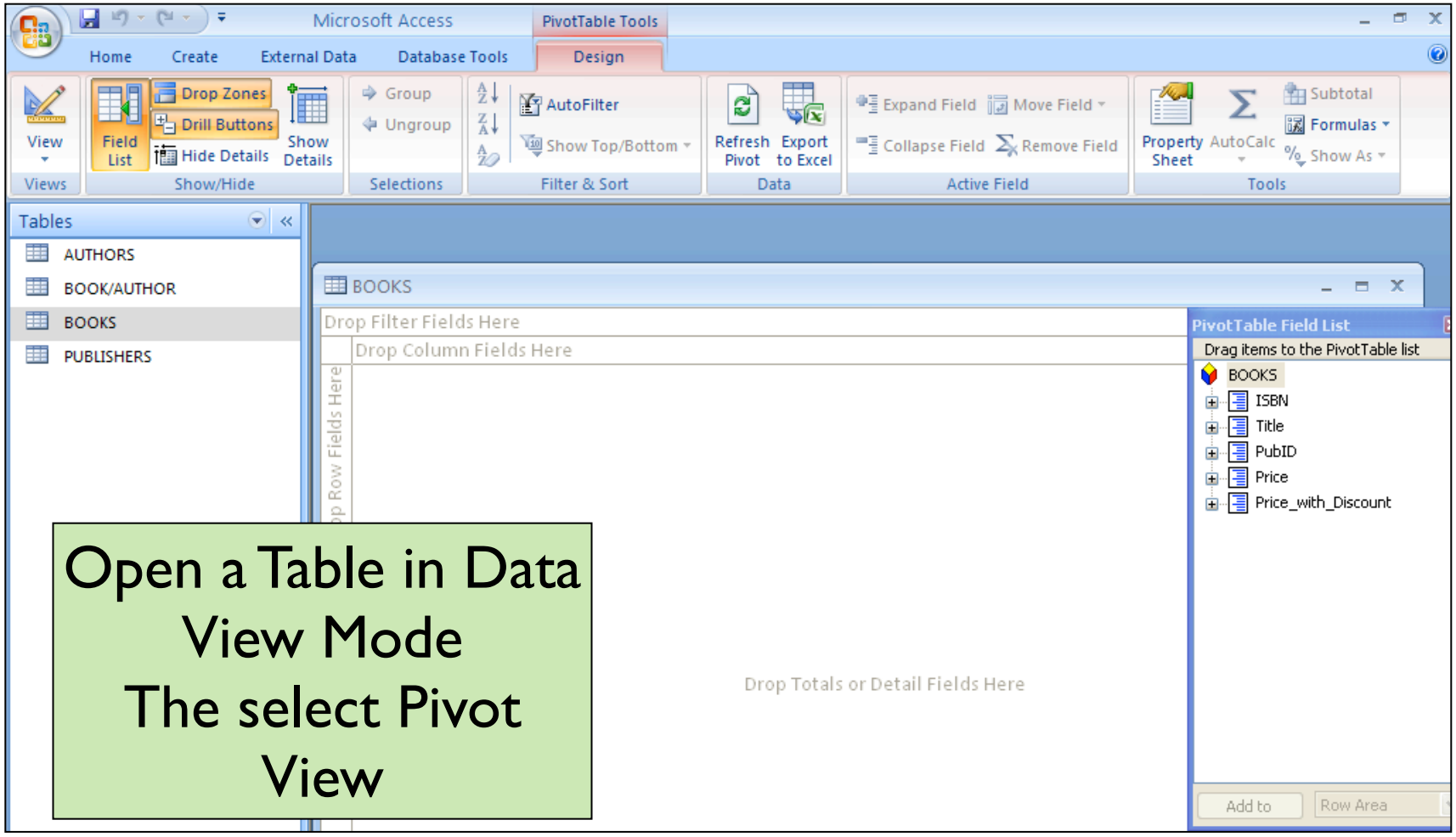


Simple Macro - Open a Table and Query (Outcome of Running the Macro)



Final Trick in Access - Pivot Tables

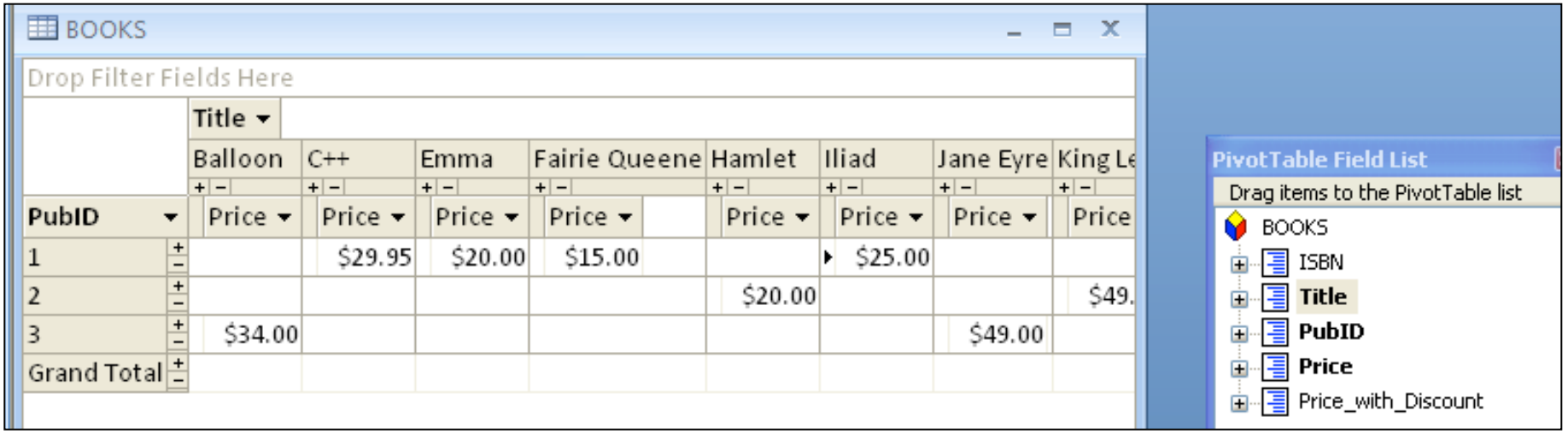
- Same idea as in Excel
- Summarizes and organizes data



Open a Table in Data View Mode
The select Pivot View

Access - Pivot Tables

- Example below using the Books Table
- To do in class: Use the construction assets file



Sample Database Applications

Developed at the Air Transportation Systems Lab

Airport and Navaid Database for The Virginia Department of Aviation (VDOA)

- Developed by Virginia Tech and Delta Airport Consultants
- The State wanted to prioritize investments at 66 public airports in Virginia
- Developed a database to:
  - Show all assets at airports
  - Show current Navigational aids (Navaids)
  - Show future improvements to meet some performance criteria

VDOA Navaid and Airport Database

New River Valley (PSK)

Dublin, Virginia

AIRPORT INFORMATION	
ROLE / CLASSIFICATION INFORMATION	
VATSP Classfication (2008):	General Aviation Regional
NPIAS Role (2008):	General Aviation
Study Classification:	General Aviation Regional (1/2 mile visibility)
ACTIVITY INFORMATION	
Based Aircraft (2007):	33
Annual Operations (2020):	9995
Annual Enplanements (2020):	n/a
DEVELOPMENT INFORMATION (2008)	
Critical Airport Reference Code (Existing):	B-II
Critical Airport Reference Code (Proposed):	C-III
Airport Layout Plan (Original):	December, 1996
Airport Layout Plan (Revision):	n/a
Proposed Development (from ALD):	- Upgrade to C-III - - - - -

AERONAUTICAL SURVEY INFORMATION

Runway End	Survey Type	Survey Date
all	OC-PSK 5084	1986

AVAILABILITY OF COMMUNICATION / NAVIGATION / WEATHER AIDS					
Available Weather Reporting:	AWOS-III				
Common Traffic Advisory Frequency:	122.7				
Clearance Delivery:	RTR				
Nearby Navigational Aids:	PULASKI	VORTAC	116.8	PSK	035°/ 3.4 NM TO FIELD
	BLUEFIELD	VORTAC	110	BLF	115°/ 26.6 NM TO FIELD
	TECH	NDB	368	TEC	258°/ 13.8 NM TO FIELD
	WOODRUM	VOR	114.9	ODR	257°/ 35.2 NM TO FIELD
	ROANOKE	VORTAC	109.4	ROA	251°/ 31.6 NM TO FIELD
	BLUEFIELD	VORTAC	110	BLF	115°/ 26.6 NM TO FIELD
	PULASKI	VORTAC	116.8	PSK	035°/ 3.4 NM TO FIELD

- Access report taken form a Virginia Airports study done at the Air Transportation Systems Lab
- Uses FAA database
- Includes Aerial photos of each airfield

VDOA Navaid and Airport Database

New River Valley (PSK)

Dublin, Virginia

System Benchmarks

General Aviation Regional (1/2 mile visibility)			
Best Approach (Primary Runway End)			
BENCHMARK		**RUNWAY 6**	
Approach:	ILS CAT I	☑ meets	ILS RWY 6 - ILS
Ceiling:	200 AGL	☐ meets	
Visibility:	1/2 statue mile	☐ meets	
Approach:	LPV	☐ meets	no satellite-based approach available
Ceiling:	200 AGL	☐ meets	
Visibility:	1/2 statute mile	☐ meets	
Equipment:	MALSR, HIRLs, PAPI	☐ meets	existing MALSR, HIRLs
Secondary Approach (Different Runway End)			
BENCHMARK		**RUNWAY 24**	
Approach:	Ground-based	☑ meets	no ground-based approach available
Ceiling:	400 AGL	☐ meets	
Visibility:	1 statute mile	☐ meets	
Approach:	LPV	☑ meets	RNAV (GPS) RWY 24 - LPV
Ceiling:	250 AGL	☑ meets	
Visibility:	1 statute mile	☑ meets	
Equipment:	REILs, HIRLs, PAPI	☑ meets	
Additional Requirements			
Weather:	on-field, 24/7, data-linked	☑ meets	
Access to ATC Clearance:	RTR	☑ meets	
ADS-B Coverage:	On ground	☐ meets	

- Access report taken form a Virginia Airports study done at the Air Transportation Systems Lab
- Uses FAA database

Aircraft Accident Database for Airport Cooperative Research Project

- Developed an accident database to identify accidents where aircraft collided with approach lights
- Database used to estimate risk of collision with approach light systems in the U.S.
- Database used to communicate to the client where accidents occur and severity levels
- Application developed using Filemaker (similar to Access but works on Macs and PCs)

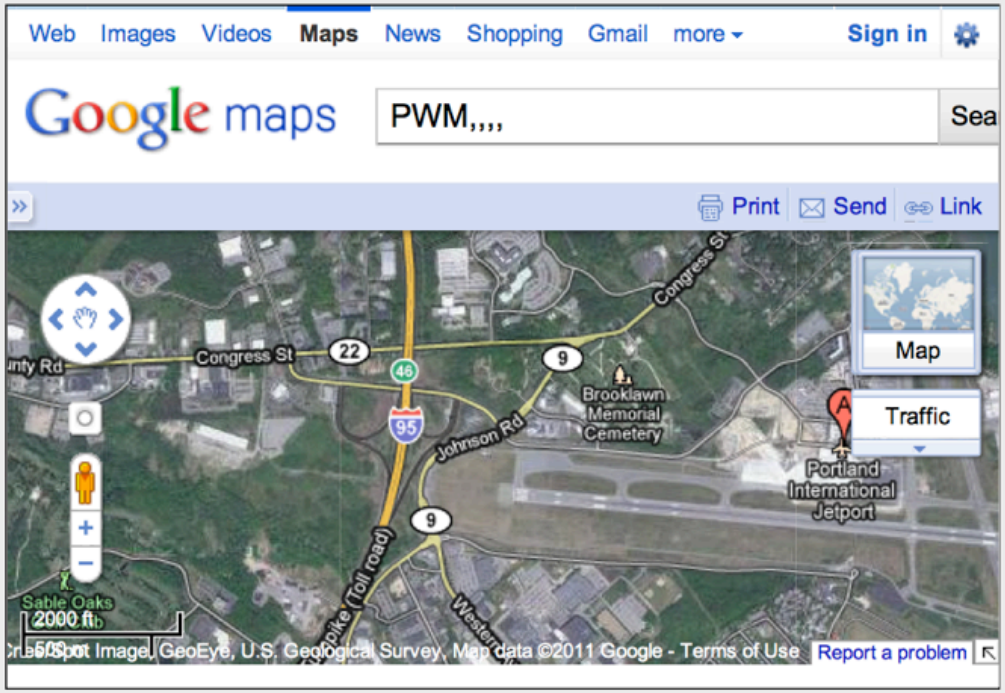
Approach Light Accident Database

Summary | Airport_Info | Map | Accident_Photos | Report | Narratives | Weather | Aircraft_Info

Add Record | Delete Record | AccidentTypeFlag overrun

Approach Light System Hazards Assessment and Mitigation Database (ACRP 04-03)

Aircraft	SF34
Type_of_Occurence	accident
Airport_Name	Portland International
Airport_Designation	PWM
Aircraft_Damage	Substantial
Carrier_Name	Unknown
Type_of_Operation	Commercial
ALS_System	Runway End Lights
Fatalities	0
Injuries	0
Date	7/20/2001
Time	
CrashID	
Accident_Runway	29
Is_accident_in_US	US
Source_Of_Information	AIDS
Total_Fatalities	111
Total_Injuries	269



Virginia Tech Transportation Institute — Driving Transportation With Technology

Virginia Tech — Invent the Future

TRB Transportation Research Board of the National Academies

Multiple Tabs are Used to Help Navigate

Summary | Airport_Info | Map | Accident_Photos | Report | Narratives | Weather | Aircraft_Info

Picture1

Source Transport Canada

Picture2

Source Transport Canada

Picture3

Source Transport Canada

Source Transport Canada

Multiple Tabs are Used to Help Navigate