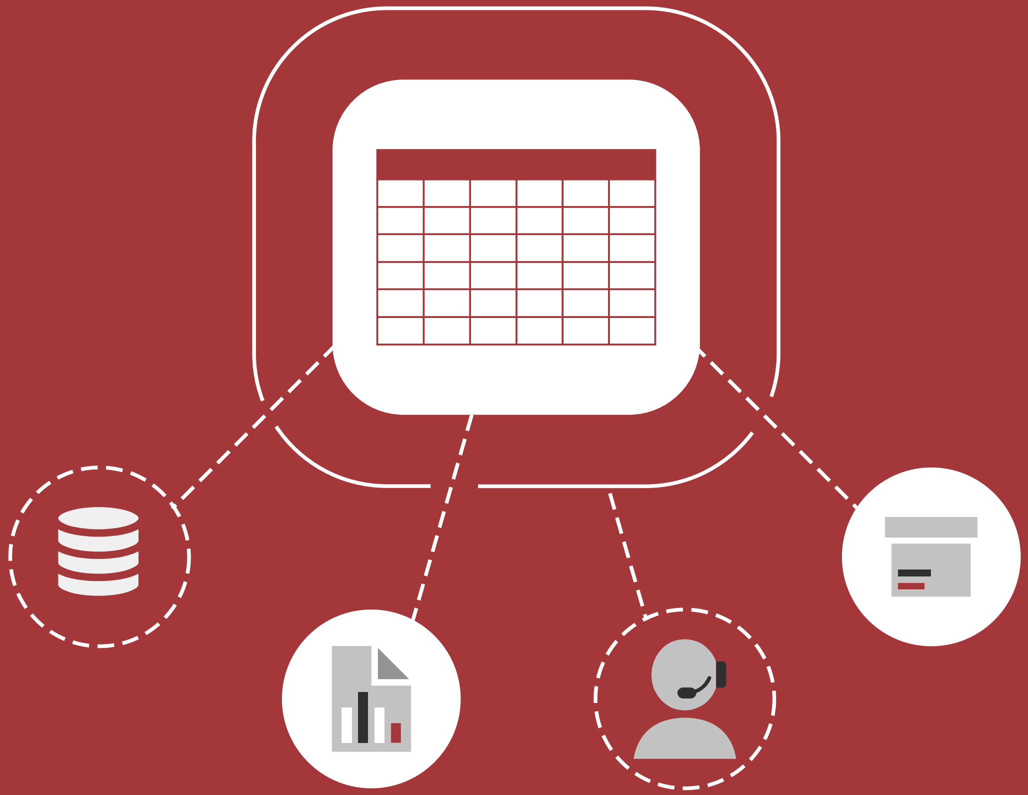
Microsoft

Microsoft Access Concepts



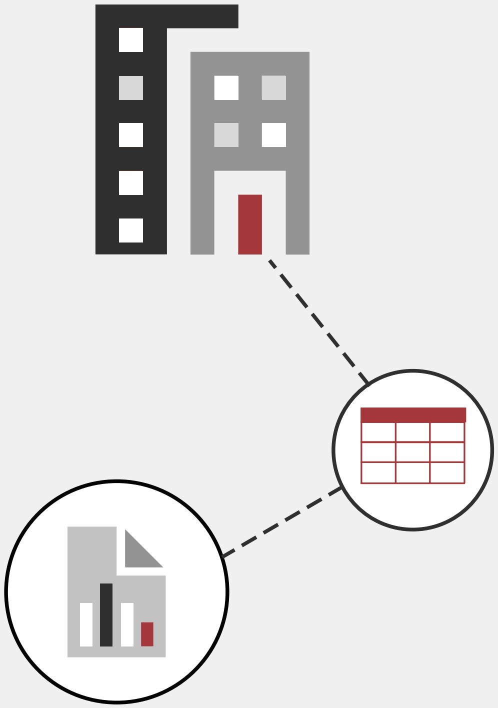
A visual tour of the main ideas behind Access

"...relational database technology offers dramatic improvements in productivity both for end users and for application programmers."

E.F. Codd

Used by 95% of Fortune 500

"We're using it to run our business. We're an **80 million dollar** company."



What is it?

"An operational database that stores, manages and tracks real-time business information and that is **often mission-critical**."

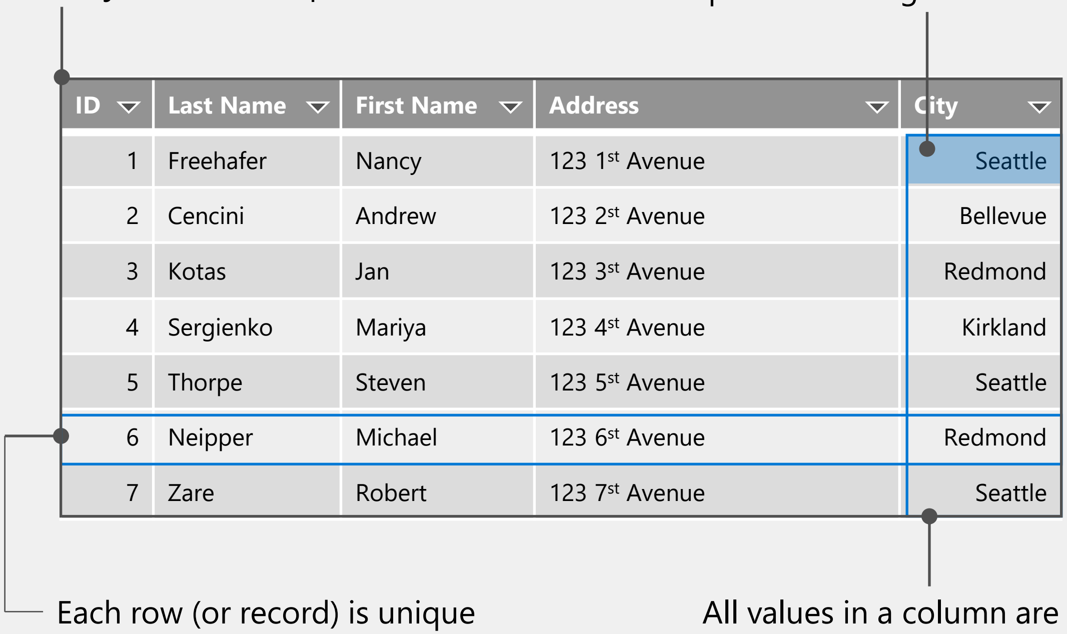
After 25 years, still no alternatives

"What I think Access does, it does extremely well and is the **best bang for the buck**."

Tables, columns, data types

A database structures data like a matrix and adds constraints to keep it that way

Tables and columns are well-defined



A table represents a single subject, such as a person

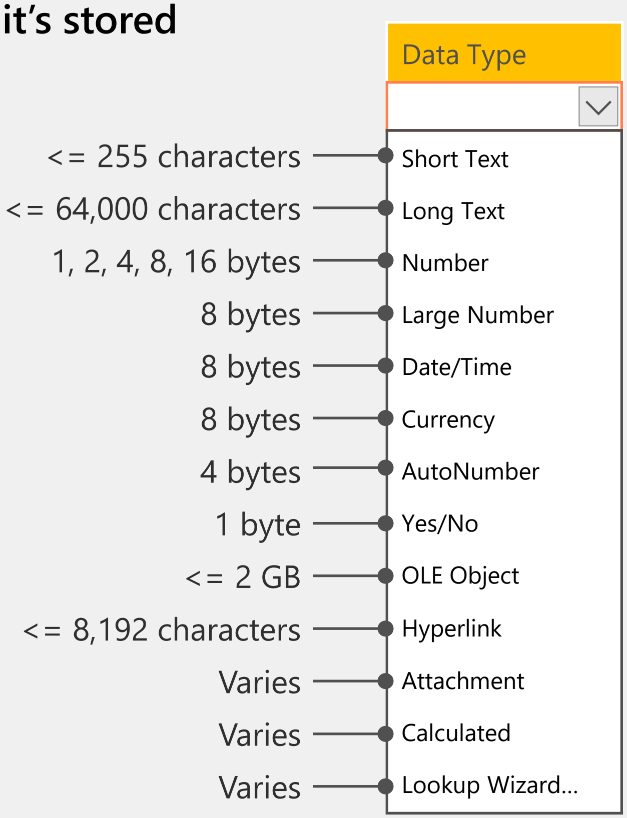
Each field has a value that represents a single fact

ID	Last Name	First Name	Address	City
1	Freehafer	Nancy	123 1st Avenue	Seattle
2	Cencini	Andrew	123 2st Avenue	Bellevue
3	Kotas	Jan	123 3st Avenue	Redmond
4	Sergienko	Mariya	123 4st Avenue	Kirkland
5	Thorpe	Steven	123 5st Avenue	Seattle
6	Neipper	Michael	123 6st Avenue	Redmond
7	Zare	Robert	123 7st Avenue	Seattle

Each row (or record) is unique and has a primary key

All values in a column are the same in meaning and format

A data type indicates the kind of data and the way it's stored



	Data Type
<= 255 characters	Short Text
<= 64,000 characters	Long Text
1, 2, 4, 8, 16 bytes	Number
8 bytes	Large Number
8 bytes	Date/Time
8 bytes	Currency
4 bytes	AutoNumber
1 byte	Yes/No
<= 2 GB	OLE Object
<= 8,192 characters	Hyperlink
Varies	Attachment
Varies	Calculated
Varies	Lookup Wizard...

Fundamental relational database principles

To be efficient, remove redundant data

To be truthful, make data accurate

To be thorough, create table relationships

To be informative, create wide-ranging queries

Relationships are fundamental

Good database design = data integrity

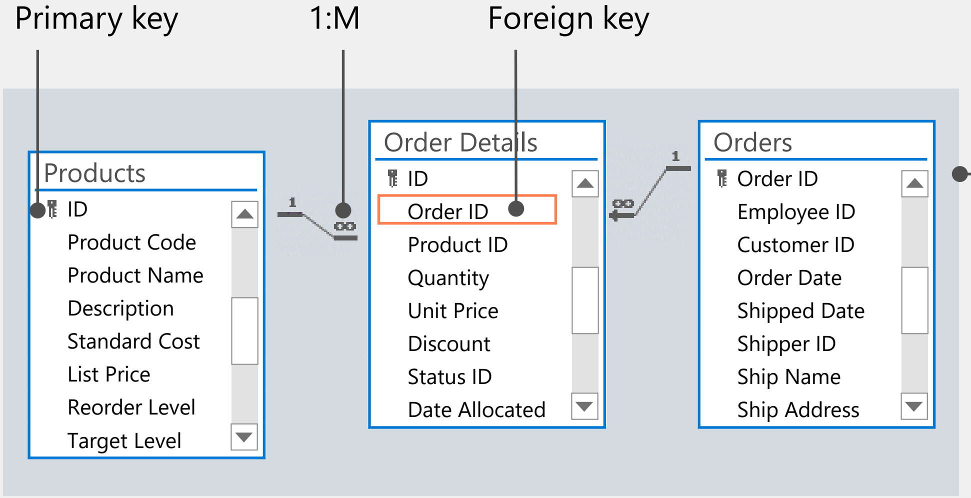
Schema design is a step-by-step approach called normalization

Normal form	Description	Action
Zero	Some columns contain repeating values	Collapse values into one column
First	Some columns contain redundant data	Remove redundancy
Second	Some columns are not based on the primary key	Move those columns to other tables
Third	All columns are based solely on the primary key	Ready for business

Relationships join tables based on primary and foreign keys

Type	Symbol	Example
One-to-one	1:1	An employee has one office and each office has one employee
One-to-many	1:M	An employee is within a department, but a department has many employees within it
Many-to-many	M:M	Each employee is assigned many projects and each project has many employees assigned to it

Well-designed schemas make complex requests doable



ORDERS

OrderID	CustomerID
10248	WILMK
10311	DUMON

PRODUCTS

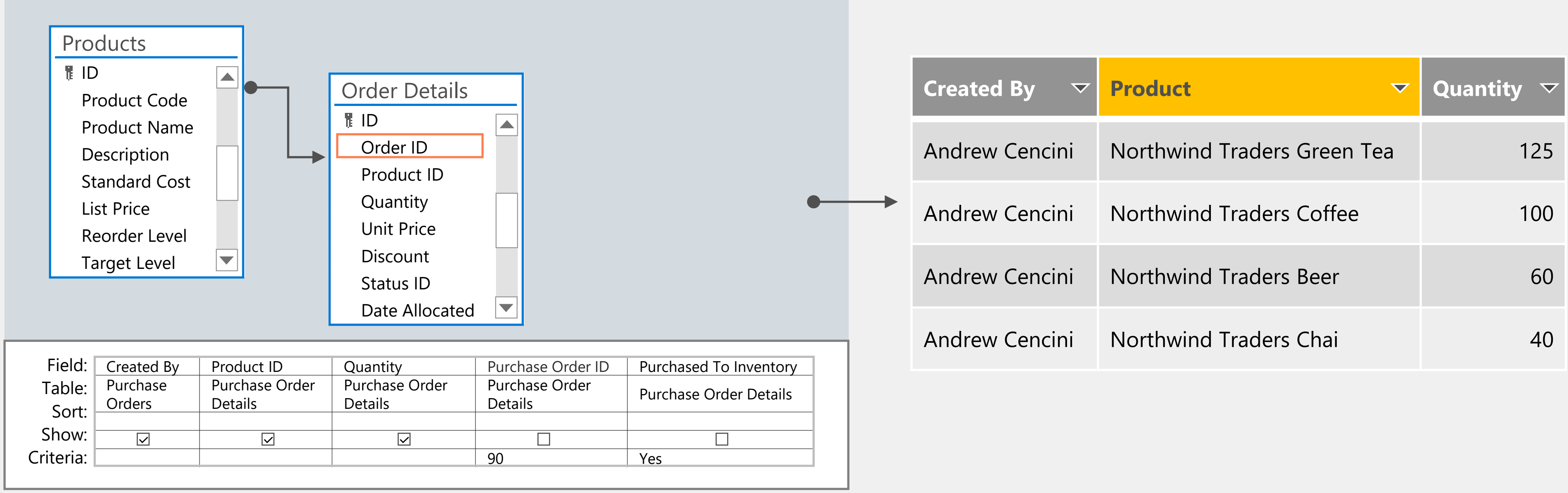
ProductID	ProductName
11	Queso Cabrales
42	Singaporean Hokkien Fried Me
69	Gudbrandsdalsost
72	Mozzarella di Giovanni

ORDER DETAILS

OrderID	ProductID	UnitPrice	Quantity
10248	11	21.00	12
10248	45	14.00	10
10248	72	34.80	5
10311	42	14.00	6
10311	69	28.80	7

Queries provide answers

At the heart of Access is the query, which retrieves data or performs data actions



Field:	Created By	Product ID	Quantity	Purchase Order ID	Purchased To Inventory
Table:	Purchase Orders	Purchase Order Details	Purchase Order Details	Purchase Order Details	Purchase Order Details
Sort:					
Show:	☑	☑	☑	□	□
Criteria:				90	Yes

Created By	Product	Quantity
Andrew Cencini	Northwind Traders Green Tea	125
Andrew Cencini	Northwind Traders Coffee	100
Andrew Cencini	Northwind Traders Beer	60
Andrew Cencini	Northwind Traders Chai	40

Query Type	Definition
Select	Retrieves only the data that you want, combines data from tables, and defines form and report data sources
Parameter	An ad hoc query that prompts you for field values, and then uses those values as criteria for your query
Totals	A select query that lets you group and summarize data, such as total sales per product
Crosstab	Creates a matrix to re-orient fields in rows and columns, and apply aggregate functions such as Count, Sum, Max
Make Table	Creates a new table from a select query
Append	Retrieves data from one or more tables and adds that data to another table
Update	Changes data in a table based on criteria to specify which rows to update
Delete	Removes data from a table based on criteria to specify which rows to remove
Pass-through	Runs a query remotely on a database server to help improve performance

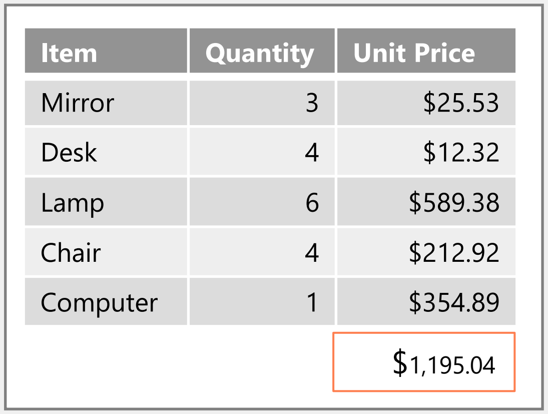
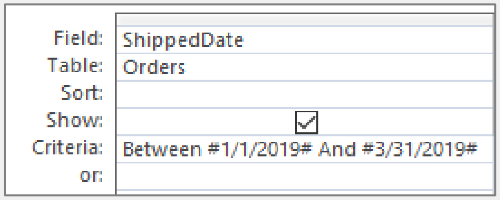
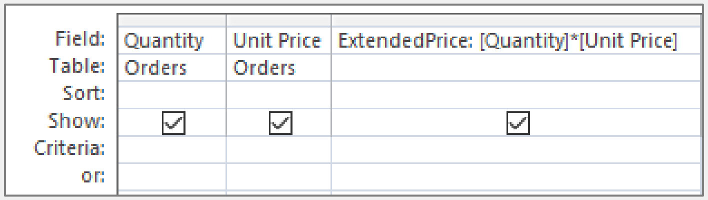
Expressions add value

Calculate values, combine/extract text, specify defaults, validate data

Expressions help enforce business rules

- Must be permanent employee to attend event
- Orders can only be placed on items in stock
- Product codes must be valid when entered

Expressions create meaningful information from data

Task	Expression	Example
Sum line items in a report footer	=Sum([Unit Price])	
Find orders shipped in Q1, 2019	Between #1/1/2019# And #3/31/2019#	
Create a calculated field	Extended Price: [Quantity] * [Unit Price]	

Item	Quantity	Unit Price
Mirror	3	$25.53
Desk	4	$12.32
Lamp	6	$589.38
Chair	4	$212.92
Computer	1	$354.89
		$1,195.04

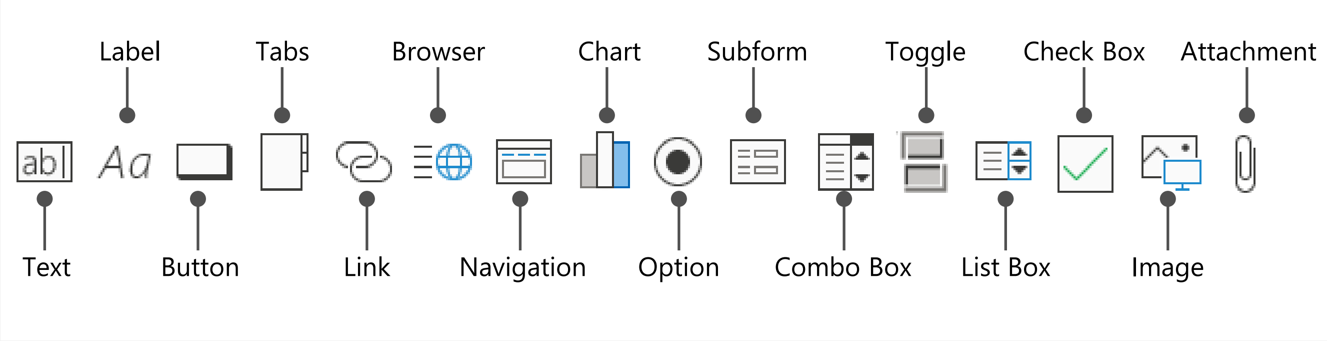
Field:	ShippedDate
Table:	Orders
Sort:	
Show:	☑
Criteria:	Between #1/1/2019# And #3/31/2019#
or:	

Field:	Quantity	Unit Price	ExtendedPrice: [Quantity]*[Unit Price]
Table:	Orders	Orders	
Sort:			
Show:	☑	☑	☑
Criteria:			
or:			

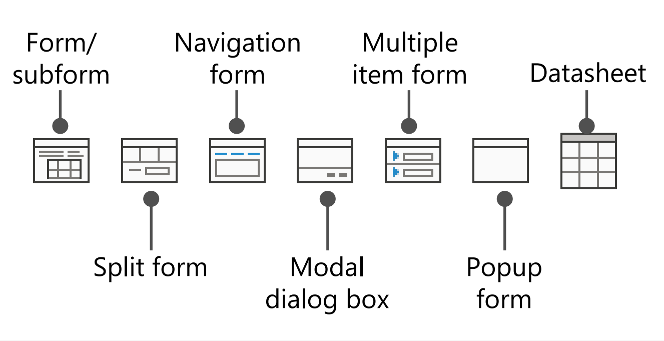
Forms over data

Organize and edit data through rich forms that are windows to your database

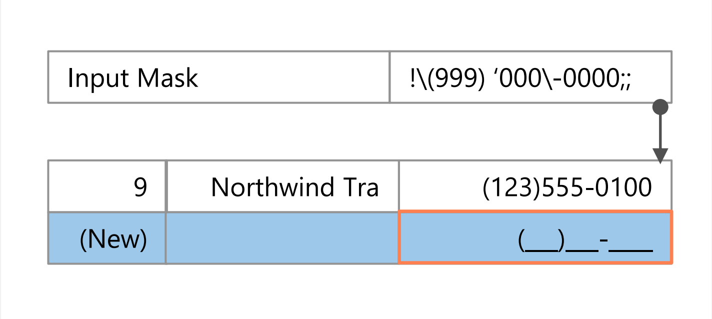
Controls are building blocks for forms



Form types



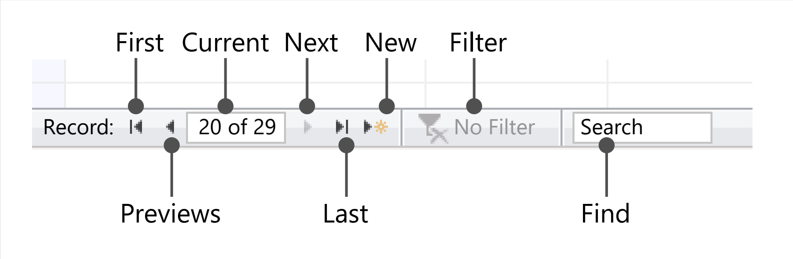
Define input masks



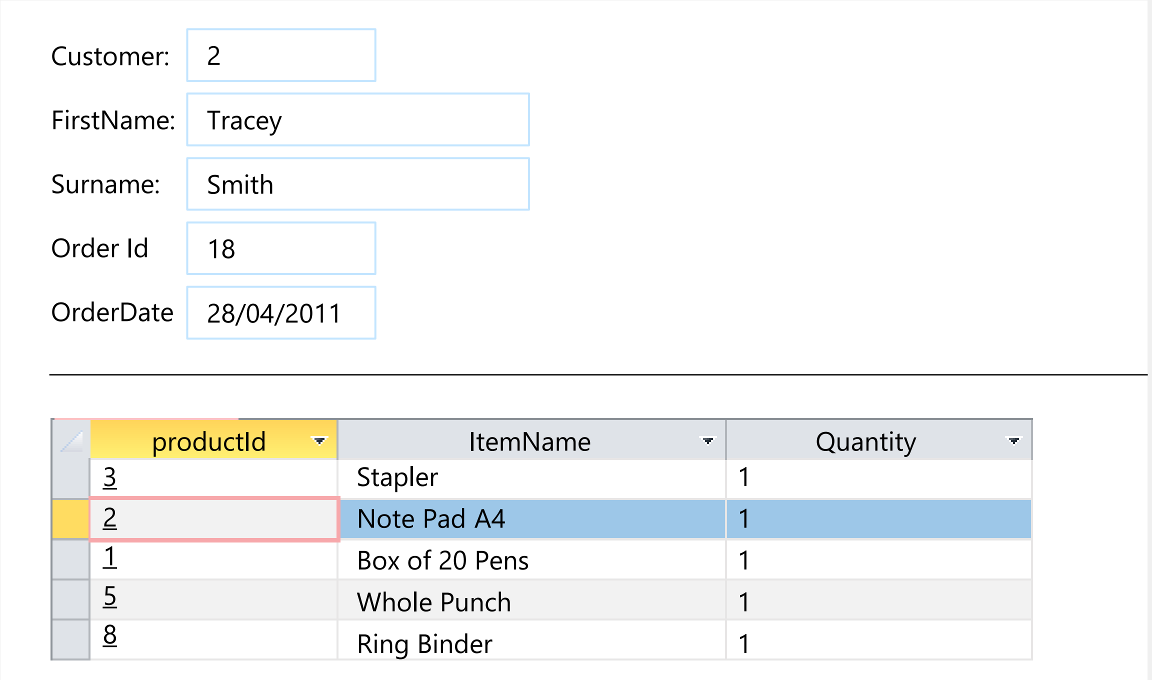
Input Mask	!\(999) ‘000\-0000;;

9	Northwind Tra	(123)555-0100
(New)		(__)__-___

Navigate records easily



Create a form/subform (1:M relationship)

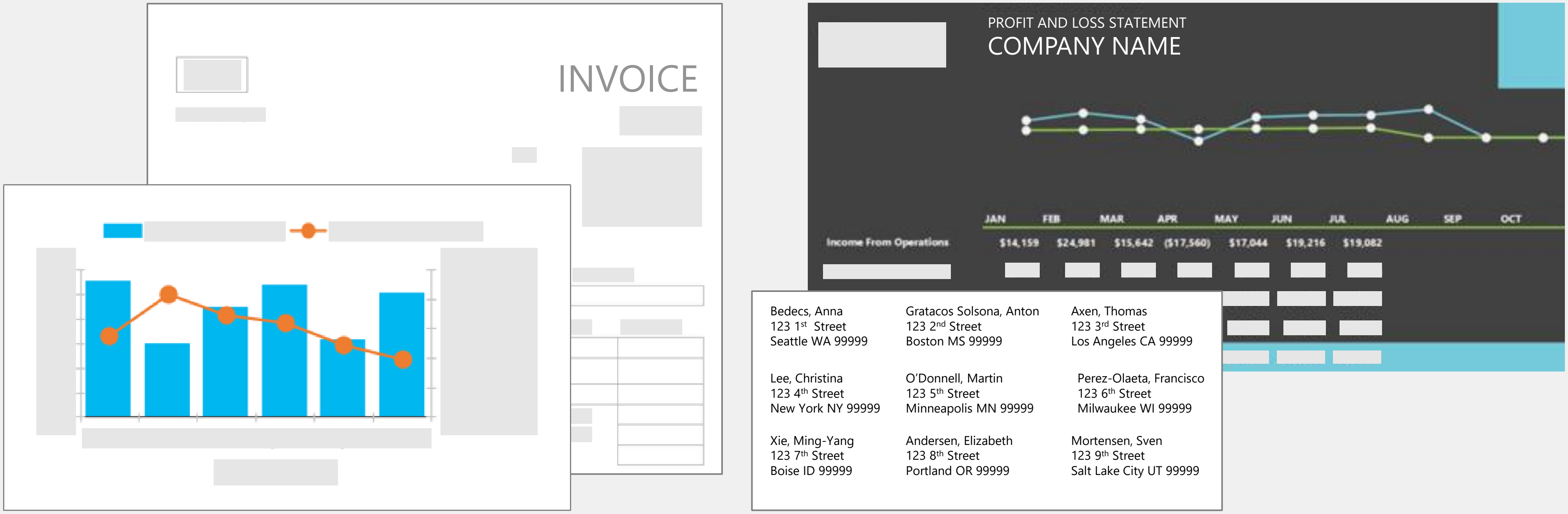


Customer:	2
FirstName:	Tracey
Surname:	Smith
Order Id	18
OrderDate	28/04/2011

productId	ItemName	Quantity
3	Stapler	1
2	Note Pad A4	1
1	Box of 20 Pens	1
5	Whole Punch	1
8	Ring Binder	1

Reports over data

Use reports to answer questions, find alternatives, devise strategies, assess risks



PROFIT AND LOSS STATEMENT

COMPANY NAME

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Income From Operations	$14,159	$24,981	$15,642	($17,560)	$17,044	$19,216	$19,082			

Bedecs, Anna
123 1st Street
Seattle WA 99999

Gratacos Solsona, Anton
123 2nd Street
Boston MS 99999

Axen, Thomas
123 3rd Street
Los Angeles CA 99999

Lee, Christina
123 4th Street
New York NY 99999

O'Donnell, Martin
123 5th Street
Minneapolis MN 99999

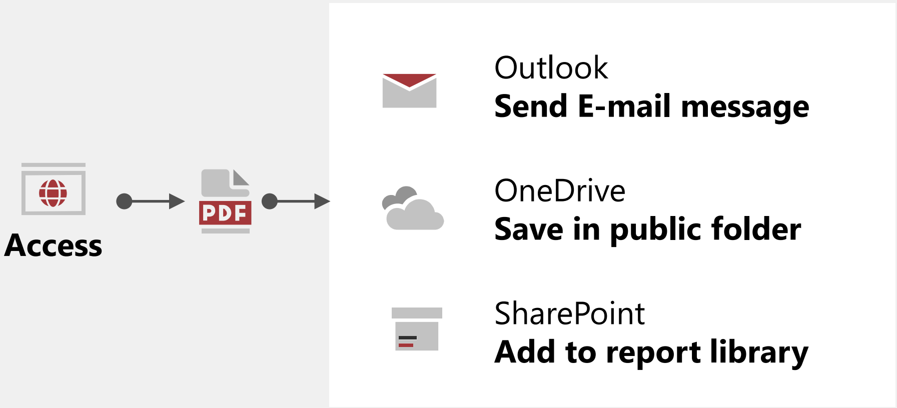
Perez-Olaeta, Francisco
123 6th Street
Milwaukee WI 99999

Xie, Ming-Yang
123 7th Street
Boise ID 99999

Andersen, Elizabeth
123 8th Street
Portland OR 99999

Mortensen, Sven
123 9th Street
Salt Lake City UT 99999

Distribute PDF reports on schedule or upon request



Outlook
Send E-mail message

OneDrive
Save in public folder

SharePoint
Add to report library

Report types by users

User	Types	Examples
Frontline worker	Scheduled, easy-to-read, one-pager, attractive graphics	Quality control, invoice, inventory, stock
Information worker	Detailed, hierarchical, grouped	Budgets, forecasts, sales summaries
Business analyst	Business intelligence (BI), customized (filter, sort, parameters)	Statistical analysis, elaborate charts
All	Pretty-printed, informative	Mailing labels, product catalogs, reference manuals, directories

Extract, Transform, and Load (ETL)

Data is always on a journey, and Access is the landing pad

Extract →

Import/link from:

- ✓ Access
- ✓ Azure SQL Server
- ✓ dBASE
- ✓ Dynamics 365
- ✓ Excel
- ✓ HTML
- ✓ Microsoft Graph
- ✓ OData
- ✓ ODBC
- ✓ Outlook contacts
- ✓ Salesforce
- ✓ SharePoint list
- ✓ SQL Server
- ✓ Text
- ✓ XML

Transform →

Then, alter data:

- ✓ Join sources
- ✓ Cleanse (correct, convert, validate, reconcile)
- ✓ Shape data for other programs
- ✓ Aggregate, group, summarize
- ✓ Bulk update, append, delete
- ✓ Make tables

Load

Finally, export to:

- ✓ Access
- ✓ dBASE
- ✓ Excel
- ✓ HTML
- ✓ ODBC
- ✓ SharePoint list
- ✓ Text
- ✓ XML

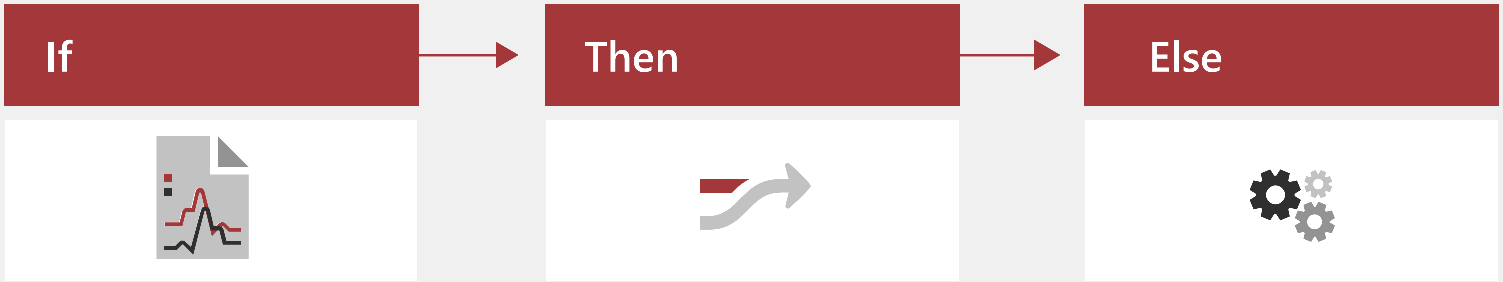
Access is like a regional airport for data that: travels from many places, makes changes and connections, and then travels to other places

Automation

For advanced tasks, use macros and Visual Basic for Applications (VBA)

Macros

Automate tasks and add functionality to your forms, reports, and controls without code.



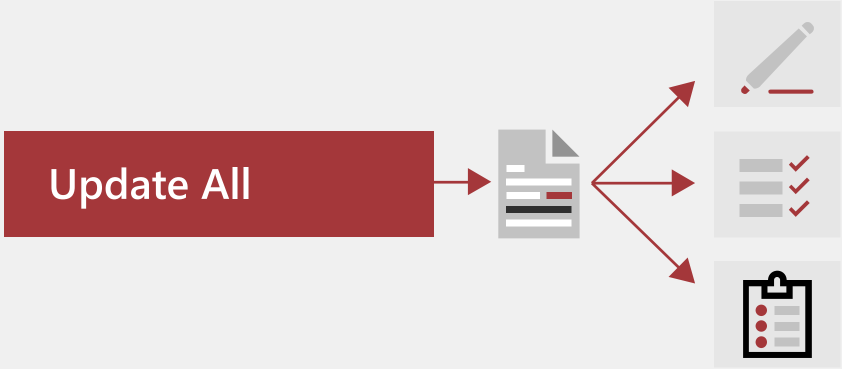
If

Then

Else

VBA

Use code to iterate through objects, create functions, step through each record, respond to events, call Windows APIs



Update All

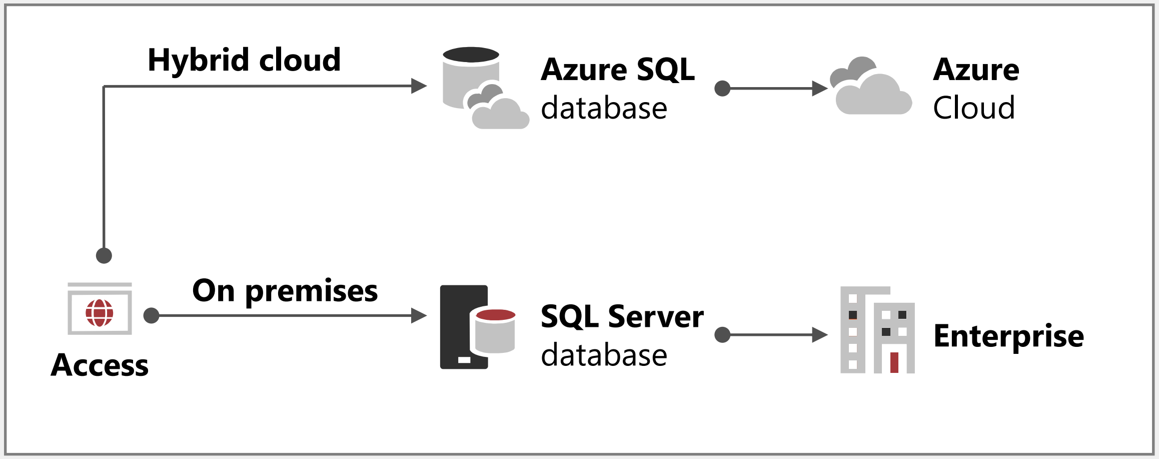
Migrate to SQL Server

Combine the benefits of Access with the industrial strength of SQL Server

Get Ready → Run SSMA → Convert objects → Link tables → Test and revise → Optimize performance

It's a natural evolution

- Keep your Access front-end (forms, reports, local queries, macros, VBA)
- Move data and remote queries to an SQL Server back-end



Hybrid cloud

Azure SQL database

Azure Cloud

On premises

SQL Server database

Enterprise

Access

SQL Server benefits:

- More concurrent users
- Increased availability
- High performance, scalability
- Improved security
- Immediate recoverability

Azure SQL Server benefits:

- Dynamic scalability, no downtime
- Intelligent optimization
- Global scalability and availability
- Elimination of hardware costs
- Reduced administration

Resources

Subject	Topics
Tables, columns, data types	Introduction to tables Introduction to data types
Relationships are fundamental	Database design basics
Queries provide answers	Introduction to queries Examples of query criteria
Expressions add value	Use Access expressions
Forms over data	Introduction to forms Create a form that contains a subform
Reports over data	Introduction to reports in Access Create a grouped or summary report
Extract, Transform, and Load (ETL)	Importing, linking, exporting data in Access
Automation	Introduction to macros Introduction to Access programming
Migrate to SQL Server	Migrate an Access database to SQL Server Take an Access excursion through SQL Server

For more information, see

support.office.com/access