Preparing for Power BI Certification Exam 70-778

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Born Again Power BI MVP

Critical Path TRAINING

Agenda

- Preparing for the 70-778 Exam
- Queries and Datasources
- Data Modeling and DAX
- Reports and Dashboards
- Apps and App Workspaces

Skills Measured

- Consume and Transform Data with Power BI Desktop (20-25%)
- Model and Visualize Data (45-50%)
- Configure Dashboards in the Power BI Service (25-30%)

Consume and Transform Data

- Connect to data sources
  - Connect to databases, files, folders
  - Import from Excel
  - Connect to SQL Azure, Big Data, SSAS
- Perform transformations
  - Design and implement basic & advanced transformations
  - Apply business rules
  - change data format to support visualization
- Cleanse data
  - Manage incomplete data
  - Meet data quality requirements

Model and Visualize Data – Part 1

- Create and optimize data models
  - Manage data relationships
  - Optimize models for reporting
  - Manually enter data
  - Use Power Query
- Create calculated columns, tables, and measures
  - Create DAX queries for calculated columns, tables, and measures
- Create performance KPIs
  - Calculate the actual, calculate the target, calculate actual to target
- Create hierarchies
  - Use date hierarchies, use business hierarchies, resolve hierarchy issues

Model and Visualize Data – Part 2

- Create and format interactive visualizations
  - Select a visualization type
  - Configure page layout and formatting
  - Setup visual relationships
  - Configure duplicate pages, handle categories that have no data
    Setup default summaries and categories,
  - Position, align, and sort visuals
  - Enable and integrate R visuals
  - Format calculated measures

Model and Visualize Data – Part 3

- Manage custom reporting solutions
  - Use Power BI API
  - Use Microsoft Power BI Embedded
  - Enable developers to create dashboards with custom applications
  - Enable developers to embed dashboards in applications
  - Authenticate a Power BI web application
  - Enable developers to create custom visuals

Configure Dashboards – Part 1

- Configure a dashboard
  - Connect to the Power BI service
  - Publish connections to services by using SSAS
  - Publish visualizations including data
  - Configure a dashboard
  - Add text and images
  - Filter dashboards
  - Configure dashboard settings
  - Customize the URL and title
  - Enable natural language queries

Configure Dashboards – Part 2

- Publish dashboards
  - Publish to web
  - Publish to Microsoft SharePoint
  - Publish to SQL Server Reporting Services (SSRS)
- Configure security for dashboards
  - Create a security group by using the Admin Portal
  - Share dashboard with users or security groups
  - Integrate with Microsoft OneDrive for Business
  - Configure row-level Security
  - Configure gateways

Configure Dashboards – Part 3

- Configure organizational content packs and apps
  - Create a content pack
  - Publish a content pack
  - Edit a content pack
  - Package dashboards and reports
  - Configure app workspace

Sample Exam Question #1

Which of the following versions of the Windows operating system support installing Power BI Desktop?

- ✗ Windows Vista
- → Windows 10
- → Windows 8.1
- → Windows 7

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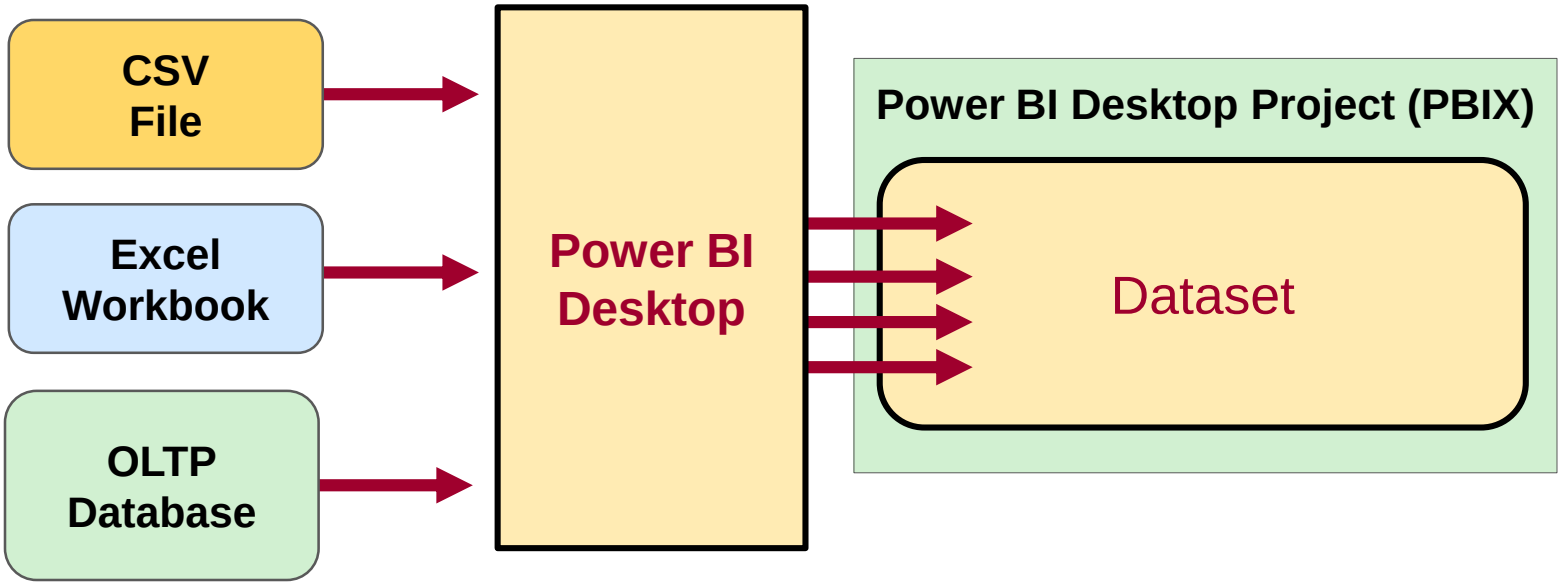
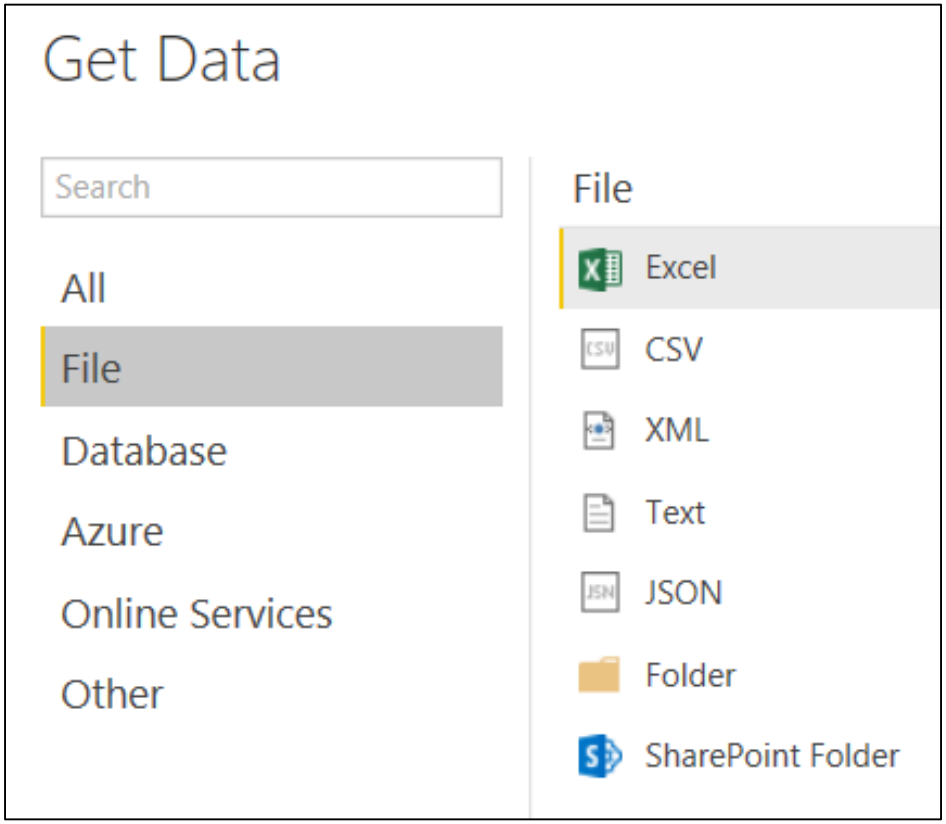
Power BI Desktop is an ETL Tool

- ETL process is essential part of any BI Project
  - **Extract** the data from wherever it lives
  - **Transform** the shape of the data for better analysis
  - **Load** the data into dataset for analysis and reporting



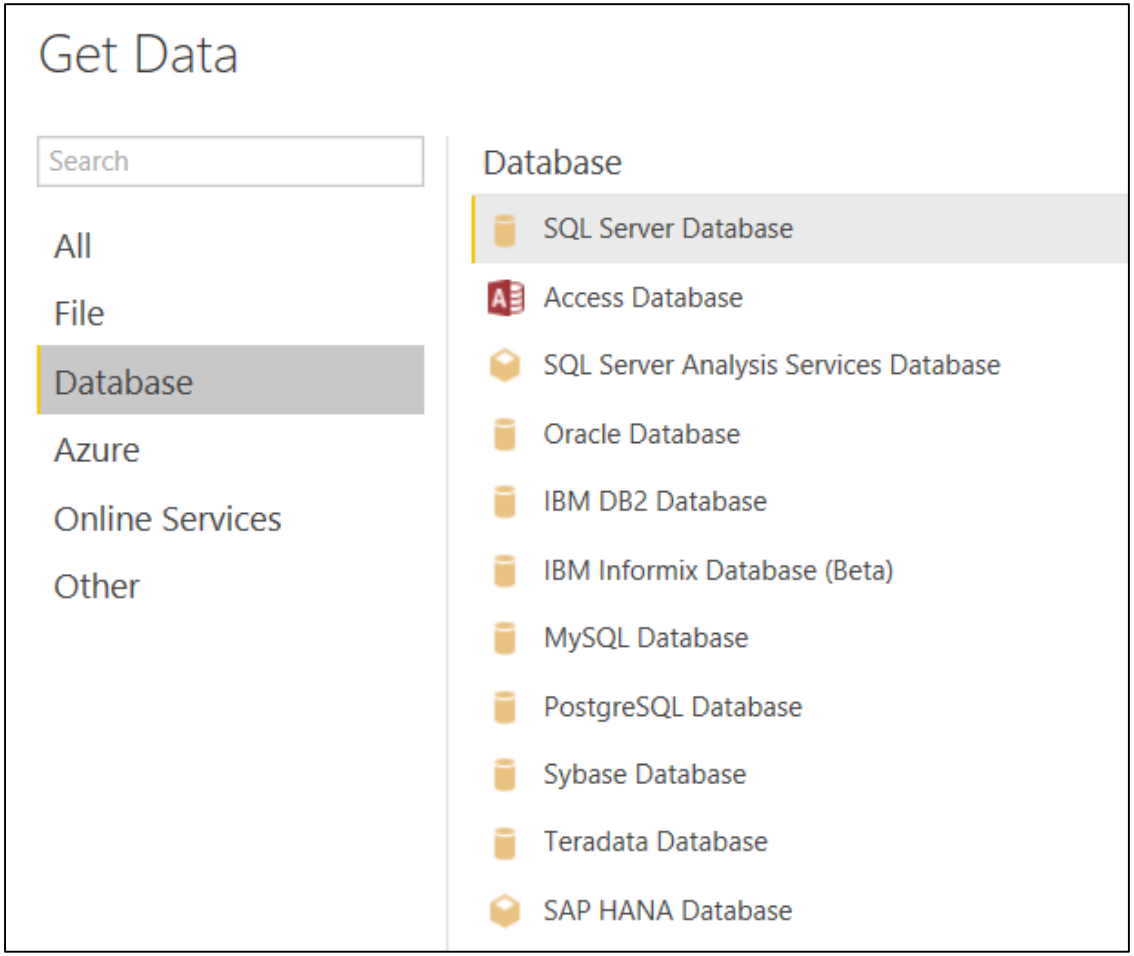
File-based Data Sources

- Power BI Desktop supports common file types



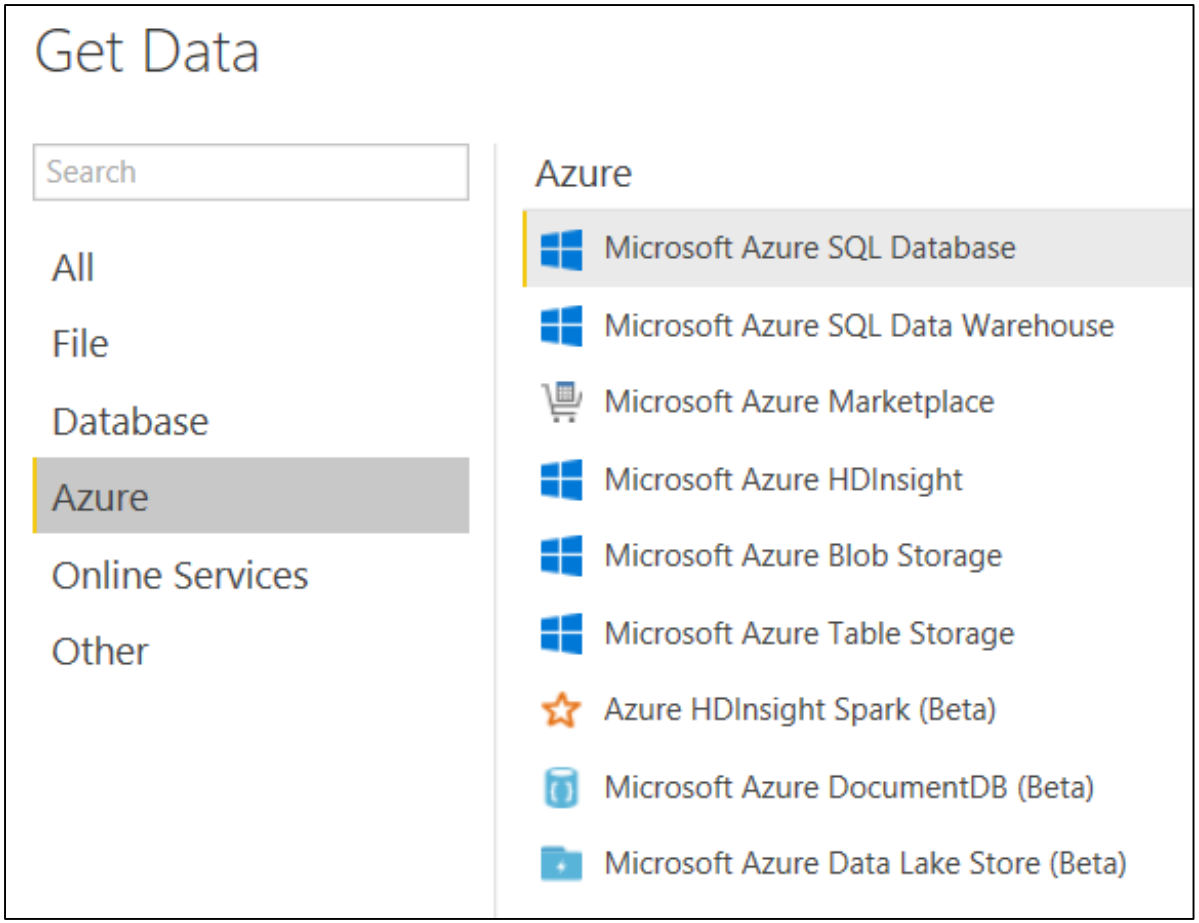
Supported Databases

- Power BI Desktop supports many database systems



Azure Data Sources

- Power BI Desktop supports many Azure data sources



Sample Exam Question #2

Which of the following items is never stored within a PBIX project file?

- Data for the rows of tables imported from external datasources
- Default values for query parameters
- Code written in R
- Data source credentials

Examples of Basic Query Steps

- Rename column
- Convert column type
- Format column values
- Replace column values
- Expanding related column
- Merging columns
- Splitting columns

Sample Exam Question #3

When designing a query in Power BI Desktop to clean up data, what operation can be used to remove non-printable characters?

- Scrub
- Trim
- Clean
- Sanitize

Query Steps for Cleaning Data

- Trim
  - Removes white space at start and end
- Clean
  - Removes non-printable characters
- Group By
  - Used to deduplify rows and create unique ID values

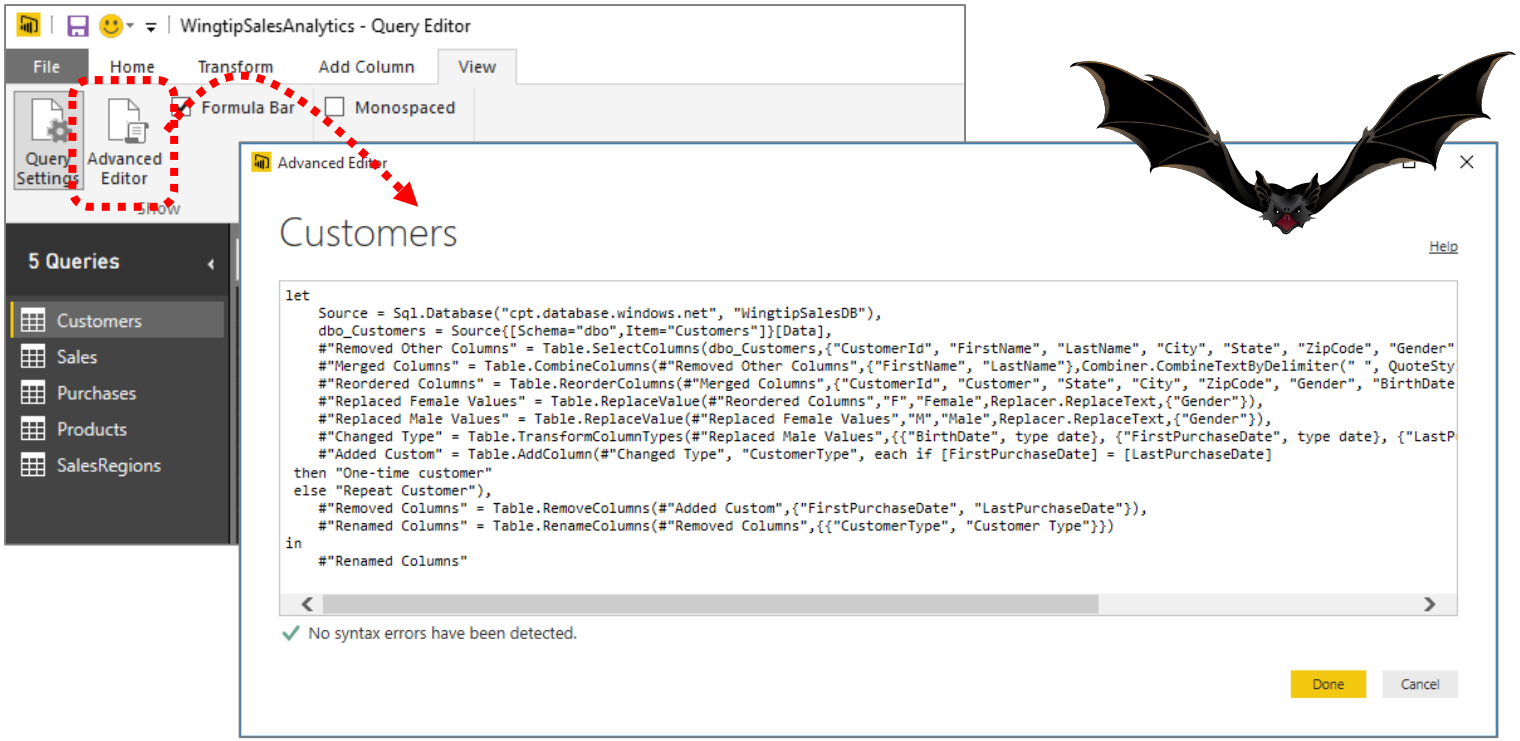
Sample Exam Question #4

Which of the following is not a valid privacy level for a Power BI data source?

- [ ] Public
- [ ] Protected
- [ ] Private
- [ ] Organizational

Queries and the M Language

- Power BI Desktop based on "M" functional language
  - Query in Power BI Desktop saved as set of M statements in code
  - Query Editor generates code in M behind the scenes
  - Advanced users can view & modify query code in Advanced Editor



Sample Exam Question #5

Which of the following in not a valid variable type when programming in the M language?

- Record
- List
- Function
- Dataframe

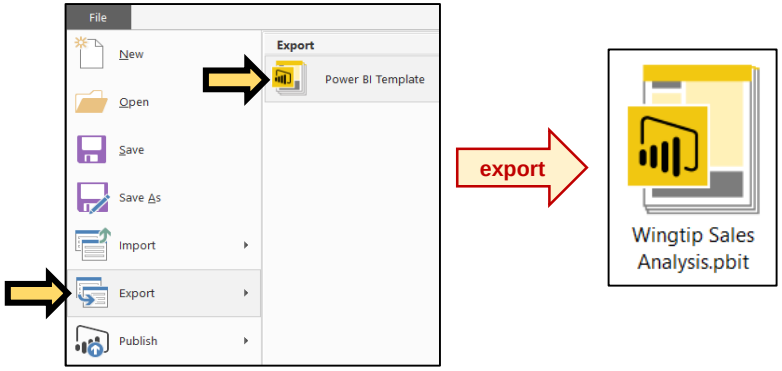
Sample Exam Question #6

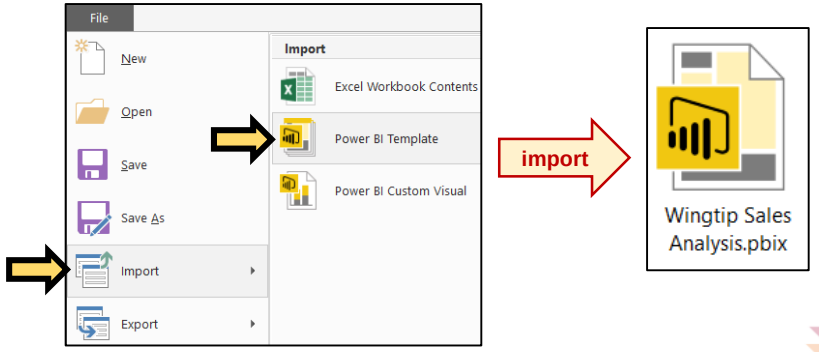
Which language(s) can be used when designing a query in Power BI Desktop?

- SQL
- M
- DAX
- Python

Power BI Project Template Files

- PBIX project can be exported to project template file
  - Template file created with PBIT file extension
  - Generated template files contains everything except for the data
  - PBIT template file can be imported to create new PBIX projects
  - Template files are powerful when used together with parameters
- How are template files used?
  - Export PBIX project to create a PBIT template file
  - Import the PBIT template file to create a new PBIX project





Sample Exam Question #7

Which of the following can be saved inside a PBIX project file but is never saved inside a PBIT project template file?

- Datasource credentials
- Query parameters
- Rows of data imported from tables in external datasources
- The default values for query parameters

Agenda

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- ➢ Data Modeling and DAX
- Reports and Dashboards
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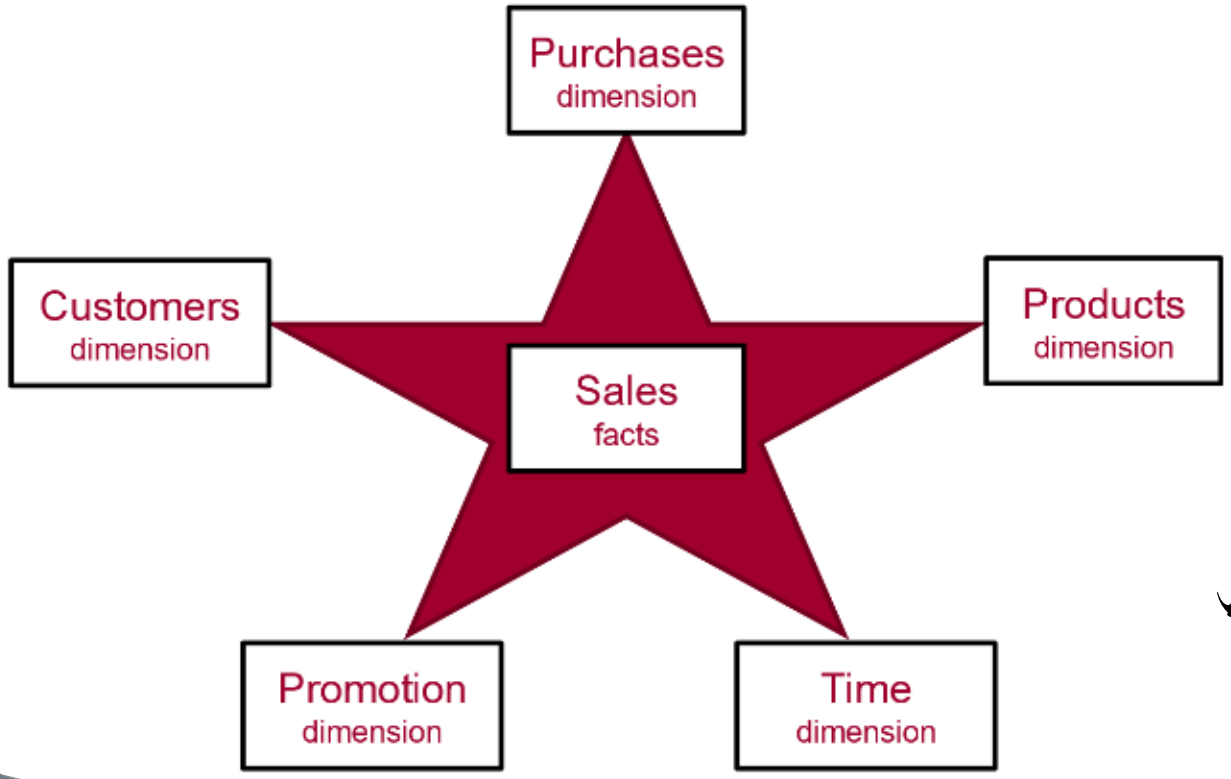
Data Modeling with Power BI Desktop

- Steps to create a data model with Power Pivot
  - Model imported tables using a star schema
  - Create relationships between tables
  - Modify columns (formatting, data category, etc)
  - Create calculated columns and measures
  - Create dimensional hierarchies
  - Add Calendar table(s)

Data Modeling using a Star Schema

- OLAP Modeling often based on Star Schema
  - Tables defined as fact tables or dimension tables
  - Fact tables related to dimension table using 1-to-many relationships



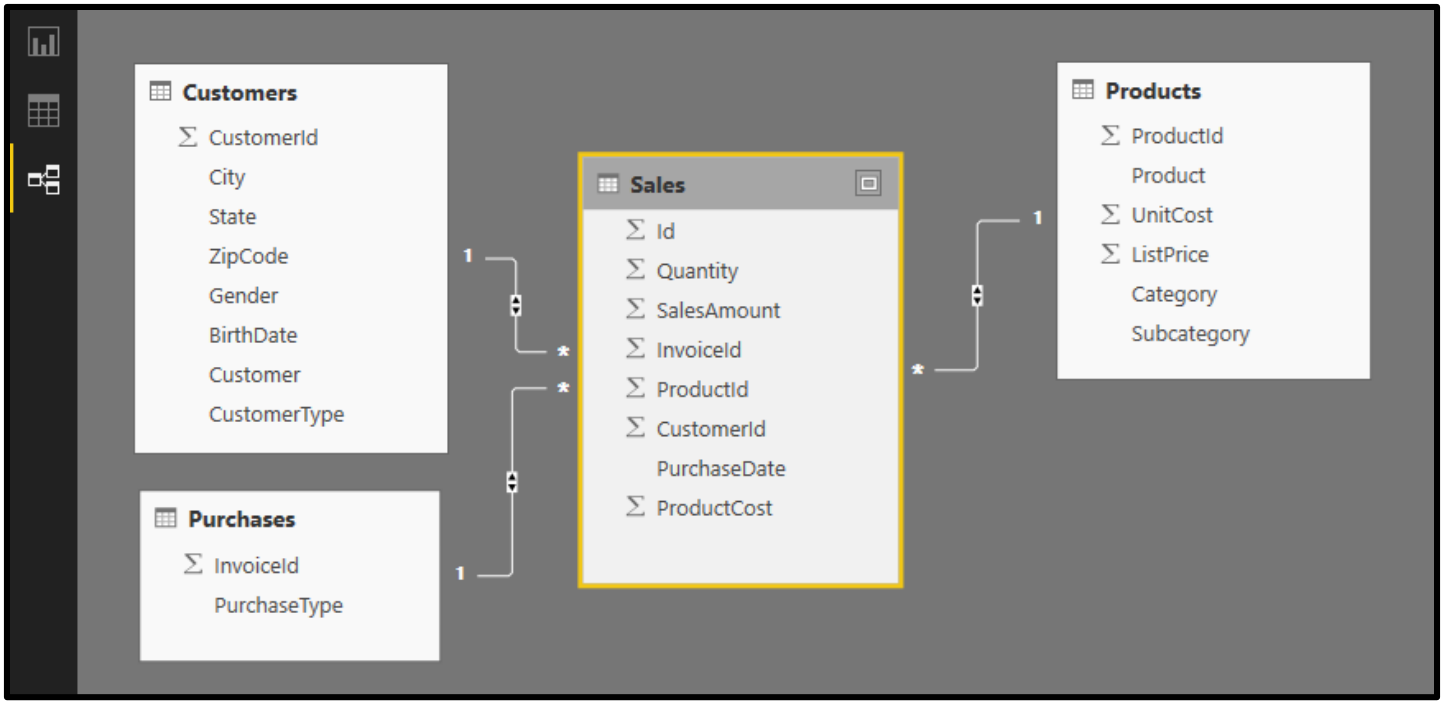
Sample Exam Question #8

When designing a data model with Power BI Desktop, which of the following statements are true regarding the rules for creating table relationships?

- ✗ A relationship between two tables can be defined using multiple fields from each table.
- → At least one column defined in a table relationship must contain unique values.
- → A relationship between two tables must be defined using a single field from each table.
- → You can define multiple relationships between two tables in a data model but only one of the relationships can be marked as active.

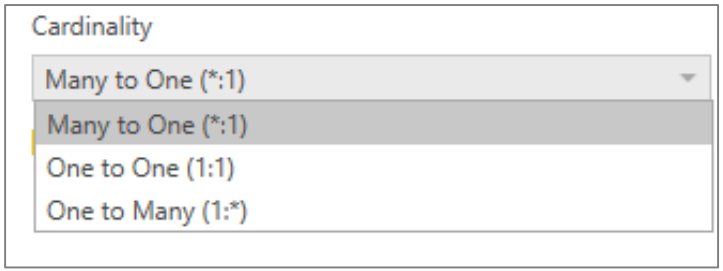
Table Relationships

- Tables in data model associated with relationships
  - Relationships based on single columns
  - Tabular model supports [1-to-1] and [1-to-many] relationships
  - Relationships based on single column in each table

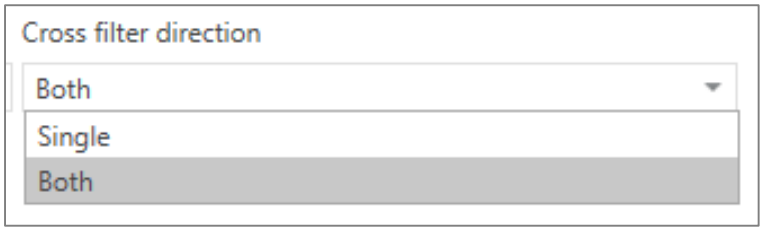


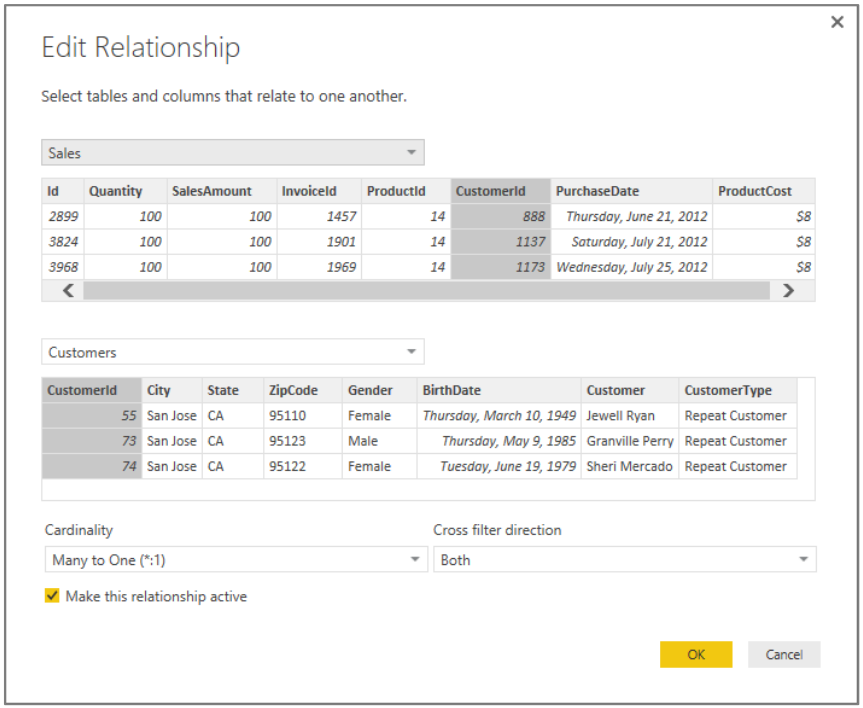
Relationship Properties

- Cardinality



- Cross filter direction





The RELATED Function

- RELATED function performs cross-table lookup
  - Effectively replaces older VLOOKUP function
  - Used in many-side table to look up value from one-side
  - Used to pull data from lookup table into primary table

```
Sales Region = RELATED(SalesRegions[SalesRegion])
```

CustomerId	City	State	ZipCode	Gender	BirthDate	Customer	CustomerType	Age	Age Group	Sales Region
55	San Jose	CA	95110	Female	3/10/49	Jewell Ryan	Repeat Customer	66	Ages 65 and over	Western Region
73	San Jose	CA	95123	Male	5/9/85	Granville Perry	Repeat Customer	30	Ages 30 TO 39	Western Region
74	San Jose	CA	95122	Female	6/19/79	Sheri Mercado	Repeat Customer	36	Ages 30 TO 39	Western Region
78	San Jose	CA	95110	Male	6/16/78	Raleigh Olson	Repeat Customer	37	Ages 30 TO 39	Western Region
136	San Jose	CA	95124	Female	1/2/45	Carrie Foreman	Repeat Customer	70	Ages 65 and over	Western Region
150	San Jose	CA	95134	Female	8/11/84	Renee McMillan	Repeat Customer	31	Ages 30 TO 39	Western Region

```
State Name = RELATED(SalesRegions[StateFullName])
```

State	ZipCode	Gender	BirthDate	Customer	CustomerType	Age	Age Group	Sales Region	State Name
CA	95110	Female	3/10/49	Jewell Ryan	Repeat Customer	66	Ages 65 and over	Western Region	California
CA	95123	Male	5/9/85	Granville Perry	Repeat Customer	30	Ages 30 TO 39	Western Region	California
CA	95122	Female	6/19/79	Sheri Mercado	Repeat Customer	36	Ages 30 TO 39	Western Region	California
CA	95110	Male	6/16/78	Raleigh Olson	Repeat Customer	37	Ages 30 TO 39	Western Region	California
CA	95124	Female	1/2/45	Carrie Foreman	Repeat Customer	70	Ages 65 and over	Western Region	California
CA	95134	Female	8/11/84	Renee McMillan	Repeat Customer	31	Ages 30 TO 39	Western Region	California

Sample Exam Question #9

When writing the DAX expression for a calculated column, you can assume your DAX code automatically has row context for the table in which the calculated column is defined.

- True
- False

Sample Exam Question #10

When writing the DAX expression for a measure, you can assume your DAX code automatically has row context for the table in which the measure is defined

- ○ True
- ◉ False

Calculated Columns vs Measures

- Calculated Columns (aka Columns)
  - Evaluated based on row context
  - Evaluated when data model is loaded into memory
  - Defined within scope of table inside data model

- Measures
  - Evaluated at query time based on current filter context
  - Commonly used for aggregations (e.g. SUM, AVG, etc.)
  - Defined at scope of data model

Sample Exam Question #11

Which of the following statements is false?

- When referencing a calculated column in a DAX expression, you must include the table name.
- When referencing a measure in a DAX expression, you must include the table name.
- When referencing a measure in a DAX expression, you should prefer not include the table name.
- When referencing a measure in a DAX expression, you can optionally include the table name.

Sample Exam Question #12

Which of the following statements are true about data modeling in Power BI Desktop project?

- ✗ Within a Power BI Desktop project, all dimensional hierarchy names must be unique.
- → Within a Power BI Desktop project, all measure names must be unique.
- ✗ Within a Power BI Desktop project, all calculated column names must be unique.
- → Within a Power BI Desktop project, all query parameter names must be unique.

Working with DAX

- DAX is the language used to create data model
  - DAX stands for "**D**ata **A**nalysis E**x**pression Language"
- DAX expressions are similar to Excel formulas
  - They always start with an equal sign (=)
  - DAX provides many built-in functions similar to Excel
- DAX Expressions are unlike Excel formulas…
  - DAX expressions cannot reference cells (e.g. A1 or C4)
  - Instead DAX expressions reference columns and tables

```
=SUM('Sales'[SalesAmount])
```

Types of DAX Functions

- Date and Time Functions
- Information Functions
- Logical Functions
- Mathematical and Trigonometric Functions
- Statistical Functions
- Filter Functions
- Text Functions
- Time Intelligence Functions

Sample Exam Question #13

Which of the following DAX functions does not return a table?

- Calculate
- Values
- AllExcept
- Filter

Sample Exam Question #14

Which of the following DAX expressions are valid and can be used for table filters when configuring row-level security

- ✗ `[State]="WA" OR [State]="OR" OR [State]="CA"`
- → `OR([State]="WA", OR([State]="OR", [State]="CA"))`
- → `[State]="WA" || [State]="OR" || [State]="CA"`
- ✗ `[State] IN ("WA", "OR", "CA")`

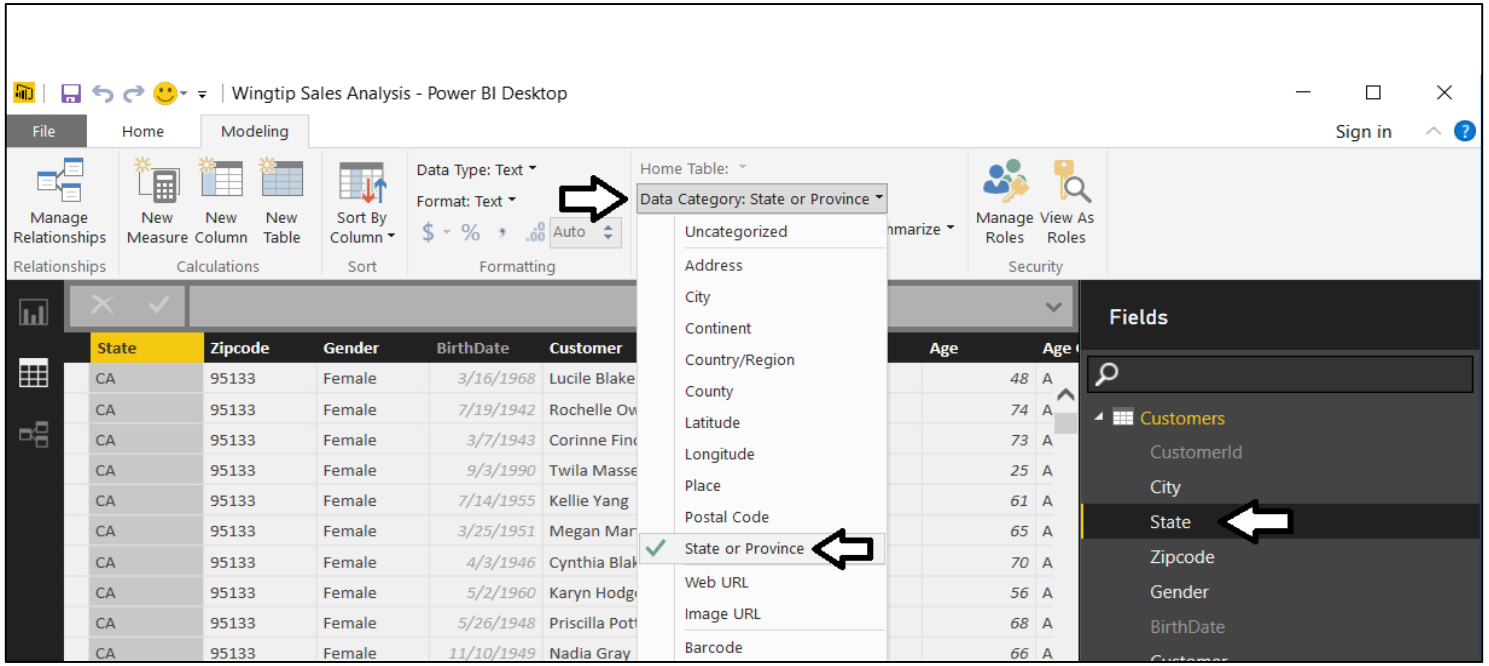
Sample Exam Question #15

Which of the following Data Category settings can be used for mapping data to geographic locations in Power BI?

- Latitude and Longitude (e.g. 47.6080, -122.3351)
- A city (e.g. London)
- An address (e.g. 1 Microsoft Way, Redmond, WA 98052)
- A place (e.g. Logan International Airport)

Geographic Field Metadata

- Fields in data model have metadata properties
  - Metadata used by visuals and reporting tools
  - Used as hints to Bing Mapping service
  - “Tampa, FL” value mapped as **Place** and not as **City**



Sample Exam Question #16

Which of the following statements are true with respect to designing a Power BI Desktop project in DirectQuery mode?

- ✗ You cannot add calculated columns to the data model.
- → All queries within the project must be based on a single source database.
- → You cannot convert column data types when editing a query.
- ✗ You cannot add measures to the data model.

Limitations of DirectQuery

- DirectQuery imposes the following limitations
  - All tables must come from a single database
  - Many types of query steps are not supported
  - You cannot convert column type in a query
  - No special treatment of date columns
  - Calculated columns only allowed since June 2017
  - By default, limitations placed on DAX in measures

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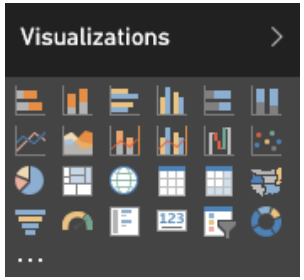
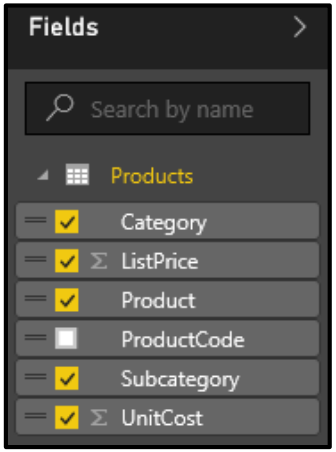
Visuals (aka Visualizations)

- Reports are designed using visual (aka visualizations)
  - Each visuals is based on an underlying visualization type
  - Visualization type can be changed using **Visualizations** pane



  - Visuals creating by using fields from tables inside **Fields** list



Power BI Licensing

- Microsoft initially offered two Power BI licensing options
  - Power BI Free license
  - Power BI Pro license ($10/month)
  - Everything has been running within a shared capacity

- Microsoft recently introduced Power BI Premium licensing
  - Power BI Premium customers can create dedicated capacities
  - Power BI Premium licensing has monthly fee for dedicated capacity
  - Dedicated capacity remove limits on upload size and # of refreshes
  - Dedicated capacity can serve Power BI content to non-licensed users

- More info at https://powerbi.microsoft.com/en-us/pricing/
  - Please ask questions about licensing offline and not during lectures

Sample Exam Question #17

Which of the following field types can be added to the Field well of a Slicer visual?

- Groups created inside a table using the "New Group" Command in Power BI Desktop
- Calculated columns created with a DAX expression
- Measures created by a DAX expression
- Native columns returned by a query

Sample Exam Question #18

Into which of the following scopes can you import a custom visual created for Power BI?

- [x] Into the scope of an app workspace
- [x] Into the scope of a Power BI Desktop project
- [x] Into the scope of your personal workspace
- [ ] Into the scope of a premium capacity

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Sample Exam Question #19

Which of the following are advantages associated with moving an App Workspace into a premium capacity creating using a Power BI Premium P1 subscription?

- ✗ Users who have the Power BI Free license can enter the App Workspace for read-only access to its content
- Dashboards within the App Workspace can be shared with users who have the Power BI Free license
- The App published from the App Workspace can be installed and consumed by users who have the Power BI Free license
- Reports and dashboards from the App Workspace can be embedded in custom applications and served to non-licensed users

Sample Exam Question #20

Which of the following Power BI subscriptions provides the proper licensing for users to view Power BI content through the Power BI mobile apps?

- Power BI Pro (user license)
- Power BI Free (user license)
- Power BI Premium EM3 (capacity license)
- Power BI Premium P1 (capacity license)

Summary

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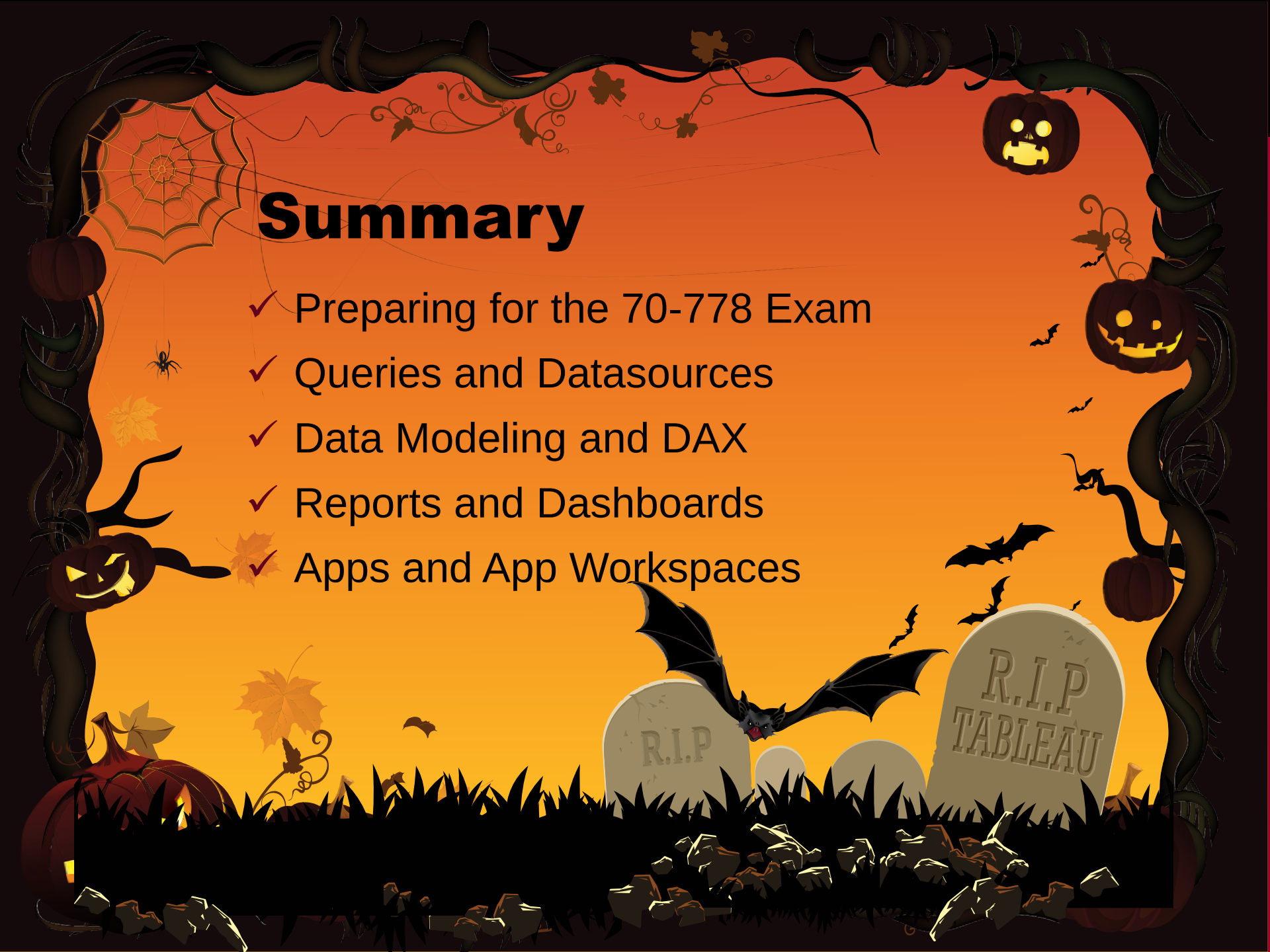
- ✓ Apps and App Workspaces



Critical Path Training

https://www.CriticalPathTrainig.com

- **PBI365: Power BI Certification Bootcamp** – 4 Days
  - Audience is Business Users, Analysts and Data Professionals
  - Provides hands-on introduction to the Power BI platform
  - Focuses on build solutions using Power BI Desktop
  - Query design, data modeling and report and dashboard design
  - Apps and App Workspaces
  - Learn about “import” vs “connect to” with Excel workbooks
- **PBD365: Power BI Developer Bootcamp** – 4 Days
  - Audience is Professional Developers
  - Teaches developing custom visuals with TypeScript and D3
  - Teaches R programming and integrating R with Power BI
  - Teaches programming with the Power BI APIs
  - Teaches developing with Power BI Embedded