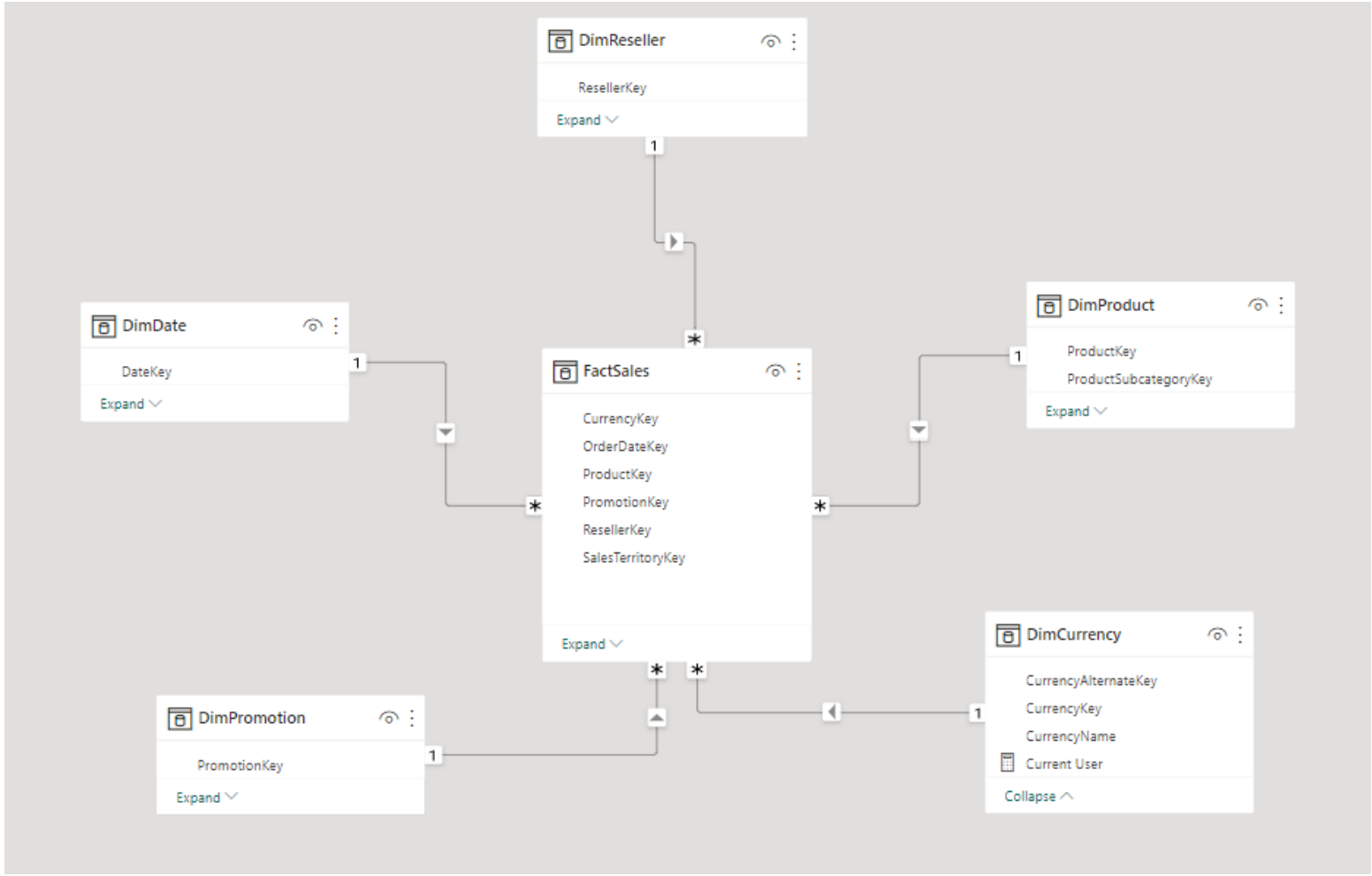
Microsoft

DAX Field Guide

Viktor Radu
Sr. Cloud Solutions Architect

Data Model

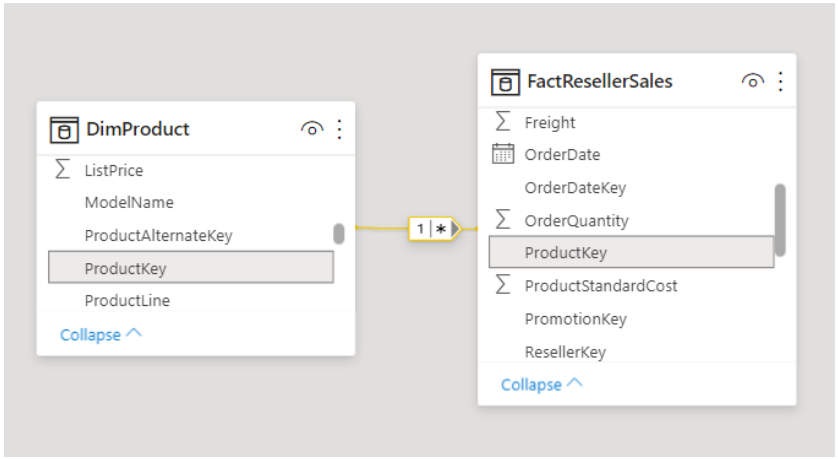
- Tables
- Relationships
- Metadata
  - Formatting
  - Categories
  - Hierarchies
  - Sorting

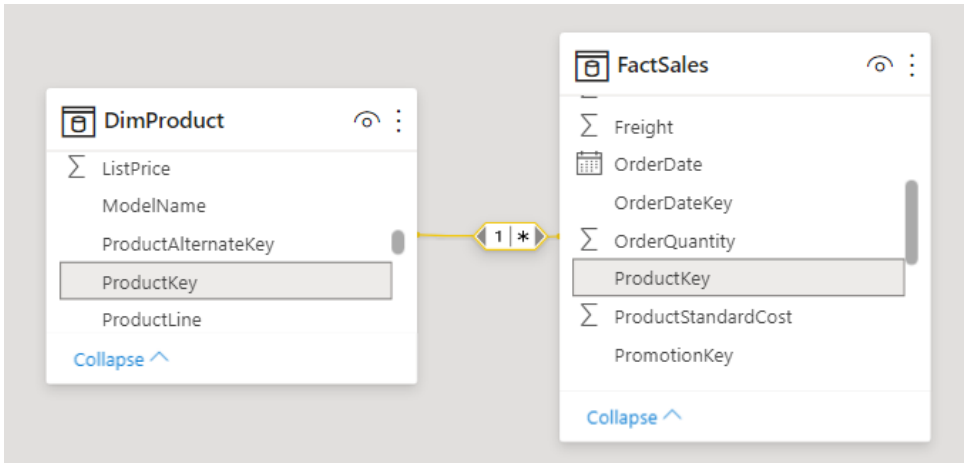


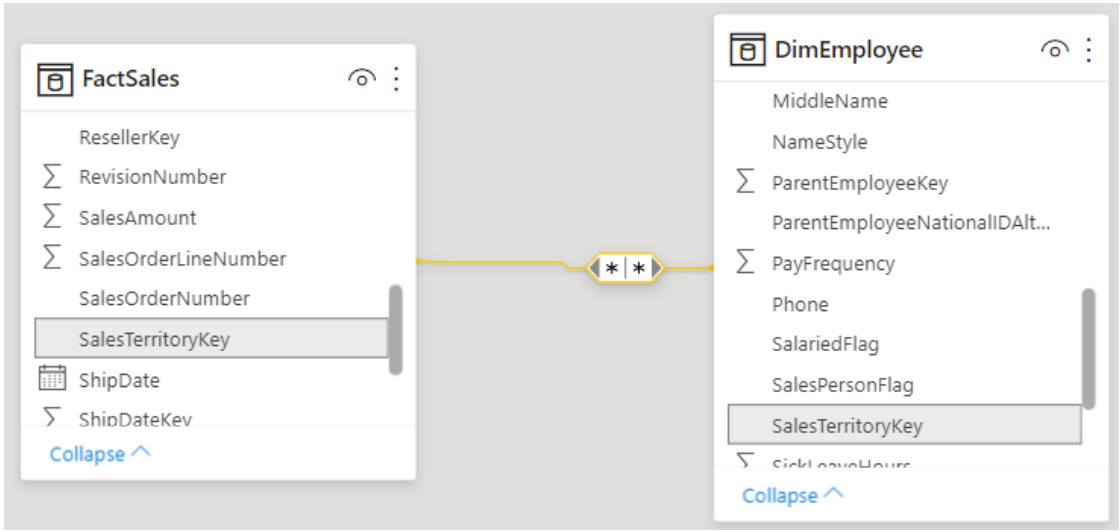
Start schema is a good way to structure the data model

Data Model - Navigation

- Cardinality
- Cross-filer direction





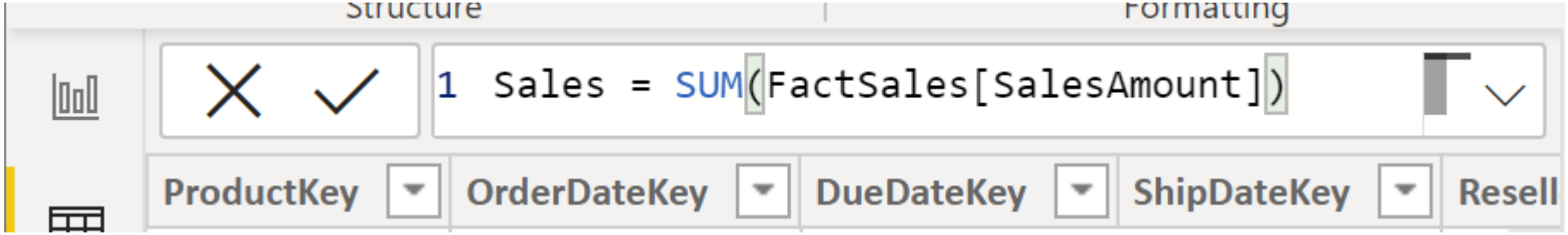


DAX in Power BI Desktop

- Calculated Columns
- Calculated Tables

- Measures
- Row-level security rules

Formula Bar



DAX in Power BI Desktop - Syntax

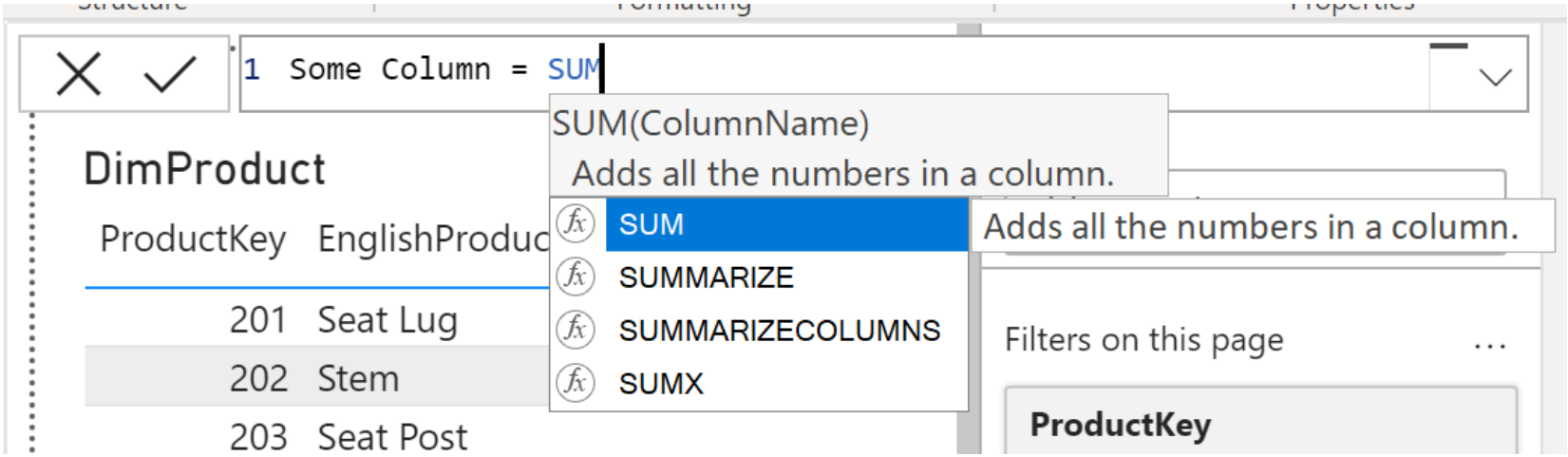
Calculations apply functions to tables/columns and combine the results into a single scalar or table

```
Some Column = FactSales[Other Column] + [Some Measure]

Some Measure = SUM(FactSales[Other Column]) + [Another Measure]

Ratio = DIVIDE(FactSales[Some Column], FactSales[Other Column])
```

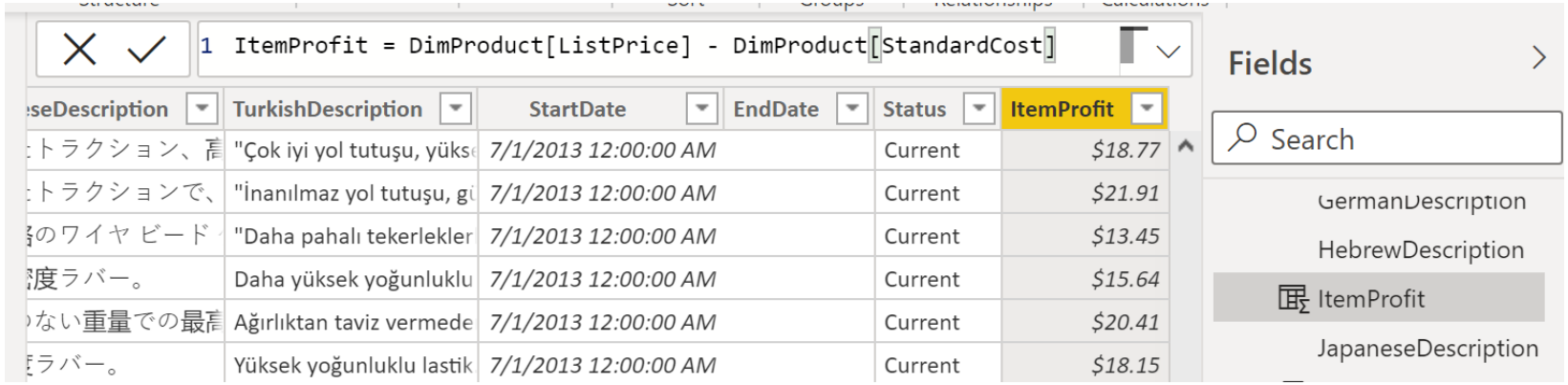
Intellisense looks up columns/function options and function definitions



Calculated columns vs Measures

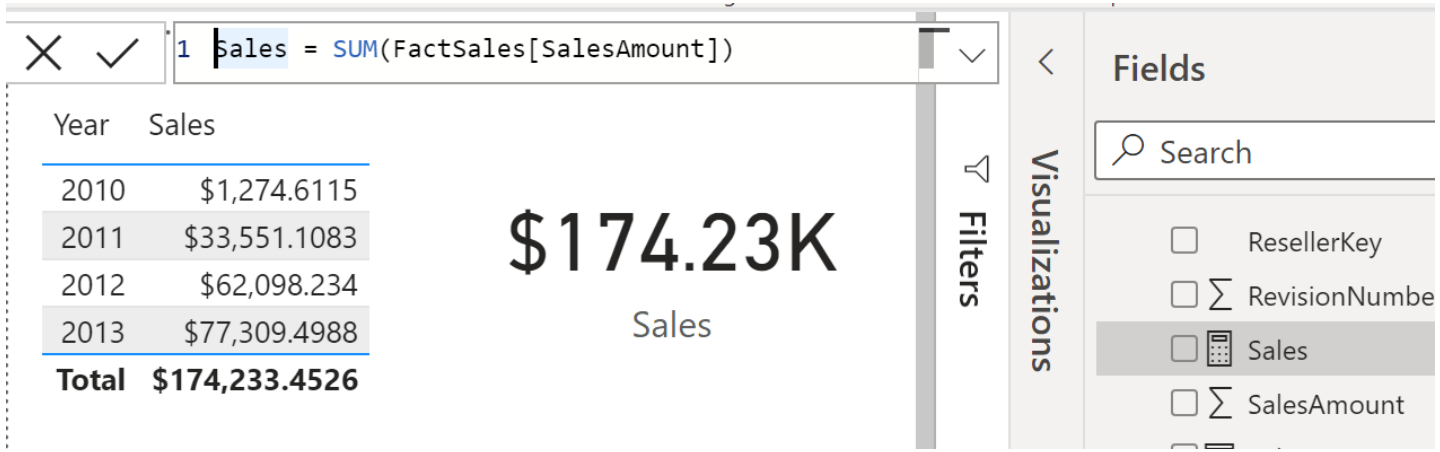
Calculated Columns

- Persisted
- Evaluated row-by-row



Measures

- Not persisted
- Evaluated for each cell/card/bar/point independently



DAX Functions - examples

- Aggregation

  SUM(), MAX(), MIN(), COUNT(), PRODUCT()

- Logical

  IF(), SWITCH(), AND(), OR()

- Financial

  ACCRINT(), NOMINAL(), PRICE(), YIELD()

- Statistical

  AVERAGE(), POISSON.DIST(), NORM.DIST(), RANK.EQ(), STDEV.S()

- …

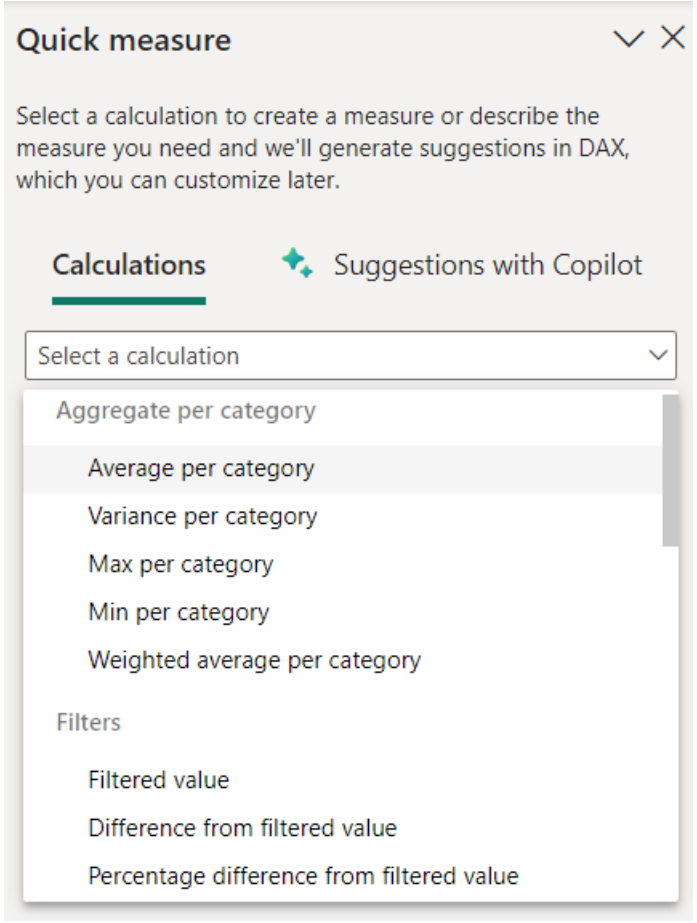
- DAX function reference – DAX

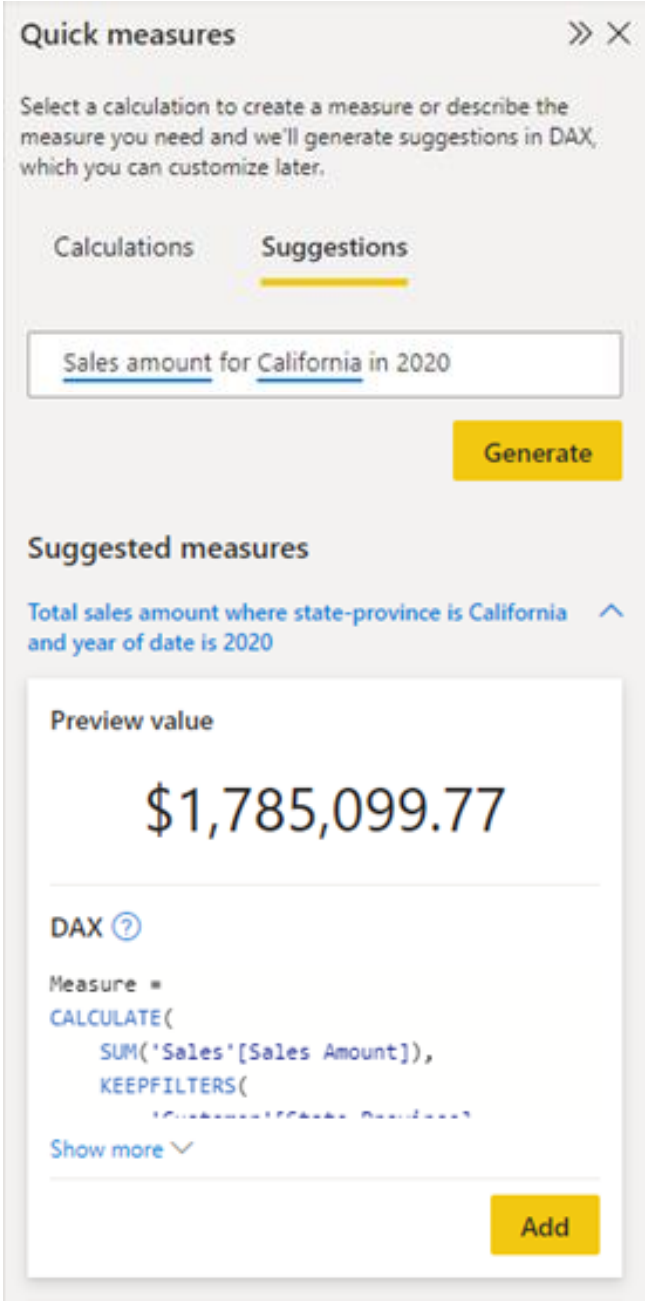
  https://learn.microsoft.com/en-us/dax/dax-function-reference

Quick Measures

- Library of
  common calculations

- Suggestions
  with Copilot





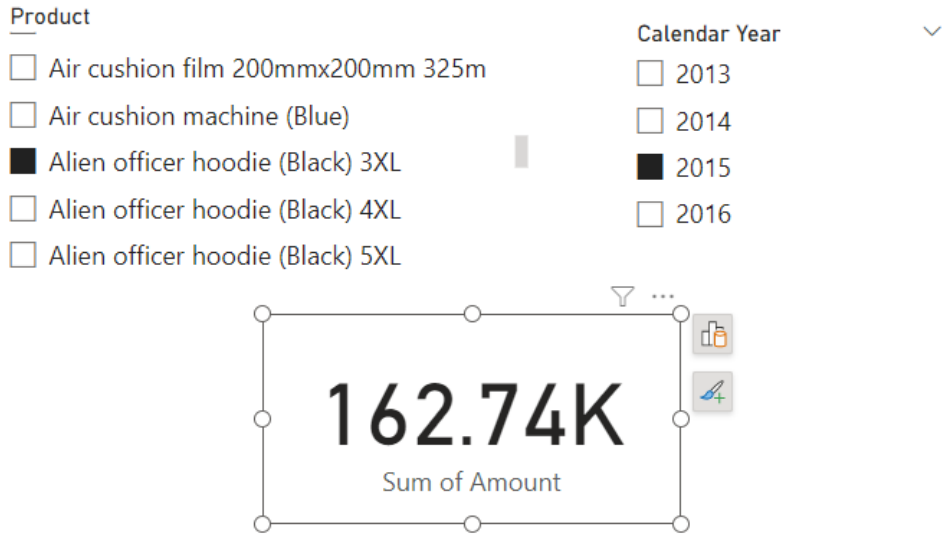
Evaluation context

```
Total = FactSale[Unit Price] * FactSale[Quantity]
```

Row context

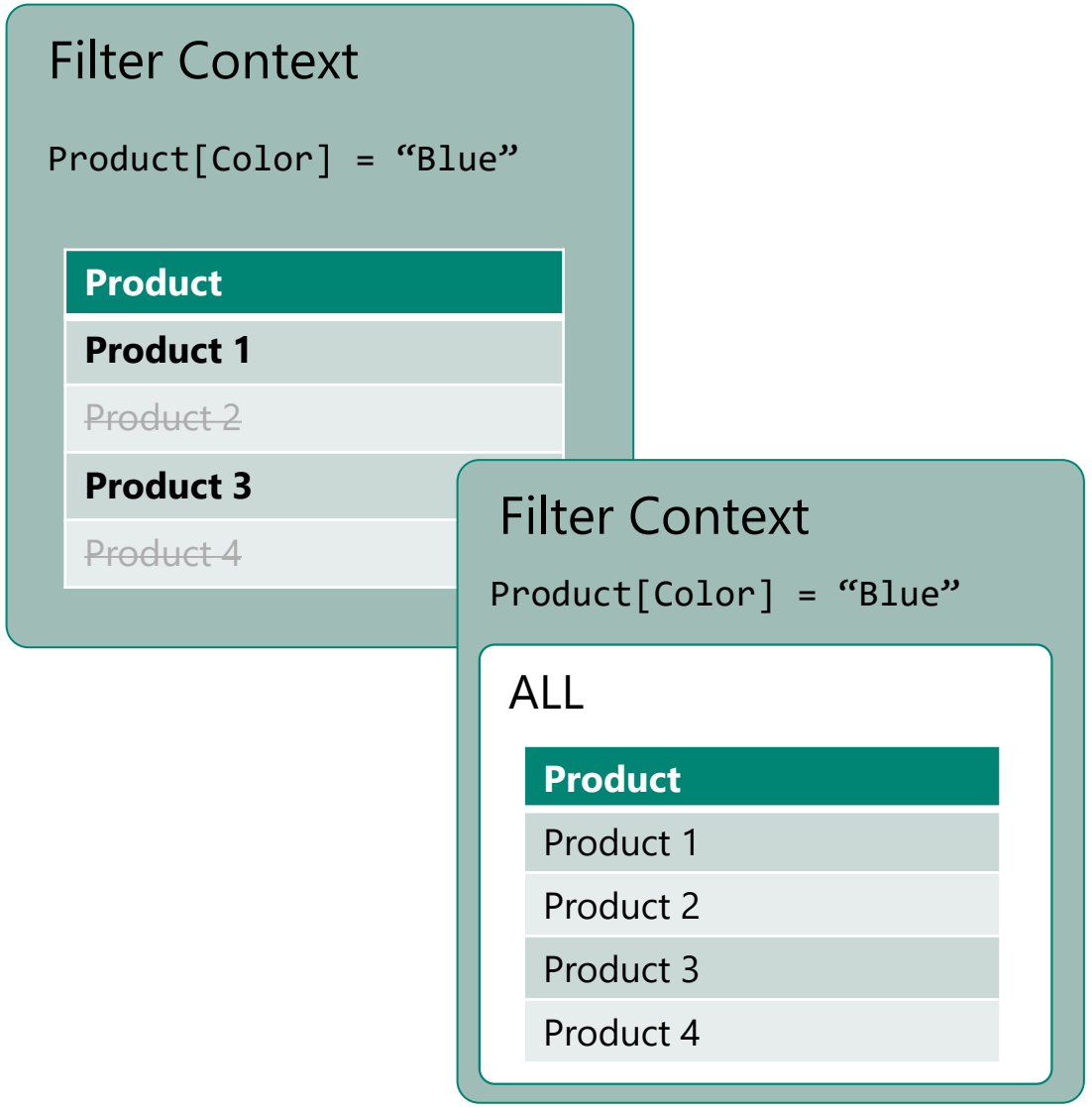
Sale Key	Product	Quantity	Unit Price	Total
	tape 48mmx100m			
226864	Black and orange fragile despatch tape 48mmx75m	324	3.70	1,198.80
227181	Black and orange fragile despatch tape 48mmx100m	324	4.10	1,328.40
227700	Black and orange fragile despatch tape 48mmx75m	324	3.70	1,198.80
123	Black and orange fragile despatch tape 48mmx75m	288	3.70	1,065.60
995	Black and orange fragile despatch tape 48mmx100m	288	4.10	1,180.80
2356	Black and orange fragile despatch tape 48mmx75m	288	3.70	1,065.60
4930	Black and orange fragile despatch	288	3.70	1,065.60

Filter context



Context manipulation

- Global
  - ALL
  - ALLNONBLANKROW
  - ALLEXCEPT
- Local
  - ALLSELECTED
  - ALLCROSSFILTERED
  - KEEPFILTERS



Practice Problems

Refer to practice.docx. DAX basics 1 - 4

Calculated tables

- Persisted
- Generated by table value functions – examples:
  - SUMMARIZE
  - SELECTCOLUMNS
  - FILTER
  - UNION
  - DATATABLE
  - ALL
- Calculated columns can be defined

Variables

```
var totalSales = SUM(Sales)
return IF(totalSales > 0, totalSales, 0)
```

Variables can be used across contexts

```
Sales Amount =
var unitPrice = MAX(FactSales[UnitPrice])
var result = SUMX(FactSales, FactSales[OrderQuantity] * unitPrice)
return result
```

Conditional functions

- `IF(Sales[Quantity] > 0, Sales[Quantity], 0)`

- `COALESCE([Sales Amount], 0)`

- `AND, OR, NOT`

  `OR(A, AND(B, C))` is equivalent to `A || (B && C)`

- `SWITCH([Selected Category], “Clothing”, “C”, “Bikes”, “B”, “…”)`

```
SWITCH(TRUE(),
        [Selected Category] = “Clothing”, “C”,
         [Selected Region] = “East” && [Total] > 100, “B”,
        “…”)
```

Calculate function

```
Sales of Size M = CALCULATE(SUM(FactSale[Amount]), 'Product'[Size] = "M")
```

- ALL, ALLNONBLANKROW, ALLEXCEPT
- ALLSELECTED, ALLCROSSFILTERED
- KEEPFILTERS
- Operators && and ||

```
Price Average = CALCULATE(AVERAGE('Product'[Unit Price]), 'Product'[Color] = "Blue" && 'Product'[Brand] = "Contoso")
```

- CALCULATETABLE

Calculate function

```
Measure = SUM(FactSales[Amount])
```

Filter Context	Result
Empty (no filters applied)	All Sales records included in the calculation
Product[Color] = “Yellow”	Only Sales records related to “Yellow” products are included in the calculation

```
Measure = CALCULATE(SUM(FactSales[Amount]), Product[Color] = “Yellow”)
```

Filter Context	Result
Empty (no filters applied)	Only Sales records related to “Yellow” products are included in the calculation
Product[Color] = “Yellow”	Only Sales records related to “Yellow” products are included in the calculation
Product[Size] = “M”	Sales records related to “Yellow” products of size M are included in the calculation

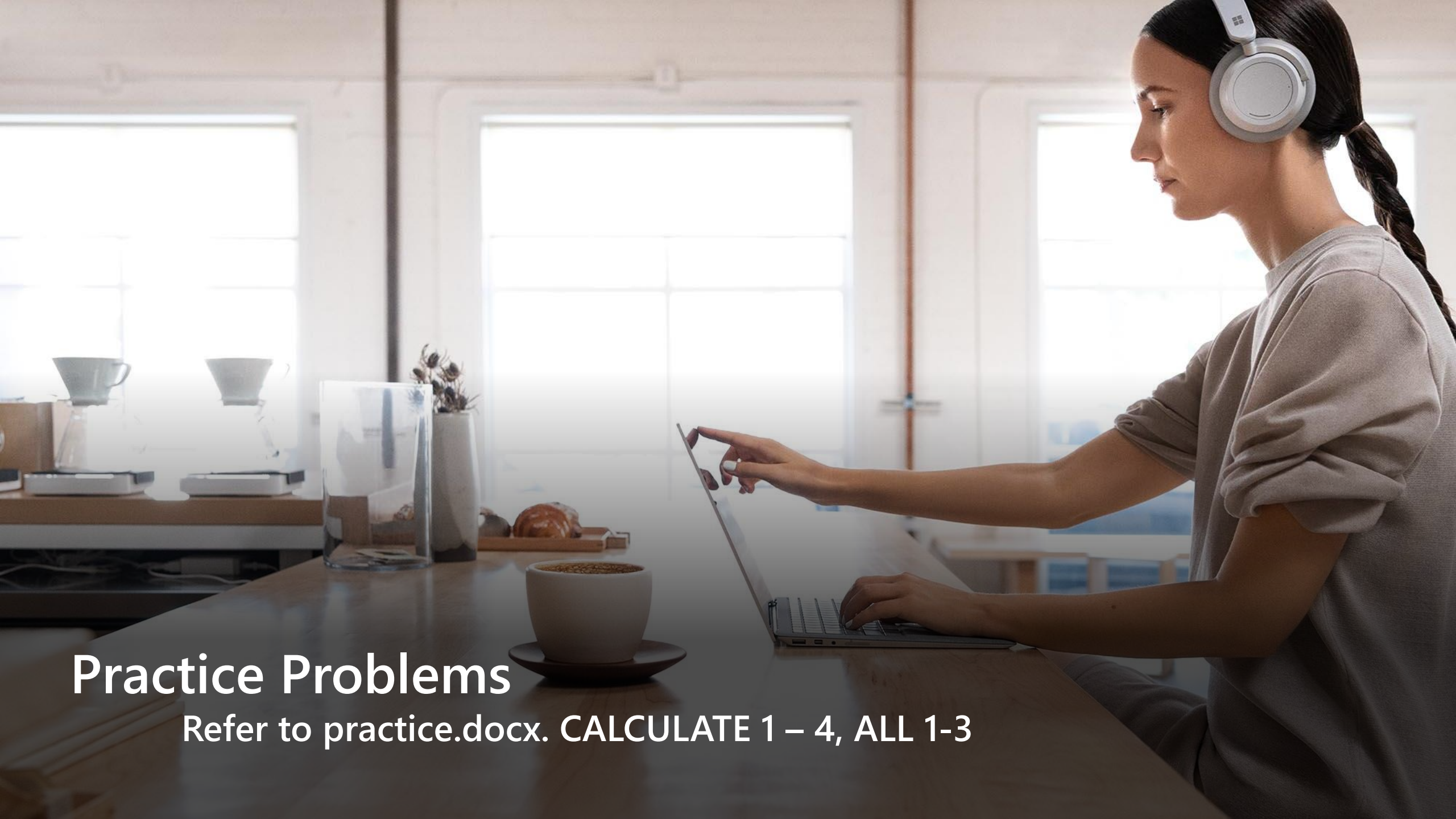
Calculate function - continued

```
Measure = CALCULATE(SUM(Sales[Amount]), KEEPFILTERS(Product[Color] = “Yellow”))
```

Filter Context	Result
Empty (no filters applied)	Only Sales records related to “Yellow” products are included in the calculation
Product[Color] = “Blue”	No Sales records satisfy both filter criteria, so the result is (Blank)

```
Measure = CALCULATE(SUM(Sales[Amount]), ALL(Product[Color]))
```

Filter Context	Result
Empty (no filters applied)	All Sales records included in the calculation
Product[Color] = “Red”	All Sales records included in the calculation
Product[Size] = “M”	Sales records related to products of size M are included in the calculation



Practice Problems

Refer to practice.docx. CALCULATE 1 – 4, ALL 1-3