Power BI Essentials - III

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Introduction to DAX

- Data Analysis Expressions (DAX) is a syntax language that comprises formulae and expressions that are used in data manipulation. Functions, constants, and operators are used in DAX to create expressions.

- In simpler terms, DAX is the advanced version of MS Excel with high-end data manipulation and management capabilities. It is developed by Microsoft to interact with its business intelligence and data modeling tools like PowerPivot, Power BI.

- Power BI is a robust analytics tool by Microsoft that offers several features and functions using DAX as a language.

Importance of DAX

- DAX is quite an important syntax as working in DAX improves the user experience by deploying functionalities like data visualisation, data importing, and manipulating.

- For normal report creation, the basic knowledge of the dashboard is enough but to be able to build up sophisticated and insightful reports, DAX is required.

DAX Components

Syntax

Syntax refers to the components of the formula you are making. It is the language used in the formula like the command, sign, operators, destination column or row or table, etc. For example, name, parenthesis, summation, name of the table, etc.

Context

Context refers to the target row that has been included in the formula for data retrieval or calculation. Context is present in two types: Row Context and Filter Context.

Functions

Functions refer to the predefined or already existing commands in the system. For example, Sum, Add, True, False, etc.

Types of Functions in DAX

1. Aggregate Functions

MIN :

Fetches the minimum value in a given column.

Syntax - MIN (<column_name>)

Other functions

- **MAX**
- **MAXA**
- **MAXX**
- **SUM**
- **AVERAGE**
- **SUMX**
- **AVERAGEX**

Types of Functions in DAX

2. Count Functions

Count :

Fetches the total count of items even if repetitions are present.

Syntax - COUNT (<column_name>)

DISTINCTCOUNT :

Fetches the count of distinct numbers avoiding any replication.

Syntax - DISTINCTCOUNT (<column_name>)

Other functions
 •**COUNTA**
 •**COUNTROWS**

Types of Functions in DAX

3. Date-Time Functions

DATE :

Fetches the desired date in Date-time format.

Syntax - DATE (<year> , <month> , <day>)

Example - DATE (2022 , 09 , 11)

HOUR :

Fetches hours in the AM PM format.

Syntax - HOUR (<datetime>)

TODAY :

Fetches the current date.

Syntax - TODAY ( )

Example - YEAR (TODAY( )) - 2021

Types of Functions in DAX

4. Maths Functions

ABS :

Fetches the absolute value

Syntax - ABS (<number>)

Example - ABS ([COST_PRICE] - [SELLING_PRICE])

Other Functions :

- LN
- LOG
- PI
- POWER
- QUOTIENT
- SIGN
- SQRT

Types of Functions in DAX

4. Logical Functions

AND :

Performs the logical conjunction on two specified expressions.

Syntax - AND(<logical1> , <logical2 >)

Example =IF(AND(1<2 , 2<3) , "All true" , "One or false")

Other Functions :

- OR
- NOT
- IF
- IFERROR
- ISBLANK
- ISNUMBER

Types of Functions in DAX

5. Text Functions

CONCATENATE :

Performs joining of two strings.

Syntax - CONCATENATE(<text1> , <text2>)

Example =CONCATENATE("Hello" , "World")

Other Functions :

- FIXED
- REPLACE
- SEARCH
- CONCATENATEX
- UPPER

Where are DAX Formulas Used in Power BI?

There are three ways you can use DAX formulas in Power BI:

- Calculated Tables - These calculations will add an additional table to the report based on a formula.

- Calculated Columns - These calculations will add an additional column to a table based on a formula. These columns are treated like any other field in the table.

- Measures - These calculations will add a summary or aggregated measure to a table based on a formula.

DAX Formula Example
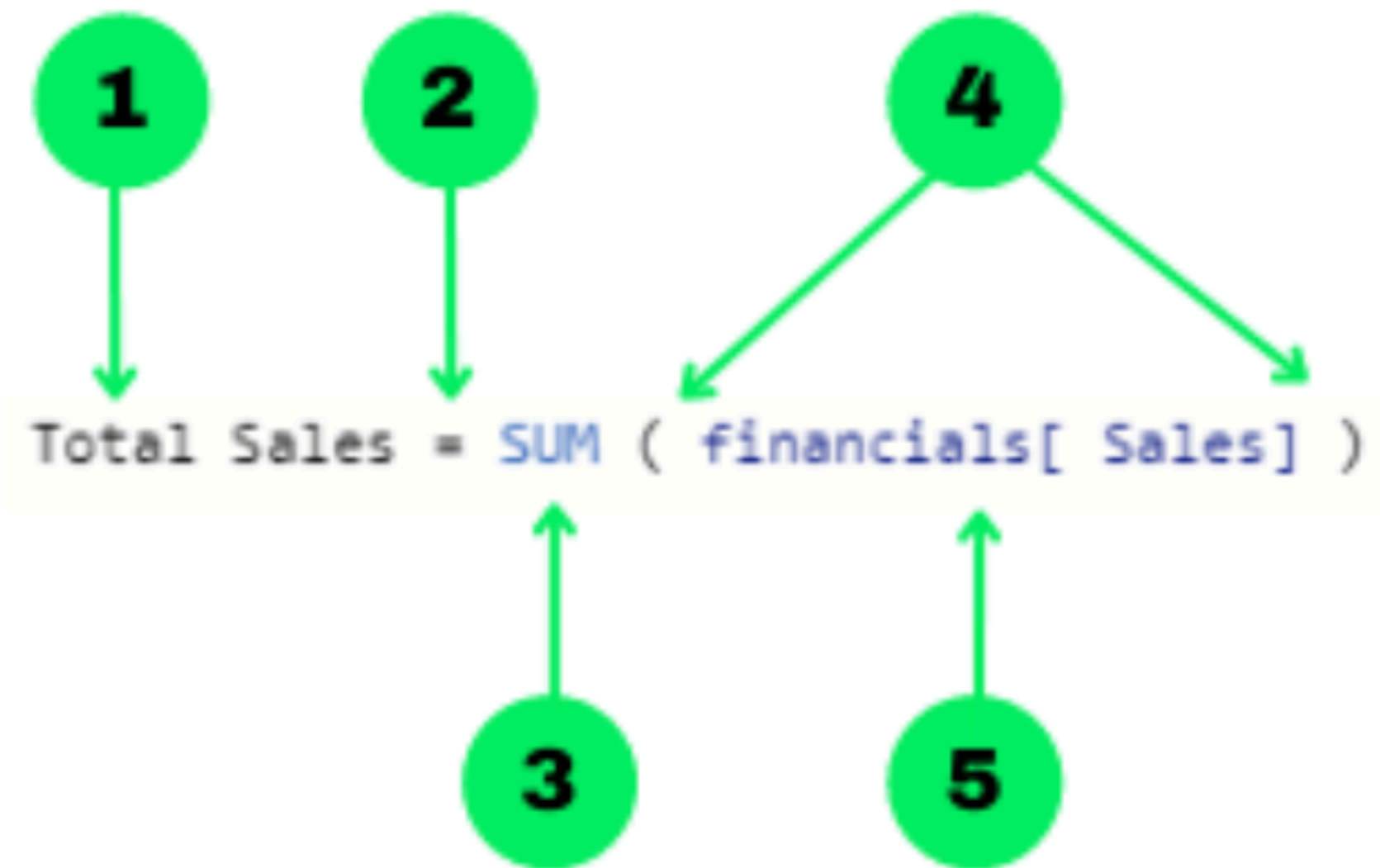
Understanding Context in DAX Formulas

There are two main types of context in DAX:

- Row context

- Filter context

Understanding Context in DAX Formulas
Row Context

`Cost Price Per Unit = financials[COGS] / financials[Units Sold]`

Understanding Context in DAX Formulas
Filter Context

Filter context is applied on top of a row context and refers to a subset of rows or columns that are specified as filters in the report. Filters can be applied in a few ways:

- Directly in a DAX formula

- Using the filters pane

- Using a slicer visual

- Through the fields that make up a visual (such as the rows and columns in a matrix)
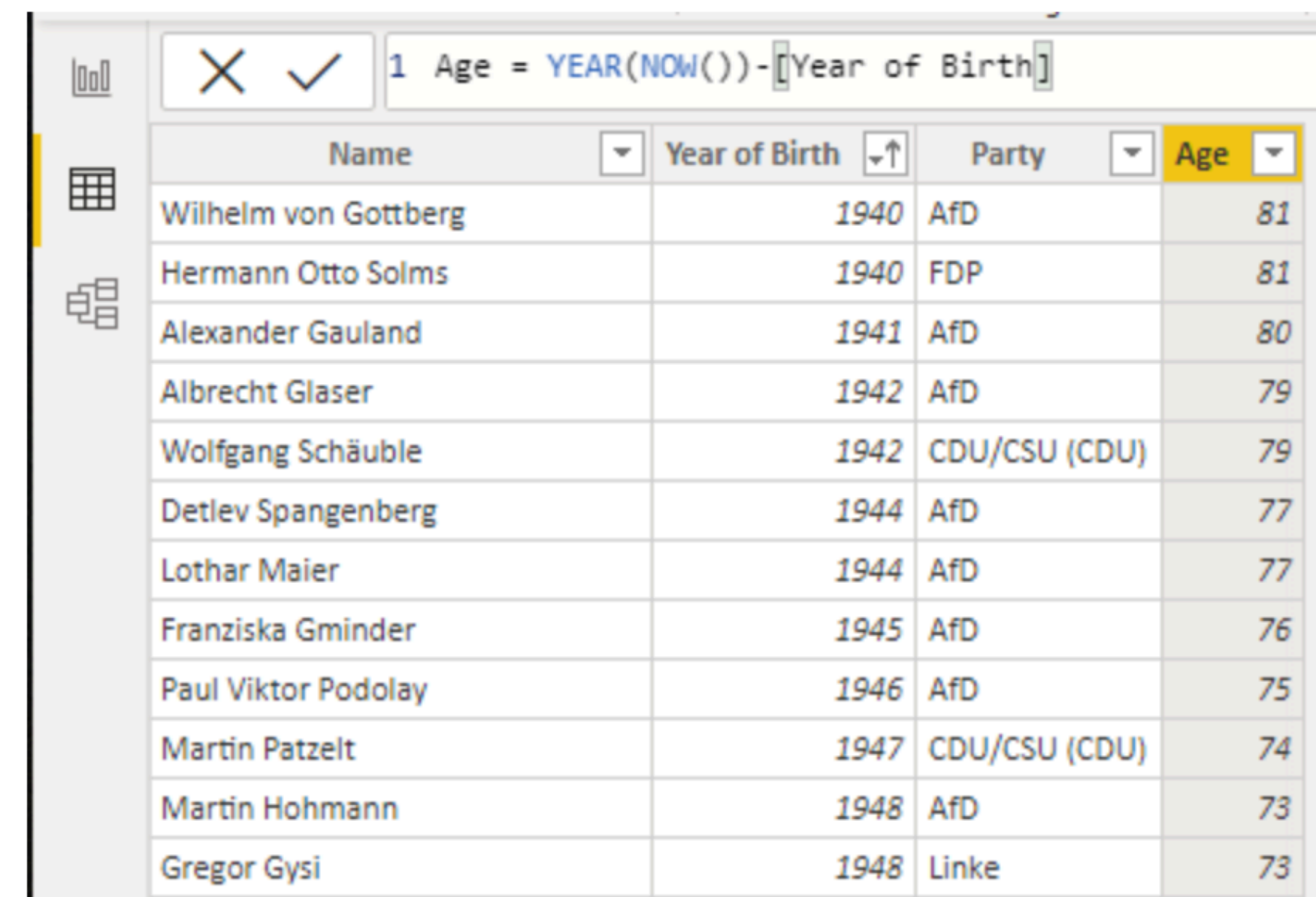
```
USA Profit Margin =

CALCULATE ( SUM ( financials[Profit] ) / SUM ( financials[Sales] ),
    financials[Country] = "United States of America")
```

Exploring some more Visuals
Histogram

Exploring some more Visuals
Histogram

You should now see an additinal field in the data model, namely "Age (bins)".
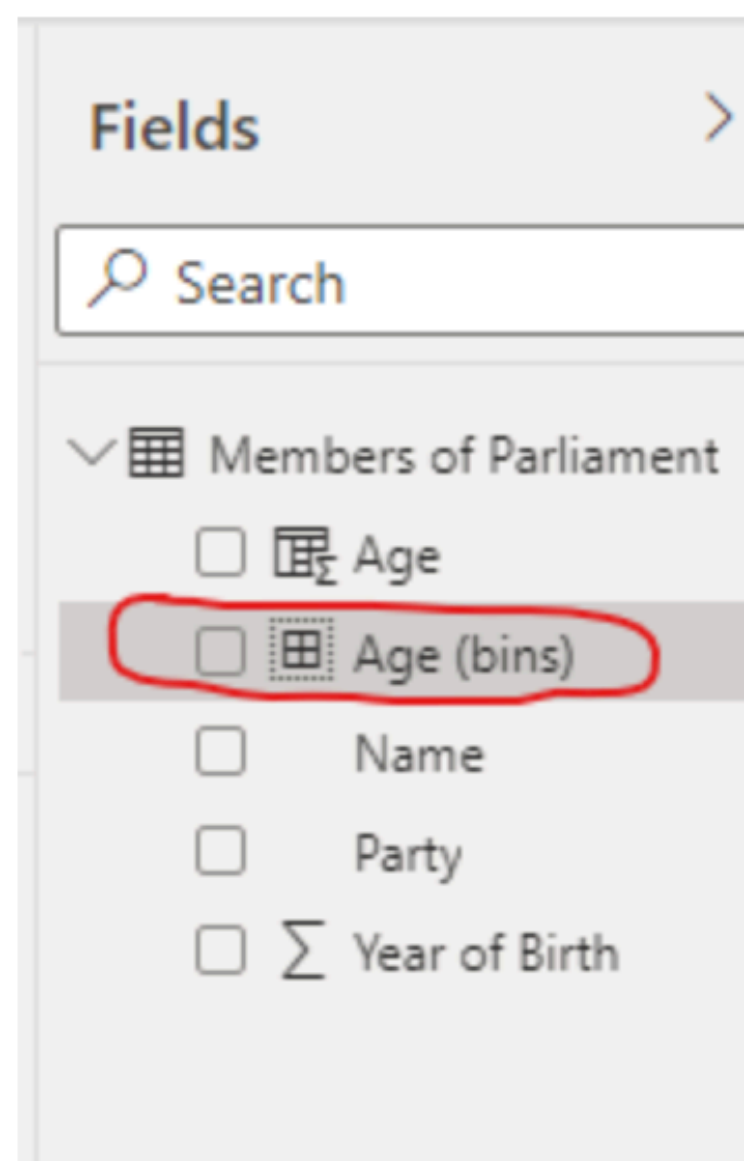
By using this grouped field you can now create a histogram from a simple column chart.

The result should look like this.
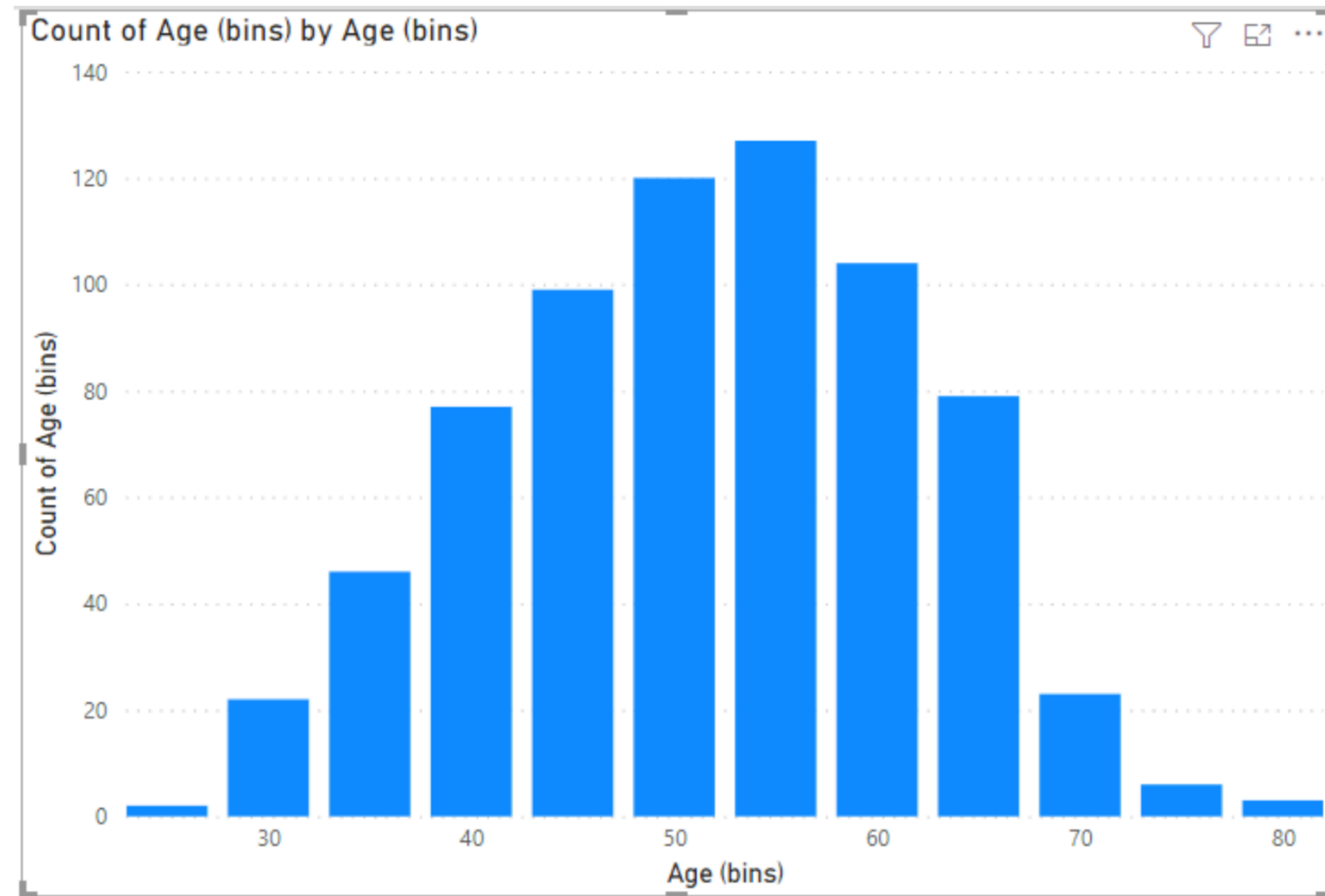
Incidentally, by formatting the X-axis, we can make our column chart look a little more like a classic histogram.
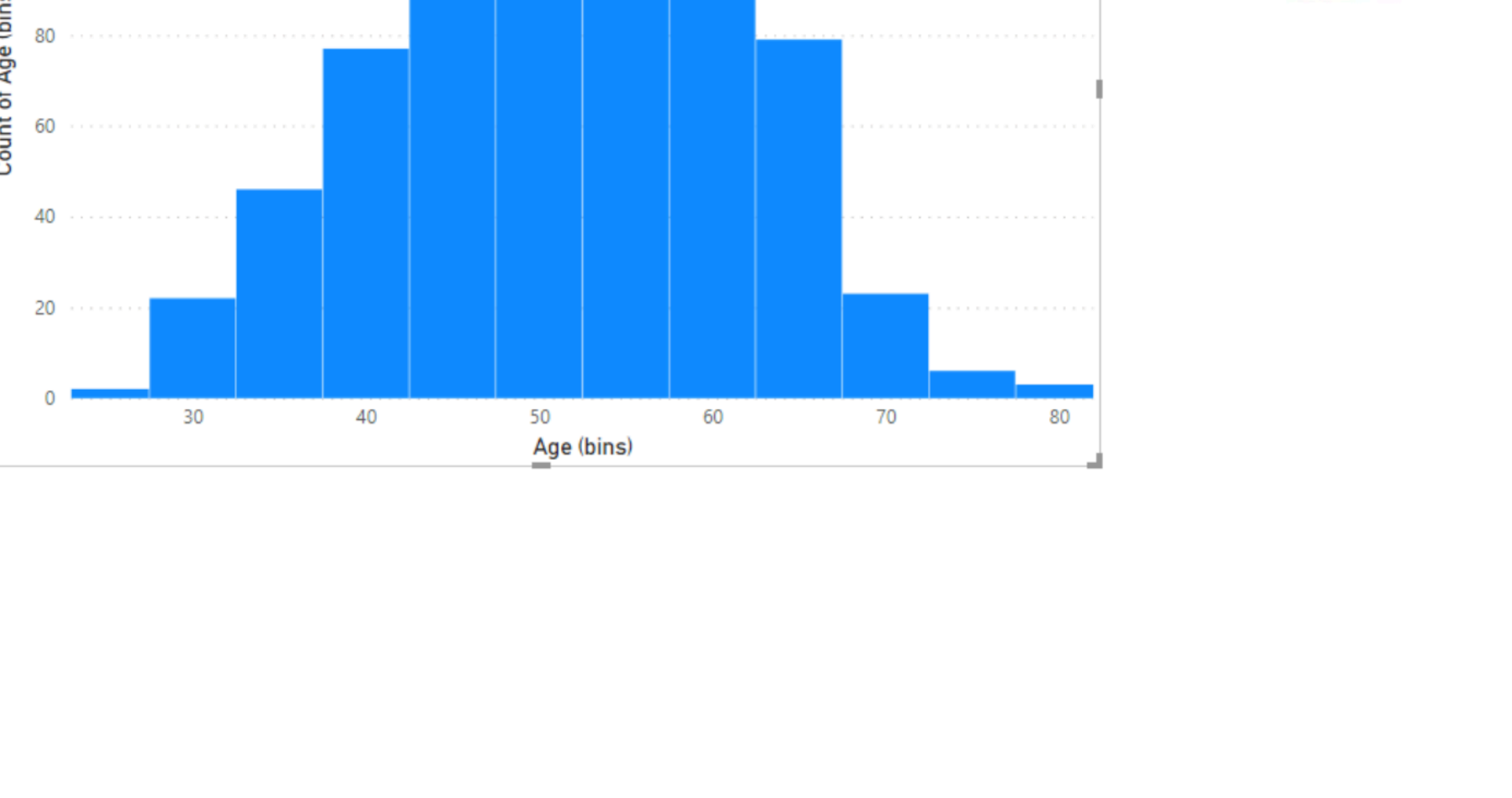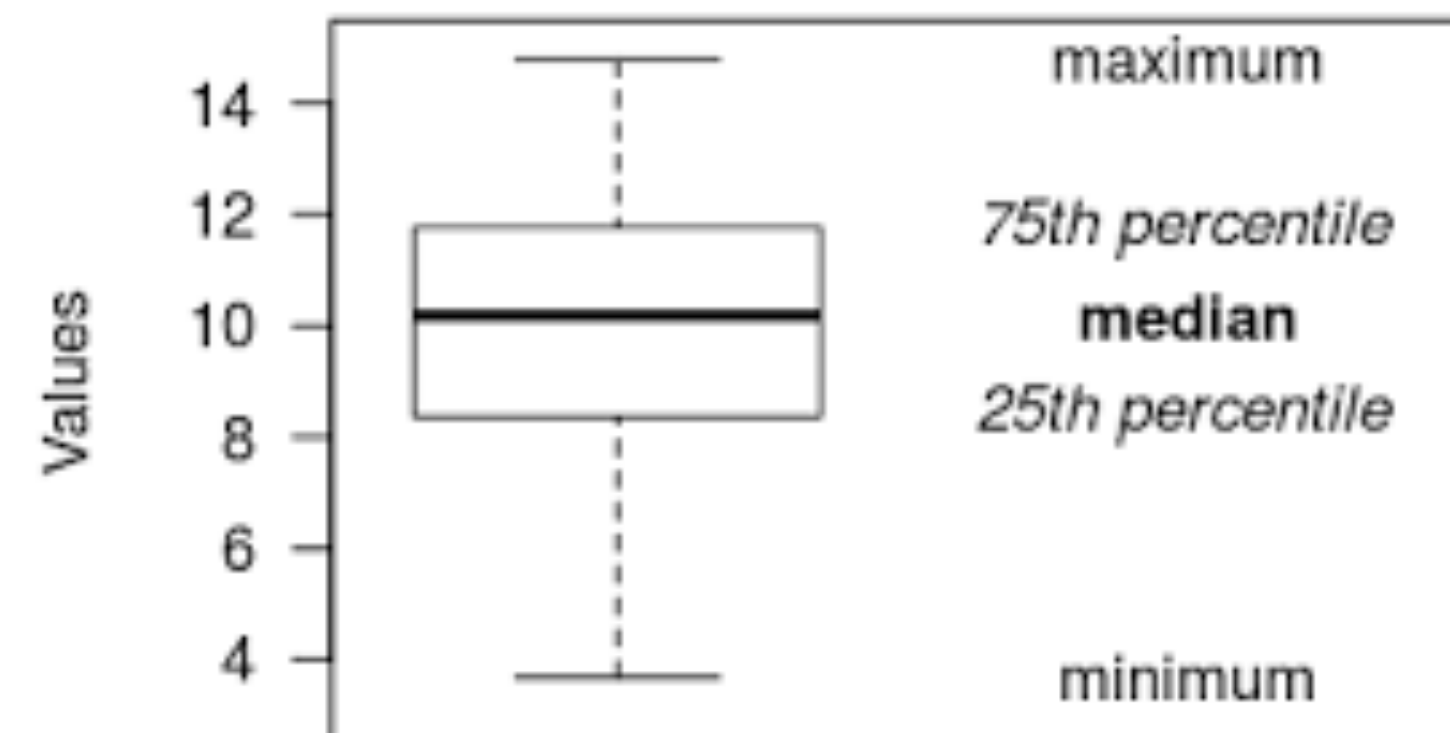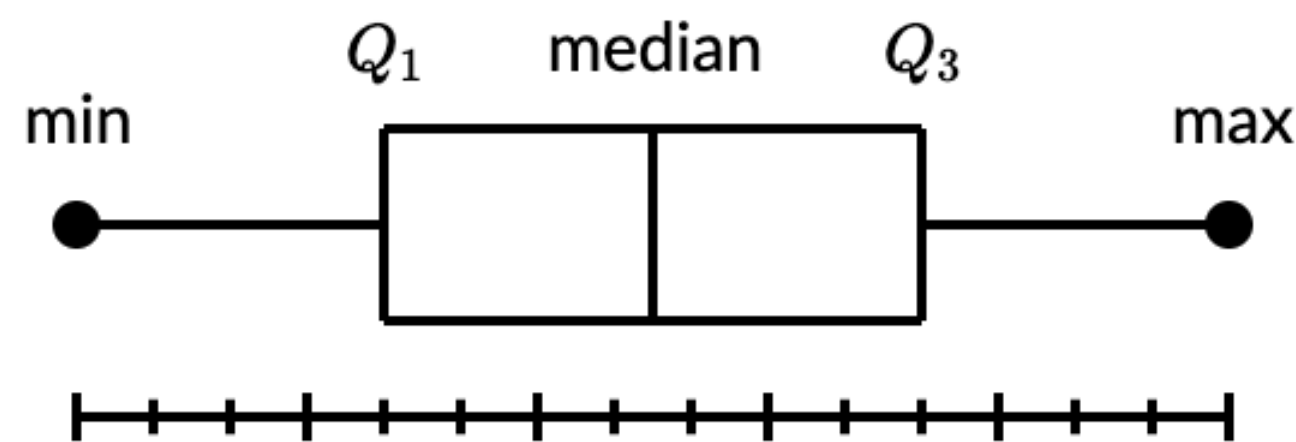
Exploring some more Visuals
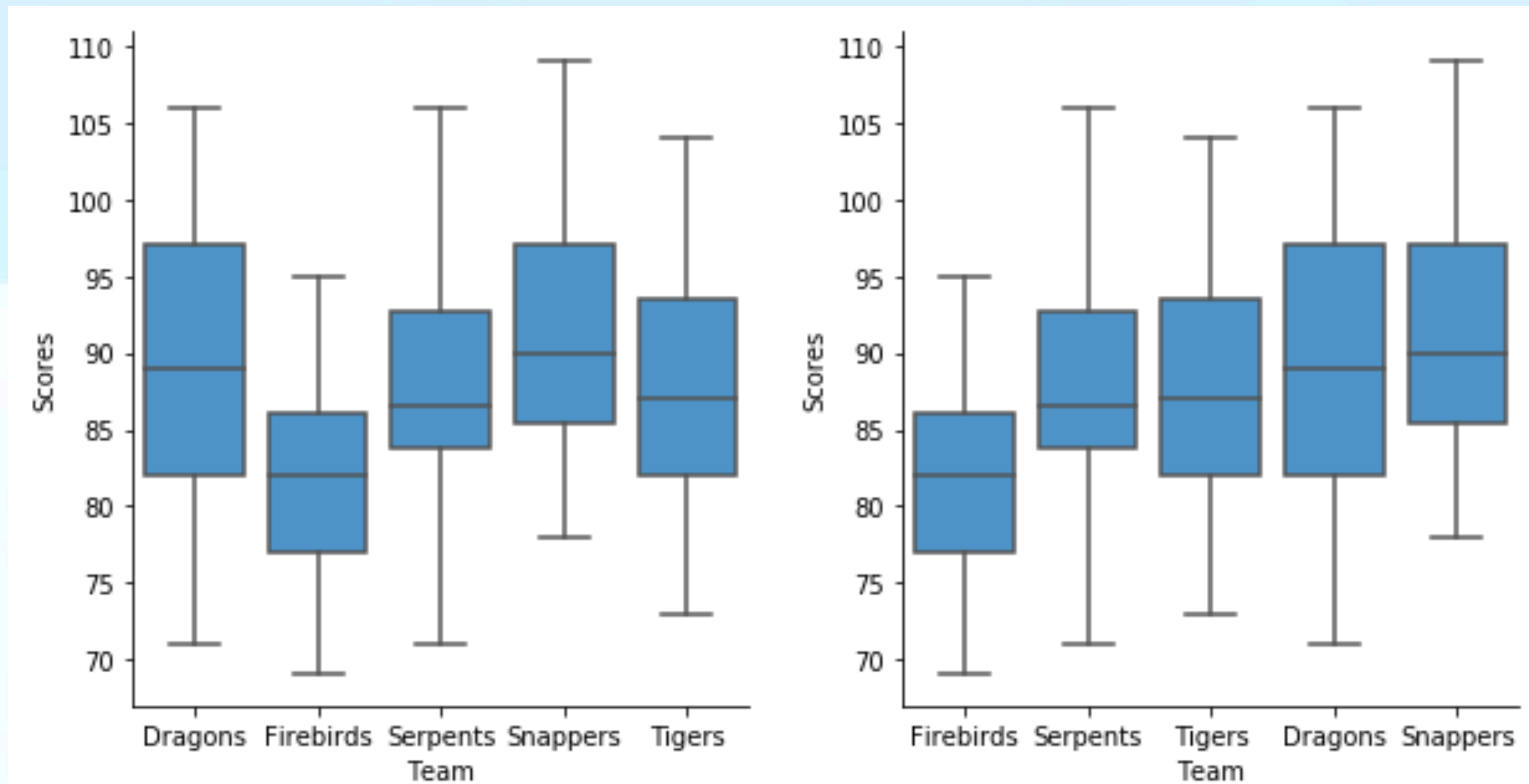## Box and Whisker Plots

A box and whisker plot—also called a box plot—displays the five-number summary of a set of data. The five-number summary is the minimum, first quartile, median, third quartile, and maximum.

In a box plot, we draw a box from the first quartile to the third quartile. A vertical line goes through the box at the median. The whiskers go from each quartile to the minimum or maximum.
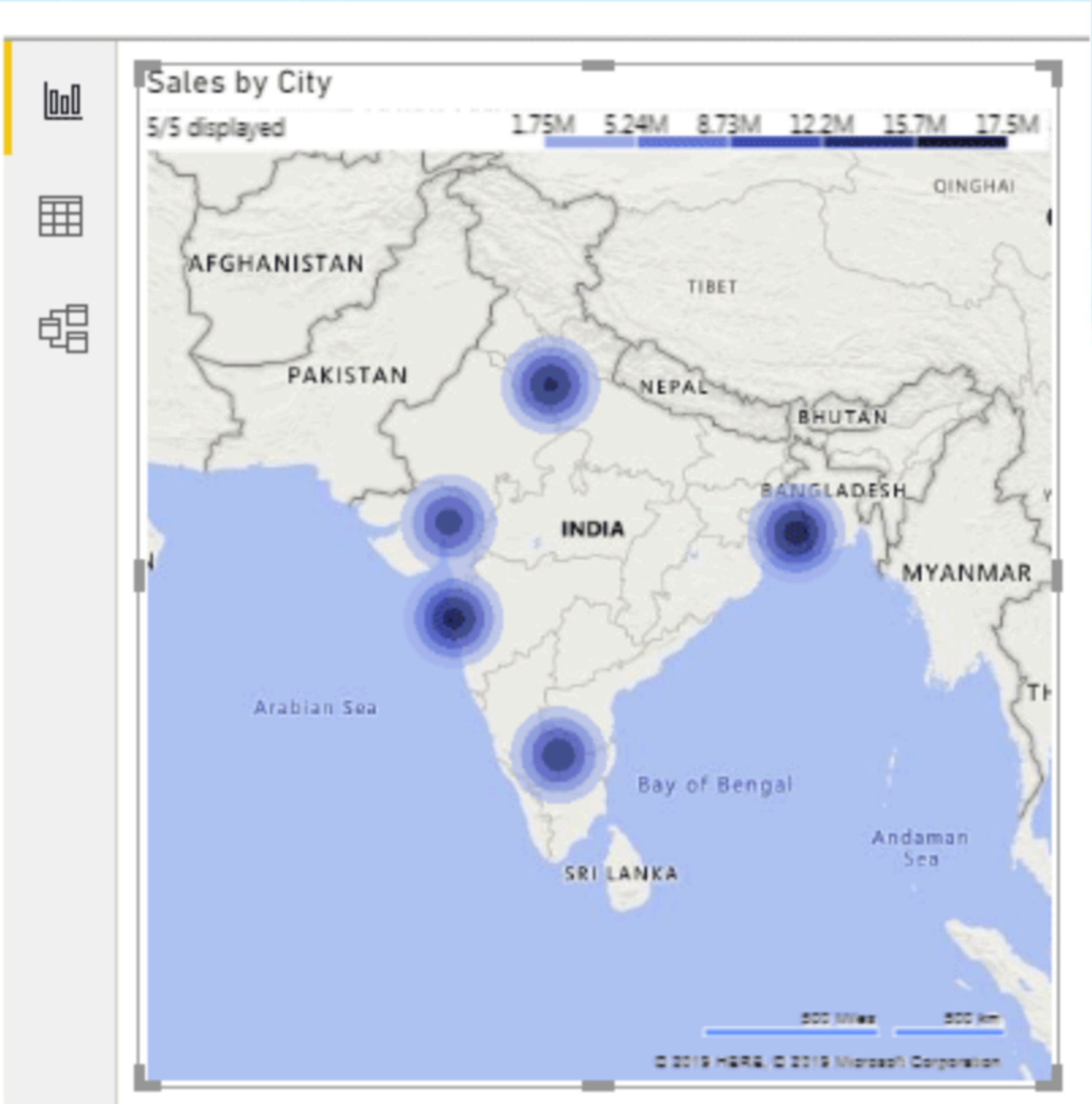
Exploring some more Visuals
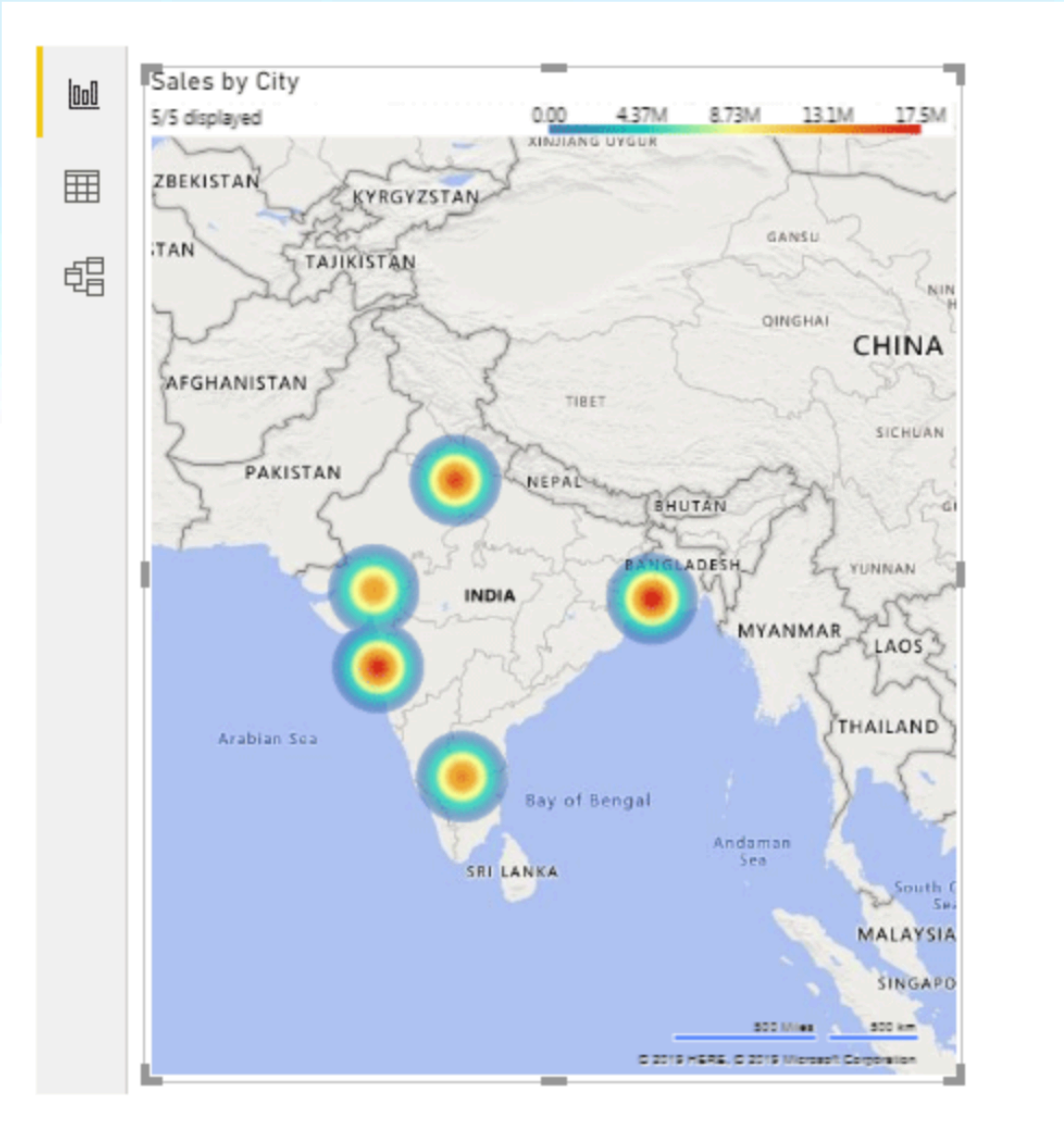## Box and Whisker Plots

Exploring some more Visuals
Heat Map

Exploring some more Visuals
Heat Map

Any Questions?