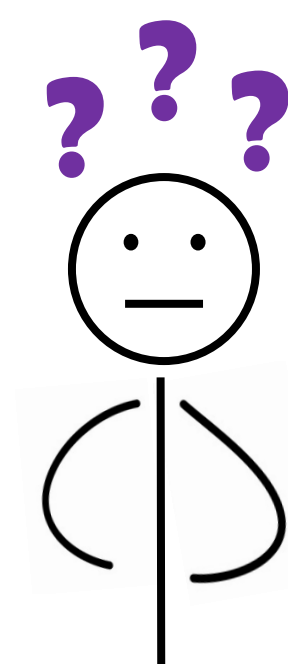
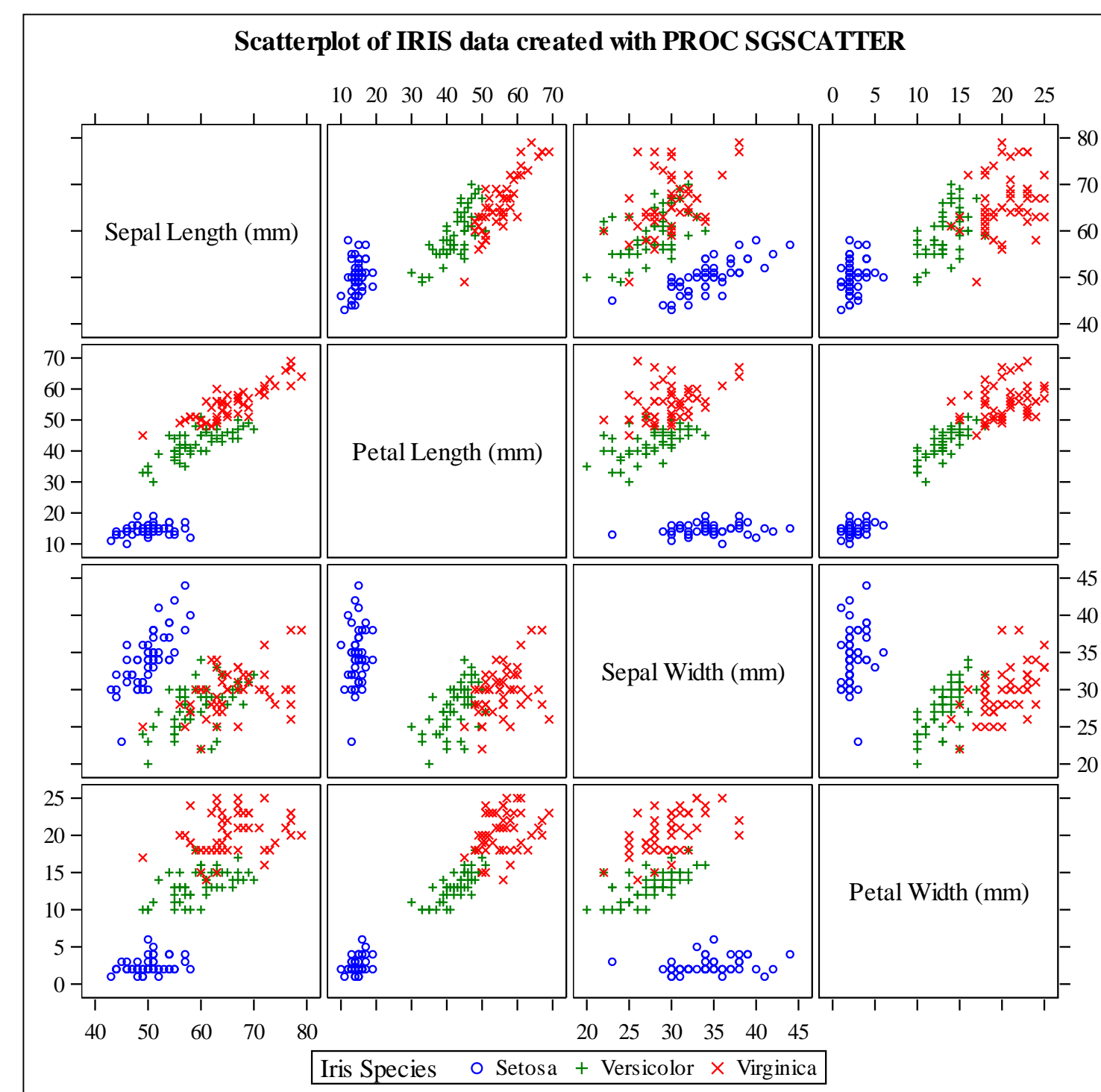
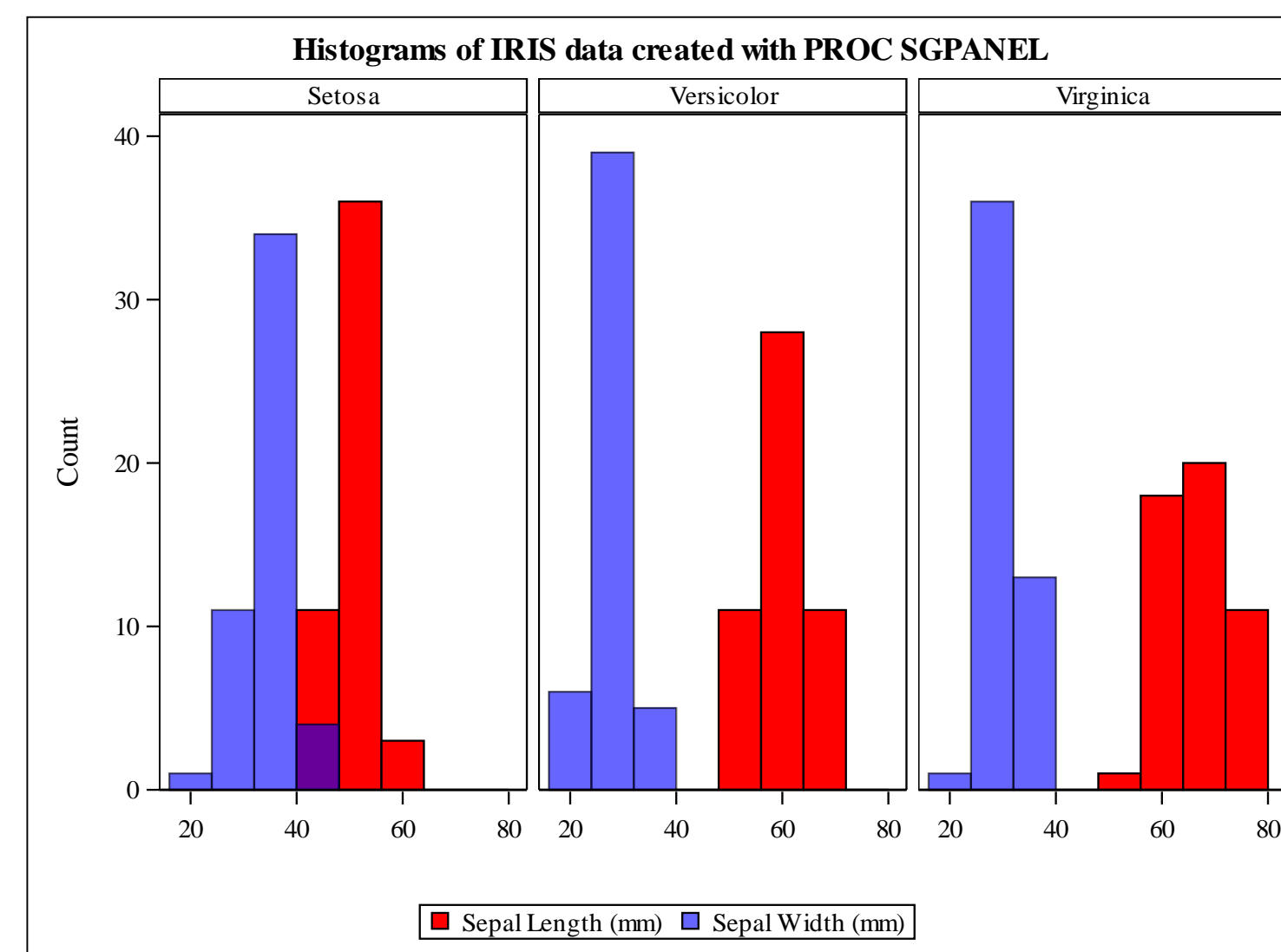
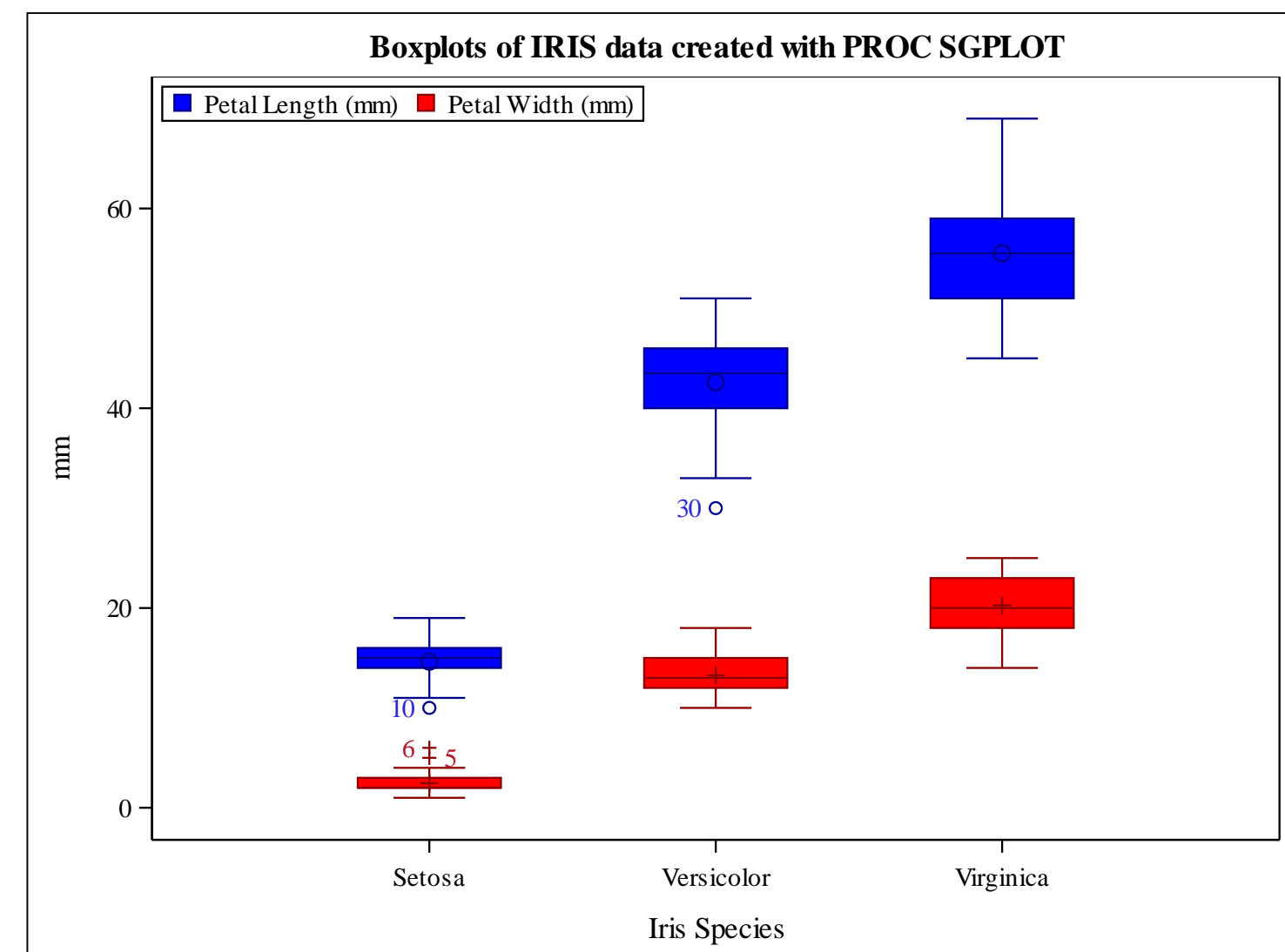




Background

To create a graph in SAS®, a programmer has different options at hand. They may use procedures such as PROC SGPLOT, PROC SGPANEL or PROC SGSCATTER or they may opt for the more adaptable graph template language (GTL). Within SAS®, it is possible to create graphs with different layouts including various types of plots. Furthermore, special attributes like the legend, titles or the labels of the axes can be embedded into the graphs. However, to create more complicated graphs, it is worth considering the use of the combination of PROC TEMPLATE and PROC SGRENDER, belonging to the GTL. With this language, it is far more effective to create a graph just the way the programmer would like and it can simplify the programming of a good graph in SAS®. However, the syntax of this language is often quite complex. The programmer should therefore be able to assess in which situations it is worth to use the GTL.

SAS® graph procedures



But how can these graphics be combined?

Graph template language (GTL)

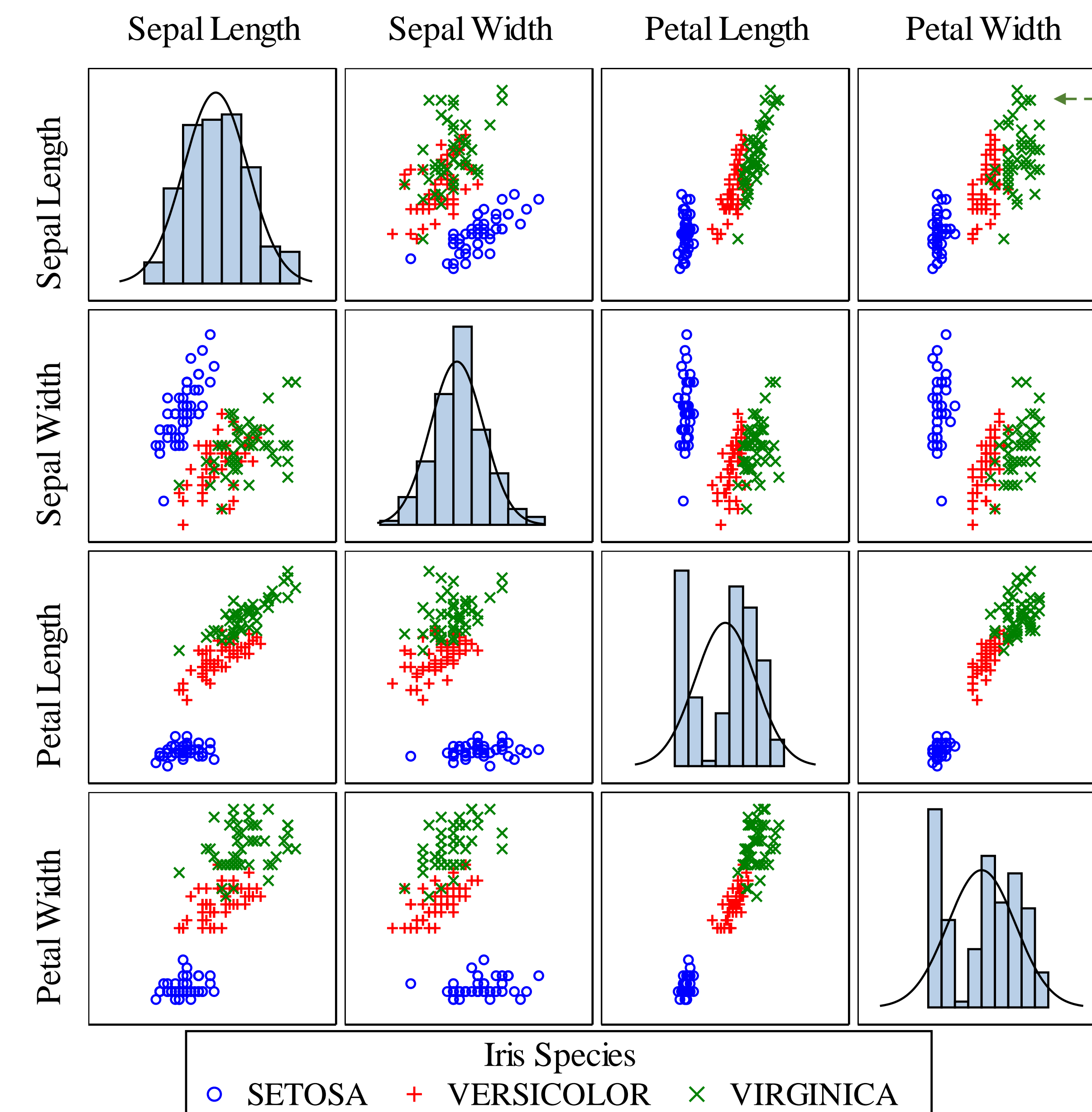
Create a template -> PROC TEMPLATE

- DEFINE STATGRAPH: Choose the name of your template
- DYNAMIC: Define one or more dynamic variables
- BEGINGRAPH: Start to specify your graph:
 - ENTRYTITLE: Define the title of your graph
 - DISCRETEATTRMAP: Define different attributes of your graph
 - LAYOUT/ENDLAYOUT: Choose the layout of your graph
 - > LAYOUT OVERLAY: Display a 2D plot in a single cell
 - > LAYOUT GRIDDED: Display several independent plots in a multi-cell layout
 - > LAYOUT LATTICE: Display several plots in a multi-cell layout across different ROWS and COLUMNS with chosen ROWWEIGHTS and COLUMNWEIGHTS
 - Define the attributes of your ROWAXES and COLUMNAXES
 - Define plot statements within the layout statement
 - Add a DISCRETELEGEND or a MERGEDLEGEND to your plot(s)
 - If necessary, define further nested layout statements
 - New in SAS® 9.4: If desired, add an ANNOTATE statement to include annotation objects into the graph
- ENDGRAPH: End the specification of the graph
- END: End the creation of the template

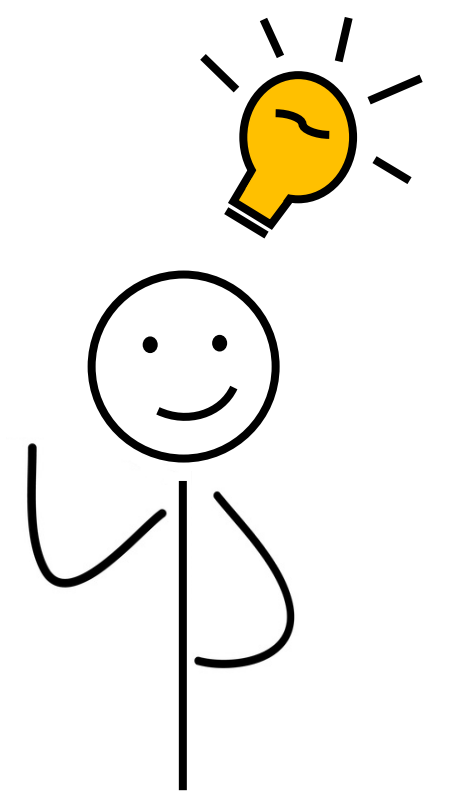
Generate the figure -> PROC SGRENDER

- Choose the template and the dataset that contains the plot variables
- New in SAS® 9.4: Specify SGANNO, to embed an annotation dataset into the graph
- Define DYNAMIC variables if necessary

Scatterplots, histograms and boxplots of IRIS data



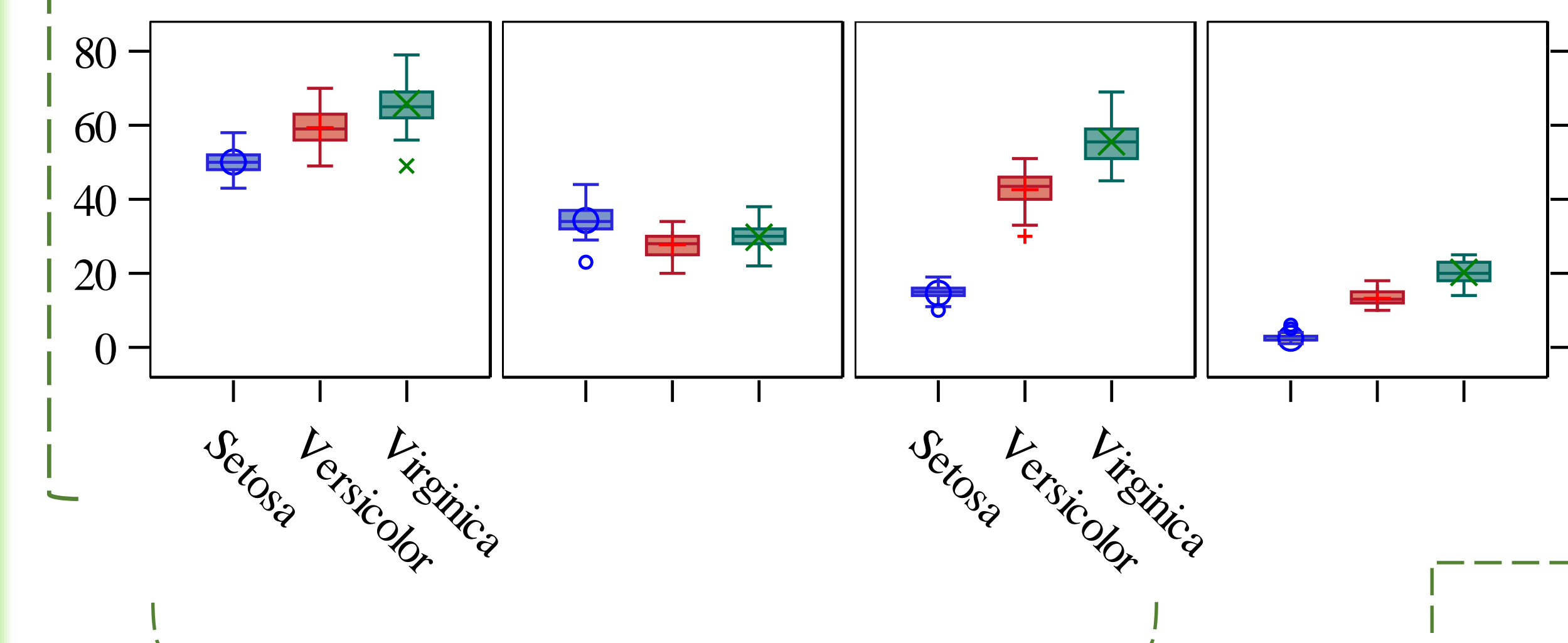
Setup of the marker attributes by using DISCRETEATTRMAP and DISCRETEATTRVAR



0.7

Creation of a ScatterPlotMatrix with DIAGONAL=(HISTOGRAM NORMAL) specified and a DiscreteLegend within LAYOUT GRIDDED

0.04 Addition of space in form of a second row



0.26 Creation of 4 BOXPLOT-graphs within LAYOUT OVERLAY respectively -> inserted in a LAYOUT LATTICE statement including 1 ROW and 4 COLUMNS with COLUMNDATARANGE=UNION and ROWDATARANGE=UNION specified

Setup of the COLUMNAXES and ROWAXES by using DISPLAY and DISPLAYSECONDARY

Creation of arrows and numbers by using an ANNOTATION dataset to show the influence of ROWWEIGHTS

Conclusion

- SAS® procedures can be used for programming simple graphs
- GTL has a complex syntax
- GTL is more adaptable than SAS® graph procedures
- Templates can be used to produce the same output from different datasets