INTERACTIVE DATA VISUALIZATION WITH BOKEH

Introduction to Layouts

Arranging multiple plots

- Arrange plots (and controls) visually on a page:
  - rows, columns
  - grid arrangements
  - tabbed layouts

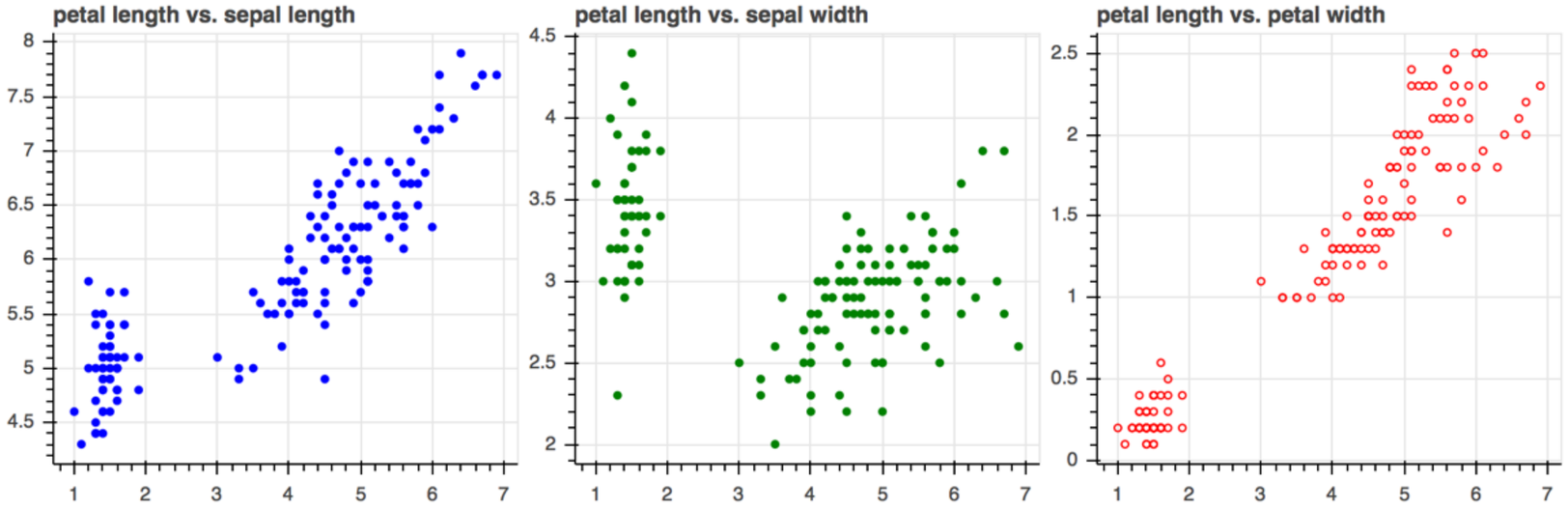
Rows of plots

```
In [1]: from bokeh.layouts import row

In [2]: layout = row(p1, p2, p3)

In [3]: output_file('row.html')

In [4]: show(layout)
```



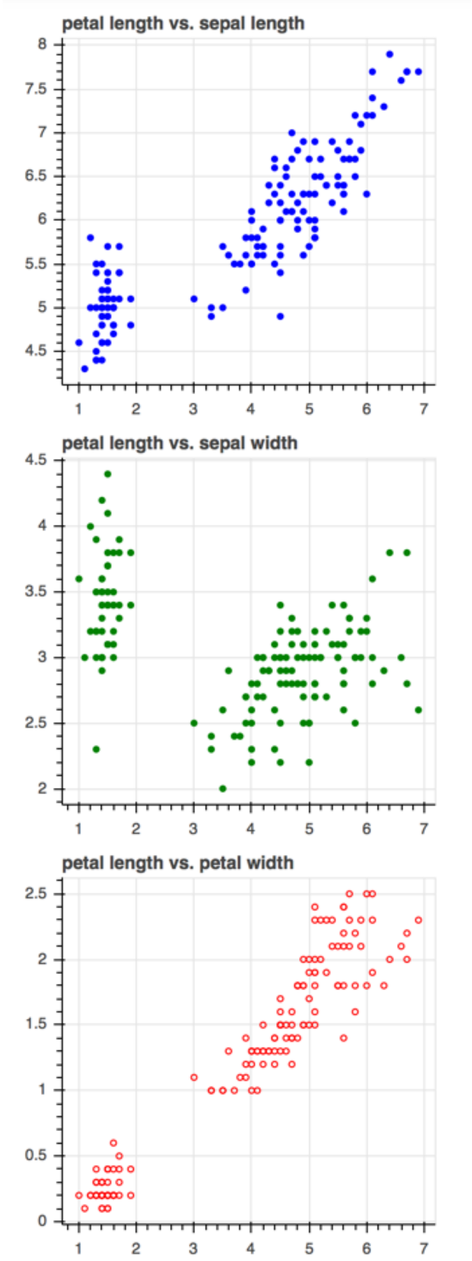
Columns of plots

```
In [1]: from bokeh.layouts import column

In [2]: layout = column(p1, p2, p3)

In [3]: output_file('column.html')

In [4]: show(layout)
```



Nested Layouts

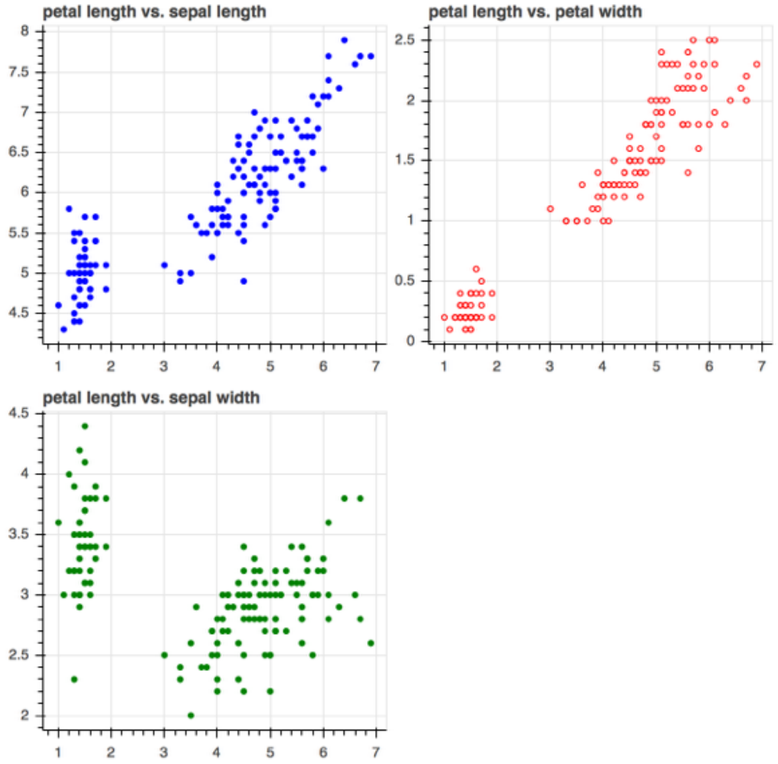
- Rows and column can be nested for more sophisticated layouts

```
In [1]: from bokeh.layouts import column, row

In [2]: layout = row(column(p1, p2), p3)

In [3]: output_file('nested.html')

In [4]: show(layout)
```



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Let’s practice!

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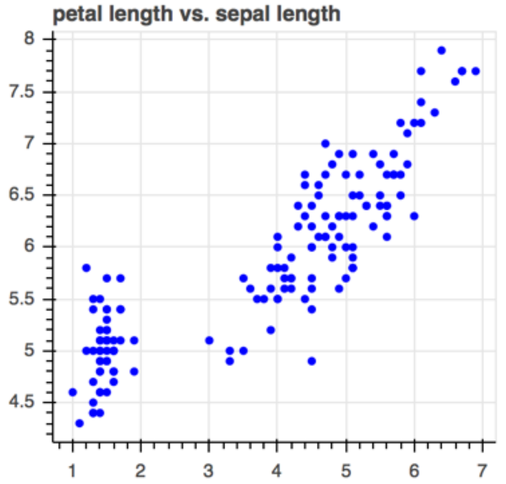
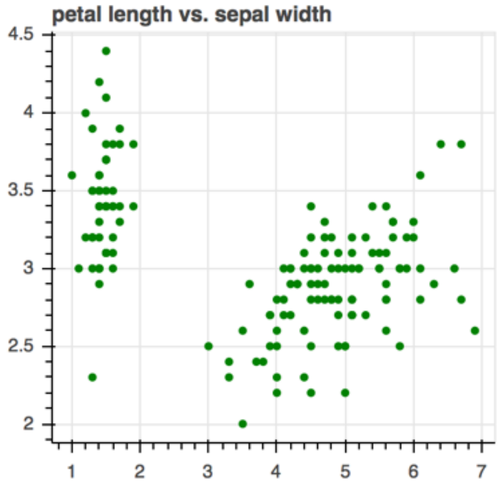
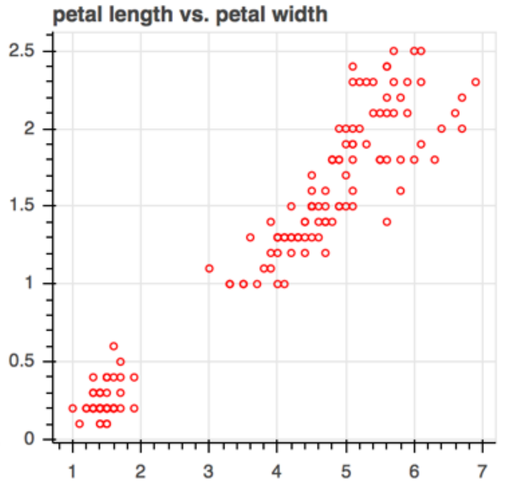
Advanced Layouts

Gridplots

```
In [1]: from bokeh.layouts import gridplot

In [2]: layout = gridplot([[None, p1], [p2, p3]],
   ...:                   toolbar_location=None)

In [3]: output_file('nested.html')

In [4]: show(layout)
```





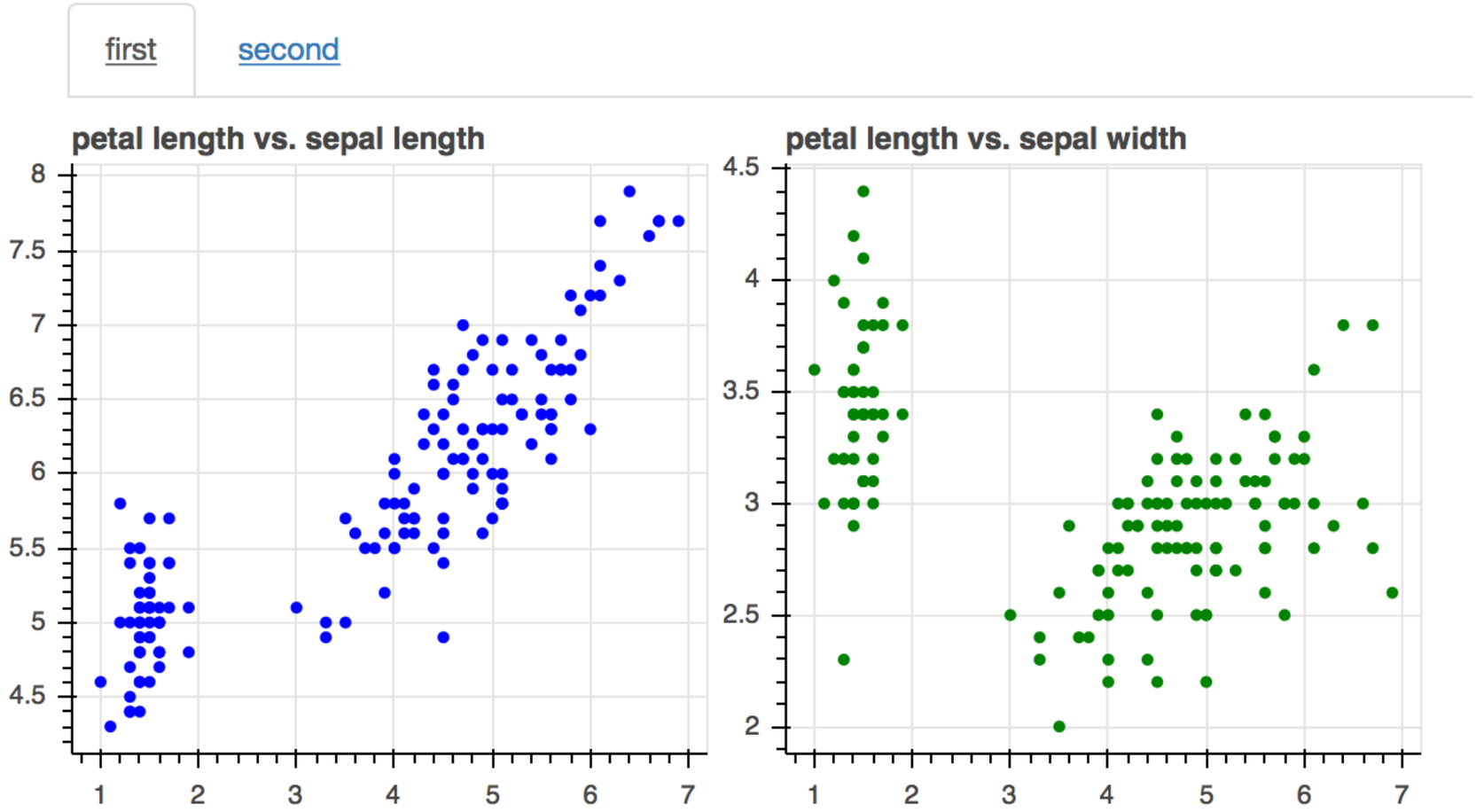


- Give a “list of rows” for layout
- can use None as a placeholder
- Accepts toolbar_location

Tabbed Layouts

```
In [1]: from bokeh.models.widgets import Tabs, Panel

In [2]: # Create a Panel with a title for each tab

In [3]: first = Panel(child=row(p1, p2), title='first')

In [4]: second = Panel(child=row(p3), title='second')

In [5]: # Put the Panels in a Tabs object

In [6]: tabs = Tabs(tabs=[first, second])

In [7]: output_file('tabbed.html')

In [8]: show(layout)
```

Tabbed Layouts



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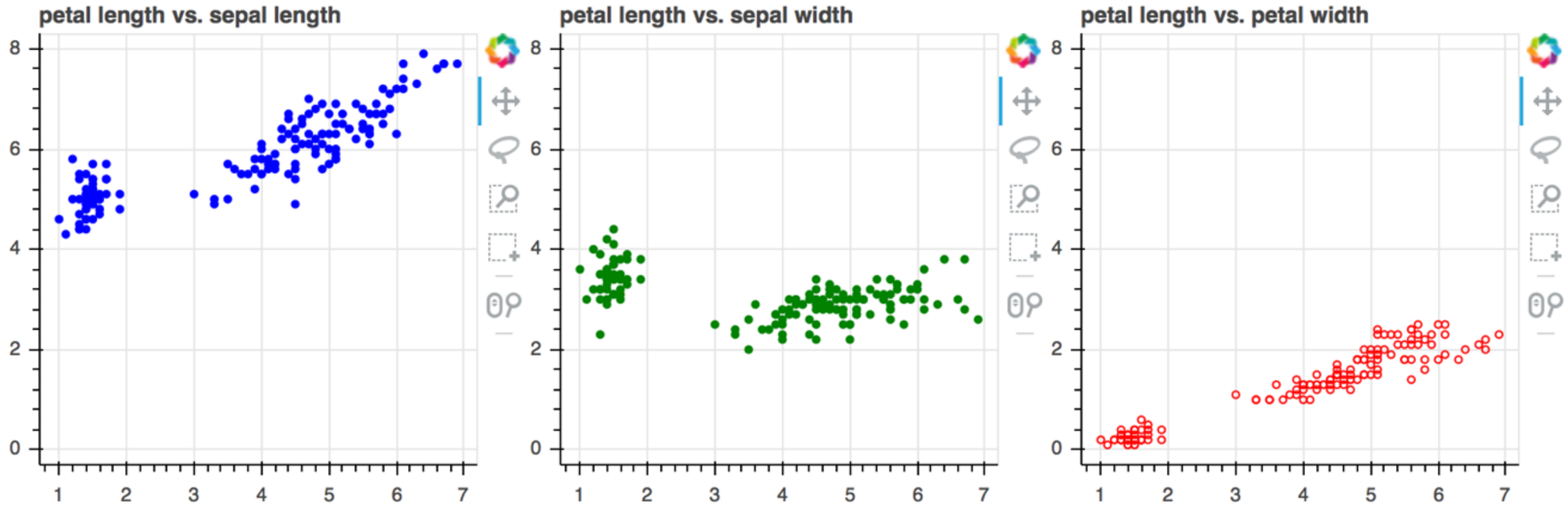
Linking Plots Together

Linking axes

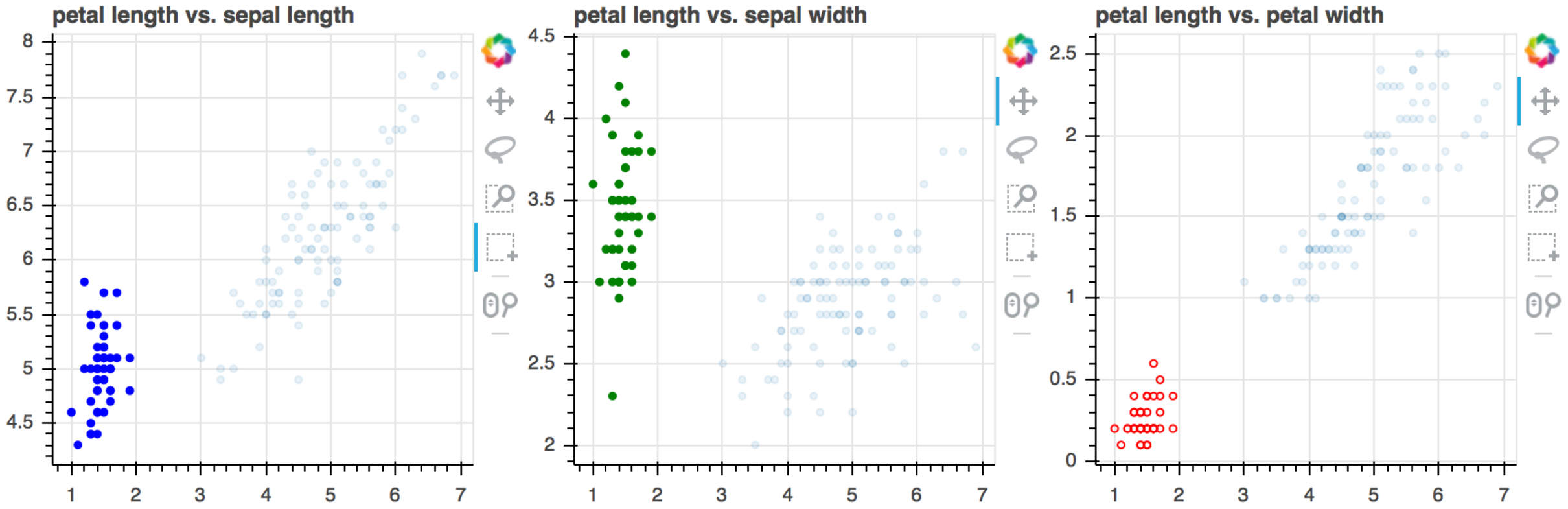
```
In [1]: p3.x_range = p2.x_range = p1.x_range

In [2]: p3.y_range = p2.y_range = p1.y_range
```



Linking selections

```
In [1]: p1 = figure(title='petal length vs. sepal length')

In [2]: p1.circle('petal_length', 'sepal_length',
   ...:           color='blue', source=source)

In [3]: p2 = figure(title='petal length vs. sepal width')

In [4]: p2.circle('petal_length', 'sepal_width',
   ...:           color='green', source=source)

In [5]: p3 = figure(title='petal length vs. petal width')

In [6]: p3.circle('petal_length', 'petal_width',
   ...:           line_color='red', fill_color=None,
   ...:           source=source)
```

Linking selections



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Annotations and Guides

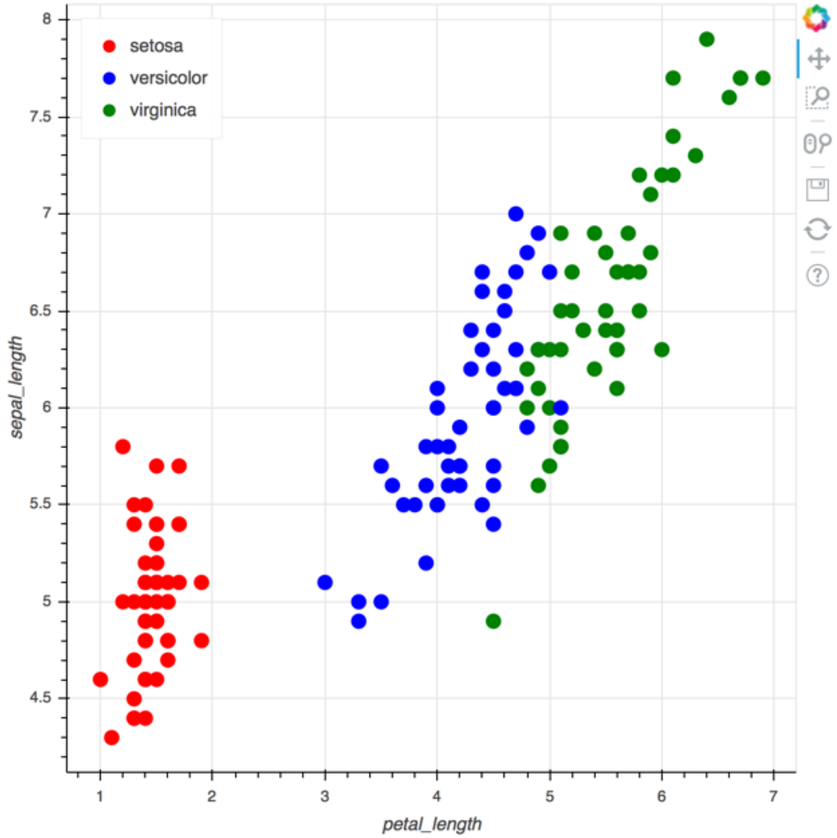
What are they?

- Help relate scale information to the viewer
    - Axes, Grids (default on most plots)
- Explain the visual encodings that are used
    - Legends
- Drill down into details not visible in the plot
    - Hover Tooltips

Legends

```
In [1]: plot.circle('petal_length', 'sepal_length',
   ...:                size=10, source=source,
   ...:                color={'field': 'species',
   ...:                'transform': mapper},
   ...:                legend='species')

In [2]: plot.legend.location = 'top_left'
```

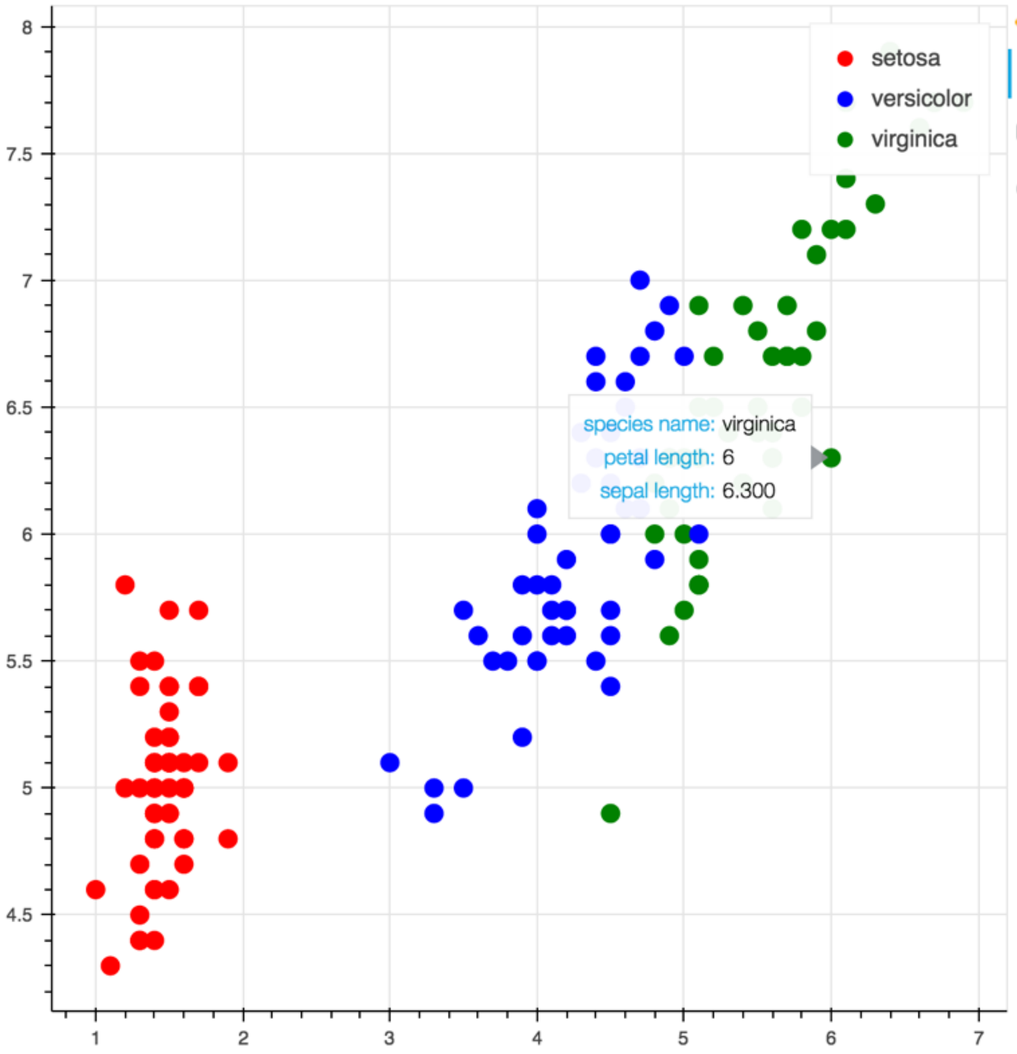


Hover Tooltips

```
In [1]: from bokeh.models import HoverTool

In [2]: hover = HoverTool(tooltips=[
   ...:           ('species name', '@species'),
   ...:           ('petal length', '@petal_length'),
   ...:           ('sepal length', '@sepal_length'),
   ...:           ])

In [3]: plot = figure(tools=[hover, 'pan',
   ...:                 'wheel_zoom'])
```



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