1 Plotting

- Plotting is an intermediate-level interface that is centered around composing visual glyphs.
- Here, you create a visualization by combining various visual elements (dot, circles, line, patch and many others) and tools (hover tool, zoom, Save, reset and others).
- Bokeh plots created using the `bokeh.plotting` interface comes with a default set of tools and visual styles.

1.1 Set Up

For plotting, follow the below steps:

- Import library, methods or functions
  (something like "`from bokeh.XXX import WWW, YYY, ZZZ `")
- Select the output mode (notebook, web browser, server)
  (commands are `output_file`, `output_notebook` etc...)
- Activate a figure (call it `p`)
- Perform subsequent plotting operations, it will affect the generated figure.
- Visualize it

```
### 1. Import all required utilities

from bokeh.charts import Scatter, output_file, show
from bokeh.sampledata.autompg import autompg as df


### 2. Render the plot

p = Scatter(df, x='displ', y='hp', marker='cyl', color='cyl',
title="HP vs DISPL (marked by CYL)", legend="top_left",
xlabel="Displacement", ylabel="Horsepower")


### 3.  Output the plot as html

output_file("scatter.html")

 # output_notebook() as alternative

### 4. Present the plot to screen

show(p)
```

To understand these steps better, let me demonstrate these steps using examples below:

1.2 Plot Example-1

Create a scatter square mark on XY frame of notebook

```
from bokeh.plotting import figure, output_notebook, show

# output to notebook
output_notebook()
p = figure(plot_width=400, plot_height=400)

# add square with a size, color, and alpha
p.square([2, 5, 6, 4], [2, 3, 2, 1, 2], size=20, color="navy")

# show the results
show(p)
```

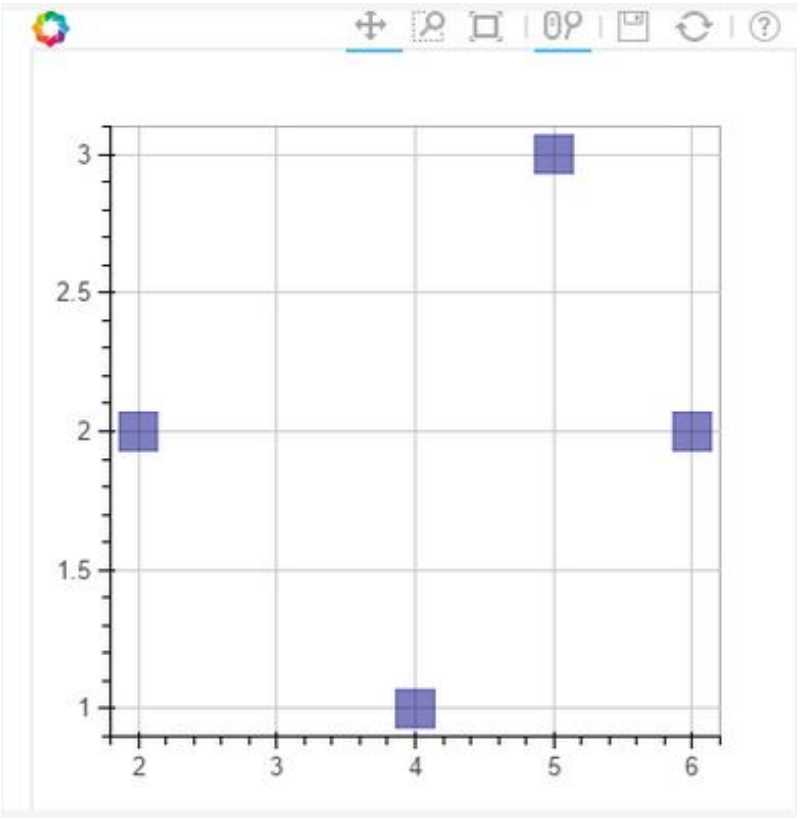

Figure 1:

Similarly, you can create various other plots like line, wedges, arc, ovals, images, patches and many others, refer this link to see various example.

1.3 Plot Example-2: Combine two visual elements in a plot

```
from bokeh.plotting import figure, output_notebook, show

# output to notebook
output_notebook()

p = figure(plot_width=400, plot_height=400)

# add square with a size, color, and alpha
p.square([2, 5, 6, 4], [2, 3, 2, 1, 2], size=20, color="navy")

#added a line plot to existing figure
p.line([1, 2, 3, 4, 5], [1, 2, 2, 4, 5], line_width=2)

# show the results
show(p)
```

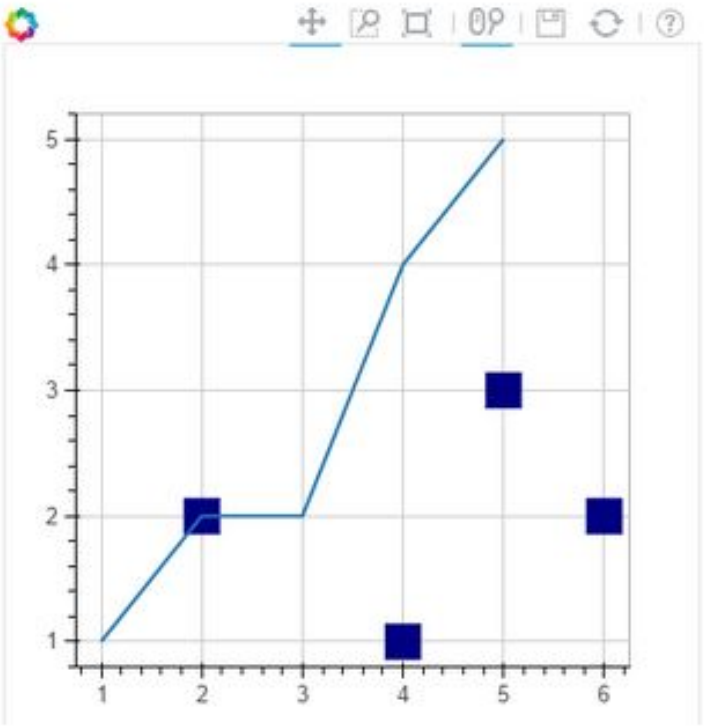

Figure 2:

1.4 Plot Example-3: Add a hover tool and axis labels to above plot

```
from bokeh.plotting import figure, output_notebook, show
from bokeh.models import HoverTool, BoxSelectTool
#For enabling tools

# output to notebook
output_notebook()

#Add tools
TOOLS = [BoxSelectTool(), HoverTool()]

p = figure(plot_width=400, plot_height=400, tools=TOOLS)

# add a square with a size, color, and alpha
p.square([2, 5, 6, 4], [2, 3, 2, 1, 2], size=20, color="navy", alpha=0.5)

#Visual Elements
p.xaxis.axis_label = "X-axis"
p.yaxis.axis_label = "Y-axis"

# show the results
show(p)
```

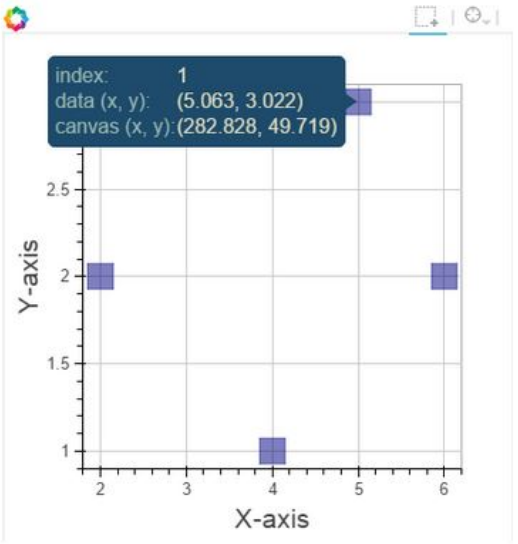

Figure 3:

For more details on visual attributes and tools refer these links:

Styling visual attributes Configuring plot tools