Customizing glyph settings

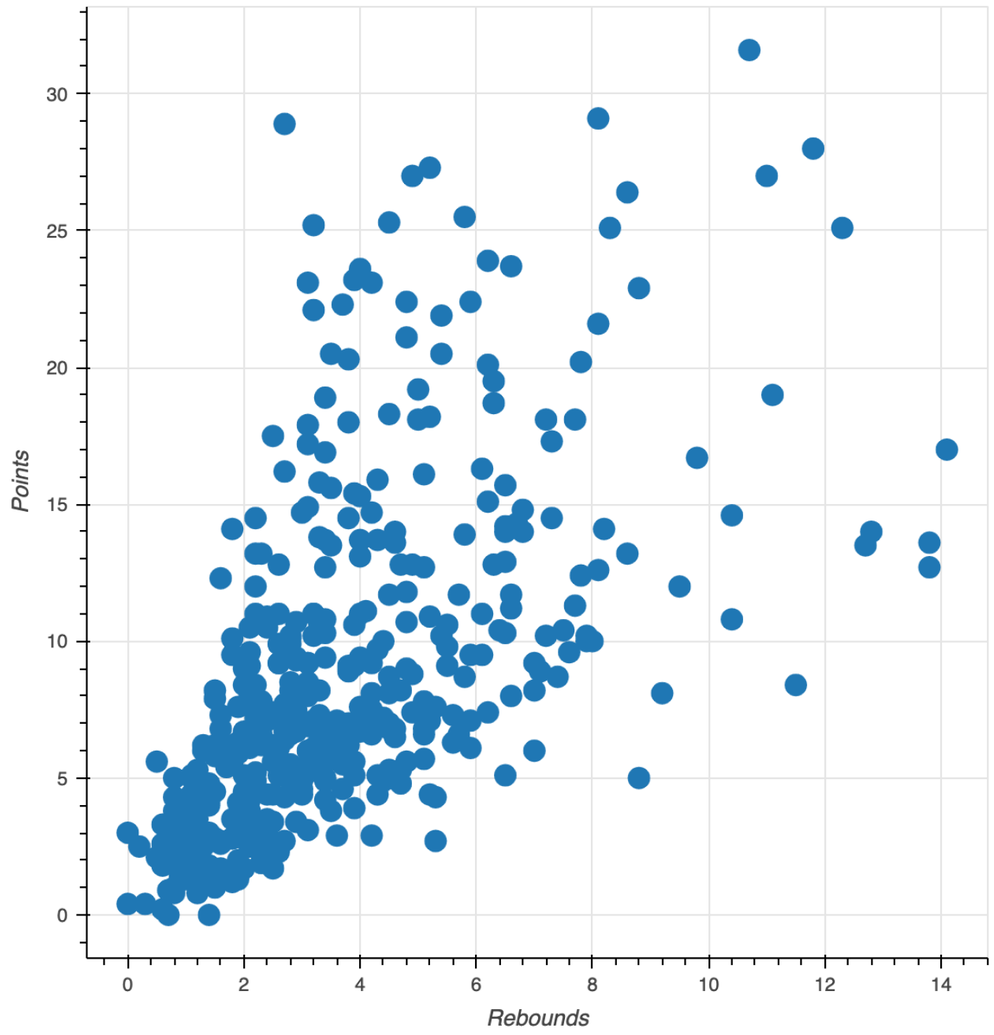
INTERACTIVE DATA VISUALIZATION WITH BOKEH

George Boorman
Core Curriculum Manager, DataCamp

datacamp

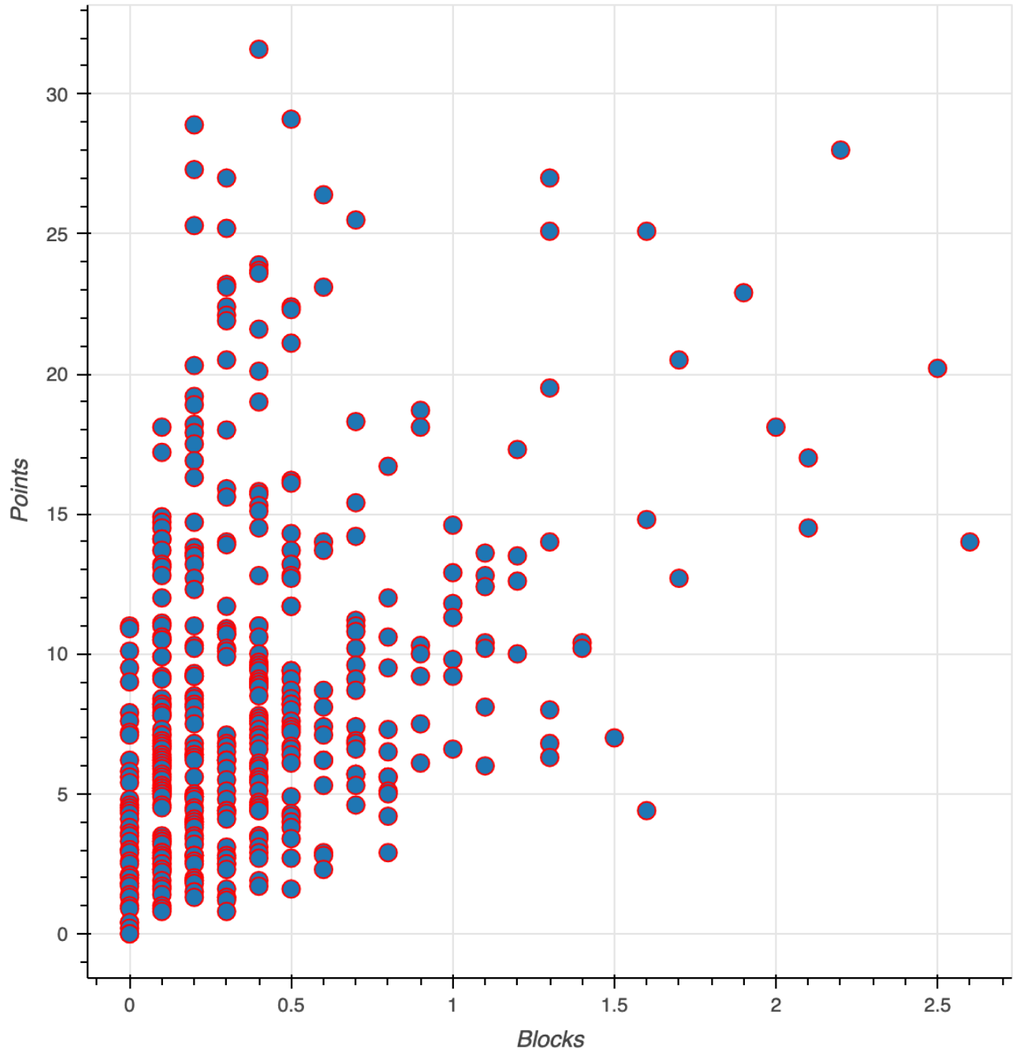
Glyph size

```
fig = figure(x_axis_label="Rebounds",
             y_axis_label="Points")
fig.circle(x="rebounds", y="points",
           source=source, size=12)
output_file(filename="size_12_scatter.html")
show(fig)
```



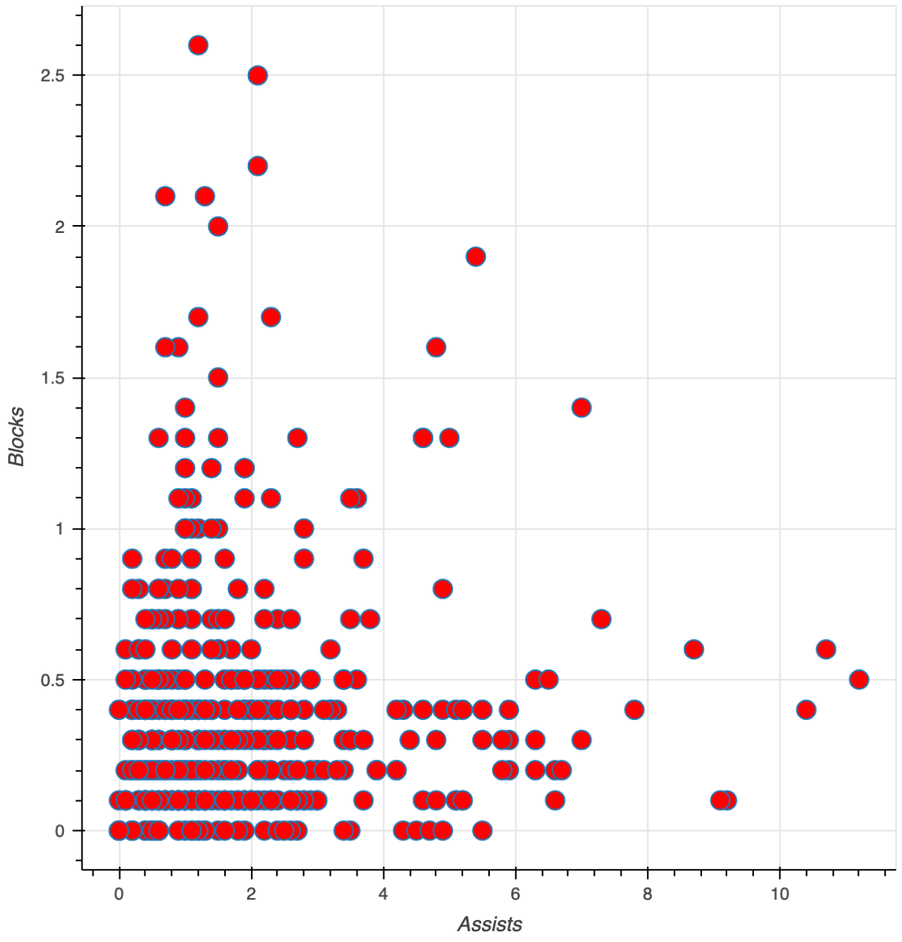
Glyph outline color

```
fig = figure(x_axis_label="Blocks",
             y_axis_label="Points")
fig.circle(x="blocks", y="points",
           source=source, size=10,
           line_color="red")
output_file(filename="red_lines.html")
show(fig)
```



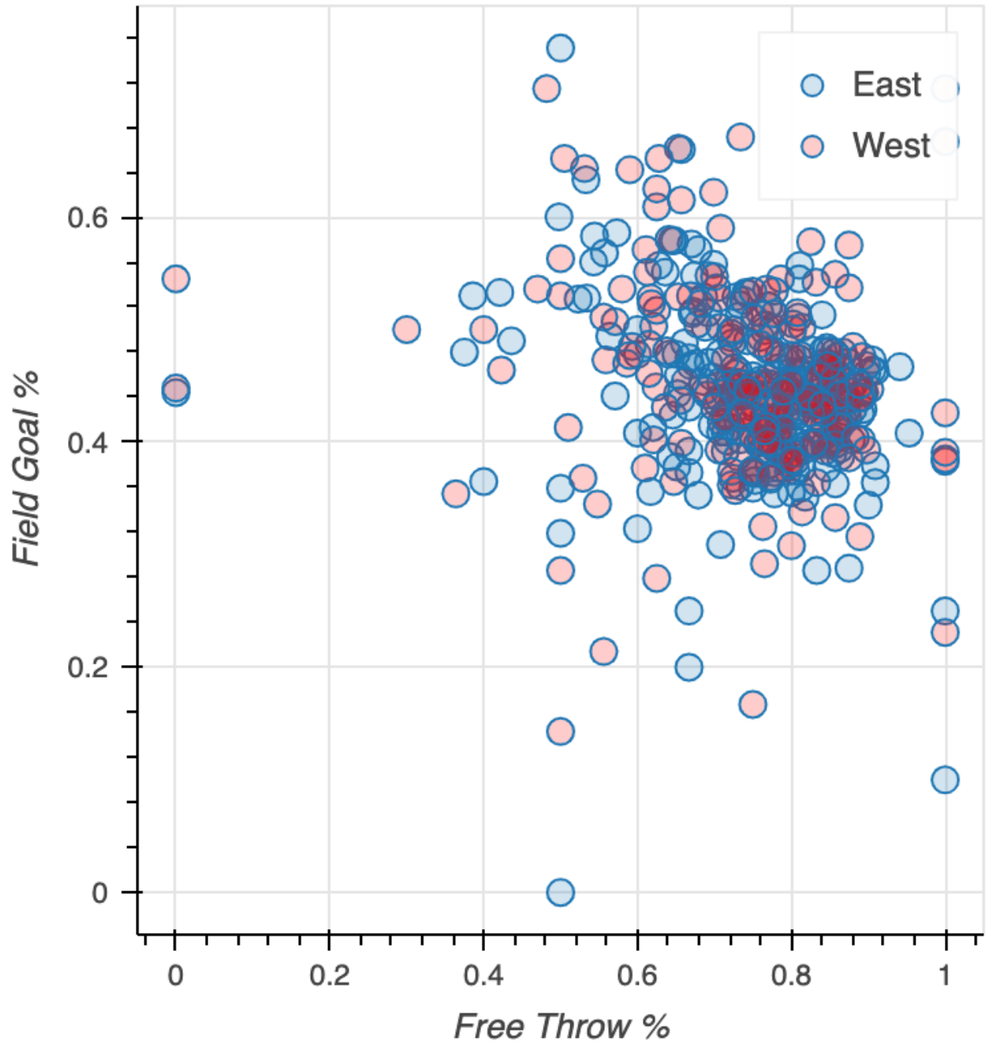
Glyph fill color

```
fig = figure(x_axis_label="Assists",
             y_axis_label="Blocks")
fig.circle(x="blocks", y="points",
           source=source, size=12,
           fill_color="red")
output_file(filename="red_circles.html")
show(fig)
```



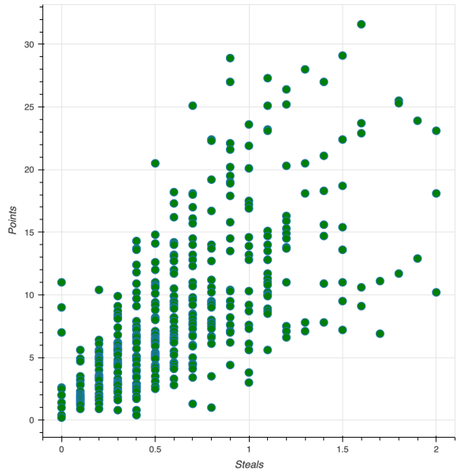
Glyph transparency

```
fig = figure(x_axis_label="Free Throw %",
             y_axis_label="Field Goal %")
fig.circle(x="free_throw_perc",
           y="field_goal_perc",
           source=east, size=10,
           fill_alpha=0.2, legend_label="East")
fig.circle(x="free_throw_perc",
           y="field_goal_perc",
           source=west, size=10,
           fill_alpha=0.2, fill_color="red",
           legend_label="West")
output_file(filename="transparent.html")
show(fig)
```

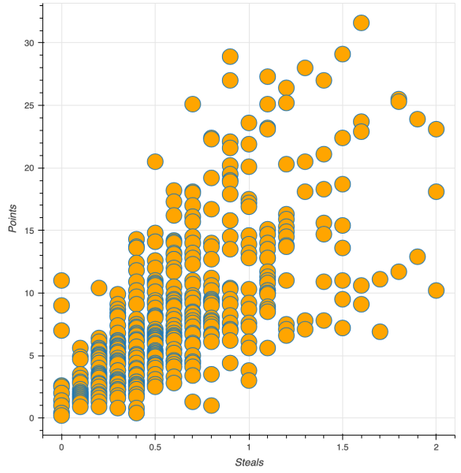


Updating glyphs

```
fig = figure(x_axis_label="Steals",
             y_axis_label="Points")
circle = fig.circle(x="steals", y="assists",
                    source=source, size=10,
                    fill_color="green")
output_file(filename="original.html")
show(fig)
```




```
circle.glyph.size = 20
circle.glyph.fill_color = "orange"
output_file(filename="updated.html")
show(fig)
```



Line glyphs

Scatter argument	Line plot equivalent
`size`	`line_width`
`fill_alpha`	`alpha`
`color`	`line_color`
`fill_color`	`Not applicable`
`line_color`	`Not applicable`

The dataset

```
print(nba.iloc[:3, :6])
```

```
     player            position    minutes    field_goal_perc    three_point_perc    free_throw_perc
0    Russell Westbrook PG          34.6       0.425              0.343               0.845
1    James Harden      PG          36.4       0.440              0.347               0.847
2    Isaiah Thomas     PG          33.8       0.463              0.379               0.909
```

```
print(nba.iloc[:3, 6:])
```

```
     rebounds    assists    steals    blocks    points    team    conference    scorer_category
0    10.7        10.4       1.6       0.4       31.6      OKC     West          High Scorer
1    8.1         11.2       1.5       0.5       29.1      HOU     West          High Scorer
2    2.7         5.9        0.9       0.2       28.9      BOS     East          High Scorer
```

Let's practice!

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Highlighting and contrasting

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Core Curriculum Manager, DataCamp

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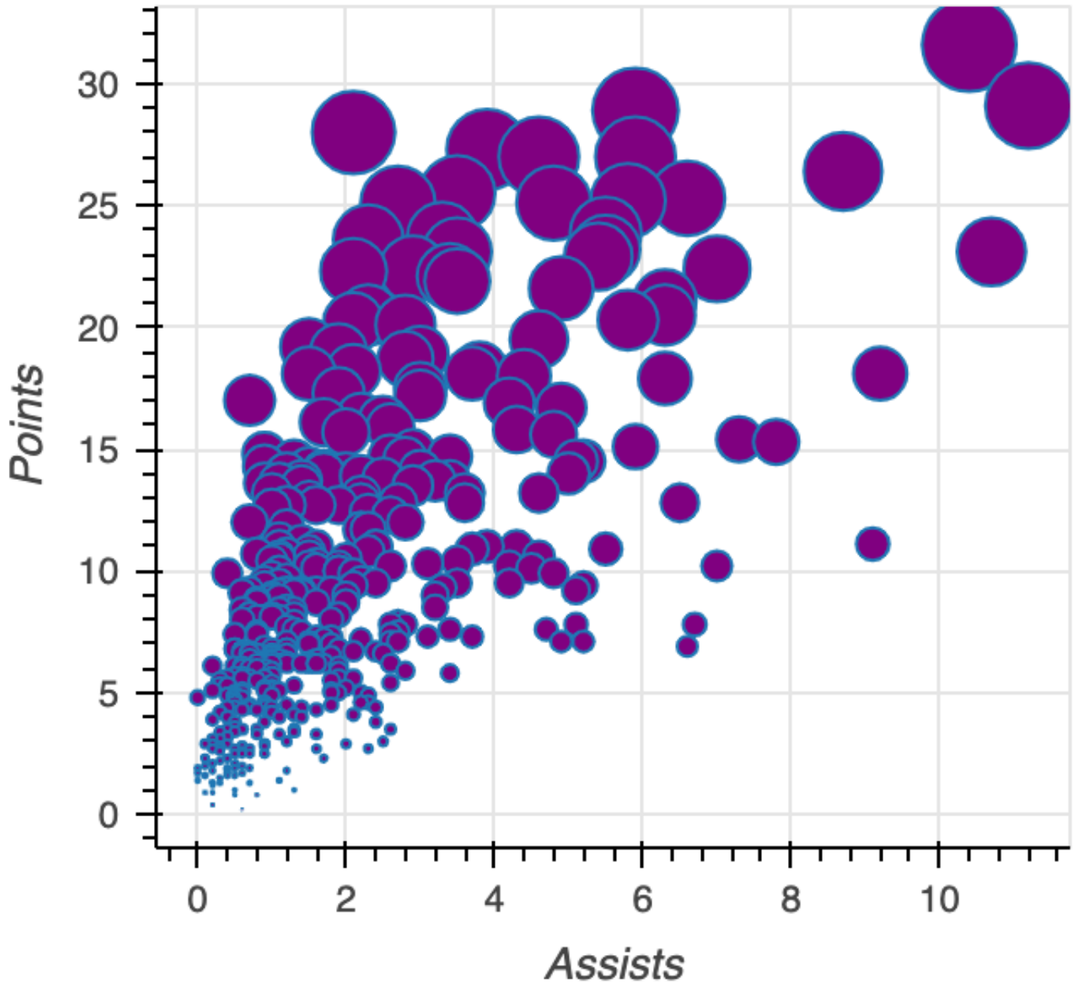
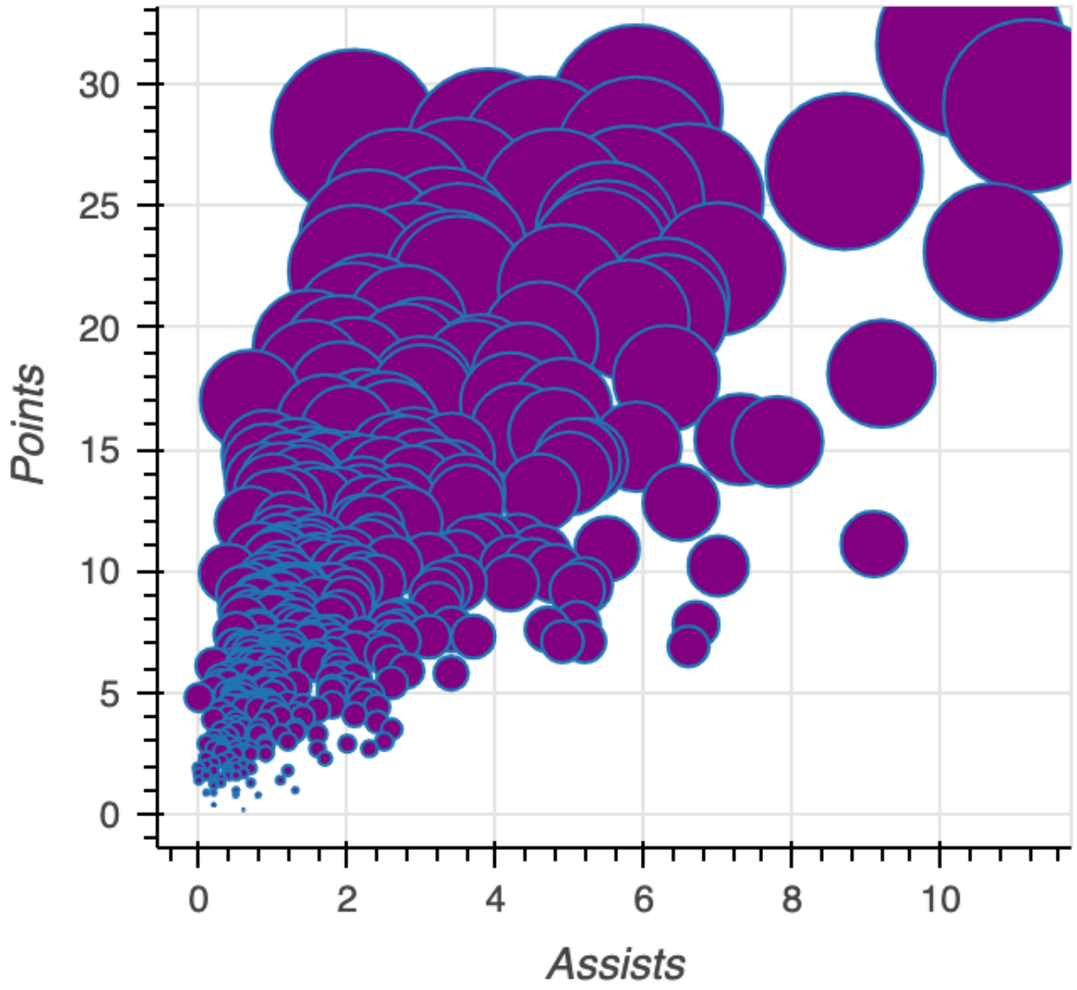
Vectorizing glyph size

```
sizes = nba["points"] / 50
fig = figure(x_axis_label="Assists", y_axis_label="Points")
fig.circle(x=nba["assists"], y=nba["points"], fill_color="purple", radius=sizes)
output_file(filename="glyph_vectorization.html")
show(fig)
```

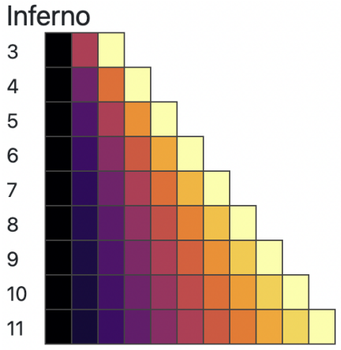
Different sizes



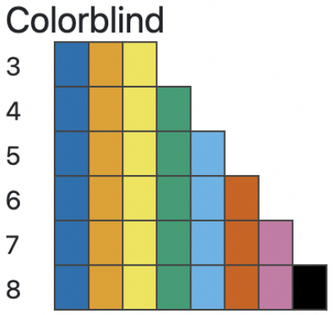


Palettes

```
from bokeh.palettes import Inferno3
```



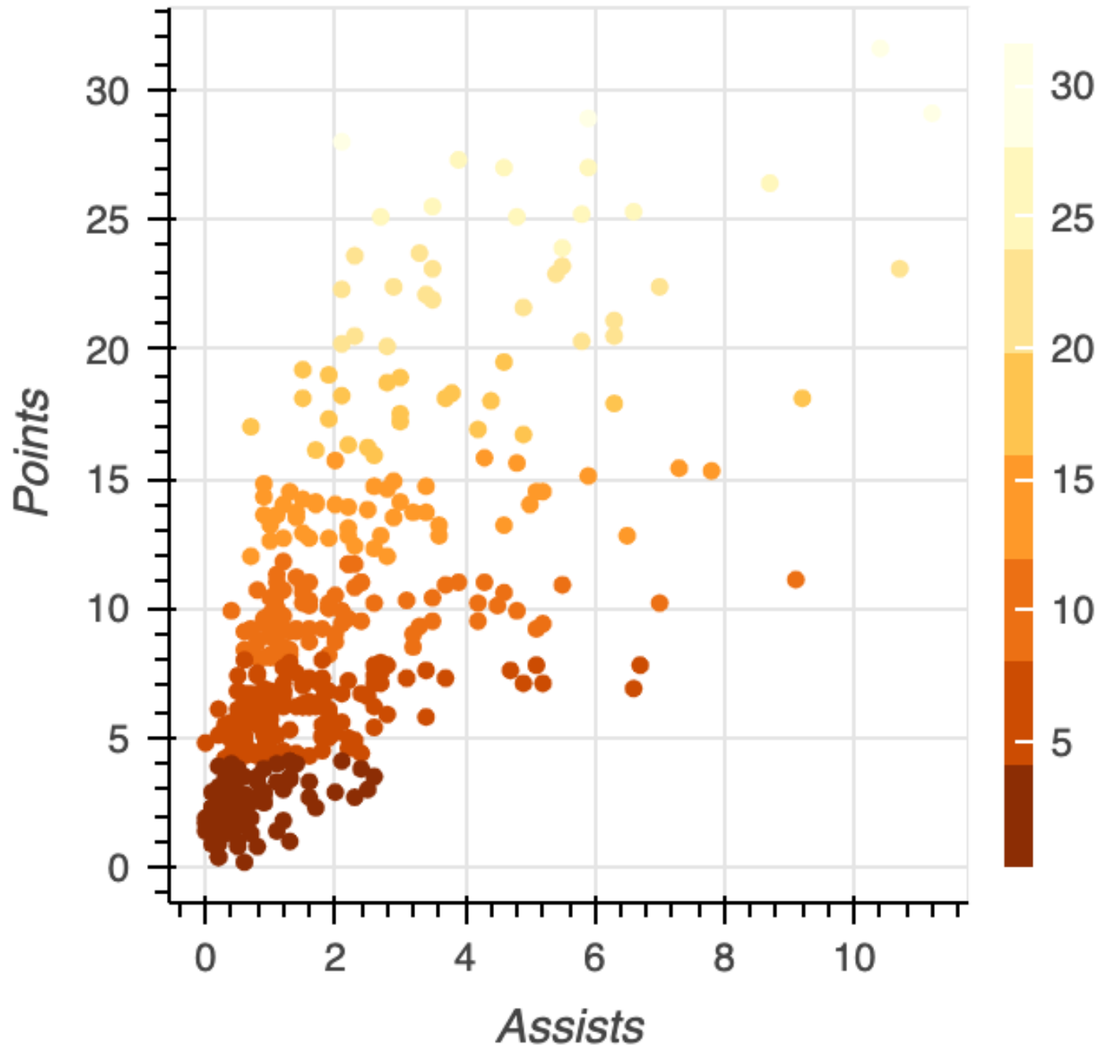

```
from bokeh.palettes import Colorblind4
```




```
from bokeh.palettes import __palettes__
__palettes__[:8]
```

```
['Accent3',
 'Accent4',
 'Accent5',
 'Accent6',
 'Accent7',
 'Accent8',
 'Blues3',
 'Blues4']
```

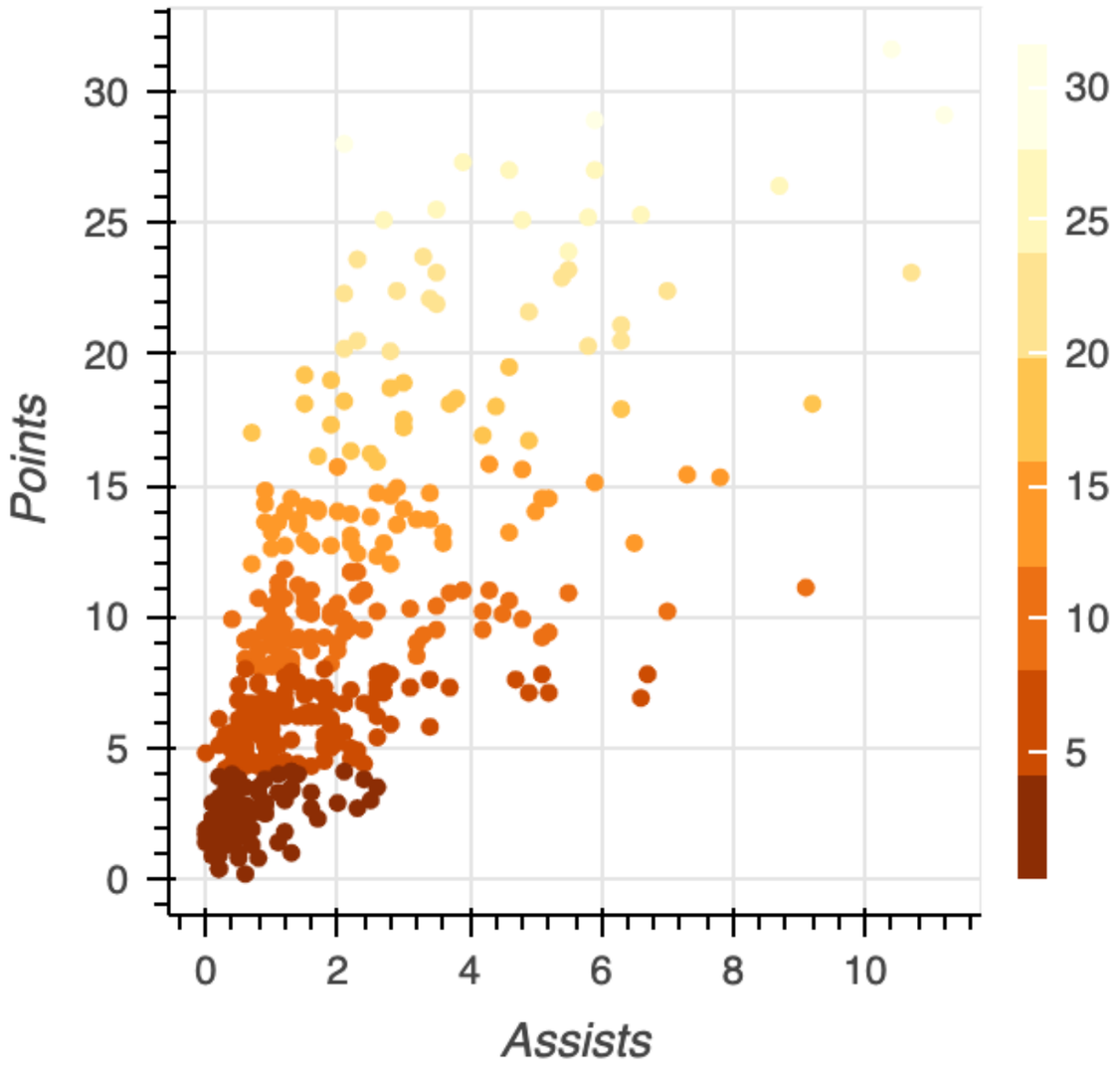
Color mapping and color bars



Linear color mapping

```
from bokeh.transform import linear_cmap
from bokeh.palettes import YlOrBr8
from bokeh.models import ColorBar
mapper = linear_cmap(field_name="points", palette=YlOrBr8,
                     low=min(nba["points"])), high=max(nba["points"]))
fig = figure(x_axis_label="Assists", y_axis_label="Points")
fig.circle(x="assists", y="points", source=source, fill_color=mapper, line_color=mapper)
color_bar = ColorBar(color_mapper=mapper["transform"], width=8)
fig.add_layout(color_bar, "right")
output_file(filename="linear_cmap.html")
show(fig)
```

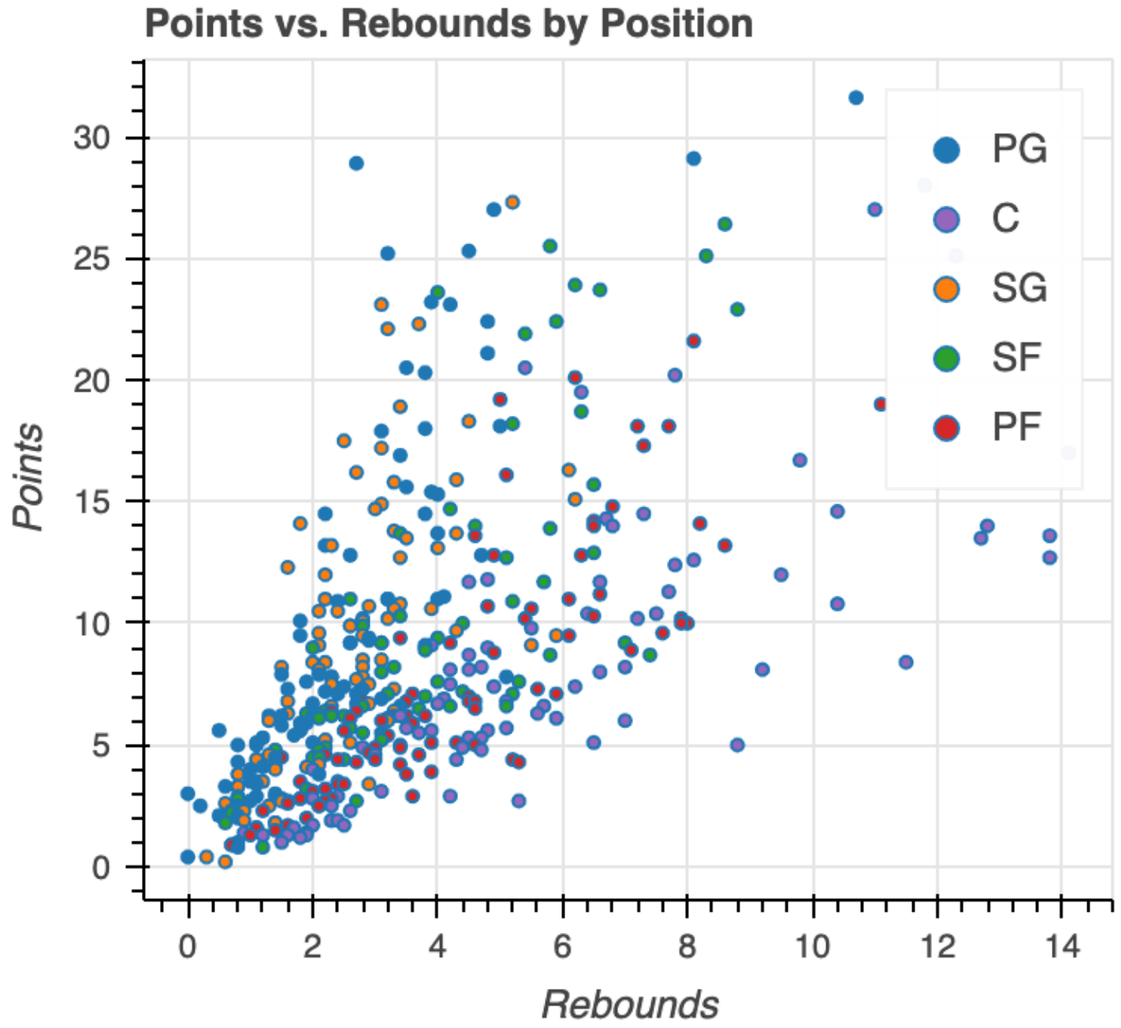
Linear color map scatter plot



Factor color mapping

```
from bokeh.transform import factor_cmap
from bokeh.palettes import Category10_5
positions = ["PG", "SG", "SF", "PF", "C"]
fig = figure(x_axis_label="Rebounds", y_axis_label="Points")
fig.circle(x="rebounds", y="points", source=source,
         fill_color=factor_cmap("position", palette=Category10_5, factors=positions),
         legend_field="position")
output_file(filename="factor_cmap.html")
show(fig)
```

Color categorized bar plot



Let's practice!

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Communicating with text

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Core Curriculum Manager, DataCamp

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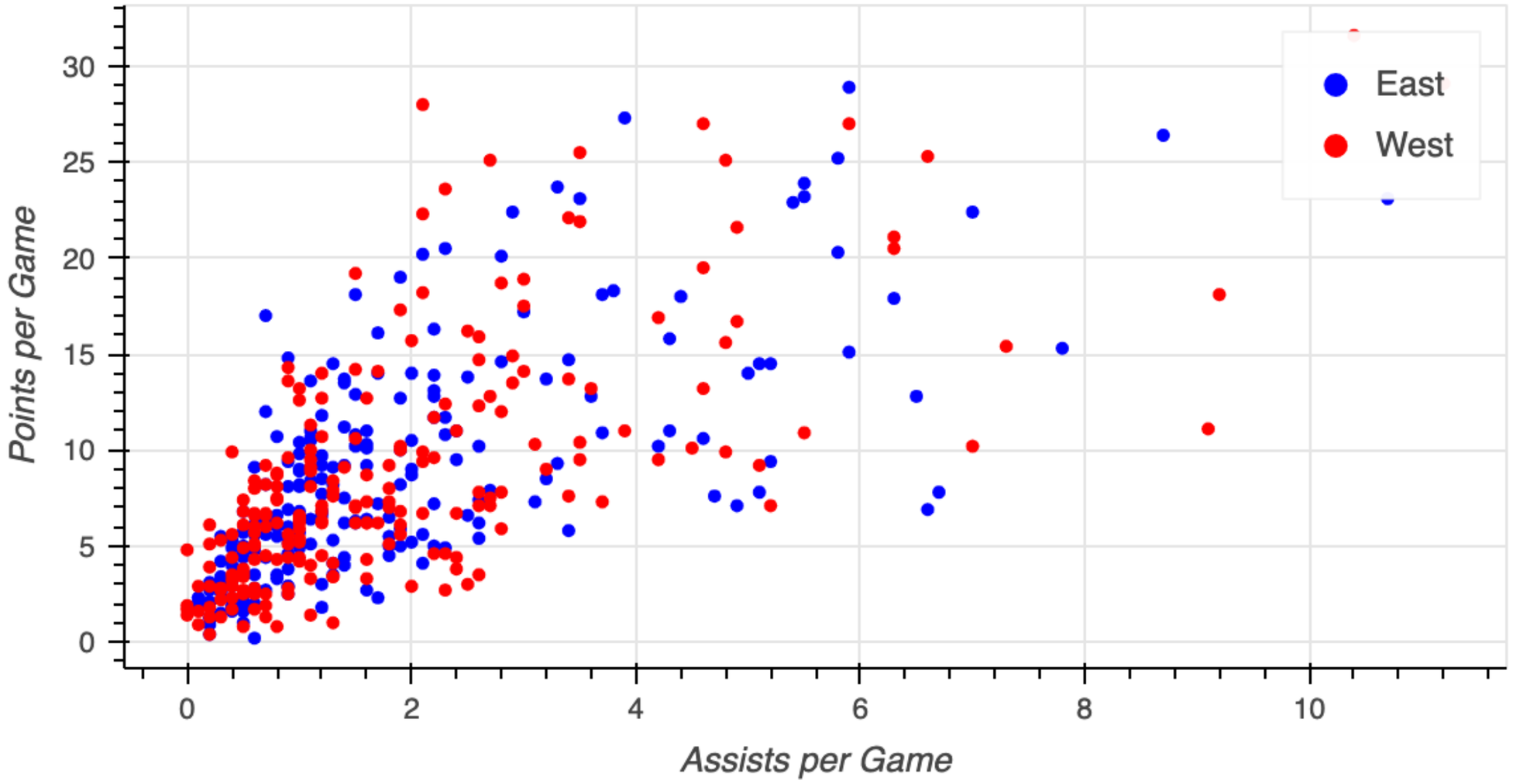
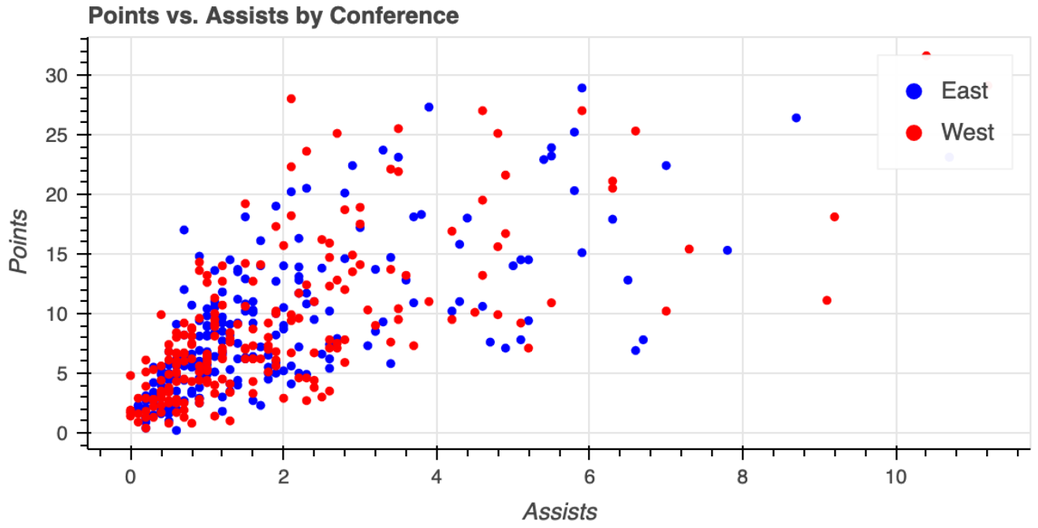
Our plot


East
West
Points per Game
Assists per Game
0
5
10
15
20
25
30
0
2
4
6
8
10

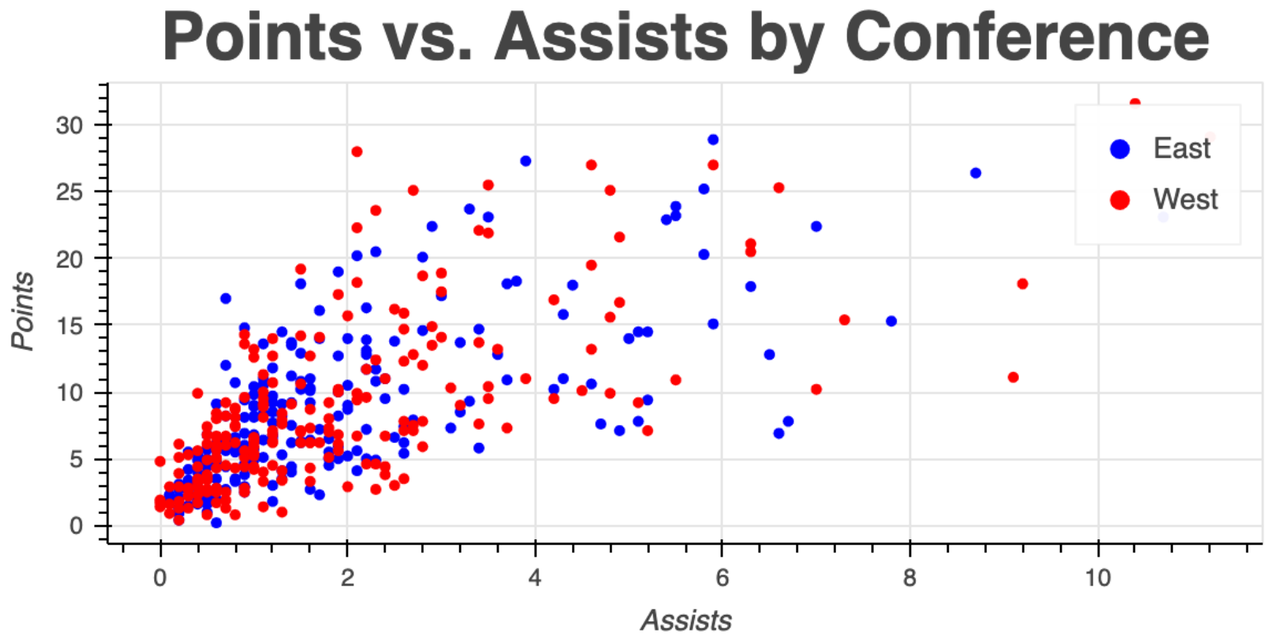
Adding a title

```
fig = figure(x_axis_label='Assists per Game', y_axis_label='Points per Game',
             title="Points vs. Assists by Conference")
fig.circle(x='assists', y='points', source=east, color='blue', legend_label='East')
fig.circle(x='assists', y='points', source=west, color='red', legend_label='West')
output_file(filename="points_vs_assists_by_conference.html")
show(fig)
```



Customizing the title

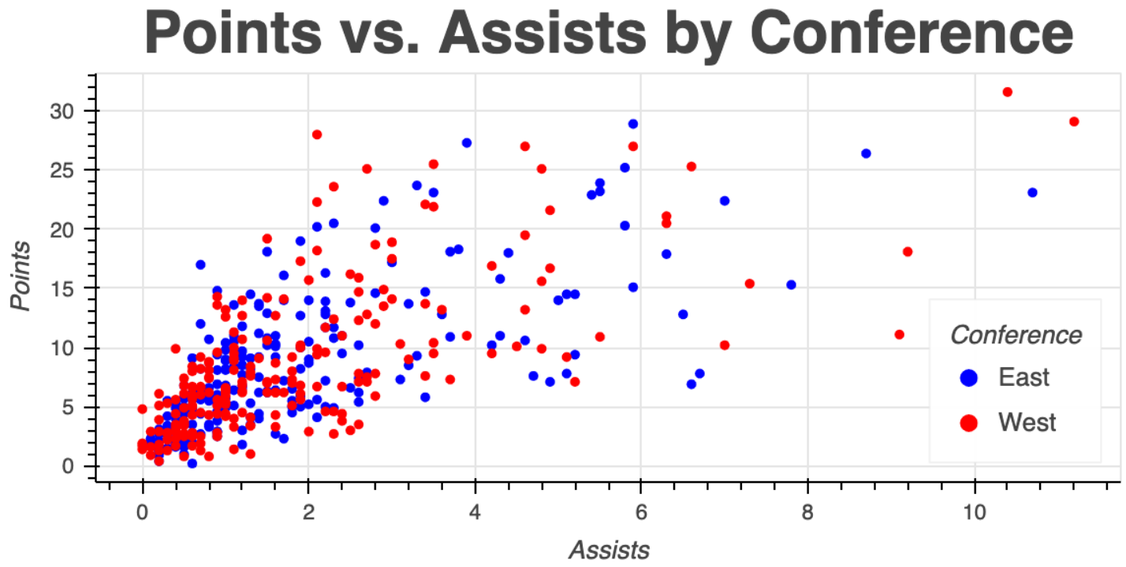
```
fig.title.text_font_size = "30px"
fig.title.align = "center"
output_file(filename="modified_title.html")
show(fig)
```



Modifying the legend

```
fig.legend.title = "Conference"
fig.legend.location = "bottom_right"
show(fig)
```

legend.location
"top_left"
"top_right"
"bottom_left"
"bottom_right"

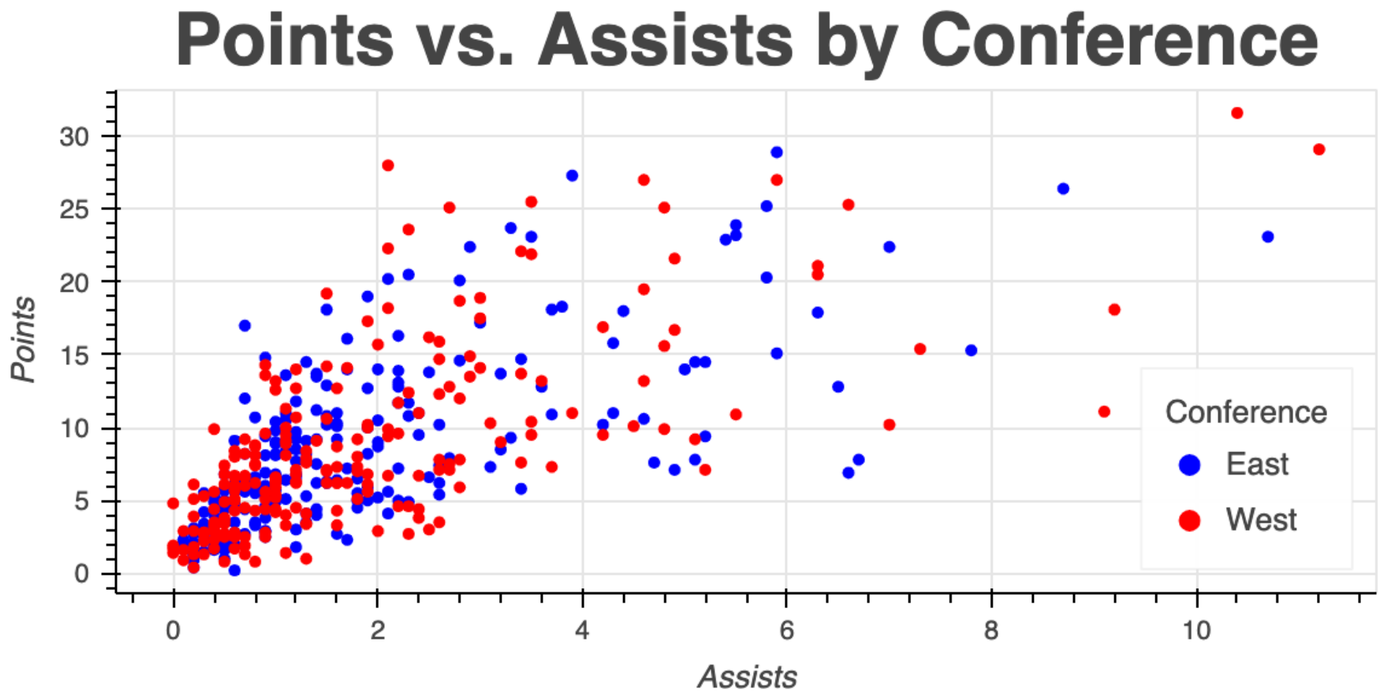


Legend title's font style

legend.title_text_font_style
"bold"
"normal"
"italic"

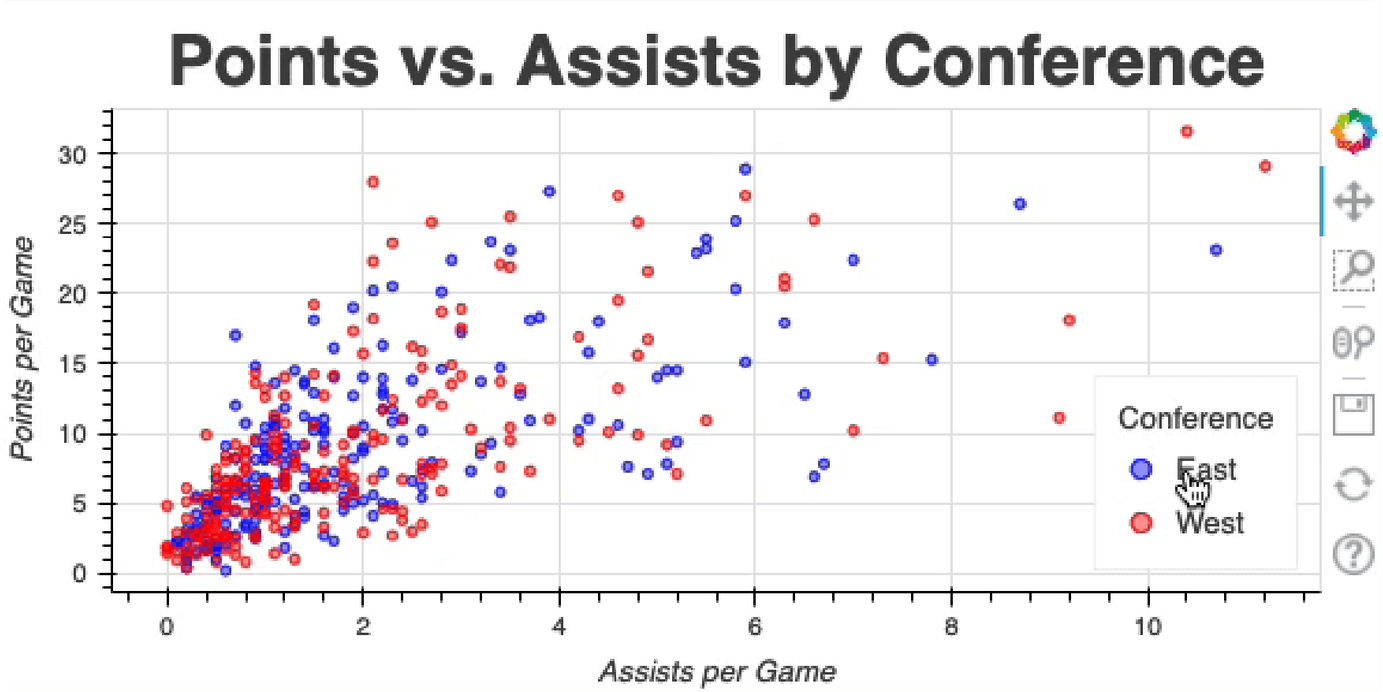
Legend title font style

```
fig.legend.title_text_font_style = "normal"
output_file(filename="normal_legend_title.html")
show(fig)
```



Displaying an interactive legend

```
fig.legend.click_policy = "hide"
output_file(filename="interactive_legend.html")
show(fig)
```



The dataset

```
print(bakery.shape)
```

```
(17486, 6)
```

```
print(bakery.columns)
```

```
Index(['transaction', 'items', 'day_time', 'day_type', 'date', 'sales'],
dtype='object')
```

Let's practice!

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Adding annotations

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George Boorman
Core Curriculum Manager, DataCamp

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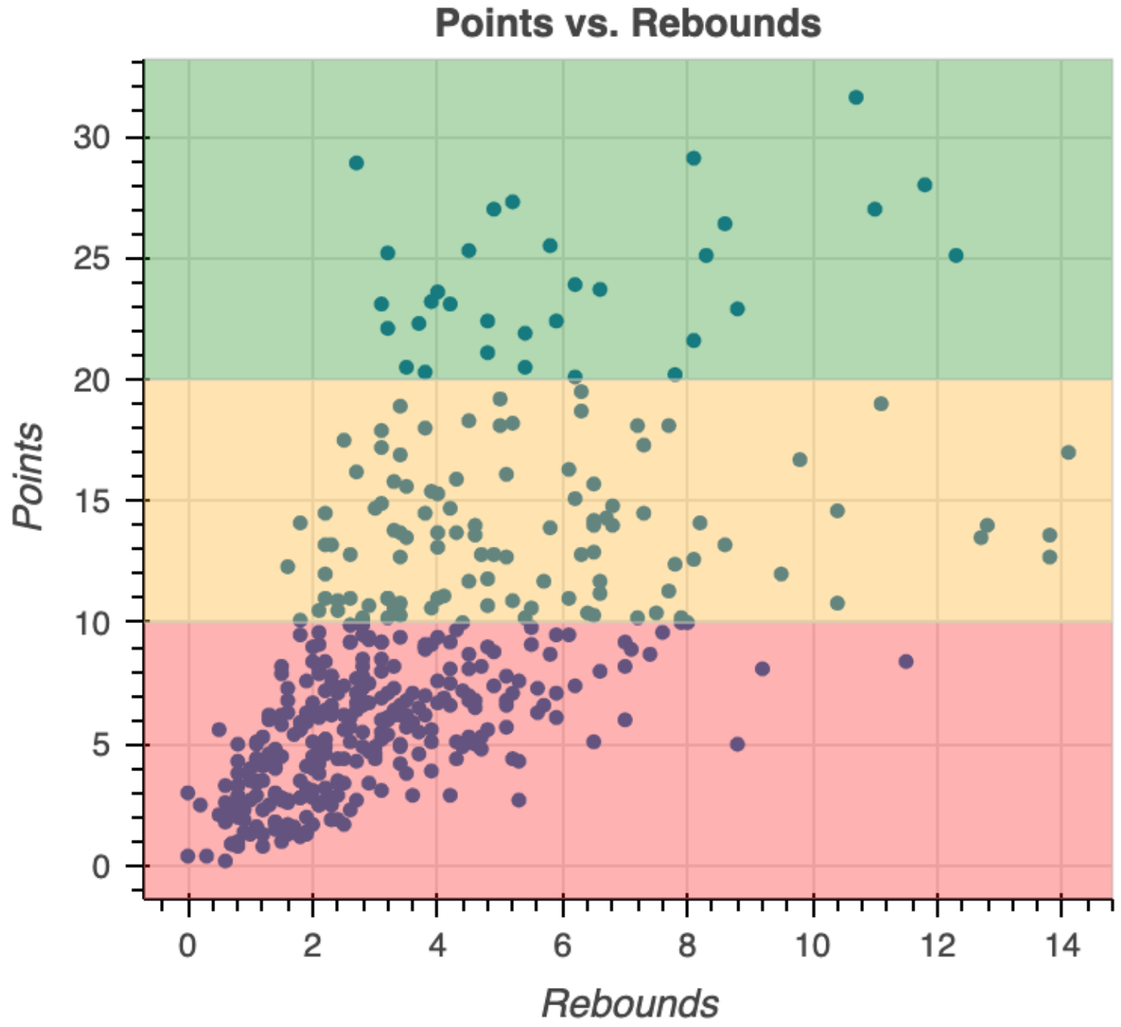
Box annotation



Adding box annotations

```
from bokeh.models import BoxAnnotation
fig = figure(x_axis_label="Rebounds", y_axis_label="Points", title="Points vs. Rebounds")
fig.circle(x="rebounds", y="points", source=source)
low_box = BoxAnnotation(top=10, fill_color="red", fill_alpha=0.3)
mid_box = BoxAnnotation(bottom=10, top=20, fill_color="orange", fill_alpha=0.3)
high_box = BoxAnnotation(bottom=20, fill_color="green", fill_alpha=0.3)
fig.add_layout(low_box)
fig.add_layout(mid_box)
fig.add_layout(high_box)
fig.title.align = "center"
output_file("color_annotated_plot.html")
show(fig)
```

Polygon annotation

Adding a polygon annotation

```
import datetime as dt
from bokeh.models import PolyAnnotation
fig = figure(title="Nvidia Stock Price", x_axis_label="Date", y_axis_label="Price")
fig.line(x="date", y="close", source=source)
fig.xaxis[0].formatter = DatetimeTickFormatter(months="%b %Y")
fig.yaxis[0].formatter = NumeralTickFormatter(format="$0")
start_date = dt.datetime(2017, 5, 9)
end_date = dt.datetime(2017, 6, 12)
start_float = start_date.timestamp() * 1000
end_float = end_date.timestamp() * 1000
start_data = nvidia.loc[nvidia['date'] == start_date]['close'].values[0]
end_data = nvidia.loc[nvidia['date'] == end_date]['close'].values[0]
polygon = PolyAnnotation(fill_color="green", fill_alpha=0.4,
                         xs = [start_float, start_float, end_float, end_float],
                         ys = [start_data-8, start_data+28, end_data+20, end_data-10])
fig.add_layout(polygon)
output_file(filename="nvidia_polygon_annotation.html")
show(fig)
```

Let's practice!

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