General Points

- Use the course material located at:
  - [Python Data Science Handbook](#)
- Assignment 13 can be completed using previously covered material and content from the following chapters:
  - 00.00-Preface *through* 04.07-Customizing Colorbars

  After completing requirements, test to ensure all cells run correctly in the .ipynb file.
- Include appropriate markdown cells to identify the requirements below by number. See this [example](#).
- Produce an .html file that shows the .ipynb after a *successful test run*.
  - by File | Download as | HTML (.html) .
- Test the .html file by opening it in a browser and ensure the content is produced correctly from the run in Jupyter Notebook.
- Submit ==BOTH== the .ipynb and .html files to the appropriate link in Blackboard | Assignments. <u>Submit the files individually</u> (via a multi-select). However, if your browser posts an error for the .html file, submit it as a .zip.
- Submit any additional files required to complete the assignment.

Requirements

(*Ensure that all Requirements are complete*)

Use Matplotlib in Assignment 13 unless otherwise specified.

For the plots below, produce (display) the symbols and colors shown.

1. Using Jupyter Notebook (or similar tool), create a file named:
   - assignment-13.ipynb
2. Add an H1 markdown: "This is Assignment 13 - <yournamehere>"
3. Show the list of file types supported by the Matplotlib.

4. Starting with:

```
import numpy as np
x = np.linspace(0, 10, 100)
fig, ax = plt.subplots(4, figsize=(12,12))
```

Use the Matplotlib object-oriented interface to display the sine, cosine, tangent, and arctangent of x, each in its own plot.

5. Save the figures in the previous requirement to files and display the images from the files.
6. Plot the sin() and cos() functions on the same graph.
7. Starting with:

```
x = np.linspace(0, 10, 1000)
```

Plot the hyperbolic tangent (tanh()) function using six different color formats. Modify x slightly in each plot so the lines are distinct.
8. Using the same x as above, plot the cosine (cos()) using 4 different color formats and 4 different line types. Modify x slightly in each plot so the lines are distinct.
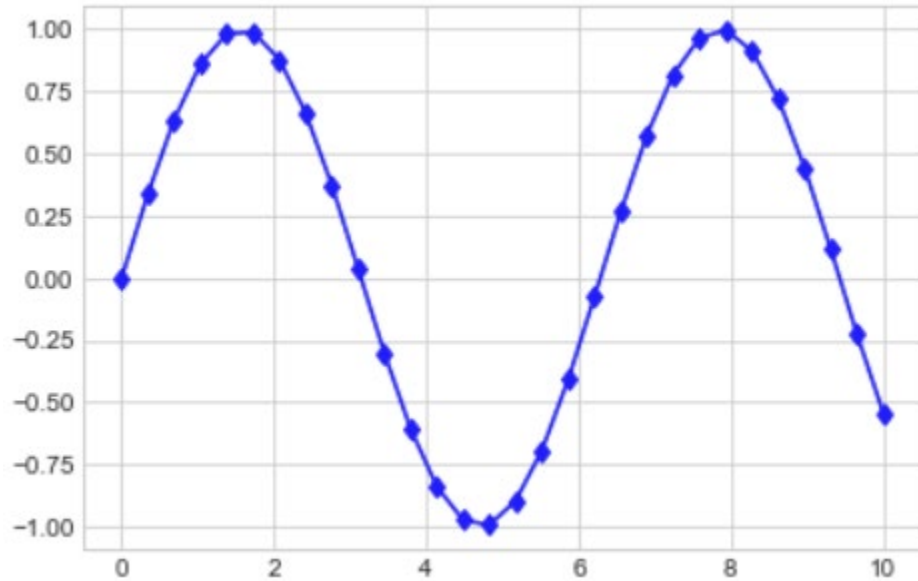9. Demonstrate limiting the x and y axes values in a plot.
10. Demonstrate a plot with an equal aspect ratio.
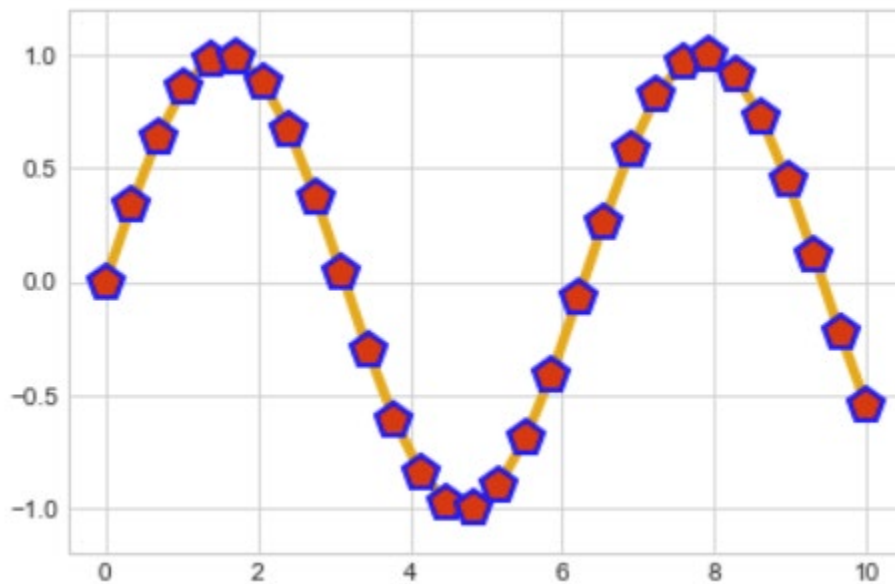11. Demonstrate the use of axis labels and a plot legend.
12. Use RandomState() and plot() to demonstrate 11 different plot marker types. **Also**, display the markers in a legend.
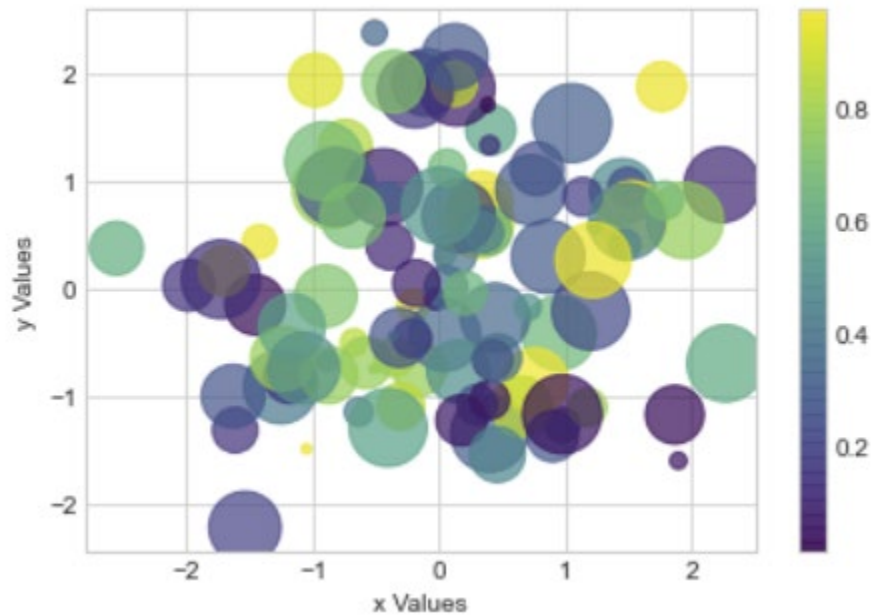
13. Produce the following plot (diamonds are markers):

14. Produce the following plot (notice the marker color and borders):

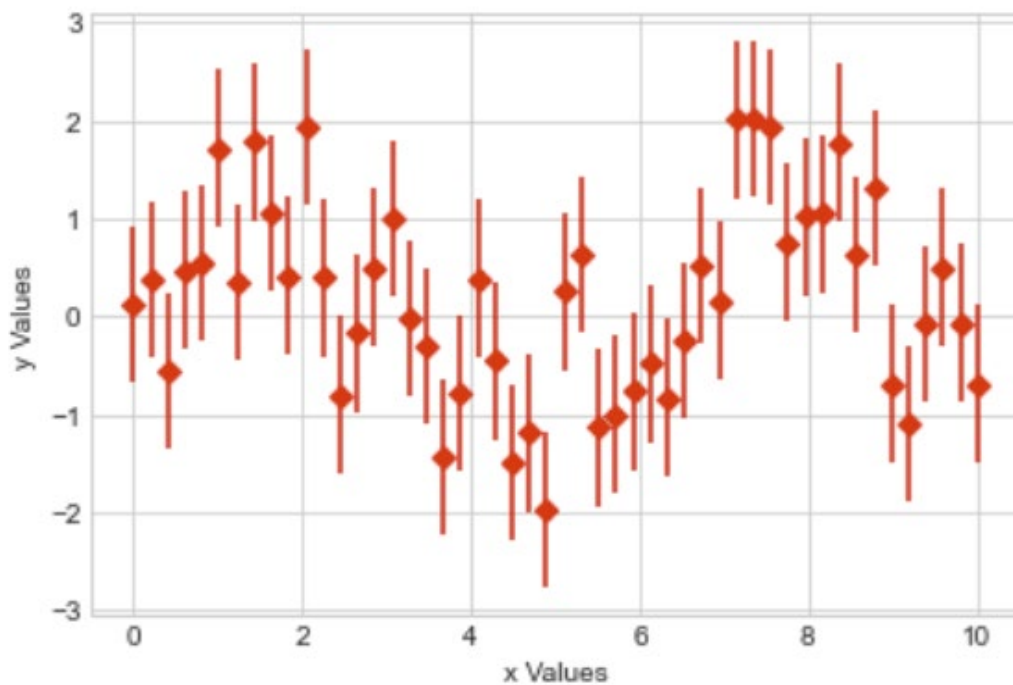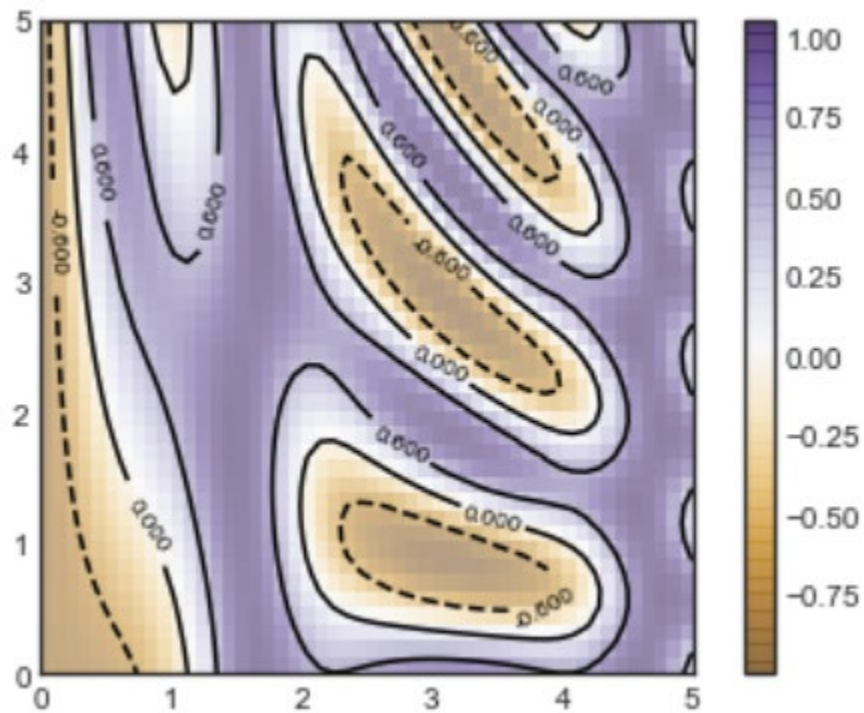15. Produce the following plot (notice the labels are darker transparency):

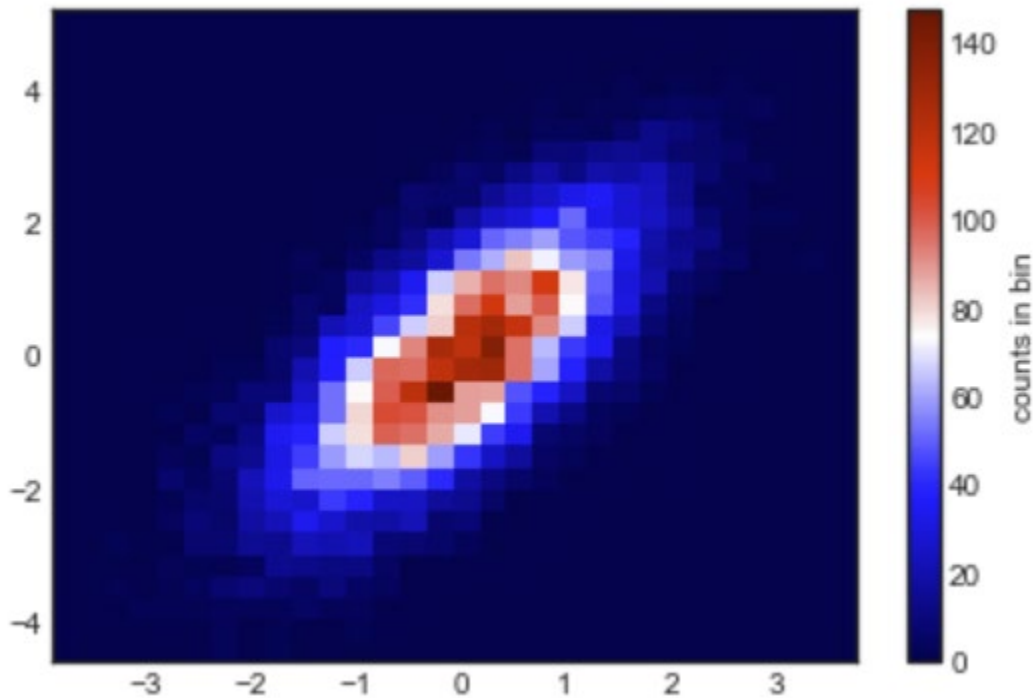16. Produce the following plot (use errorbar()). This page will be helpful:

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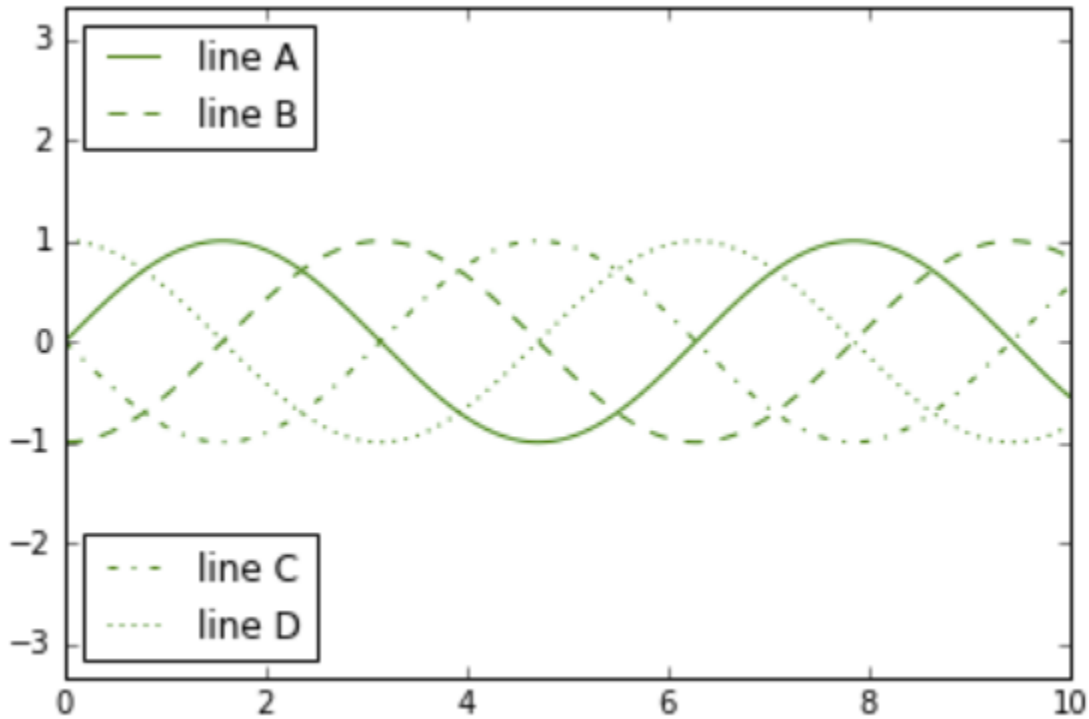17. Produce the following plot (**purple** and **orange**). This page will be helpful:

18. Produce the following plot. This page will be helpful:

19. Produce the following plot (notice the color and legends).

20. Use markdown to include a statement at the end of assignment-13.ipynb explaining your experiences with Assignment 13. Make this authentic (minimum of 2-3 sentences).

TEST – TEST – TEST your .ipynb file to ensure all requirements are met. Produce an .html file from a *successful test run* of the .ipynb file. Ensure that the .html is produced correctly by opening it in a browser.

- Use the list above as a confirmation checklist.
- Not meeting all requirements = 0 points for the assignment.