

Creating, formatting, and comparing plots

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Creating graphical plots is a powerful way to visualize data and enhance your algorithmic thinking. In the Application portion of most Modules, we will ask you to create plots that help you understand the data being analyzed. To grade these plots, we will use peer assessment. This page discusses how to create plots using Python and describes some best practices for formatting and comparing plots.

Creating plots

We will not require the use of any particular plotting software for this class. However, we do have some recommended methods that you might consider using:

- The easiest method for plotting data is to use one of Python's [many plotting packages](#). For this class, we suggest using [matplotlib](#). This [class page](#) describes how to install [matplotlib](#). The [pyplot](#) module in [matplotlib](#) supports a MATLAB-like framework for plotting.
- [CodeSkulptor](#) also supports the creation of plots using the [simpleplot](#) module. Enter "simpleplot" in the search box for the [CodeSkulptor Docs](#) for more details. One important point concerning [simpleplot](#) is that it does not provide built-in support for log/log plotting. Since you will be asked to create log/log plots for some problems, you are allowed to use linear plots of the [log](#) of the data as done in [this example](#). Be sure to label the axes of your plot to indicate that you have taken this approach.
- You are also welcome to export your data to a file and then use an external plotting application such as Microsoft Excel, [Libreoffice](#), or [plotly](#) to create a plot. If you chose this approach, you should probably to export your data in some common format such as [comma-separated values](#).

Some tools such as [matlibplot](#) provide a "Save image" option that allows you to save the created plot as an image file. For plotting tools that don't support saving as an image, you can record a screen shot of the plot's window using this [tip for Windows](#) or [this tip for Mac](#).

Formatting plots

Since your plots will be peer-assessed, we have created a short set of guidelines for formatting plots. We suggest that you review these guidelines when creating your plots. The plots that you submit will be assessed using these guidelines.

- The plot includes an image that visualizes the data. Note that a text file is **not** a plot.
- The plot is appropriately trimmed. Showing the boundary of the plot's window is fine. However, the plot should not include part of the desktop.
- The elements of the plot are of the correct type. Line plots are not the same as point plots.
- Both axes should have tick marks labeled by regularly-spaced coordinate values.
- Both axes have appropriate text labels that describe the quantities being plotted.
- The plot has an appropriate title that describes the content of the plot.
- The plot has an appropriate legend (when required) that distinguishes the various components of the plot.

Comparing plots

During peer assessment, you will be asked to compare a submitted plot to one or more examples of correct plots that we will provide. In your comparison, you should focus on the general shape and structure of the submitted plot. The formatting of the plot will be assessed in a separate rubric item. To guide your comparison, here are some specific items that pertain to the "shape and structure" of plots. Each item should help you assess whether two plots are more or less similar.

- Compare the number of points/lines in each plot.
- Compare the coherence of the points/lines in each plot. Are the points/lines scattered randomly or can they be approximated by a curve?
- If the points in each plot can be approximated by a curve, compare the shapes of the curves. Is one curve linear and the other curve non-linear?
- If the points in each plots can be approximated by a line, compare the slopes of the lines. Is one line rising and the other line falling?

Created Sun 17 Aug 2014 12:48 PM PDT

Last Modified Sun 14 Sep 2014 5:58 PM PDT