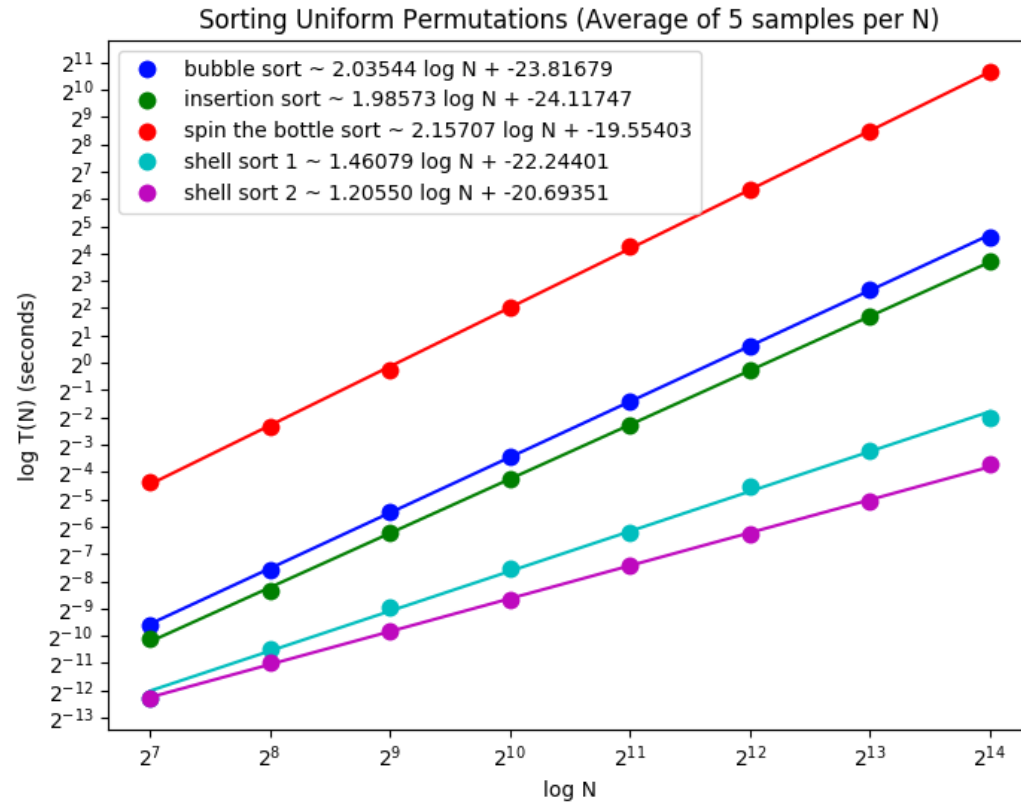


Plotting Data with matplotlib.pyplot

CS 165, Project in Algorithms and Data Structures
UC Irvine
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Presented by Rob Gevorkyan

Our end goal



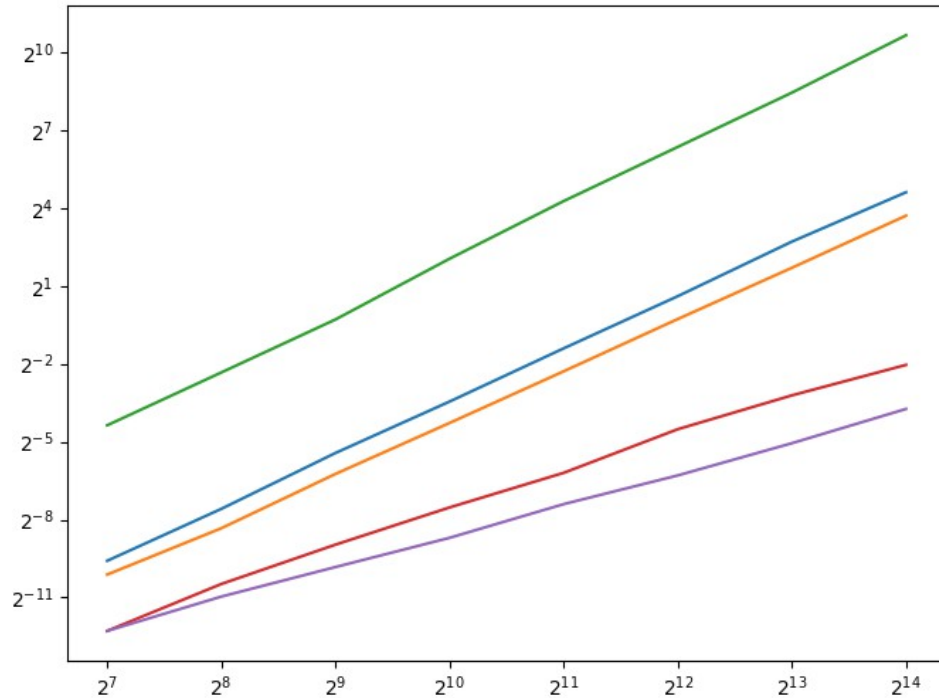
How matplotlib.pyplot works

- The basic workflow with matplotlib is to do the following steps:
 - For one or more sets of (x, y) coordinate pairs represented as separate arrays of values, call a plotting function (normal, semilog, or loglog)
 - Call a function to either display the resulting plot in a new window or save it to a file.
- We will examine the syntax and options to get to the kind of plot shown in the previous slide.

Plotting functions

- The following functions are provided by pyplot to create (but not display) a plot.
 - plot
 - do not apply log to either x or y values
 - loglog
 - apply log to both x and y values
 - semilogx, semilogy
 - apply log only to x or y respectively

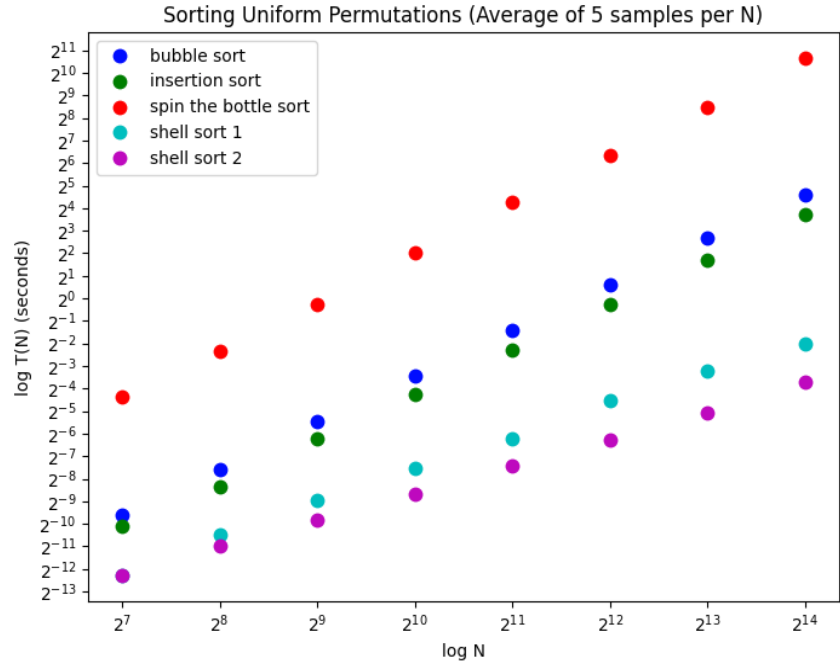
Default plotting behavior



The plot above was generated with the following code, iterating over 5 sets of (x, y) pairs

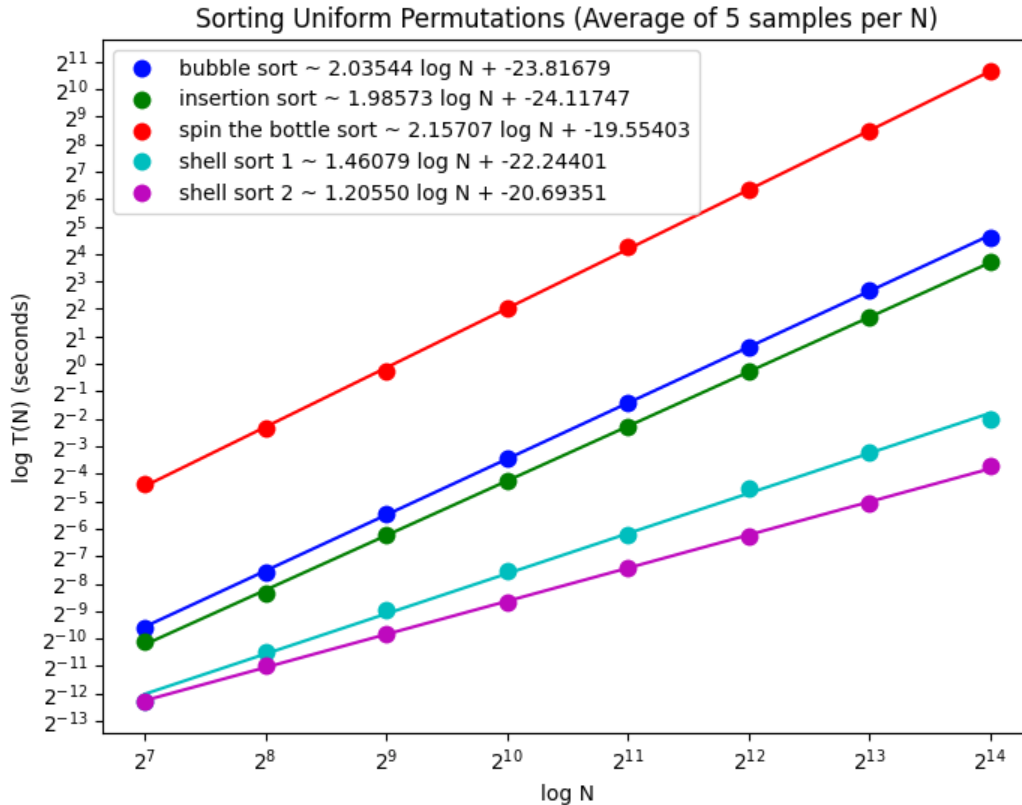
```
plt.loglog(x, y, basex=2, basey=2)
```

Various tweaks later



- For each set of (x, y) call
 - `plt.loglog(x, y, '.', basex=2, basey=2, label=y_label, markersize=markersize, color=color)`
- Once for the whole plot call
 - `plt.xlabel, plt.ylabel, plt.yticks, plt.title, and plt.legend` to set those properties

Adding the regression lines



```
m, b = np.polyfit(x, y, 1)
plt.loglog(x, y, '.', basex=2, basey=2, label=f'{y_label} ~ {m} log N + {b}',
markersize=markersize, color=color)
plt.loglog(x, 2 ** (m * logx + b), basex=2, basey=2, color=color)
```

Additional resources

- <https://matplotlib.org/tutorials/introductory/pyplot.html>
- <https://www.datacamp.com/community/tutorials/matplotlib-tutorial-py>
- <https://www.datacamp.com/community/tutorials/matplotlib-tutorial-py>