Major and Minor Ticks

Within each axis, there is the concept of a *major* tick mark and a *minor* tick mark. As the names would imply, major ticks are usually bigger or more pronounced, while minor ticks are usually smaller. By default, Matplotlib rarely makes use of minor ticks, but one place you can see them is within logarithmic plots (Figure 4-73):

```
In[1]: %matplotlib inline
       import matplotlib.pyplot as plt
       plt.style.use('seaborn-whitegrid')
       import numpy as np

In[2]: ax = plt.axes(xscale='log', yscale='log')
```

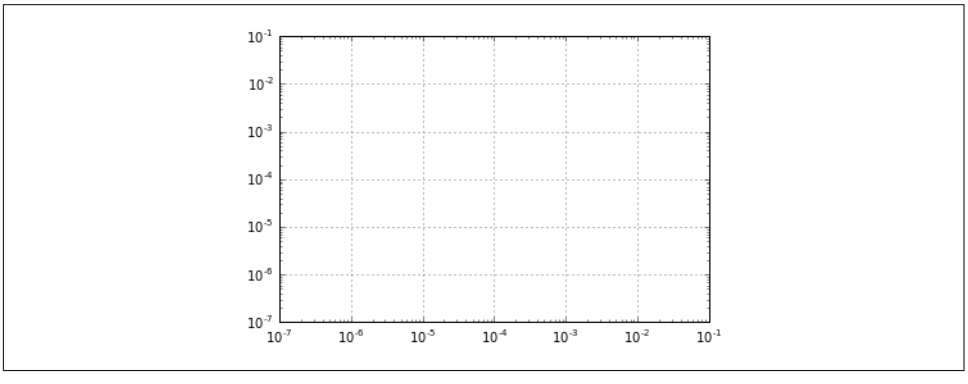

Figure 4-73. Example of logarithmic scales and labels

We see here that each major tick shows a large tick mark and a label, while each minor tick shows a smaller tick mark with no label.

We can customize these tick properties—that is, locations and labels—by setting the `formatter` and `locator` objects of each axis. Let's examine these for the x axis of the plot just shown:

```
In[3]: print(ax.xaxis.get_major_locator())
       print(ax.xaxis.get_minor_locator())

<matplotlib.ticker.LogLocator object at 0x107530cc0>
<matplotlib.ticker.LogLocator object at 0x107530198>

In[4]: print(ax.xaxis.get_major_formatter())
       print(ax.xaxis.get_minor_formatter())

<matplotlib.ticker.LogFormatterMathtext object at 0x107512780>
<matplotlib.ticker.NullFormatter object at 0x10752dc18>
```

We see that both major and minor tick labels have their locations specified by a `LogLocator` (which makes sense for a logarithmic plot). Minor ticks, though, have their labels formatted by a `NullFormatter`; this says that no labels will be shown.

We'll now show a few examples of setting these locators and formatters for various plots.

Hiding Ticks or Labels

Perhaps the most common tick/label formatting operation is the act of hiding ticks or labels. We can do this using `plt.NullLocator()` and `plt.NullFormatter()`, as shown here (Figure 4-74):

```
In[5]: ax = plt.axes()
       ax.plot(np.random.rand(50))

       ax.yaxis.set_major_locator(plt.NullLocator())
       ax.xaxis.set_major_formatter(plt.NullFormatter())
```

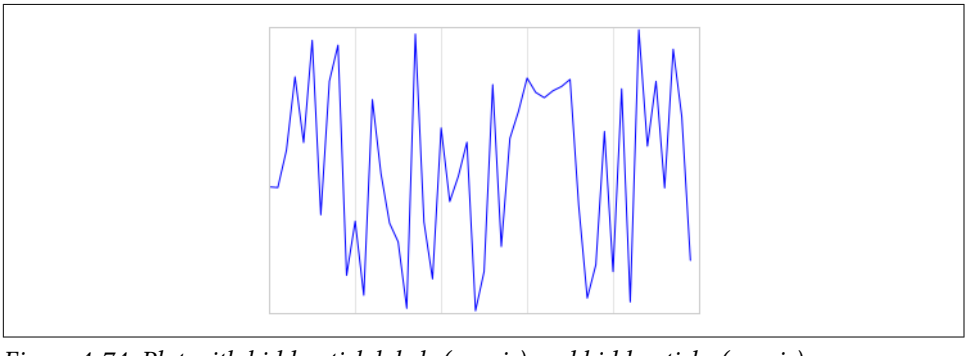

Figure 4-74. Plot with hidden tick labels (x-axis) and hidden ticks (y-axis)

Notice that we've removed the labels (but kept the ticks/gridlines) from the x axis, and removed the ticks (and thus the labels as well) from the y axis. Having no ticks at all can be useful in many situations—for example, when you want to show a grid of images. For instance, consider Figure 4-75, which includes images of different faces, an example often used in supervised machine learning problems (for more information, see "In-Depth: Support Vector Machines" on page 405):

```
In[6]: fig, ax = plt.subplots(5, 5, figsize=(5, 5))
       fig.subplots_adjust(hspace=0, wspace=0)

       # Get some face data from scikit-learn
       from sklearn.datasets import fetch_olivetti_faces
       faces = fetch_olivetti_faces().images

       for i in range(5):
           for j in range(5):
               ax[i, j].xaxis.set_major_locator(plt.NullLocator())
               ax[i, j].yaxis.set_major_locator(plt.NullLocator())
               ax[i, j].imshow(faces[10 * i + j], cmap="bone")
```