```
In [14]:  !pip show astropy
```

```
Name: astropy
Version: 7.0.1
Summary: Astronomy and astrophysics core library
Home-page:
Author:
Author-email: The Astropy Developers <astropy.team@gmail.com>
License: BSD-3-Clause
Location: C:\Users\btcya\Desktop\astronomy-course-programming\astrocourse\Lib\sit
e-packages
Requires: astropy-iers-data, numpy, packaging, pyerfa, PyYAML
Required-by:
```

Import libraries

```
In [2]:  import numpy as np
         import matplotlib.pyplot as plt
         from astropy import units as u
```

Examples

- give examples how to add units to code

```
In [3]:  a = 50.0 * u.meter
         print(a)
         b = [23,45,88] * u.meter

         c = [4,7,10] * u.second
         print(c)
```

```
50.0 m
[ 4.  7. 10.] s
```

Explanation of the Code

1. **Create a New Figure**:

   - `plt.figure()` : Initializes a new figure for the plot.
2. **Plot Data Points**:

   - `plt.plot(b, c, 'o', label='Wind speed [m/s]')` :
     - Plots the data points `(b, c)` as circles (`'o'`).
     - Adds a label for the data points: "Wind speed [m/s]".
3. **Label Axes**:

   - `plt.xlabel('Speed [m\u2009/s]')` : Labels the x-axis as "Speed [m/s]" with a half-space interval between `m` and `/s` .
   - `plt.ylabel('Time [s]')` : Labels the y-axis as "Time [s]".
4. **Add a Legend**:

   - `plt.legend()` : Adds a legend to the plot to describe the data points.
5. **Generate Reference Line Data**:

- `l1 = np.linspace(0, 100, 10)` : Creates an array of 10 evenly spaced points between 0 and 100.
- `l2 = np.linspace(0, 100, 10)` : Creates another array of 10 evenly spaced points between 0 and 100.

6. **Plot a Reference Line**:

- `plt.plot(l1, l2, color='gray', linestyle='--')` :
  - Plots a gray dashed line using `l1` and `l2` as the x and y coordinates.
  - This line serves as a reference or guide in the plot.

Output:

- The plot will display:
  1. Data points `(b, c)` as circles labeled "Wind speed [m/s]".
  2. A gray dashed reference line from `(0, 0)` to `(100, 100)`.
  3. X-axis labeled as "Speed [m/s]" with a half-space interval.
  4. Y-axis labeled as "Time [s]".
  5. A legend describing the data points.

Use Case:

This plot is useful for visualizing the relationship between speed and time, with a reference line for comparison.

```
In [4]:  # Create a new figure for the plot
         plt.figure()

         # Plot the data points (b, c) as circles with a label
         plt.plot(b, c, 'o', label='Wind speed [m/s]')

         # Label the x-axis with a half-space interval in the unit
         plt.xlabel('Speed [m\u2009/s]')

         # Label the y-axis
         plt.ylabel('Time [s]')

         # Add a legend to the plot
         plt.legend()

         # Generate two linearly spaced arrays for plotting a reference line
         l1 = np.linspace(0, 100, 10)  # Array from 0 to 100 with 10 points
         l2 = np.linspace(0, 100, 10)  # Array from 0 to 100 with 10 points

         # Plot a gray dashed reference line using l1 and l2
         plt.plot(l1, l2, color='gray', linestyle='--')
```

```
Out[4]:  [<matplotlib.lines.Line2D at 0x200187b9d50>]
```