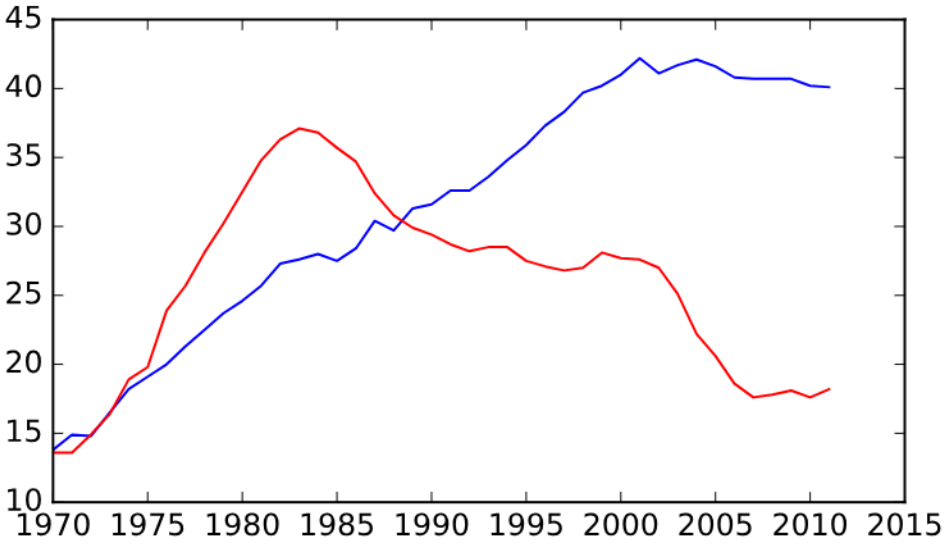
Introduction to Data Visualization with Python

1)- Customizing Plots:

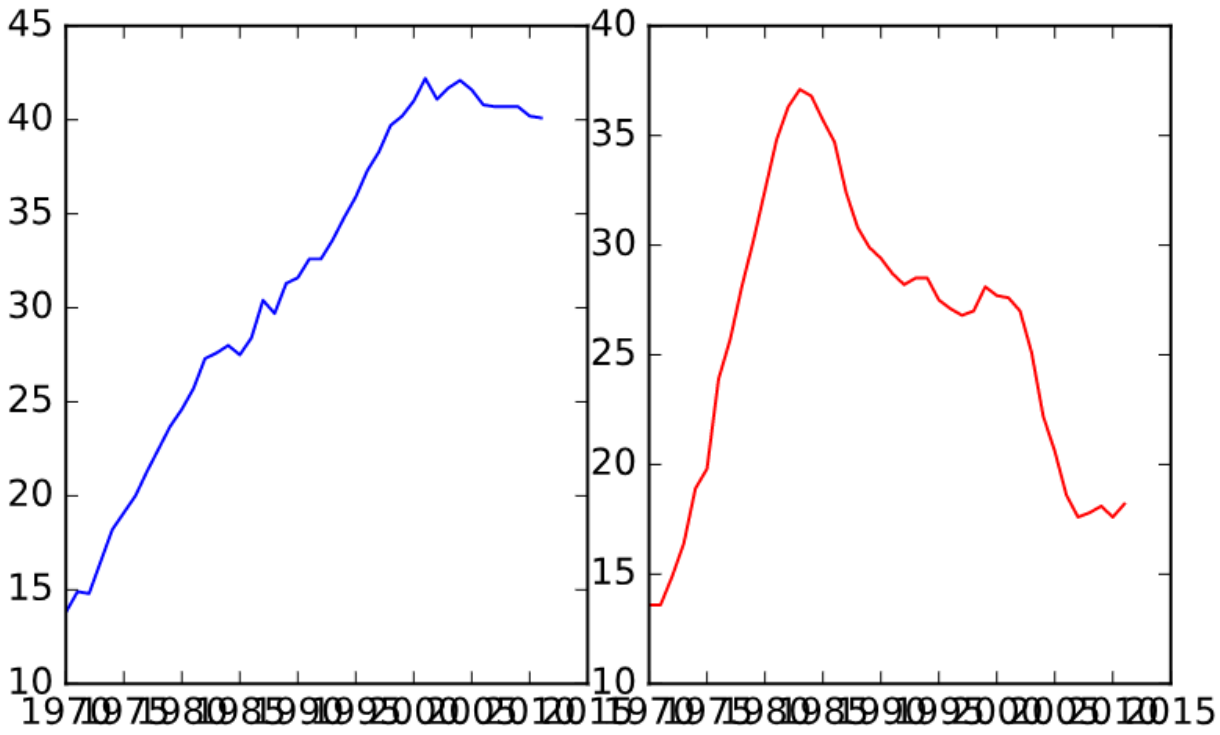
a).

```
# Import matplotlib.pyplot
import matplotlib.pyplot as plt

# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')

# Display the plot
plt.show()
```



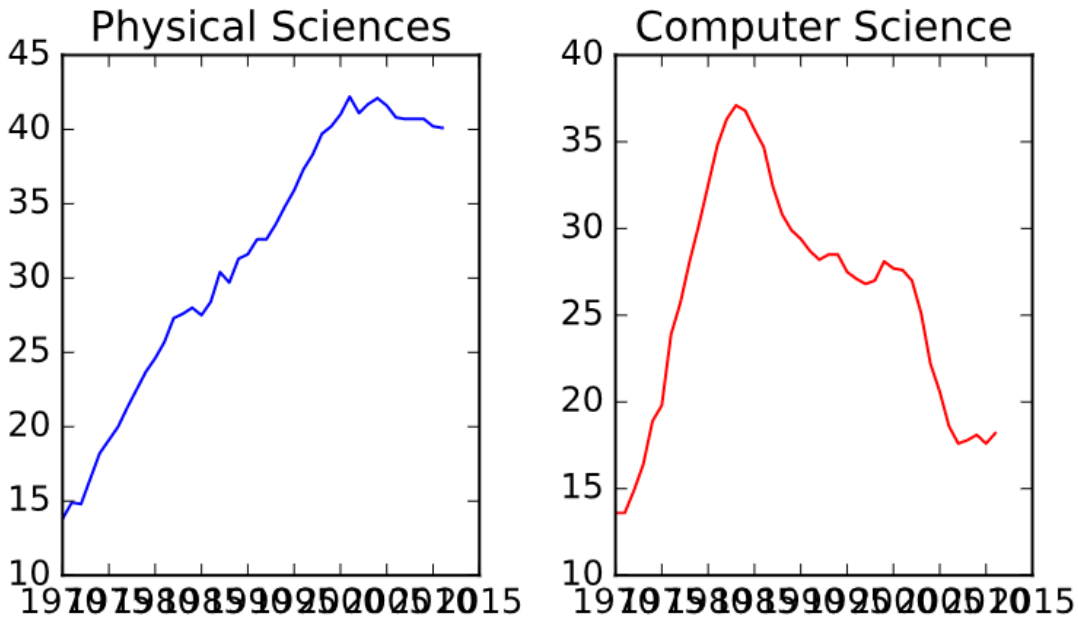
b).

```
# Create plot axes for the first line plot
plt.axes([0.05,0.05,0.425,0.9])

# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')

# Create plot axes for the second line plot
plt.axes([0.525,0.05,0.425,0.9])

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')

# Display the plot
plt.show()
```



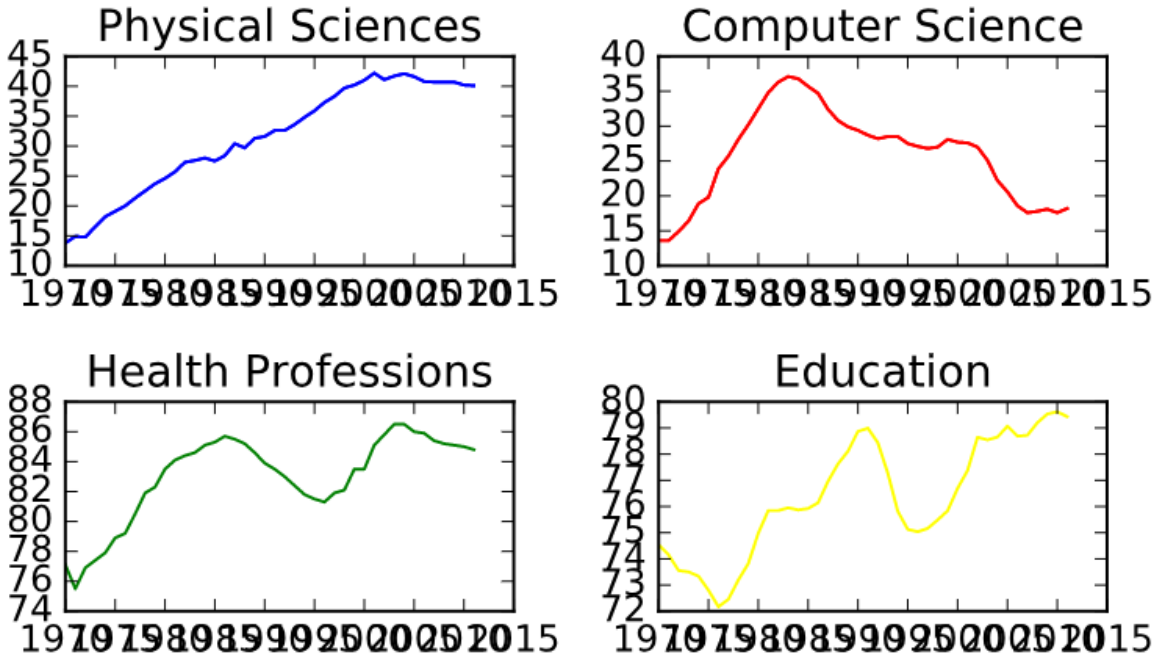
c)

```
# Create a figure with 1x2 subplot and make the left subplot active
plt.subplot(1,2,1)

# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')
plt.title('Physical Sciences')

# Make the right subplot active in the current 1x2 subplot grid
plt.subplot(1,2,2)

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')
plt.title('Computer Science')

# Use plt.tight_layout() to improve the spacing between subplots
plt.tight_layout()
plt.show()
```



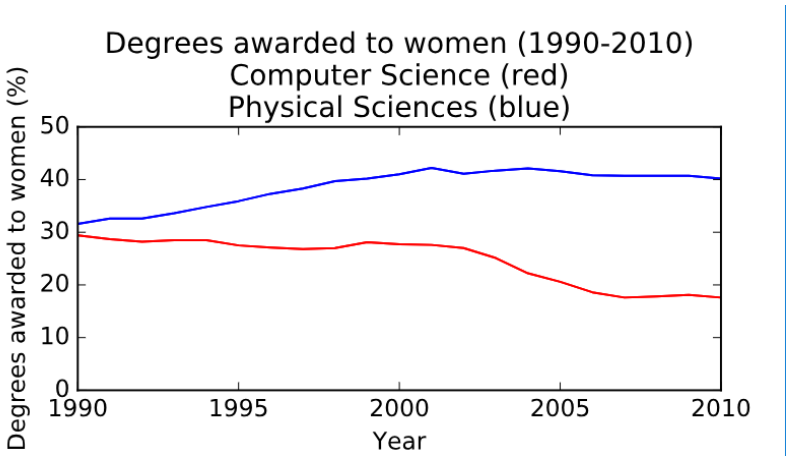
d)

```
# Create a figure with 2x2 subplot layout and make the top left subplot active
plt.subplot(2,2,1)

# Plot in blue the % of degrees awarded to women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')
plt.title('Physical Sciences')

# Make the top right subplot active in the current 2x2 subplot grid
plt.subplot(2,2,2)

# Plot in red the % of degrees awarded to women in Computer Science
plt.plot(year, computer_science, color='red')
plt.title('Computer Science')

# Make the bottom left subplot active in the current 2x2 subplot grid
plt.subplot(2,2,3)

# Plot in green the % of degrees awarded to women in Health Professions
plt.plot(year, health, color='green')
plt.title('Health Professions')

# Make the bottom right subplot active in the current 2x2 subplot grid
plt.subplot(2,2,4)

# Plot in yellow the % of degrees awarded to women in Education
plt.plot(year, education, color='yellow')
plt.title('Education')

# Improve the spacing between subplots and display them
plt.tight_layout()
plt.show()
```


Physical Sciences
Computer Science
Health Professions
Education

e)

```
# Plot the % of degrees awarded to women in Computer Science and the Physical Sciences
plt.plot(year,computer_science, color='red')
plt.plot(year, physical_sciences, color='blue')

# Add the axis labels
plt.xlabel('Year')
plt.ylabel('Degrees awarded to women (%)')

# Set the x-axis range
plt.xlim([1990, 2010])

# Set the y-axis range
plt.ylim([0, 50])

# Add a title and display the plot
plt.title('Degrees awarded to women (1990-2010)\nComputer Science (red)\nPhysical Sciences (blue)')
plt.show()

# Save the image as 'xlim_and_ylim.png'
plt.savefig('xlim_and_ylim.png')
```



f).

#Plot in blue the % of degrees awarded to women in Computer Science

plt.plot(year,computer_science, color='blue')

Plot in red the % of degrees awarded to women in the Physical Sciences

plt.plot(year, physical_sciences,color='red')

Set the x-axis and y-axis limits

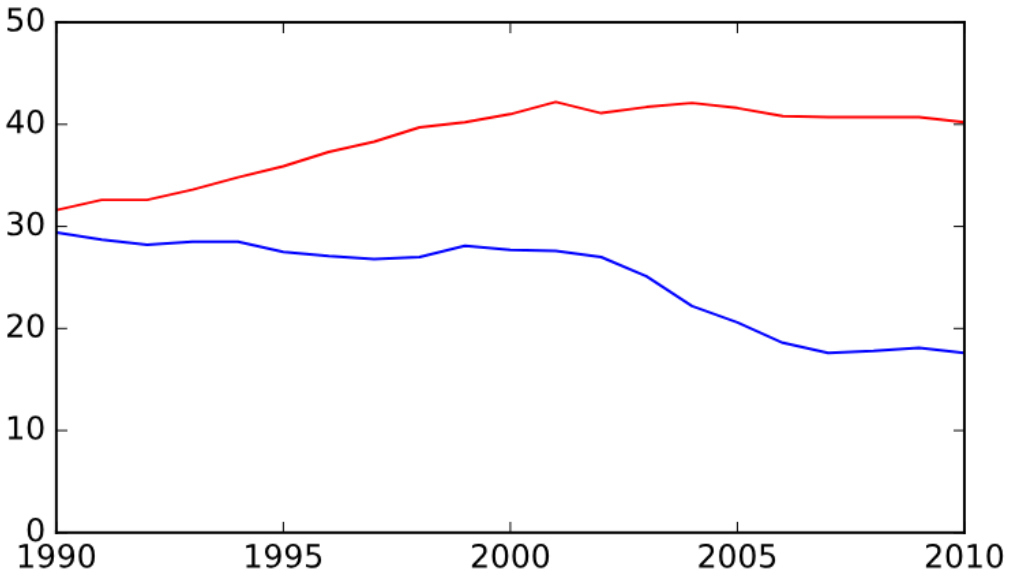
plt.axis([1990,2010,0,50])

Show the figure

plt.show()

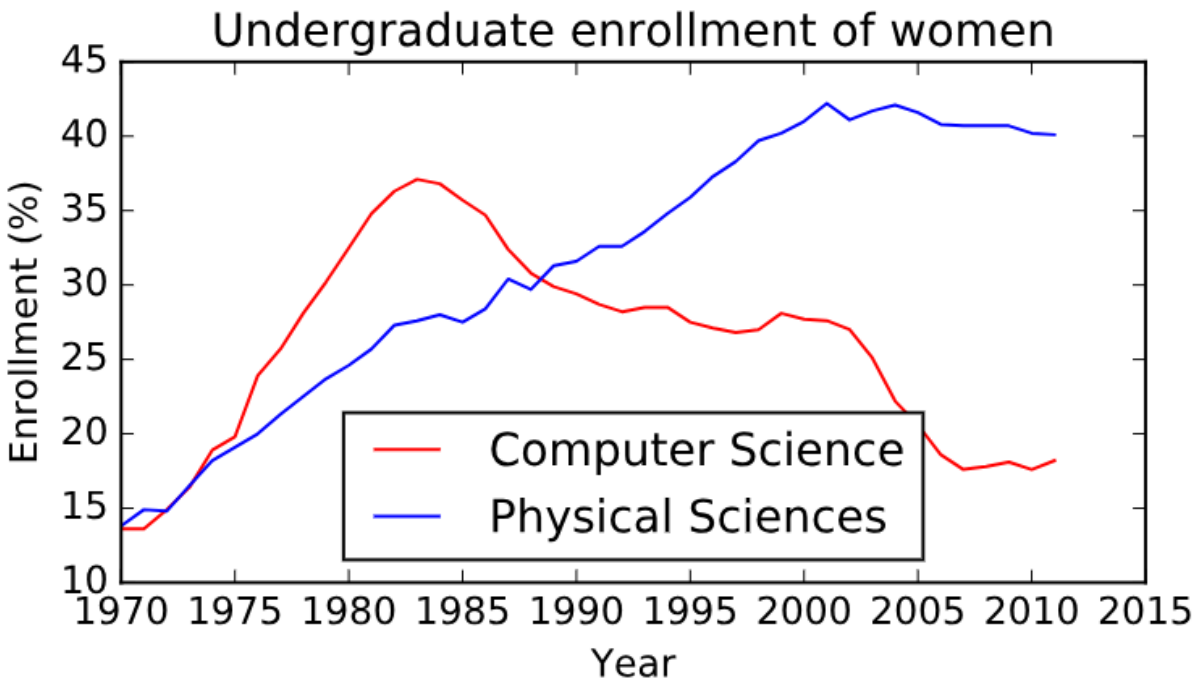
Save the figure as 'axis_limits.png'

plt.savefig('axis_limits.png')



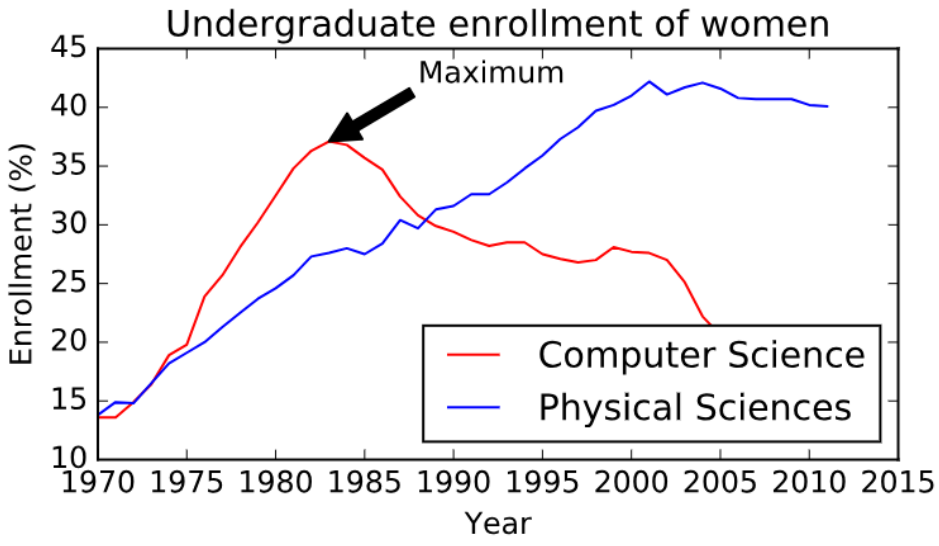
g).

```
# Specify the label 'Computer Science'
plt.plot(year, computer_science, color='red', label='Computer Science')

# Specify the label 'Physical Sciences'
plt.plot(year, physical_sciences, color='blue', label='Physical Sciences')

# Add a legend at the lower center
plt.legend(loc='lower center')

# Add axis labels and title
plt.xlabel('Year')
plt.ylabel('Enrollment (%)')
plt.title('Undergraduate enrollment of women')
plt.show()
```



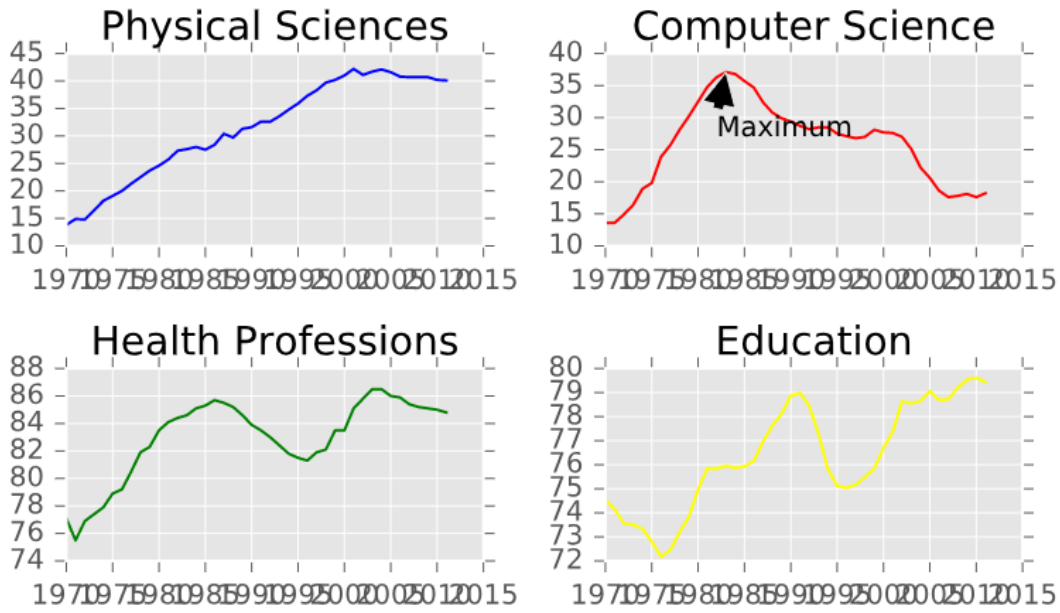
h). **Using annotate()**

```
# Plot with legend as before
plt.plot(year, computer_science, color='red', label='Computer Science')
plt.plot(year, physical_sciences, color='blue', label='Physical Sciences')
plt.legend(loc='lower right')

# Compute the maximum enrollment of women in Computer Science: cs_max
cs_max = computer_science.max()

# Calculate the year in which there was maximum enrollment of women in Computer Science: yr_max
yr_max = year[computer_science.argmax()]

# Add a black arrow annotation
plt.annotate('Maximum',xy=(yr_max,cs_max),xytext=(yr_max+5,cs_max+5),arrowprops=dict(facecolor='black'
))

# Add axis labels and title
plt.xlabel('Year')
plt.ylabel('Enrollment (%)')
plt.title('Undergraduate enrollment of women')
plt.show()
```



i). Modifying styles

```
# Import matplotlib.pyplot
import matplotlib.pyplot as plt
# Set the style to 'ggplot'
plt.style.use('ggplot')
# Create a figure with 2x2 subplot layout
plt.subplot(2, 2, 1)
# Plot the enrollment % of women in the Physical Sciences
plt.plot(year, physical_sciences, color='blue')
plt.title('Physical Sciences')
# Plot the enrollment % of women in Computer Science
plt.subplot(2, 2, 2)
plt.plot(year, computer_science, color='red')
plt.title('Computer Science')
# Add annotation
cs_max = computer_science.max()
yr_max = year[computer_science.argmax()]
plt.annotate('Maximum', xy=(yr_max, cs_max), xytext=(yr_max-1, cs_max-10),
arrowprops=dict(facecolor='black'))
# Plot the enrollmment % of women in Health professions
plt.subplot(2, 2, 3)
plt.plot(year, health, color='green')
plt.title('Health Professions')
# Plot the enrollment % of women in Education
plt.subplot(2, 2, 4)
plt.plot(year, education, color='yellow')
plt.title('Education')
# Improve spacing between subplots and display them
plt.tight_layout()
plt.show()
```


Physical Sciences
Computer Science
Maximum
Health Professions
Education