PRACTICALS

Practical 1

Create a script that calculates the kinematics of a cannonball:

- Prompt the user for height, velocity and angle
- Print time-of-flight
- Plot the x,y trajectory
- Print impact location (x,y)

HINT:

$$x(t) = x_0 + v_0 \cdot t + \tfrac{1}{2} \cdot a \cdot t^2$$

Practical 2

Create a script to play rock-paper-scissors:

- Prompt the user a choice
- Print result based off computer choice

HINT:

Dictionaries can help turn strings into numbers for comparision

Practical 3

Create a script to read in ‘junk.txt’ and sort values:

- Sort words alphabetically, and save to file
- Sort numbers numerically, and save to file
- Return mean, median, and standard deviation of numbers
- Plot a bar chart for the counts of unique words

HINT:

Values are either alphabetic strings, integers or random symbol strings

Practical 4

Create a script to read in ‘scores.csv’ and create subplots:

- Create histograms for each section, and full class list
- Calculate the mean and std for all sections, and full class list
- Save final figure as PNG file

HINT:

numpy.genfromtxt can intelligently evaluate entry datatype with dtype=None

Practical 5

Create a simple Monte Carlo script to estimate the value for π:

- Randomly (and uniformly) fill a square region with N datapoints
- Count the number inside a circle embedded in that square
- Compare the numbers to estimate the value of pi
- Plot the points inside and out to illustrate the method