CS115 Introduction to Programming with Python

Lab Guide 10

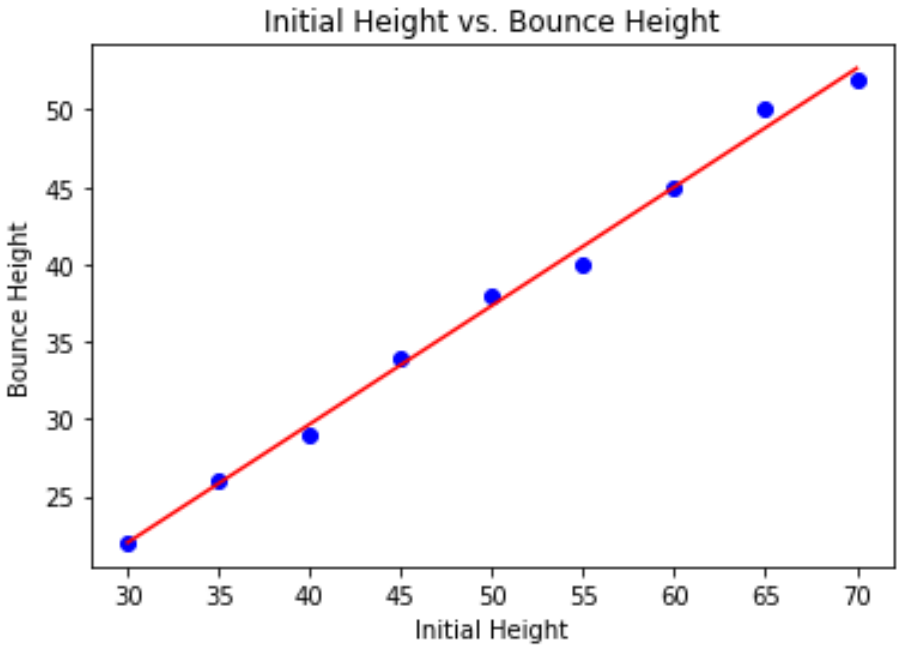
Objectives: Data visualization with matplotlib and numpy.

1. A ball is dropped from different heights and the maximum height of the ball after the bounce is measured. The **Table** below shows the data collected.

Initial Height (cm)	Bounce Height (cm)
30	22
35	26
40	29
45	34
50	38
55	40
60	45
65	50
70	52

Write a script that does the following:

a. Load the data into two numpy arrays, `initial` and `bounce`.
b. Create the plot below, by first plotting initial vs. the bounce.
c. Find the first-degree polynomials for the curve fitting these measurements and produce a plot of the curve in the format shown below. All formatting should be done according to the figure below.



2. Download the file `student.txt`, and create a Python script that does the following:
    a. Import the data in the file into a numpy array, `student`.
    b. The scholarship values in the file are 1-Full Scholarship, 2-Half Scholarship and 3-Non-Scholarship. Select the records whose scholarship is Half Scholarship and store as a new numpy array, `half`.
    c. Open a new Figure1 window and create the bar charts and plots shown below using the appropriate data.
    d. Create the histogram showing the writing grades of Half Scholarship students (from `half`), using 4 bins.
    e. Create the plot comparing the math vs reading grades of Half Scholarship students.
    f. Create the pie chart with the data shown below.
    g. Select the data about the average of reading grades of all students vs. Half Scholarship students