Assignment 5:

Installation

1. Open a command prompt in the folder, and type 'pip install –r requirements.txt' to make sure that all the dependencies are installed
2. To run the file, on a command prompt type 'python numpy_linalg.py'

Explanation

1. **Write the constraints in a matrix form. Explain the result. You can use Microsoft Word or Notepad**

The matrix form is as follows (written in Latex, rendered as an image and pasted in word)

$$\begin{bmatrix} 1 & 1 & 1 \\ 3 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 6 \\ 10 \\ 3 \end{bmatrix}$$

We take the co-efficient and make a matrix of that. A dot product of the co-efficient of the matrix with the variables will give us the left hand side of the equation. That is equated with a vector of the right hand sides of the equation. Therefore, the equation form can be converted into matrix form using the above steps. Whenever a variable is missing in the equation, it's corresponding co-efficient is 0.

2. **Determine x, y, and z values using the Numpy linalg.solve function**

The following is the output of the program, which solves our equations, by first converting them into matrix form

```
The solution to the equations are:
x = 0.9999999999999997
y = 2.0000000000000004
z = 3.0
The combined solution is:
[1. 2. 3.]
Checking if solution is correct...
The solution is correct
```

3. **Indicate a possible objective function in this case**

Since a company wants to invest in stocks, and have a portfolio, we must 'Maxmize' that portfolio, subjected to certain constraints in order to gain profits.

$$Maximize \quad x + y + z$$