1 Getting Started

Please visit `https://numpy.org/doc/stable/user/absolute_beginners.html` to familiarize yourself with **numpy. See an example on the back to see how your submissions look like.**

2 Exercise

Write a block of code to achieve the result for the following problems. Include the print command as well to see the output. Please use the standard *import numpy as np* command. For the following exercise, please print your work (block of code and output) in the pdf format, and upload on Moodle.

1. **Use the *arange* or *linspace* command to achieve the following. Visit here for more info:**
   `https://numpy.org/doc/stable/reference/generated/numpy.arange.html`
   `https://numpy.org/doc/stable/reference/generated/numpy.linspace.html`

   (a) **Provide the correct syntax for printing the number 37 from the array:** **firstq** $= [3, 8, 13, 18, 37, 43]$**.**

   (b) **Provide the correct syntax for printing the number 70 from the array:** **secondq** $= [[10, 20, 30, 40], [60, 70, 80, 90]]$

   (c) **Make an array of numbers `x` consisting of the numbers 5, 6, 7,.....,80.**

   (d) **Make an array of vectors `y` consisting of the numbers 2.5, 3, 3.5, ..., 100.**

   (e) **Make a vector `z` consisting of the numbers 100, 99, 98, ..., 1 (in that order).**

   (f) **Create a row-vector `a` consisting of 15 ones, that is an array 1, 1, 1, ...1.**

   (g) **Create a row-vector `b` consisting of 13 sevens, that is an array 7, 7, 7, ...7.**

   (h) **Create a** 2×2 **identity matrix.**

   (i) **Create a** 3×3 **zero matrix.**

   (j) **Find the dimensions of above mentioned two matrices: (h) and (i).**

`The dimension of an array (or matrix) can be found as follows`

```
vec = np.array([[1, 2, 4], [2, 4, 1]])
print(vec.shape)
```

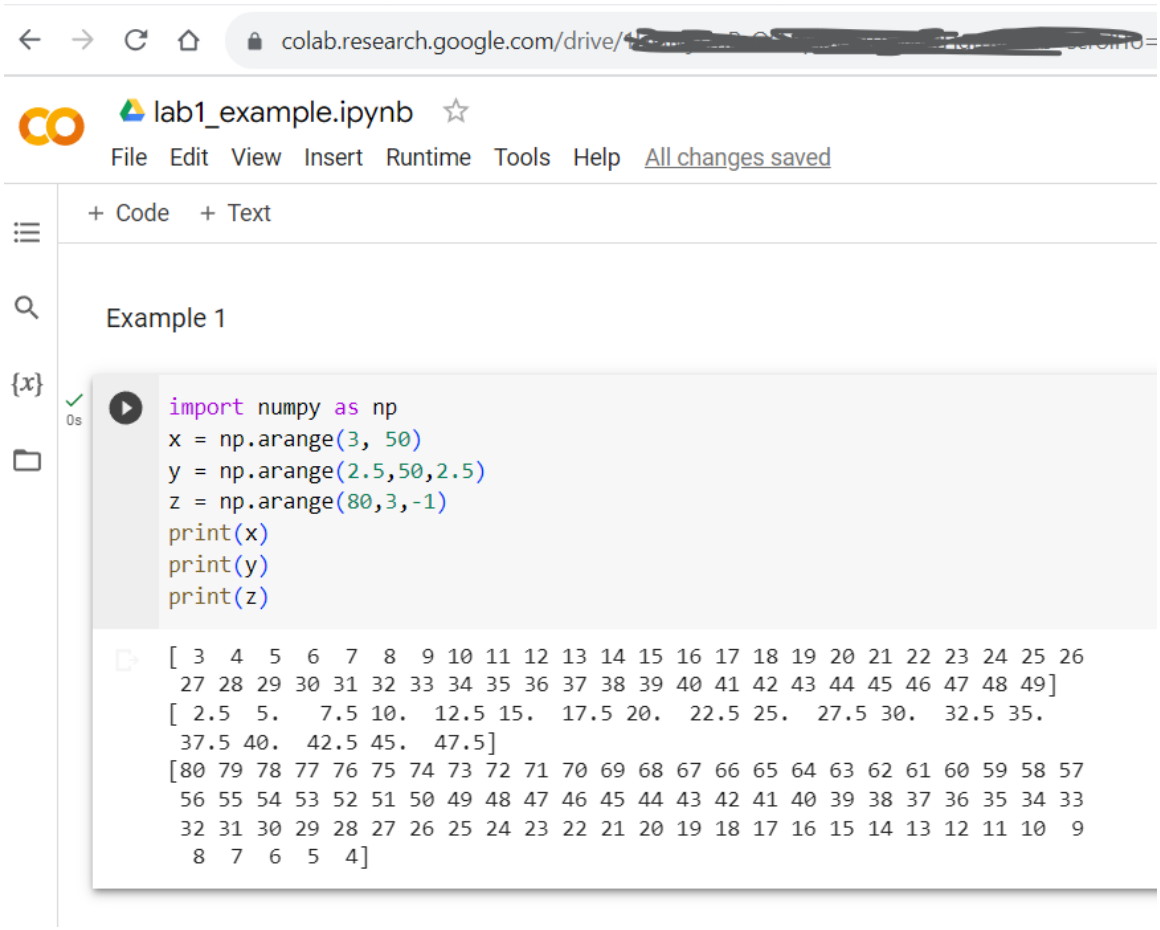
The 3×3 **identity and zero matrices are as follows:**

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}, \quad \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

3 Example 1

For the problems below, your work on Colaboratory could be as shown below.

1. **Make an array of numbers x consisting of the numbers 3, 4,.....,50.**
2. **Make an array of vectors y consisting of the numbers 2.5, 5, 7.5, ..., 50.**
3. **Make a vector z consisting of the numbers 80, 79, 78, ...,3. (in that order).**



But for your submission you would print the page (Ctrl+P or equivalent), save as a pdf file. It would look as shown.

Example 1

```
import numpy as np
x = np.arange(3, 50)
y = np.arange(2.5,50,2.5)
z = np.arange(80,3,-1)
print(x)
print(y)
print(z)
```

```
[ 3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49]
[ 2.5  5.   7.5 10.  12.5 15.  17.5 20.  22.5 25.  27.5 30.  32.5 35.
 37.5 40.  42.5 45.  47.5]
[80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57
 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33
 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10  9
  8  7  6  5  4]
```