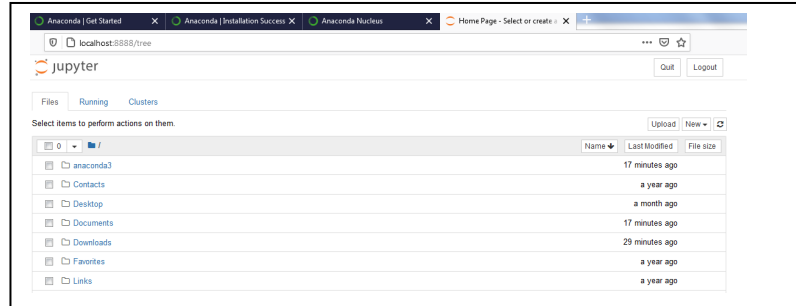
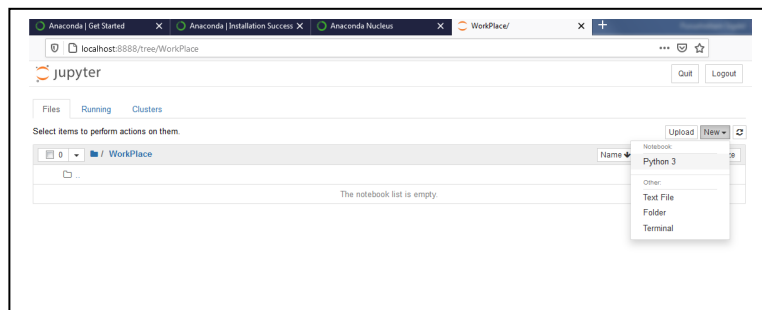


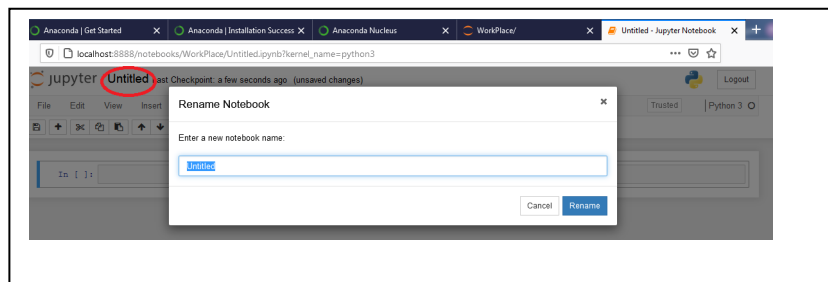
- It will open the browser and show your files and directory (folders) from C:\Users\Your_user_account.
- For the time being, create a working directory at C:\Users\Your_user_account\[yourWorkingDirectory]



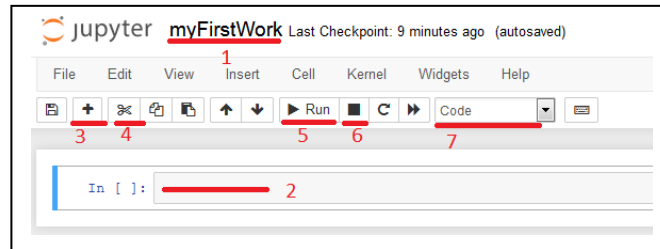
- Click on your working directory (in my case, it is 'workPlace'). It will take you to a new window.
- Click on the New dropdown button (on the right side) and click on the Python 3.



- It will open a new page in the browser with the Untitled – Jupyter Notebook page. To change the name, click on the Untitled label (on the top left) and rename your file.

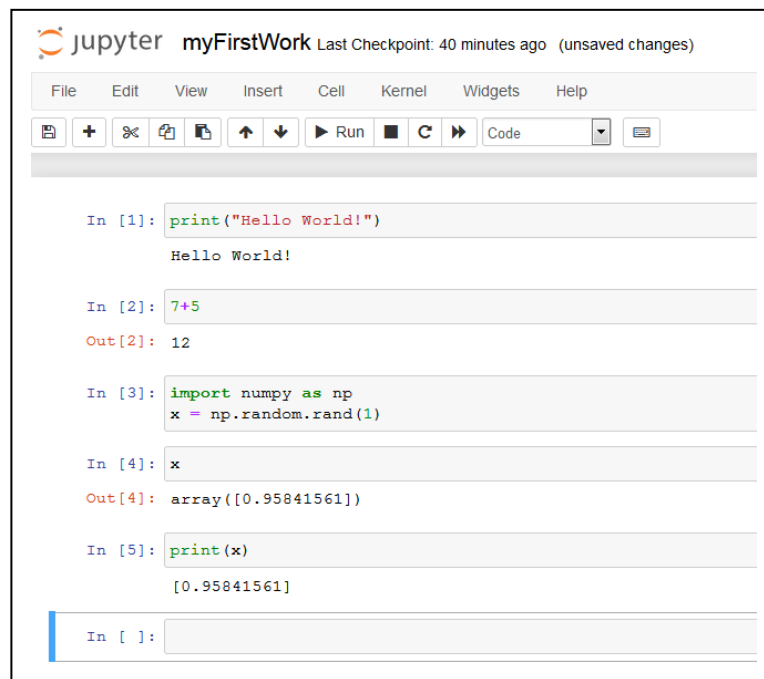


13. We will use the following buttons/labels most frequently.



1. It is your working file
2. This section is called a cell, where you will write your program code or report (if you have selected code in the dropdown button (label 7), it will treat the text you have written in this cell as program code; otherwise, your text will be treated as other than a program code).
3. Clicking on '+' will create another cell to write a program code or some information, such as a comment.
4. This button deletes the current active cell.
5. This button runs the program code (or formatted comment) in the current active cell.
6. A click on this button interrupts the kernel (i.e., current running program code in a cell).
7. The dropdown button selects whether the text in the active cell is treated as program code or formatted comment.

14. The figure below shows some simple program codes in different cells.



Some basic matrix operations in python using NumPy package

```
# This is comment
import numpy as np # use numpy package

# Two matrices are initialized by value
x = np.array([[4, 6], [8, 10]])
y = np.array([[2, 3], [4, 5]])
print("Two Matrices x and y")
print(x)
print(y)
```

```
Two Matrices x and y
[[ 4  6]
 [ 8 10]]
[[2 3]
 [4 5]]
```

#1. `add()/'+'` is used to add two matrices

```
print ("Elementwise addition of x and y: ")
print (np.add(x, y))
print (x+y)
```

```
Elementwise addition of x and y:
[[ 6  9]
 [12 15]]
[[ 6  9]
 [12 15]]
```

2. `subtract()/'-'` is used to subtract two matrices

```
print ("Elementwise subtraction of x and y: ")
print (np.subtract(x,y))
print (x-y)
```

```
Elementwise subtraction of x and y:
[[2 3]
 [4 5]]
[[2 3]
 [4 5]]
```

#3. `divide()/'/'` is used to divide matrices

```
print ("Elementwise matrix division: ")
print (np.divide(x,y))
print (x/y)
```

```
Elementwise matrix division:
```

```
[[2. 2.]  
 [2. 2.]  
 [[2. 2.]  
 [2. 2.]
```

#4. `multiply()/'*` is used to elementwise multiply two matrices

```
print ("Elementwise multiplication of two matrices (x and  
y): ")  
print (np.multiply(x,y))  
print (x*y)
```

```
Elementwise multiplication of two matrices (x and y):
```

```
[[ 8 18]  
 [32 50]]  
[[ 8 18]  
 [32 50]]
```

#5. Matrix multiplication

```
print ("The product of two matrices (x and y): ")  
print (np.dot(x,y))
```

```
The product of two matrices (x and y):
```

```
[[32 42]  
 [56 74]]
```

#5. `sqrt()` computes the elementwise square root of the matrices

```
print ("Elementwise square root of x: ")  
print (np.sqrt(x))
```

```
Elementwise square root of x:
```

```
[[2.          2.44948974]  
 [2.82842712  3.16227766]]
```

#6. `sum()` computes the sum of all the elements of a matrix/array

```
print ("The summation of elements of the matrix y: ")  
print (np.sum(y))
```

```
The summation of elements of the matrix y:
```

```
14
```

#7. `sum(y,axis=0)` computes the column wise sum of the matrix

```
print ("The column wise summation of matrix y: ")  
print (np.sum(y,axis=0))
```

```
The column wise summation of matrix y:  
[6 8]
```

```
#8. sum(y,axis=1) computes the row wise sum of the matrix  
print ("The row wise summation of matrix y: ")  
print (np.sum(y,axis=1))
```

```
The row wise summation of matrix y:  
[5 9]
```

```
#9. transpose()/'T' computes the transpose the matrix  
print ("Transpose of matrix x: ")  
print(np.transpose(x))  
print (x.T)
```

```
Transpose of matrix x:  
[[ 4  8]  
 [ 6 10]]  
[[ 4  8]  
 [ 6 10]]
```