Hands-on Lab: Creating a Python Package

Skills Network

Creating a Python Package

Estimated time needed: **30** minutes

Objectives

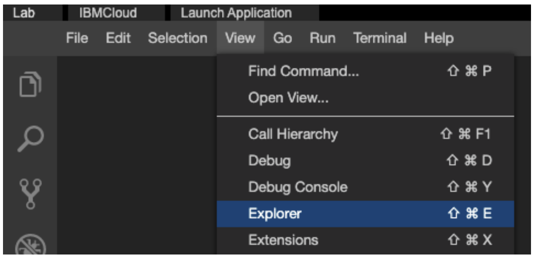
In this lab you will :

- Create a module named basic
- Add two functions to the module basic
- Create a module named stats
- Add two functions to the module stats
- Create a python package named mymath
- Verify that the package is working

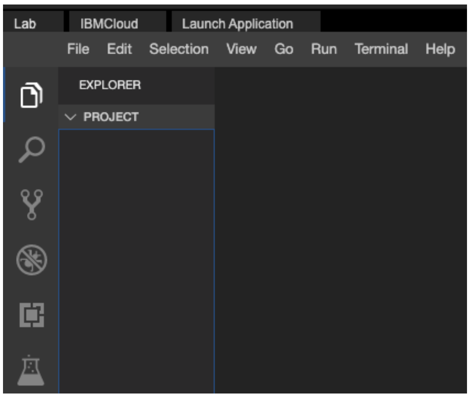
Lab

Create Package

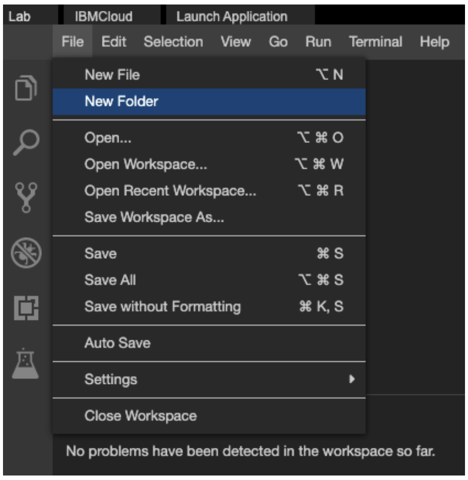
- On the window to the right, click on the **View** menu and select **Explorer** option, as shown in the image below.



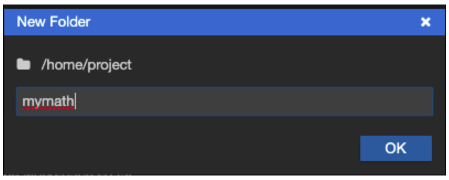
- Your IDE now should look like the image below.



- On the window to the right, click on the **File** menu and select **New Folder** option, as shown in the image below.



- Enter **mymath** and click OK as shown in the image below.



/home/project

mymath

Create the first module

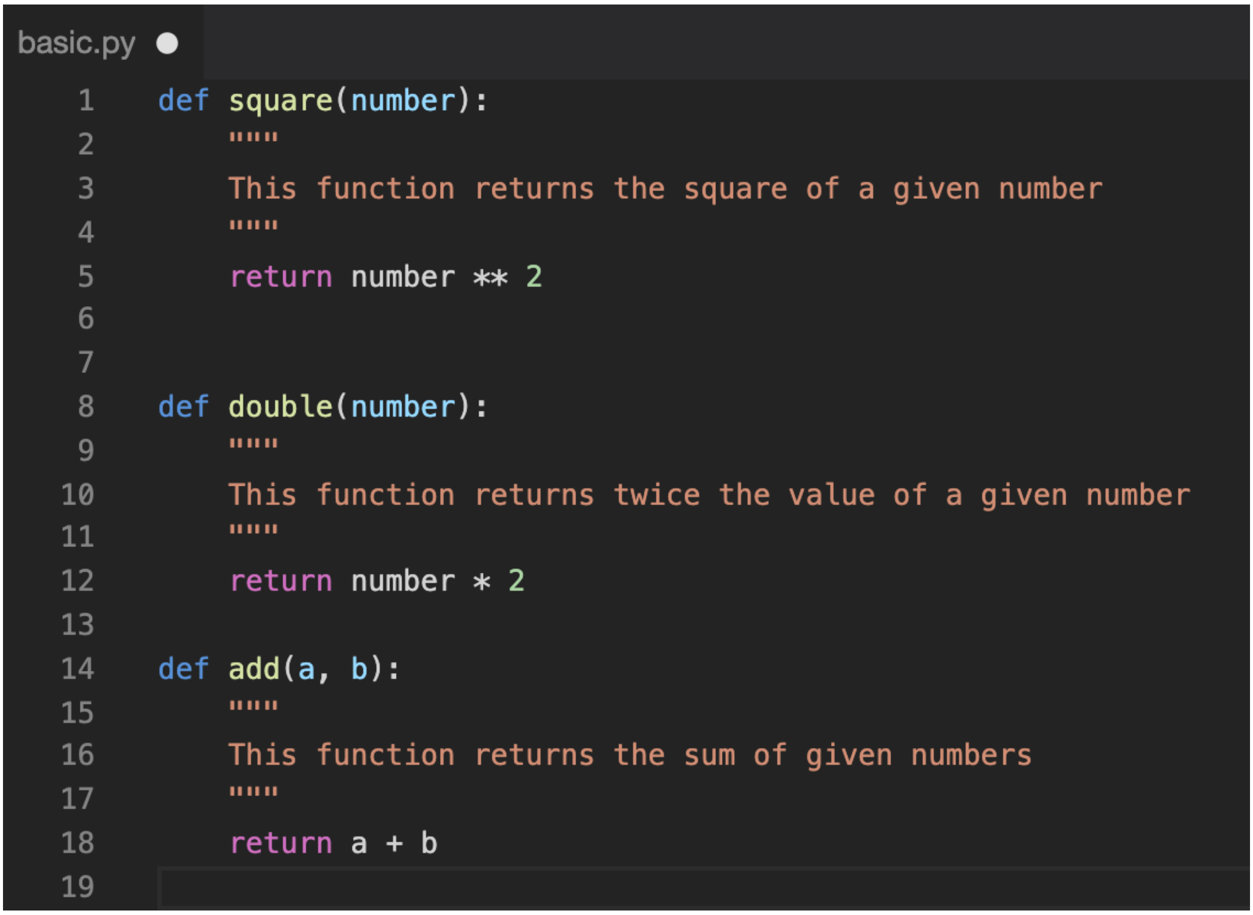
- Create a python module named basic

Create a file named **basic.py**.

Copy and paste the below code into basic.py

```
def square(number):
    """
    This function returns the square of a given number
    """
    return number ** 2
def double(number):
    """
    This function returns twice the value of a given number
    """
    return number * 2
def add(a, b):
    """
    This function returns the sum of given numbers
    """
    return a + b
```

You should see a screen like this now.



```
def square(number):
    """
    This function returns the square of a given number
    """
    return number ** 2


def double(number):
    """
    This function returns twice the value of a given number
    """
    return number * 2

def add(a, b):
    """
    This function returns the sum of given numbers
    """
    return a + b

```

Save the file **basic.py**

Create the second module

- Create a module named stats

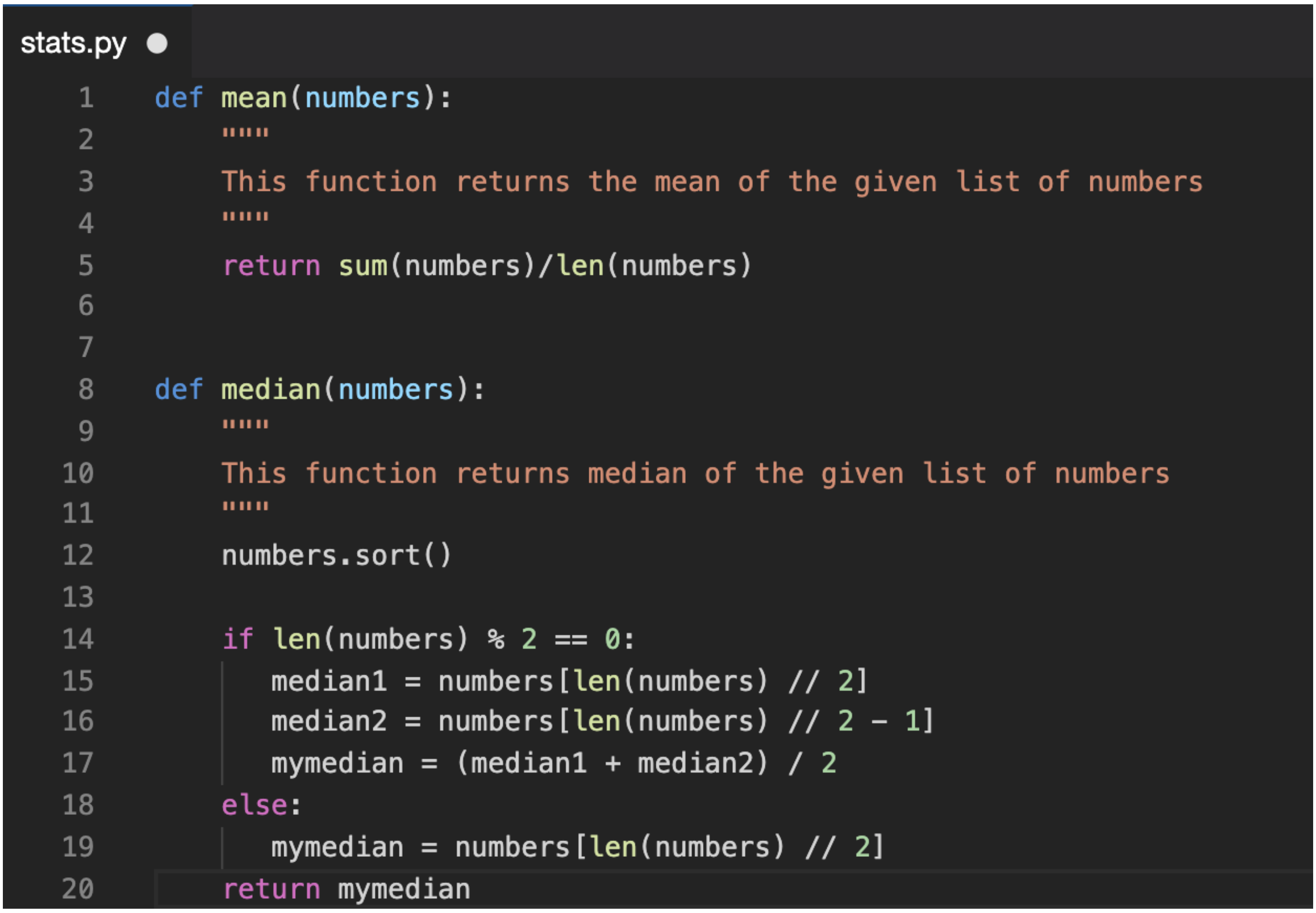
Create a file named **stats.py**.

Copy and paste the below code into stats.py

```
def mean(numbers):
    """
    This function returns the mean of the given list of numbers.
    The mean is calculated as the sum of all numbers divided by the count of numbers.
    """
    # Calculate the mean by summing all the numbers and dividing by the length of the list.
    # 'sum(numbers)' computes the total of all numbers in the list.
    # 'len(numbers)' gives the count of numbers in the list.
    # The mean (or average) is the total sum divided by the number of elements.
    return sum(numbers) / len(numbers)  # Return the mean value.
def median(numbers):
    """
    This function returns the median of the given list of numbers.
    The median is the middle value when the numbers are sorted.
    If there is an even number of observations, it returns the average of the two middle numbers.
    """
    # Sort the list of numbers in ascending order.
    # Sorting is necessary to find the median, as the median depends on the order of values.
    numbers.sort()
    # Check if the number of elements in the list is even.
    # len(numbers) % 2 == 0 evaluates to True if the list has an even number of elements.
    if len(numbers) % 2 == 0:
        # If the list has an even number of elements, find the two middle numbers.
        # 'len(numbers) // 2' computes the index of the second middle element in a zero-indexed list.
        # 'len(numbers) // 2 - 1' computes the index of the first middle element.
        median1 = numbers[len(numbers) // 2]  # The higher index of the two middle values.
        median2 = numbers[len(numbers) // 2 - 1]  # The lower index of the two middle values.

        # Calculate the median by taking the average of the two middle numbers.
        # This is done by adding the two middle values and dividing by 2.
        mymedian = (median1 + median2) / 2  # Average of the two middle values.
    else:
        # If the list has an odd number of elements, return the middle number.
        # 'len(numbers) // 2' computes the index of the middle element.
        mymedian = numbers[len(numbers) // 2]  # The middle value for lists with an odd number of elements.
    # Return the calculated median value.
    return mymedian
```

You should see a screen like this now.



```
def mean(numbers):
    """
    This function returns the mean of the given list of numbers
    """
    return sum(numbers)/len(numbers)


def median(numbers):
    """
    This function returns median of the given list of numbers
    """
    numbers.sort()

    if len(numbers) % 2 == 0:
        median1 = numbers[len(numbers) // 2]
        median2 = numbers[len(numbers) // 2 - 1]
        mymedian = (median1 + median2) / 2
    else:
        mymedian = numbers[len(numbers) // 2]
    return mymedian
```

Save the file **stats.py**

Create init.py

- Create the file `__init__.py`

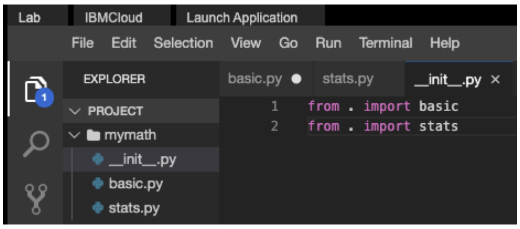
Copy and paste the below code into `__init__.py`

```
from . import basic
from . import stats
```

Save the file `__init__.py`

Now your directory structure should look like

```
mymath
mymath/__init__.py
mymath/basic.py
mymath/statistics.py
```

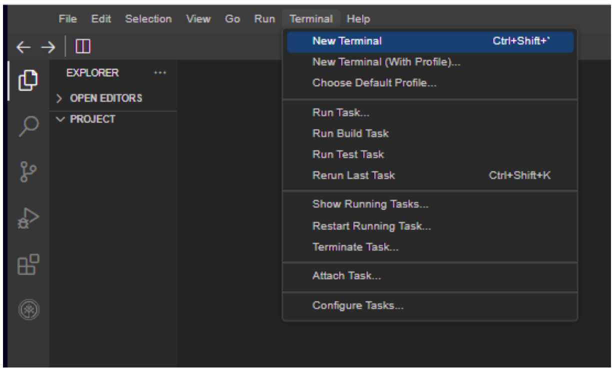


```
from . import basic
from . import stats
```

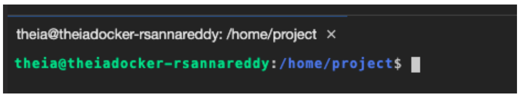
You are done creating a package

Verify the package

- On the window to the right, click on the **Terminal** menu and select **New Terminal** option, as shown in the image below.

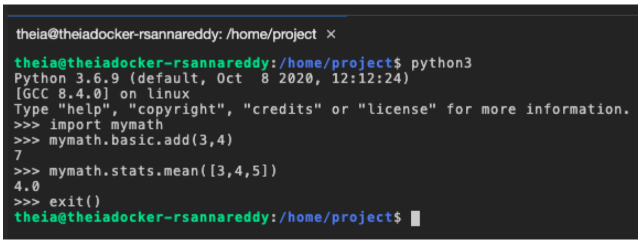


- You will see a terminal open up on the bottom of the screen like the one in the image below.



```
theia@theiadocker-rsannareddy:/home/project$
```

- At the terminal type **python3** to invoke python interpreter.
- Once the python interpreter is loaded.
- At the python prompt type **import mymath**
- If the above command runs without errors, it is an indication that the mymath package is successfully loaded.
- At the python prompt type **mymath.basic.add(3,4)**
- You should see an output *7* on the screen.
- At the python prompt type **mymath.stats.mean([3,4,5])**
- You should see an output *4.0* on the screen.
- Type **exit()** to quit python interpreter.



```
theia@theiadocker-rsannareddy:/home/project$ python3
Python 3.6.9 (default, Oct  8 2020, 12:12:24)
[GCC 8.4.0] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import mymath
>>> mymath.basic.add(3,4)
7
>>> mymath.stats.mean([3,4,5])
4.0
>>> exit()
theia@theiadocker-rsannareddy:/home/project$
```

Practice Exercise

Create a new module named geometry and add to the mymath package.

- Create a module name geometry
- Add a function named `area_of_rectangle` that takes length and breadth as input and returns the area of a rectangle.
- Add a function named `area_of_circle` that takes radius as input and returns the area of a circle.
- Modify the `__init__.py` to include this module.
- Import and test the function `area_of_circle` from python terminal.

Authors

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