

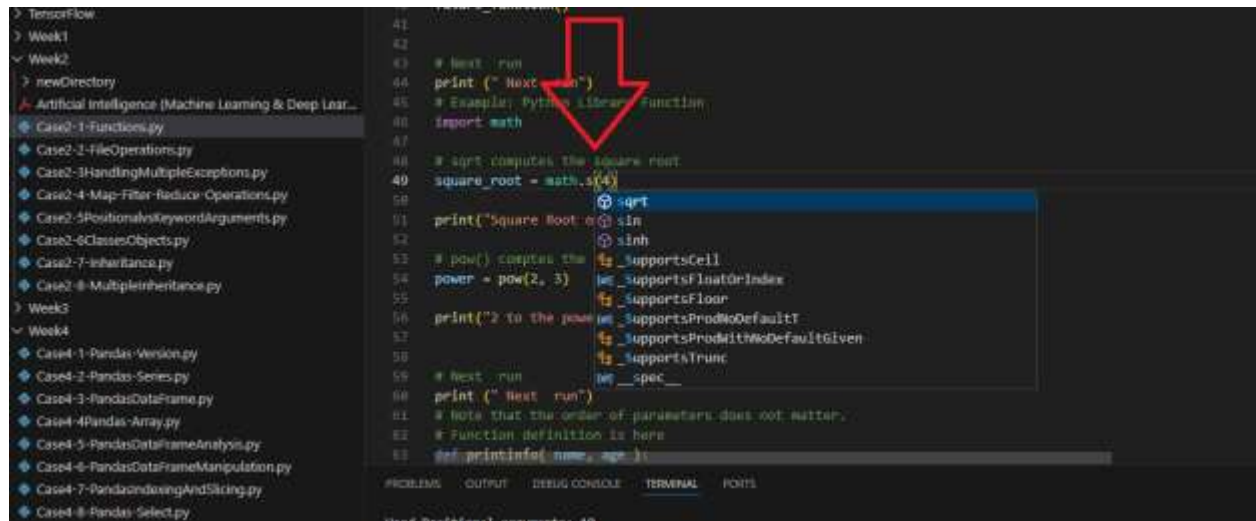
# How to Think, Research and Develop – Few Tips

Kindly note, spoon feeding does not work in software development (especially in Artificial Intelligence- Machine Learning), because **complexity, fast pace evolution and research oriented nature of content**. So, how you think, plan, solve, for development matters a lot.

## Tips:

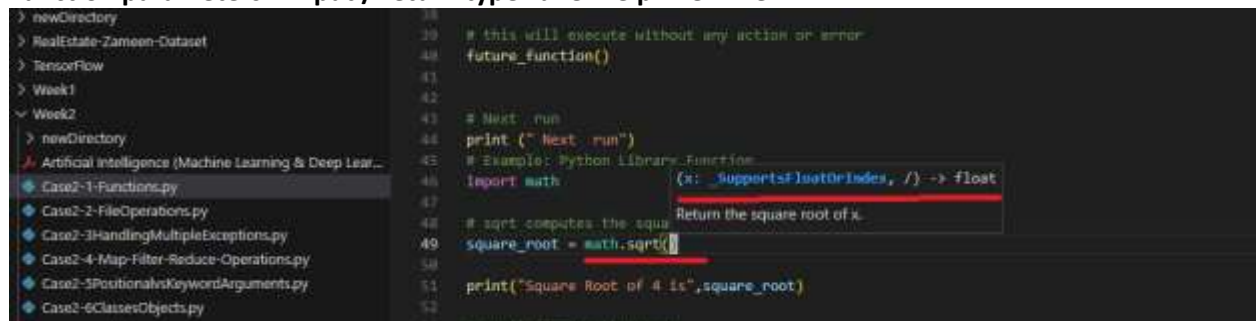
- **First level**, Read – software development editor (our case: Visual Studio Code- VSCode, help – IntelliSense).

Function – IntelliSense View as:



```
41
42
43 # Next : run
44 print (" Next : run")
45 # Example: Python library function
46 import math
47
48 # sqrt computes the square root
49 square_root = math.sqrt(4)
50
51 print("Square Root of 4 is", square_root)
52
53 # pow() computes the power of a number
54 power = pow(2, 3)
55
56 print("2 to the power of 3 is", power)
57
58 # Note that the order of parameters does not matter.
59 # Function definition is here
60 def printinfo(name, age):
61     print("Name: ", name, "Age: ", age)
```

Function parameters – input / return type- brief help line – view:

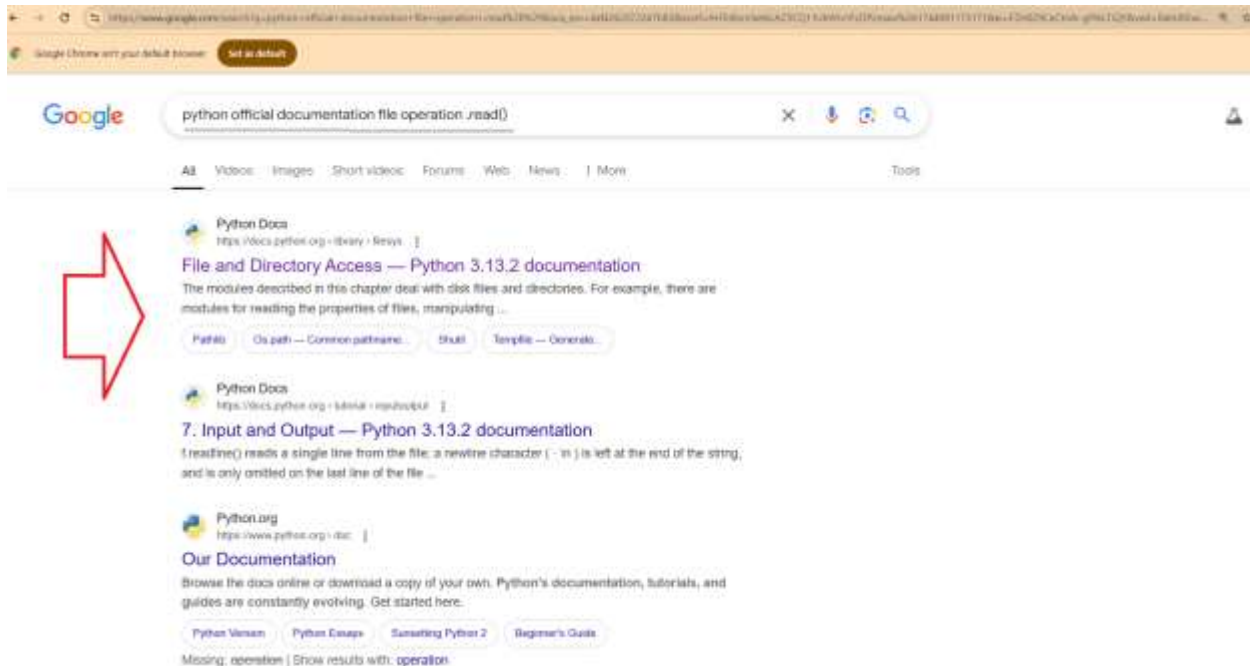


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43 # Next : run
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45 # Example: Python library function
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48 # sqrt computes the square root of x
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51 print("Square Root of 4 is", square_root)
52
```

Explicitly, give time to explore and study, this aspect. Important, very important.

- **Second Level:** Get Google to land page on **official documentation**, some pattern for search from yesterday class.  
Google  
"python official documentation file operation .read()"  
"python official documentation map"  
"python official documentation reduce"

See view as:



Note results from official python, web site.

Such documentation, is detail oriented , a lot of theory, have detail for all function details, all input parameters, all output parameter. Reading help, is beneficial, when you need very , detail orientation.

Note links from official web site of python as below.

<https://docs.python.org>

Very important.

**Sometimes, it is not possible read all information, so you can skim read, the content.**

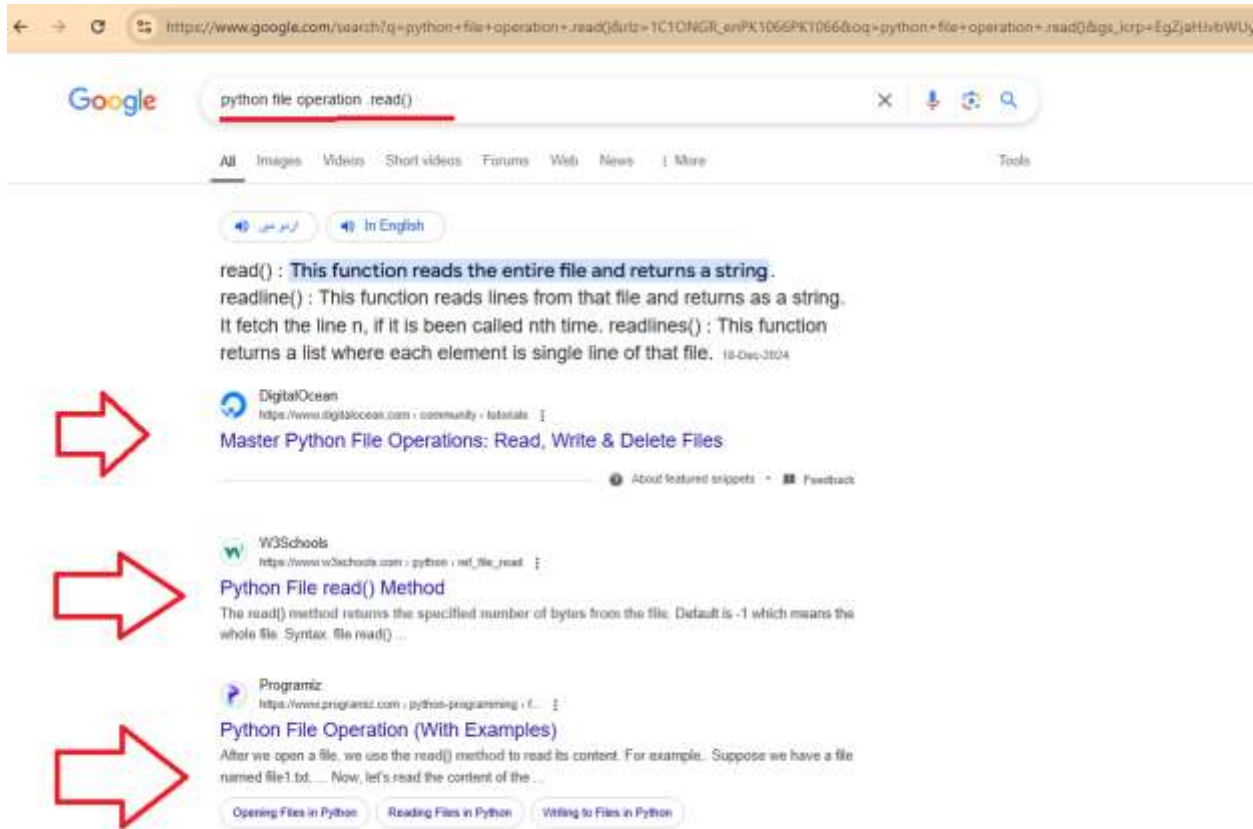
- **Third Level:** Get Google to land page on third party content, blog, tutorial and , some pattern for search from yesterday class.

"python file operation .read()"

"python map"

"python reduce"

Such links and its material, is good for reading to create a foundation for a concept. **This type of information, is ideal for fast, medium size, medium complexity content reading.** It is not official python documentation, so there is chance of – miss-guided information from third party. Or the information is obsolete, mean old content.



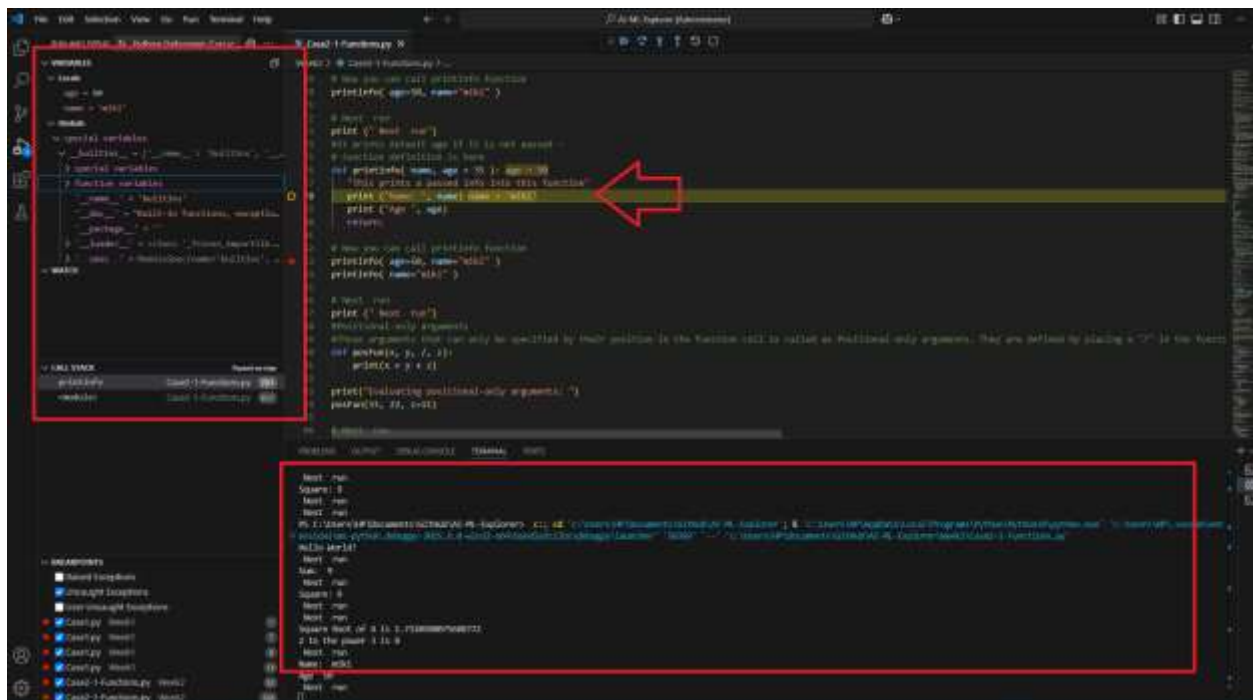
**Forth Level:** Putting the IDE – Code editor, debugger in action. DEBUGGING, is ideal for understanding, how code statements behave. What values of different parameters, objects – as your program goes by – line by line, statement by statement. You should be able to trace and debug, any complexity of code with ease.

See below, the debugging view of program, you should be able to see:

- ✓ All local variables
- ✓ All global variables
- ✓ All debug trace print command output
- ✓ All debug watches.
- ✓ And a lot more

You should be able to put “BREAK POINT in code in any code statement.

You should be able to “Step Over” “Step Into”, “Step out”, “full run” in IDE debug session, as per your debugging requirements. DEBUGGING, is very important.



Kindly recommend, suggest and provide feedback.

Thanks.

Shahzad