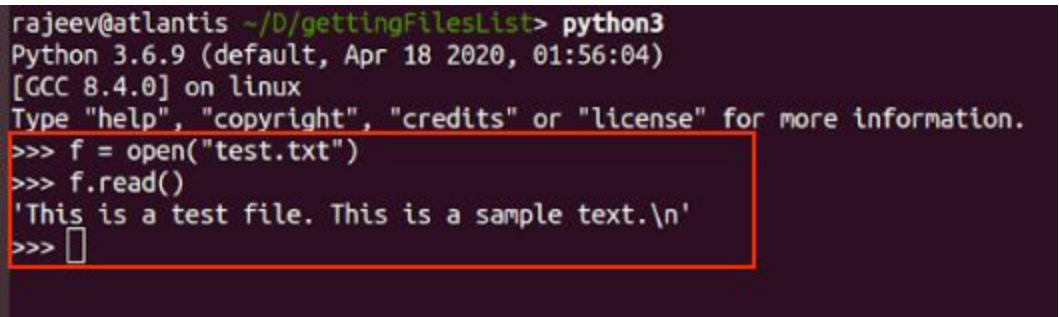
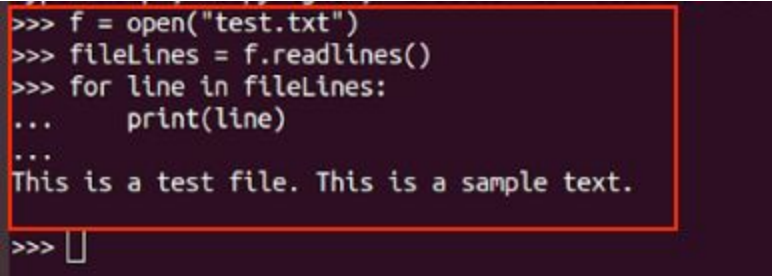
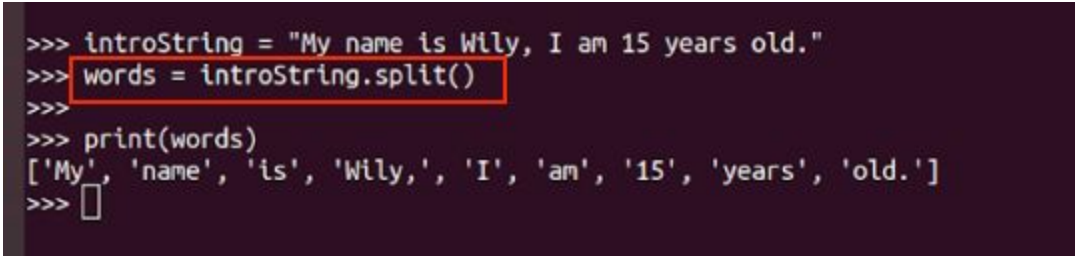


Topic	Functions	
<b>Class Description</b>	Student learns how to use pre-defined functions in python. Student also learn how to write their own functions. Student writes a function which takes a filename from the user and outputs the number of words in the file.	
<b>Class</b>	SUP-ADV-C98	
<b>Class time</b>	45 mins	
<b>Goal</b>	<ul style="list-style-type: none"> <li>• Write a custom defined function in Python</li> <li>• Write a program which takes file path from the user and prints the number of words in the file</li> </ul>	
<b>Resources Required</b>	<ul style="list-style-type: none"> <li>• Teacher Resources <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> </ul> </li> <li>• Student Resources <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> </ul> </li> </ul>	
<b>Class structure</b>	<b>Warm Up</b> <b>Teacher-led Activity</b> <b>Student-led Activity</b> <b>Wrap up</b>	<b>15 min</b> <b>15 min</b> <b>5 min</b>
Class Steps	Teacher Action	Student Action
<b>Step 1: Warm Up (15 min)</b>	Hello <student name> Last class, we were introduced to this new and powerful general purpose language called Python. Do you remember what we learned?	ESR: We learned the python syntax to create variables, conditional programming , writing loops etc.
	Great! We also wrote a program which takes input from the user and tells us the number of words in the	functions are blocks of code which can be invoked inside the main program. functions

	<p>message input by the user.</p> <p>This class, we will be learning about functions in python. We will learn about some of the functions which are pre-defined in python. We will also learn about how to write custom functions?</p> <p>Can you remember and connect with functions which we used in javascript? What are functions?</p>	can take some argument and use them to do some specific task.
	Have we used functions in python so far?	ESR: Yes! input() print()
	<p>print() is a predefined function in python. We will learn more about the other predefined functions in python. We will also learn how we can write our own function. Let's get started.</p>	-
<b>Teacher Initiates Screen Share</b>		
<b>Step 2: Teacher-led Activity (15 min)</b>	<p>You have already used two important pre-defined functions in python - print() and input().</p> <p>Let's learn a few more pre-defined functions which we will be using in our program.</p>	
	<p>One of the pre-defined functions in python is called open().</p> <p>open() function can be used to open</p>	<p>Student looks at the documentation for open.</p> <p>Student Activity 1</p>

	<p>any file in read, write or append mode. The function returns a file object which we can read in our program.</p> <p>Let's quickly look at the reference document for open() function in python.</p>	
	<p>Let's try to use open() function to read a file in our current folder.</p> <ol style="list-style-type: none"> <li>1. Teacher creates a file called "test.txt"</li> <li>2. Teacher opens python console Teacher uses <code>f = open("test.txt")</code> to store the file in 'f' variable.</li> <li>3. Teacher uses <code>f.read()</code> to read the file and then prints it on the console.</li> </ol> <p>Note:</p> <ul style="list-style-type: none"> <li>- By default a file opens in read mode.</li> </ul> <p>We could have also used <code>open("test.txt",'r')</code> to open the file explicitly in the read mode.</p> <ul style="list-style-type: none"> <li>- file is an object in python which has several functions defined on them.</li> </ul> <p><code>read()</code> is a function defined on files.</p> <ul style="list-style-type: none"> <li>- <code>"\n"</code> represents the Enter or return key</li> </ul>	<p>Student learns how to use the open() function</p>
 <pre> rajeev@atlantis ~/D/gettingFilesList&gt; python3 Python 3.6.9 (default, Apr 18 2020, 01:56:04) [GCC 8.4.0] on linux Type "help", "copyright", "credits" or "license" for more information. &gt;&gt;&gt; f = open("test.txt") &gt;&gt;&gt; f.read() &gt;&gt;&gt; 'This is a test file. This is a sample text.\n' &gt;&gt;&gt; </pre>		

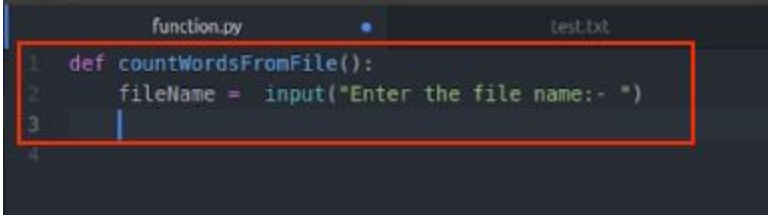
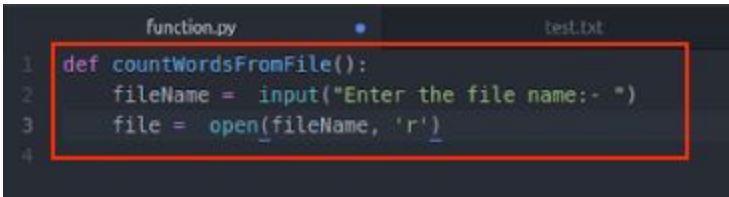
	<p>You can also print a file line by line in python.</p> <p>Teacher writes code to print the file line by line.</p> <pre>f = open("test.txt") fileLines = f.readlines()</pre> <p>readlines() defined on file object splits the lines in the file and stores it line by line as a list. We can print these lines by calling a for loop on the list.</p> <pre>for line in fileLines:     print(line)</pre>	<p>Student understands how to use functions defined on file object to read the file line by line</p>
 <pre>&gt;&gt;&gt; f = open("test.txt") &gt;&gt;&gt; fileLines = f.readlines() &gt;&gt;&gt; for line in fileLines: ...     print(line) ... This is a test file. This is a sample text. &gt;&gt;&gt; █</pre>		
	<p>There are several other functions defined on files which you can explore on your own by referring to the documentation</p>	<p>Student can look at the documentation for functions defined on the file</p>
	<p>We saw file is an object in python. In fact, everything in python is an object. For example - a variable which holds a string is also an object in python. Let's look at it.</p> <p>Let's store a string inside a variable.</p>	<p>ESR: It will split the text into words.</p>

	<p>introString = "My name is Wily, I am 15 years old."</p> <p>introString is a string object on which several functions are defined. One of the functions defined on introString is called split().</p> <p>Can you guess what split() does?</p>	
	<p>Yes! split() splits the given string by their whitespaces, gives each individual word and stores them in a list.</p> <p>We can write:</p> <pre>words = introString.split() print( words )</pre>	<p>Student sees the output of split() used over a string</p>
 <pre>&gt;&gt;&gt; introString = "My name is Wily, I am 15 years old." &gt;&gt;&gt; words = introString.split() &gt;&gt;&gt; &gt;&gt;&gt; print(words) ['My', 'name', 'is', 'Wily,', 'I', 'am', '15', 'years', 'old.'] &gt;&gt;&gt; □</pre>		
	<p>split() splits using whitespace by default.</p> <p>You can also specify which separator to use to split the items. For example, we could have used comma (,) as the separator:</p> <pre>phrases = introString.split(",")</pre>	<p>Student learns how to use split() with a custom separator</p>

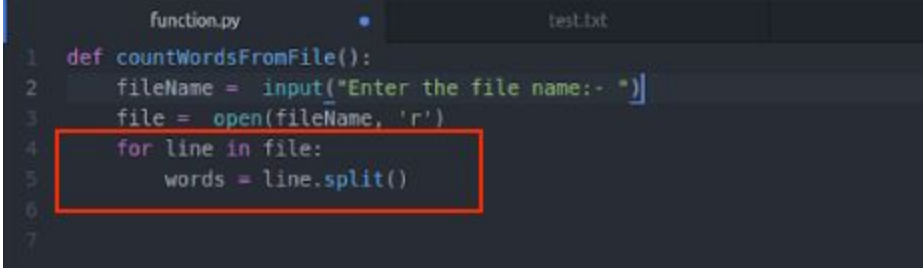
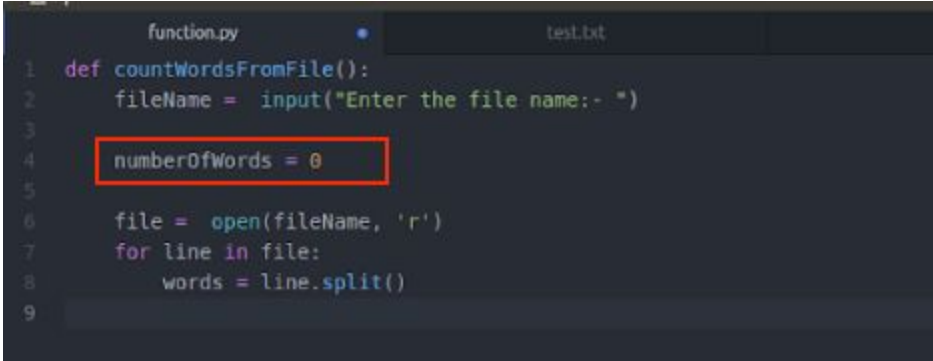
```
>>> introString = "My name is Wily, I am 15 years old."
>>> words = introString.split(",")
>>> print(words)
['My name is Wily', ' I am 15 years old.']
>>>
```

	<p>Again, there are several functions defined on string object in Python. You can look over them in the documentation for python</p>	<p>Student sees the documentation for string functions in python</p>
	<p>Now, we have used several functions which are pre-defined in python.</p> <p>Let's learn how to define a custom function in python. You already know how to define a custom function in javascript. It is similar in python except for the change in syntax.</p> <p>To define a function in python, we use the syntax:</p> <p><b>def functionName():</b>              &lt;block of code for the function&gt;</p> <p>You can also pass arguments to your function inside the brackets - similar to how we did in javascript.</p> <p><b>def functionName(variable):</b>              &lt;block of code for the function&gt;</p>	<p>Student understands the syntax for defining function in python</p>
	<p>Let's quickly try to define a function greet() which takes name as an input and greets the person by name.</p> <p>Teacher writes code to create the function greet() which takes name as</p>	<p>Student helps in writing the function greet()</p>

	an input and prints a greeting with the person's name	
<pre>&gt;&gt;&gt; def greet(name): ...     print("Hello, " + name + ". How are you?") ... &gt;&gt;&gt; greet("Rahul") Hello, Rahul. How are you? &gt;&gt;&gt; </pre>		
	<p>In the last class we wrote code to count the number of words and characters from a string input by the user.</p> <p>Can you write a program which takes the path of a file from the user and outputs the number of words used in the file?</p> <p>Where could such a function be useful?</p>	<p>ESR: yes!</p> <p>There are a lot of places where there is a restriction on the number of words to be used - for example while writing essays....we can use the program to count the number of words used.</p>
	Let's get started.	
<b>Teacher Stops Screen Share</b>		
	Now it's your turn. Please share your screen with me.	
<ul style="list-style-type: none"> <li>• <b>Ask Student to press ESC key to come back to panel</b></li> <li>• <b>Guide Student to start Screen Share</b></li> <li>• <b>Teacher gets into Fullscreen</b></li> </ul>		
<b>Step 3: Student-Led Activity (5 min)</b>	<p>Great! Let's get started.</p> <p>Let's start by creating a countWordsFromFile.py file.</p> <p>Inside the file, let's create a custom function countWordsFromFile() which takes the file path as input.</p>	<p>ESR: We can define function using def countWordsFromFile()</p> <p>&lt;Student write code to define the function&gt;</p>

	
	<p>We can open the file using open() in read mode.</p> <p>Student writes code to open the file name</p>
	
	<p>We can read all the lines in our file and store it in a list.</p> <p>For each line in the file, let's split the line by whitespace to store all the words in the line as a list.</p> <p>Student writes code to read all the lines in a file.</p> <p>Student uses a for loop to run for each line in the file. For each line in the file, student uses split() to split the line by whitespace and store the words in the words list</p>



		
	<p>Great! Now how do we count the number of words in each line and in the file overall?</p>	<p>ESR: We use a numberOfWords variable which starts from 0 We count the number of words in the words list for each file and keep adding to the numberOfWords</p>
		
	<p>There is a predefined function len() in python which will give you the length of the list. We can use it to find the length of words listed for each line.</p>	<p>Student declares numberOfWords = 0 Student uses numberOfWords = numberOfWords + len(words) to increment the value of count by the number of words in each line of the file. Student returns the count from the function</p>

		
	<p>Now let's print the number of words and call the function</p>	<p>Student writes the print statement to print the number of words and calls the countWordsFromFile function</p>
		
	<p>Let's run the code on the terminal . Open the terminal and go to the folder which contains your function.py file. run the command <b>python3 function.py</b></p>	<p>Student opens the terminal and goes to the folder which contains the function.py file and then run the command <b>python3 function.py</b></p>

```
~/D/gettingFilesList> python3 function.py
Enter the file name:- test.txt
Number of words:
10
```

### Teacher Guides Student to Stop Screen Share

#### Step 4: Wrap-Up

Amazing! I would encourage you to explore more about file objects. You can also use them to write to your files from the program!

Do you think we can also learn how to move our files from one location to another programmatically!

ESR:  
varied

Of course we can! We can do anything on our system using python. In fact in the coming few classes, we will be creating a little program using which you will be able to back up your files in any folder automatically to a remote cloud!

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**Teacher Clicks**

**✕ End Class**

<b>Additional Activities</b>	<p>Encourage the student to write reflection notes in their reflection journal using markdown.</p> <p>Use these as guiding questions:</p> <ul style="list-style-type: none"> <li>• What happened today? <ul style="list-style-type: none"> <li>◦ Describe what happened</li> <li>◦ Code I wrote</li> </ul> </li> <li>• How did I feel after the class?</li> <li>• What have I learned about programming and developing games?</li> <li>• What aspects of the class helped me?</li> <li>• What did I find difficult?</li> </ul>	<p>The student uses the markdown editor to write her/his reflection as a reflection journal.</p>
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Activity	Activity Name	Links
Teacher Activity 1	Reading and writing files doc	<a href="https://www.geeksforgeeks.org/reading-writing-text-files-python/">https://www.geeksforgeeks.org/reading-writing-text-files-python/</a>
Teacher Activity 2	Split method doc	<a href="https://www.geeksforgeeks.org/python-string-split/">https://www.geeksforgeeks.org/python-string-split/</a>
Teacher Activity 3	reference code	<a href="https://github.com/whitehatjr/Functions">https://github.com/whitehatjr/Functions</a>
Student Activity 1	Reading and writing files doc	<a href="https://www.geeksforgeeks.org/reading-writing-text-files-python/">https://www.geeksforgeeks.org/reading-writing-text-files-python/</a>
Student Activity 2	Split method doc	<a href="https://www.geeksforgeeks.org/python-string-split/">https://www.geeksforgeeks.org/python-string-split/</a>