

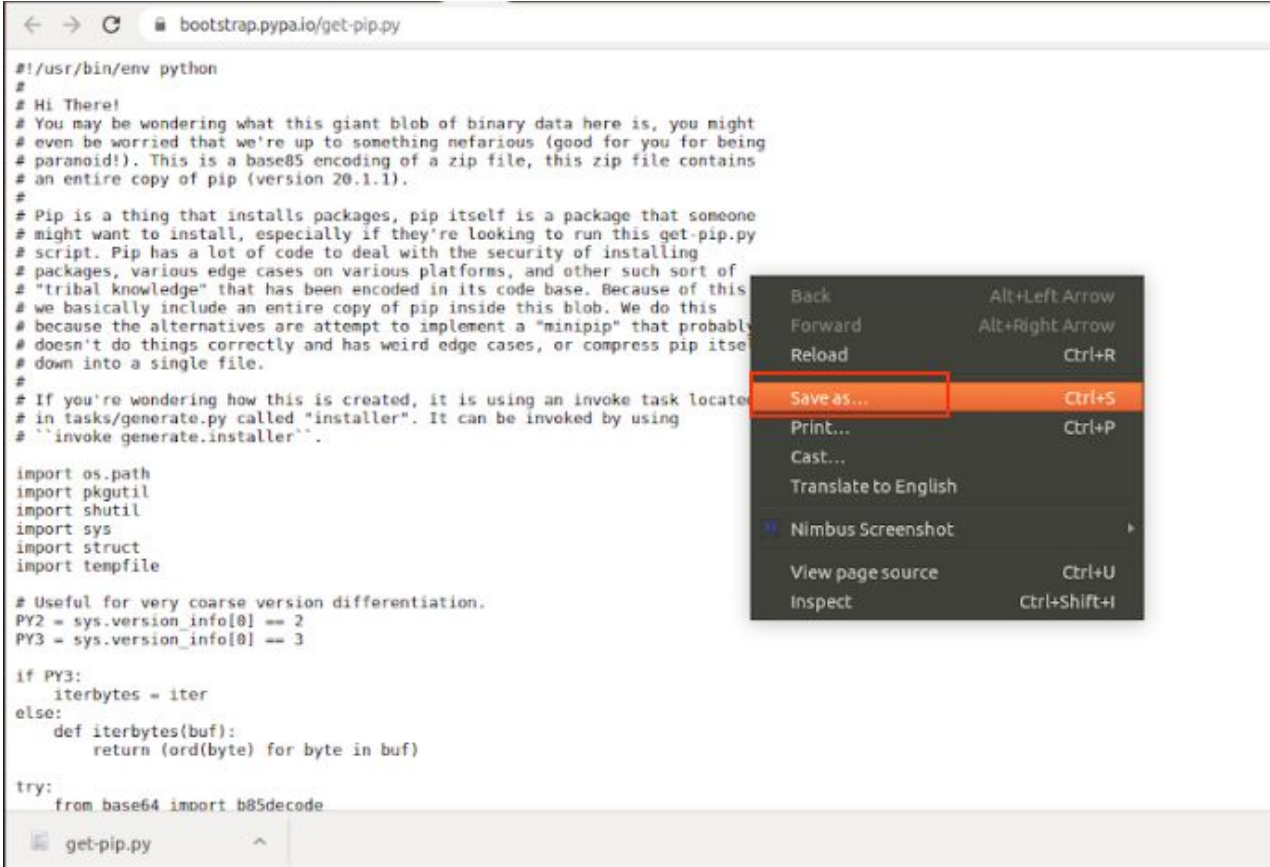

Topic	Package Manager in Python (pip)	
Class Description	<p>Student learns about package installer in python3 - pip. Student uses howdoi python package to ask questions about python.</p> <p>Student learns about functions, dictionaries, classes and objects by asking questions using howdoi</p>	
Class	C100	
Class time	45 mins	
Goal	<ul style="list-style-type: none"> • Install Python Package Manager - Pip • Install and use howdoi package manager using pip • Use howdoi to ask questions to python and learn more about how functions, dictionaries, classes and objects are used in python 	
Resources Required	<ul style="list-style-type: none"> • Teacher Resources <ul style="list-style-type: none"> ○ Visual Code studio ○ Laptop with internet connectivity ○ Earphones with mic ○ Notebook and pen • Student Resources <ul style="list-style-type: none"> ○ Visual Code studio ○ Laptop with internet connectivity ○ Earphones with mic ○ Notebook and pen 	
Class structure	Warm Up Teacher-led Activity Student-led Activity Wrap up	5 mins 15 min 15 min 5 min
CONTEXT <ul style="list-style-type: none"> • Talk about package managers for languages and operating systems 		

Class Steps	Teacher Action	Student Action
Step 1: Warm Up (5 mins)	<p>Hello <student name></p> <p>Today, we are going to do something very very interesting and I'm sure you will have a lot of fun!</p> <p>Before that, let's talk about what we learned in the last class.</p>	<p>ESR:</p> <p>We learned about packages/modules in python.</p> <p>We used os and shutil modules in python to create a backup for our files.</p>
	<p>Awesome!</p> <p>Python comes with certain packages/modules pre-installed.</p> <p>os and shutil were such packages which comes pre-installed when you install python.</p> <p>There are many more interesting and exciting packages in python which we can install and use.</p> <p>To install packages in python we use a package manager. Do you remember using package managers before?</p>	<p>ESR:</p> <p>Yes, we have used package managers - npm, yarn - for installing react native libraries in our project earlier.</p>
	<p>Python uses a package manager called "pip"</p> <p>Pip stands for "Pip installs packages".</p> <p>We will be learning how to use pip to install python packages.</p> <p>We will also explore some interesting python packages!</p>	-
Teacher Initiates Screen Share		

CHALLENGE

- Install pip - python package manager
- Use and explore howdoi package in python

Step 2: Teacher-led Activity (15 min)	Let's install pip package in our system.	-
	<p>To install pip on windows use the following commands</p> <ul style="list-style-type: none"> -open the link from Teacher Activity 1 - Save(Ctrl+s or Cmd + S) file to download get-pip.py to a folder on your computer. -Open a command prompt / terminal and navigate to the folder containing get-pip.py. -Run the following command: python3 get-pip.py <p><Teacher installs pip on their system and helps student install it on their system></p>	<p><Student installs pip on their system></p> <p>Teacher guides the student to install pip on their system</p>

		
	<p>To check if pip is correctly installed on your system. Run</p> <p>pip3 --version</p> <p>on your command prompt / terminal</p>	<p>Student checks installation for pip3 on their system</p>

```

~> cd Downloads/
~/Downloads> python3 get-pip.py
Keyring is skipped due to an exception: not all arguments converted during string formatting
Defaulting to user installation because normal site-packages is not writeable
Collecting pip
  Downloading pip-20.1.1-py2.py3-none-any.whl (1.5 MB)
    | 1.5 MB 228 kB/s
Installing collected packages: pip
Successfully installed pip-20.1.1
~/Downloads> pip3 --version
pip 20.1.1 from /home/rajeev/.local/lib/python3.6/site-packages/pip (python 3.6)
~/Downloads>

```

Let's install an important and a very popular python package called howdoi.

We need to simply run
pip3 install howdoi

The message displayed will tell us if howdoi was installed properly

Student installs howdoi on their system.

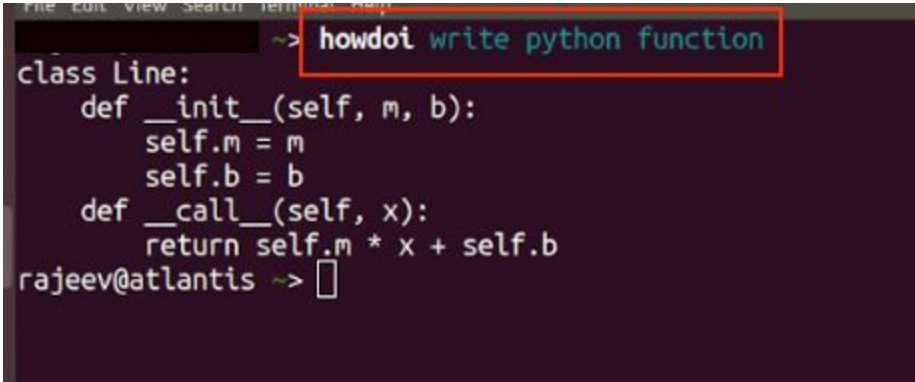
```

~/Downloads> pip3 install howdoi
Keyring is skipped due to an exception: not all arguments converted during string formatting
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: howdoi in /home/rajeev/.local/lib/python3.6/site-packages (1.2.1)
Requirement already satisfied: appdirs in /home/rajeev/.local/lib/python3.6/site-packages (from howdoi) (1.4.4)
Requirement already satisfied: requests in /home/rajeev/.local/lib/python3.6/site-packages (from howdoi) (2.23.0)
Requirement already satisfied: cachelib in /home/rajeev/.local/lib/python3.6/site-packages (from howdoi) (0.1)
Requirement already satisfied: pyquery in /home/rajeev/.local/lib/python3.6/site-packages (from howdoi) (1.4.1)
Requirement already satisfied: pygments in /home/rajeev/.local/lib/python3.6/site-packages (from howdoi) (2.6.1)
Requirement already satisfied: idna<3,>=2.5 in /home/rajeev/.local/lib/python3.6/site-packages (from requests->howdoi) (2.9)
Requirement already satisfied: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in /home/rajeev/.local/lib/python3.6/site-packages (from requests->howdoi) (1.25.9)
Requirement already satisfied: certifi>=2017.4.17 in /home/rajeev/.local/lib/python3.6/site-packages (from requests->howdoi) (2020.4.5.1)
Requirement already satisfied: chardet<4,>=3.0.2 in /home/rajeev/.local/lib/python3.6/site-packages (from requests->howdoi) (3.0.4)

```

howdoi is a very interesting tool for developers.
howdoi is a type of google for developers BUT you get only one

Student asks questions on how to use howdoi and cases they will be helpful

	<p>"best" result.</p> <p>The result is not always perfect. But it is very helpful and quick tool to learn to do anything related to programming.</p>	
	<p>Let's ask some python related questions to howdoi - like</p> <p>howdoi write functions in python</p> <p>Teacher asks the student to explain the output.</p>	<p>Student explains the response of howdoi to the teacher</p>
 <pre> ~> howdoi write python function class Line: def __init__(self, m, b): self.m = m self.b = b def __call__(self, x): return self.m * x + self.b rajeev@atlantis ~> </pre>		
	<p>Let's ask a few more questions:</p> <p>howdoi declare variables in python</p> <p>Ask the student to explore more of howdoi tool and guide them towards exploring more of python using howdoi tool</p>	<p>Student experiments with using howdoi tool to learn more about python</p>


```

~> howdoi declare variables in python
foo = 'bar' # the name 'foo' is now a name for the string 'bar'
foo = 2 * 3 # the name 'foo' stops being a name for the string 'bar',
# and starts being a name for the integer 6, resulting from the multiplication
rajeev@atlantis ~>

```

	<p>These were some of the topics that we have already explored in python.</p> <p>Now let's try to see if we can learn something more. Do you remember OOPs ?</p>	<p>Yes. Object Oriented Programming.</p> <p>It is a way of structuring code where programmers imagine everything as an object.</p> <p>We design objects using class (as a blueprint) and create new objects using the class.</p>
	<p>Great!</p> <p>Python is also an Object Oriented Language. You can similarly structure code using OOPs style of coding. But obviously python has a different syntax than javascript in which we have written our code in the past.</p> <p>Let's see if we can ask howdoi how to write class in python.</p> <p>Teacher runs:</p> <p>howdoi write class in python</p> <p>Allow the student to look at the code and explain the output</p>	<p>Student looks at the output and tries to understand how to create class in python</p>

```
~> howdoi write class in python

class Student(object):
    def __init__(self, name, age, gender, level, grades=None):
        self.name = name
        self.age = age
        self.gender = gender
        self.level = level
        self.grades = grades or {}

    def setGrade(self, course, grade):
        self.grades[course] = grade

    def getGrade(self, course):
        return self.grades[course]

    def getGPA(self):
        return sum(self.grades.values())/len(self.grades)

# Define some students
john = Student("John", 12, "male", 6, {"math":3.3})
jane = Student("Jane", 12, "female", 6, {"math":3.5})

# Now we can get to the grades easily
print(john.getGPA())
print(jane.getGPA())
rajeev@atlantis ~> █
```


	<p>A class is defined in python with the keyword: class Student: or class Student(object):</p> <p>Here Student is any class name you want to create.</p> <p>Indentation is very important while we are creating the class.</p> <p>__init__ is a pre-defined function in python and it is very similar to our constructor in javascript. It is called whenever we create an object using the class.</p> <p>It takes some arguments and creates an object using the arguments.</p> <p>You can see that __init__ function is taking several arguments.</p> <p>self -> similar to this keyword in javascript. Not necessary to pass name -> string age -> number gender -> string level -> number grades -> this is a dictionary in python. similar to json object in javascript.</p> <p>Do you notice the similarities of python language with javascript?</p>	<p>Student tries to decode how classes are created in python</p>
--	--	--

<pre> class Student(object): def __init__(self, name, age, gender, level, grades=None): self.name = name self.age = age self.gender = gender self.level = level self.grades = grades or {} </pre>		
	<p>Similarly, there are other functions in the student class which are used to set and get grades GPA of the student.</p> <p>These are normal functions which will automatically get defined on the objects we create using the class. Notice the use of "self".</p> <p>"self" refers to the object created using the class.</p>	<p>Student tries to decode each function in the class. Student also tries to understand the use of "self" in the code</p>
<pre> def setGrade(self, course, grade): self.grades[course] = grade def getGrade(self, course): return self.grades[course] def getGPA(self): return sum(self.grades.values())/len(self.grades) </pre>		
	<p>How did we create a new object in javascript using a defined class?</p>	<p>ESR: We used new ClassName() We pass the arguments inside the brackets.</p>

<pre># Define some students john = Student("John", 12, "male", 6, {"math":3.3}) jane = Student("Jane", 12, "female", 6, {"math":3.5})</pre>		
	<p>Yes! Python doesn't need the keyword new.</p> <p>You can create new objects using the class by using class name.</p> <p>Teacher shows how class is created in the example.</p>	<p>Student learns how to create an object.</p>
<pre># Define some students john = Student("John", 12, "male", 6, {"math":3.3}) jane = Student("Jane", 12, "female", 6, {"math":3.5})</pre>		
	<p>This is how we create class and objects in python.</p> <p>Do you notice the similarities with Javascript?</p>	<p>Student talks about the similarities with javascript.</p> <p>Student also asks questions about class and objects in javascript.</p>
	<p>Alright. Do you think you can create your own class and object in python?</p>	<p>ESR: I can try</p>
	<p>Ok...</p> <ol style="list-style-type: none"> 1. Pick up any object... 2. Create a template Class for it... 3. Assign properties for the class in the init function 4. Write functions to define what the object can do 5. Create a new object using the class and pass properties to it. 	-
Teacher Stops Screen Share		
	<p>Now it's your turn. Please share your</p>	

	screen with me.	
<ul style="list-style-type: none"> • Ask Student to press ESC key to come back to panel • Guide Student to start Screen Share • Teacher gets into Fullscreen 		
<p style="text-align: center;">ACTIVITY</p> <ul style="list-style-type: none"> • Ask questions to howdoi package to learn more about functions, classes, different data types etc. • Student writes code to create a class and create objects using the class in python. 		
Step 3: Student-Led Activity (15 min)	Guide the student to pick up any object for which they want to create a class. It can be a Bank Account, It can be a person, a car etc.	Student picks up any object for which they want to create a class
	Guide the student to create a class.	syntax:- class name_of_class: <Student writes code to create a class> class Car:
<pre>1 class Car(object): 2 """</pre>		
	What are the attributes which cars have?	ESR:- A car has attributes like "color", "company", "speed_limit". And methods like "change_gear", "start", "accelerate", "move" etc.

	<p>Now using constructor let's create object.</p> <p>Class functions that begins with double underscore (__) are called special functions as they have special meaning.</p> <p>One of these functions is the <code>__init__()</code> function. This special function gets called whenever a new object of that class is instantiated. This type of function is also called constructors in Object Oriented Programming (OOP). We normally use it to initialize all the variables.</p> <p>If you notice we have used a <code>self</code> word here. Do you know any word which is used for similar purpose? <code>self</code> works same like this in js. <code>self</code> represents the instance of the class. By using the "self" keyword we can access the attributes and methods of the class in python.</p>	<p>Student writes code</p> <p>code:-</p> <pre>def __init__(self, model, color, company, speed_limit): self.color = color self.company = company self.speed_limit = speed_limit self.model = model</pre>
<pre>def __init__(self, model, color, company, speed_limit): self.color = color self.company = company self.speed_limit = speed_limit self.model = model</pre>		

	<p>Now lets add some methods to our car.</p> <p>Method of an object are corresponding functions of that class.</p> <p>Guide the student to think about the different methods in the class.</p>	<p>Student writes code :</p> <p>code:-</p> <pre>def __init__(self, model, color, company, speed_limit): self.color = color self.company = company self.speed_limit = speed_limit self.model = model def start(self): print("started") def stop(self): print("stopped") def accelerate(self): print("accelarating...") "accelarator functionality here" def change_gear(self, gear_type): print("gear changed") " gear related functionality here"</pre>
--	--	---


```

5
6  def __init__(self, model, color, company, speed_limit):
7      self.color = color
8      self.company = company
9      self.speed_limit = speed_limit
10     self.model = model
11
12     def start(self):
13         print("started")
14
15     def stop(self):
16         print("stopped")
17
18     def accelerate(self):
19         print("accelarating...")
20         "accelarator functionality here"
21
22     def change_gear(self, gear_type):
23         print("gear changed")
24         " gear related functionality here"

```

Now we have our class ready .
so let's create a new object called
audi with it's attributes

we can access the elements by
audi.color

We can print them up if we want

code:-
audi = car("A6", "red",
"audi", 80)

Student prints the properties
of the object

```
>>> audi = Car("A6", "red", "audi", "80")
>>> audi.color
'red'
>>>
```

	We can also call other functions we defined on these objects.	Student calls other functions on the audi object
	Awesome...this is how we create classes and objects in python.	-
Teacher Guides Student to Stop Screen Share		
<p style="text-align: center;"><u>FEEDBACK</u></p> <ul style="list-style-type: none"> • Appreciate the student for their class • Get them to play around with different ideas, automations which they can build for their system using python 		
Step 4: Wrap-Up (5 min)	We have learned creating classes and objects using python today. We will be learning how to use them to create backup for our files on a remote cloud.	-

	Meanwhile, why don't you explore howdoi tool and see if you can learn how to do a remote backup using howdoi tool?	Student thinks about exploring howdoi tool to create backup on remote server.
<div>Teacher Clicks</div> <div>✕ End Class</div>		
Additional Activities	<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"> • What happened today? <ul style="list-style-type: none"> - Describe what happened - Code I wrote • How did I feel after the class? • What have I learned about programming and developing games? • What aspects of the class helped me? What did I find difficult? 	The student uses the markdown editor to write her/his reflection in a reflection journal.

Activity	Activity Name	Links
Teacher Activity 1	installing pip on windows	https://bootstrap.pypa.io/get-pip.py
Teacher Activity 2	Solution	https://github.com/whitehatjr/Python_class

Student Activity 1	installing pip on windows	https://bootstrap.pypa.io/get-pip.py
--------------------	---------------------------	---