UDACITY

Lesson 02b Notes

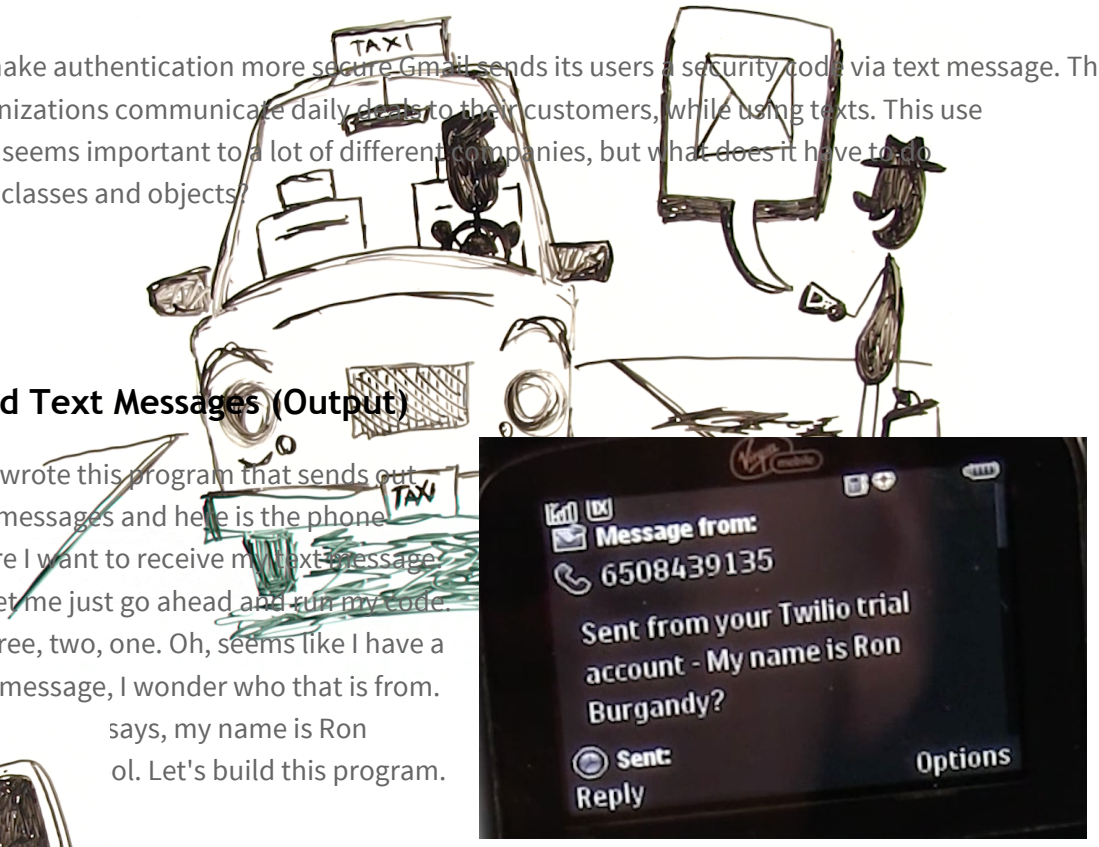
Course Map

So, we have seen one example of how we can use classes to design geometric shapes, let's look at another example of how classes can make things easier.

Send Text Messages (Story)

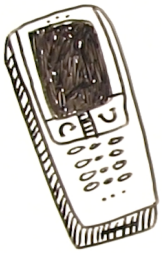
So we've all used our phones to send out text messages. But sometimes there is a need for code to send texts. Consider the following. Taxi companies send out text messages to their passengers informing them of the cab driver's location. Dating websites help potential couples communicate with each other while using texts, but without sharing phone numbers

To make authentication more secure Gmail sends its users a security code via text message. This the Gmail user can th
organizations communicate daily deals to their customers, while using texts. This use
case seems important to a lot of different companies, but what does it have to do
with classes and objects?



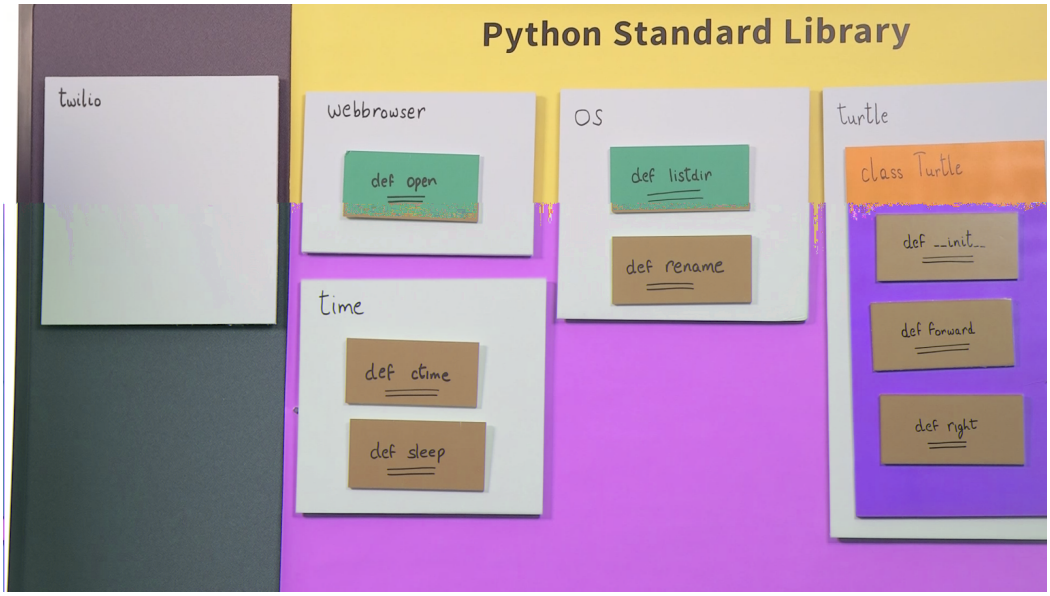
Send Text Messages (Output)

So, I wrote this program that sends out
text messages and here is the phone
where I want to receive my text message.
So, let me just go ahead and run my code.
In three, two, one. Oh, seems like I have a
new message, I wonder who that is from.
says, my name is Ron
ol. Let's build this program.



Introducing Twilio

Now our goal is to send a text message using code, and I know of a Python package that does exactly that. It's called twilio. And I am going to place twilio on the board.



Twilio does not come with the Python Standard Library, which is why I have kept it outside of the yellow background. Twilio is one of the thousands of external Python packages that are available for you to download and use, and there is a link in the instructor notes that points out some of the more popular external Python packages. For now what we are going to do, is being by downloading twilio.

Popular Python Packages - https://pypi.python.org/pypi

Download Twilio

Okay, so what we are going to do in this video is work together to get Twilio. Now, I don't know about you, but downloading and installing software from the Internet can sometimes be a very painful process. Although it's still a very important part of building cool apps. So, what we have done here is, we have provided some documentation in the instructor notes. And this documentation can guide you through the installation of Twilio.

By the way, after we created these documents, we shared them with a whole bunch of students and solicited feedback from those students. This way, we were able to improve the quality of these documents and now we feel really confident. That these

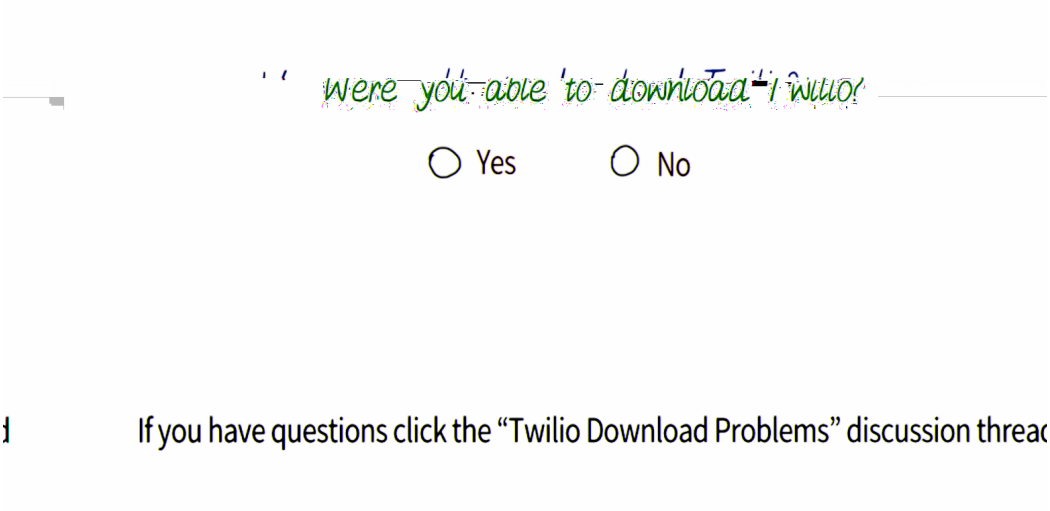
documents can help guide you through the entire installation process. If you still have questions about the installation process, however, feel free to ask us on the discussion forum. We are here to help. So, at this point, I recommend that you get these download instructions and then install Twilio on your own computer.

Links

- Install Twilio on Windows
- Install Twilio on a Mac

Twilio Download Feedback

Now, here's a question for you. Were you able to download Twilio successfully? If not, don't worry. We are here to help. Tell us about your experience. You can even ask us, or other students in the course, a question on the discussion forum.



Setting Up Our Code

Okay, let's begin writing code. Now, the first thing I've done is created a new file called send_text.py. And as you can see, this file is empty for now.

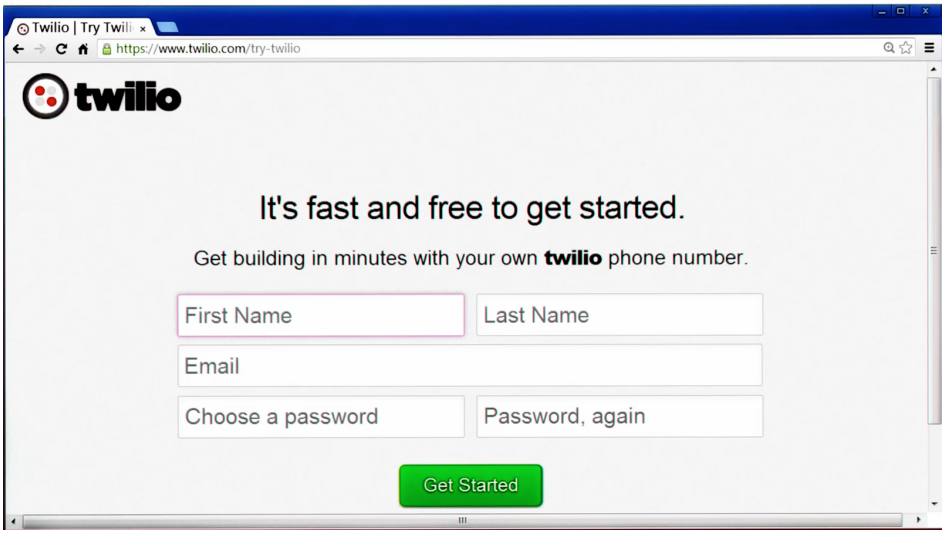
Then, if you go to Twilio's installation page, oh by the way, this link is also available on the instructor notes. If you scroll down on this page, you will notice that Twilio has provided some sample code that allows us to send text messages to our phone.

```
from twilio.rest import TwilioRestClient

# Your Account Sid and Auth Token from twilio.com/user/account
account_sid = "AC32a3c49700934481addd5ce1659f04d2"
auth_token  = ""
client = TwilioRestClient(account_sid, auth_token)

message = client.sms.messages.create(body="Jenny please?! I love you <3
    to="+14159352345",    # Replace with your phone number
    from_="+14158141829") # Replace with your Twilio number
print message.sid
```

Now, I just want to run and see if this code even works. If this program does work only then will I try and understand how it actually sends a text message to our phone. So, for now, all I'm going to do is copy this code and go back to my syntax program and paste that code.

Okay, so it seems that the code is importing Twilio. Although it is a little different than what we have seen thus far, there is this keyword here called from which we haven't seen before, I will return to this later. Okay, if you read the next two lines in the program they talk about account sid and authorization token. Now, these must be for Twilio to figure out who I am. Almost like my username and password. So, let's go to the Twilio website and figure out these two values.

Registering With Twilio

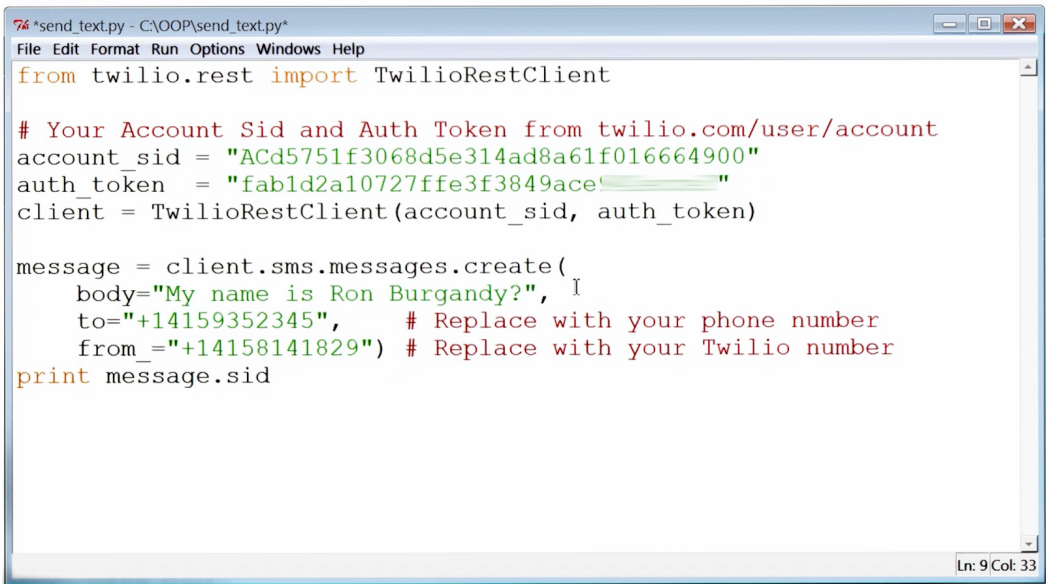


Okay, so here I am on the Twilio signup page. Oh, by the way, this link, its also available in the instructor notes. Here I will sign up for free. Twilio also wants my phone number, which I will provide. Now, I'm currently located in the United States. Make sure you select the country where you are located. Then Twilio sends me a verification code on the phone that I had previously registered, you will get one on your phone too. I will enter that code in this box here.

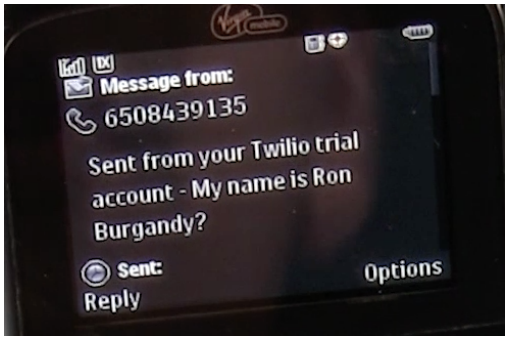
Okay, so they're giving me a phone number, I'm not quite sure I understand that just yet, but I will go ahead and continue. Alright, it seems like I can do a bunch of things here with my account, but I'm really looking for my authorization token. Where is that? Hm? Let me just go to my account. ha! Here they are. Here's the Account SID, and here in the Authorization Token. Now, I'm going to copy and paste both of these into my program.

Running Our Code

So here I am back at my code and I have pasted both the account_sid and the Authorization Token, into my program. Now the next thing I want to change, is the body of the text message. I will change it to something I actually want to send which is, *My name is Ron Burgandy?* with a question mark.



Now for this 'to' number the comments in the code suggests that I have to replace it with my phone number. So, I'm going to select and change this to my phone number with my country code. This by the way is also the number I registered with twilio previously. Then they say the from number, I have to replace it with my Twilio number. Now, I remember that Twilio actually gave me a phone number, but I didn't quite save it. So, if I go back to my accounts page, and click on Numbers. I can get my phone number from Twilio. Alright, back to the code and now I can change that number along with the country code.



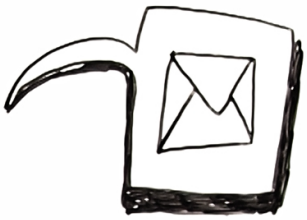
Next I will save and run my program and
this is the phone that I'm going to receive the text message. So I'm just going to give my program a few seconds oh, there it is, there's my text message. Let me read it. You probably can't read it but it says, "*My name is Ron Burgandy?*" Alright this just blows my mind that a few lines of code like this can help us send a text message. Okay, so now that this code has worked, let's figure out what's actually going on with this code.

Python Keyword From

So now that our code has worked, let's figure out what's actually going on with this program. Now, the first thing that strikes me is this first line of code, which is from twilio.rest import TwilioRestClient. Now thus far, what we've been doing is statements like this, where we say import some filename.

```
import turtle
```

Like in this case, import turtle, but here we have this new word called from. So here's a task for you, we want you to find out what this Python keyword from means? You can enter your responses in this box.



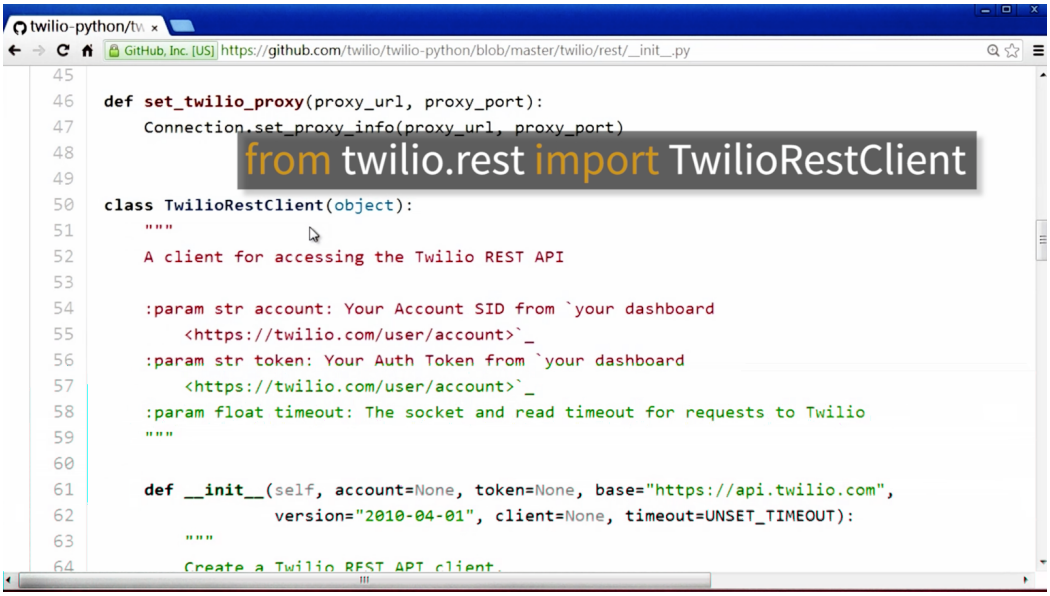
What does the Python keyword *from* mean?

Investigating the Code

So the best way to find out about anything is to Google it. So I typed in Python keyword from. Here I scanned all of the results that were available, and then from there I landed on this web page. By the way the link to this web site is also available in the instructor notes. Now this webpage says that Python's from statement lets you import specific attributes from a module.

So I guess it allows you to say from module or filename import something. So I guess our code that means, that from something called twilio.rest, we want to import TwilioRestClient.

Now, this got me curious about what these things called Twilio.rest and TwilioRestClient were. So then I went back to Google and tried to find out how Twilio was actually implemented, so I typed in Twilio Python Code. Then I looked through these results and I got to this website called GitHub. Here I could read all of the code that actually makes Twilio work behind the scenes, by the way, this link is also available in the instructor notes. Now in the code for twilio I find that there was a folder called twilio so I clicked on it, now inside that folder is another folder called rest. And within rest there is a python file which, if we look through, we will find that there is a class called class TwilioRestClient inside it.



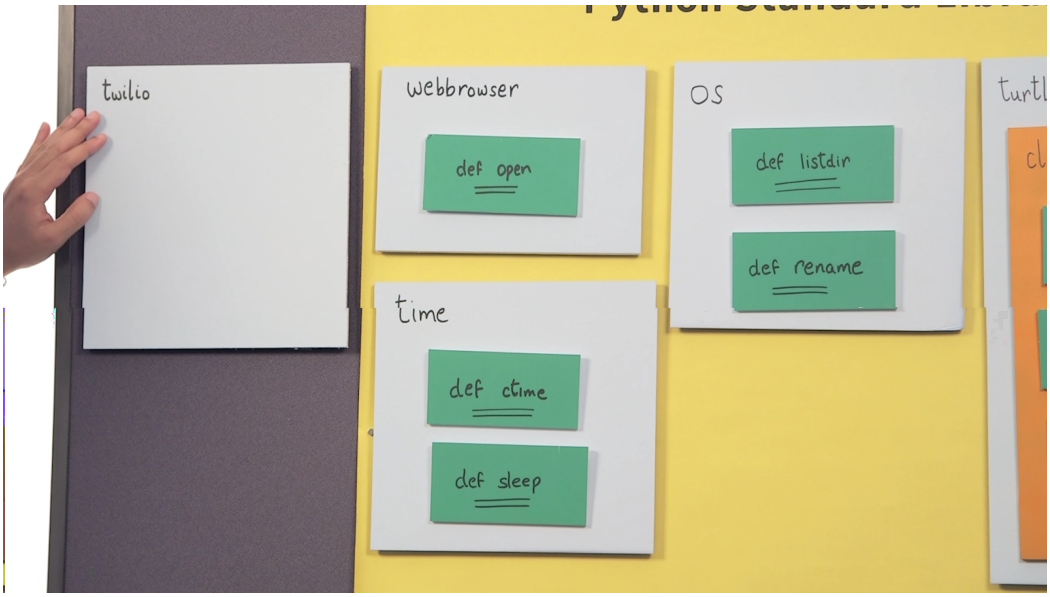
So when we write this line of code from twilio.rest import TwilioRestClient what we are telling the computer is, hey, inside Twilio. There is a folder called rest and inside that folder is a class called TwilioRestClient and we are going to use that class inside our code. And if we go back and look in our code here is how we are using that class TwilioRestClient.

Now you know if we were writing this code from scratch we probably wouldn't have written this line of code. We would have modified it to say from twilio import rest.

Now with this line of code, what we are telling the computer is, hey inside the folder twilio is another folder called rest. Import that because we are going to use that in our program, and we know that inside the folder rest is the class TwilioRestClient. So I would now access that class by saying rest. TwilioRestClient. Let me save, and run this program one more time to see if it still works. All right? Here's my phone and let's see if I get a text message any time soon.

Ah-hah! There's the text message, it seems like our program still works. So in the next video what I want to do is revisit the idea of how twilio, rest, and TwilioRestClient are related with one another.

Where Does Twilio Come From



So here is a snapshot of our code. Now, we know that when we downloaded Twilio, we got, among other things, a folder called twilio. And inside that folder is a folder called rest. Inside rest, is a python file, which has a class called TwilioRestClient.

Now, when we say rest.TwilioRestClient(), with those parentheses after the class name, what we are really doing is calling the init function defined inside the class. And that creates an instance. We call that instance client, and then we do a bunch of stuff with that instance, like send SMSes.

Now, we know that TwilioRestClient is a class. And we've seen another class before which is class Turtle. Let's figure out if there are any similarities between these two classes.

Connecting Turtle and Twilio

So thus far, we have seen, two examples with classes. One, when we drew shapes

using Turtles. And then the other one, when we sent out text messages using Twilio.

Thus far...


```
brad = turtle.Turtle()
```

↳ an object of Turtle

turtle

```
class Turtle():
    def __init__():
```

```
brad.forward(100)
```

```
client = rest.TwilioRestClient()
```

↳ an object of TwilioRestClient

rest

```
class TwilioRestClient():
    def __init__():
```

```
client.sms
```

Now, when we created shapes using Turtle. We hold a line of code that read, brad = turtle.Turtle(). Now, what we are really trying to say with this line of code here, is that inside Python, there is a file called turtle, and inside that file, is a class called Turtle. There it is. And when we try to access that class using this statement, especially with this, open, close brackets, what we are really doing behind the scenes, is calling the, init function defined inside the class Turtle. And what this function init does, is that it initializes, or creates space in memory for a new instance, which we called, brad. Brad is an object or instance of the class turtle. This instance brad, can then do things defined inside the class turtle, like, move the turtle forward.

Similarly, when we, write a line of code that says client = rest.TwilioRestClient(), what we are really trying to say, is that, inside Twilio, there is a folder called, rest. And inside that folder, is a Python file which has a class called TwilioRestClient. Now, when we call this line of code, the one where we access the class, TwilioRestClient(), with these open-close brackets, what we are really doing, is calling a function init defined inside that class TwilioRestClient. And what this function in it does, is again initializes or creates spaces in memory, for an object or instance of that class, TwilioRestClient. We call that object, client. The object client, can then do things defined inside that class TwillioRestClient, like send smses or texts.

So, in summation. You can think of a class, as a blueprint of a building. Now, this blueprint will have certain pieces of information about the building, like the number of rooms in the building, the area under the building etc. Now we can use the same blueprint, to build multiple buildings. For instance, a residential complex with yellow walls and an office building with, blue walls. Similarly, a class. Let's take the example of class Turtle that we've used thus far. Now, this has information about the turtle, for instance, how to make the turtle move forward, how to make the turtle turn right,etc. Now, we can use one class as a blueprint or a template to create, multiple instances like Brad and Angie. Now, these instances. They can do things that are defined inside our class or blue print. Things like, move forward, turn right, and draw a circle.

Now, recently, we've seen another class, and this class is called TwilioRestClient, which I have just abbreviated here for lack of space. This class has information about how to connect with Twilio and send a text message. And from this blueprint, we can then create an instance called, client. Client can then do things that are defined inside the class, like, send out texts. So you can think of a class, as a blueprint, which have some basic information defined inside of them. And you can think of its objects, as examples or instances, of that blueprint.

Send Text Messages: Mini Project

Congratulations on finishing another project. Here is your assignment. Now that we've seen classes in two different projects, for instance with Turtle and Twilio Rest Client, we want you to answer the following questions on the discussion forum. The first question is, what is a class? The next one is, what is an instance of a class? And finally, thus far we have compared a class to a blueprint. Can you think of another analogy to explain classes? Make sure to check this box, after you have submitted your responses on the forum.

Send Text Messages - Mini Project

Answer the following questions on the discussion forum:

1) *What is a class?*
2) *What is an instance of a class?*
3) *Thus far we have compared the class to a blueprint. Can you think of another analogy to explain classes?*

☐ Check this box after submitting your response on the forum
(To access the forum click the "Send Text Messages - Mini Project" discussion thread)