Here we are coming to the end of the first module of 5001. So let's recap a couple of things that we know so far. We're learning about computational thinking and algorithms, we're talking about problems and how to break them down, and we're using Python as our programming language.

Python we're going to think about as the tool to implement these algorithms that we now are talking about how to design. So that's what today is, today is all about Python. We're going to do a couple things in this video. We're going to download the latest version of Python, we're going to do a few calculations to see how it works.

And we're going to write and see our first Python program. So first things first, we need to download Python and get it installed on your computer. Here's how we're going to do that. So I'm going to show you what I do to install Python. I'm going to go open up just Chrome and I'm going to go to python.org.

And here we go. Now if I just click on Downloads, then we can see it's got **Python 3.7.4,** that's the latest version right now while we are shooting. There may be a new version when you go to get Python so just get whatever's the latest thing. And then we just click on it and start loading by itself you see there at the bottom.

So I have a Mac, what you might see might look a little bit different if you have another kind of machine, but the steps are all basically the same. So here we go and download the file. So I'm going to click on the file, and I'm going to carefully read all the licensing agreements and stuff, of course I agree.

And now we're just going to install. Now I have to remember my password. First try, okay, so Python's installing and it's going to go onto my laptop that is the same place that I'm going to write all of my code. And so what this is installing is actually called IDLE.

It's the Python name for what's called the development environment, we call it the **IDE, integrated development environment**. So while it's doing that, what we're going do is we're going to open up IDLE as soon as it's done. And this is going to be where we write our Python code.

So Python is this high-level language is something that we as humans can read and understand even though it's different than talking in English. And so what the computer can understand is zeros and ones. We're going to write in Python; it gets translated for the computer so that it can understand what to do.

There we go, it finished and so I'm just going to make sure we can get the Python, right? So I'm going to click on Applications and see right there. You can see Python 3 7, I'm going to click the button and you see where it says IDLE, that's what we're looking for.

So IDLE, let's open that up. Let me get rid of some of the stuff. The first thing I'm going to do is

just make the type a little bit bigger, just so you all can see it, you don't have to do this yourself. Just going to make it a little bit bigger so we can all see what we're doing, awesome.

Okay, so this is the shell of Python, it's also called interactive mode. So this interactive mode is really good for quick-hit things you might want to do; stuff that you don't really need to save like little calculations and things. I also really like it for, hey, let's see what happens if we do whatever.

And some people I know actually use this part of Python interactive mode instead of a calculator, because it's so handy for stuff like that. So we can do stuff in here like add numbers together. `1+5`, it tells us the answer, it gives us a 6. We can add more things together, and then we can subtract something off the end, we get 11.

So we can do just sort of your average everyday calculations right here in iterative mode. But often what you're going to want to do, is you are going to want to save your code in a file. So this is what you're going to want to do when you have homework, when you have labs.

You're going to create a file that has your Python code all in it and then you run the whole file together. And that way, it won't be forgotten, anything in interactive mode, sort of goes away. So here's what I'm going to do, I'm going to create a file and we're going to write our first Python program together.

It is a classic, it's called hello world. Anytime you learn a new programming language on your own, or when you're working somewhere or for fun, this is traditionally the first thing computer scientists do. We write our hello world program. So that's what we're going to do. So we're going to do this in file, because this is something that we want to save.

So I'm going to do `File > New File`, I'm going to scooch this on over here. And the very first thing before I start writing any Python is I'm going to put in some comments. Comments are always going to go at the top of your files and they're just going to give some sort of basic information.

So CS5001 for Align Online, Hello World, and I'm going to put my name in there at the bottom. So a comment, this is not code, this is for me, for me and other programmers who might see it. We always start that just to sort of describe in English what's happening in your program.

Next thing I'm going to do is put in a `main`. `main` is just where everything starts, it's good practice. And now in CS5001 we're going to call this a guideline. Always write a `main`, always write your comment at the top, always write your `main`. And that is where your Python code is going to begin.

So I'm going to write `def main` and then `main`. Okay, so what's going on here, is we are setting up just the structure, the basic structure of our Python code. So we've got a comment to the top,

we've got this `def main`, the syntax probably looks a little bit weird, we don't usually see parenthesis in this way.

And this is something that we need to get used to when we're coding in Python or any other language. It has a certain set of syntax that we have to learn and just become familiar with. So in this case, `def main`, all of those words are important, `def` is important, `main` is important, empty parentheses, colon, we need all of those parts to make it happen.

So now we have this sort of basic structure, every program you ever write is going to start out looking like this. Now I'm going to run it, so here in IDLE I'm going to click `Run > Run Module`, because this is module. Source must be saved. I have to save the file.

That's the whole point, we wanted to save the file to use it later, right? So I'm going to save the file. And I'm going to save it here on my laptop and I have put together a folder that's `Northeastern > Align Online`. And then you can see here I have a bunch of folders.

This is something you might want to do as well have a folder for align and then inside there you have something for homework, something for labs just to organise things. I have in here a scratch folder where I just used to play. I'm playing around with stuff, this is where I put it.

So I'm going to call this `helloworld`, I'm going to click `Save`. All right, so now let's run again. `Run Module`, it wants me to save it again. Expected an indentation block. Okay, so here's what's happening. We have set up our basic structure, but Python wants something to go inside of it, right?

So when you set up a `def main` and then our `main`, absolutely important we're going to do it for every program but then there has to be your actual program. What do we want this to do? We want our program to do something meaningful. Often we're doing some kind of a calculation or we're doing some kind of computation.

For us right now we're going to do what's called a `print`, because we want to print "hello world" so that everybody can see it. Hello world, that is our classic program. So we are going to use Python's `print`. So you can see my cursor now is right after the colon.

So `def main():` I hit `Enter`, and you see how on the next line now we are indented. So this happens on purpose in Python, spacing matters, this is really important. So we're going to leave the cursor right there it's in the correct place. And now I'm going to type, `print("Hello World!")`. So this is how we print things. And so what I have here, what I'm looking at right now this is my Python code, and now when I run it what I'm going to see is the output of the program. So I'm going to save it again, so `File > Save`, and then `Run > Run Module`.

Do you see that? Now it goes back into your active mode and we get Hello World! So what's happening when we click `Run`, is that Python took all of this code and translated it into zeros and

ones. And now the computer can understand it, and it gives us this output which is Hello World!

Our classic, our tradition, right? So there it is. And so what I'm going to do right now is just quickly quit out of Python so we can see what happens. So let me quit. And now I just want to show you where that file lives so if you need to get back to it, right?

So this is what you would do if you're working on a homework or something. So I'm going to click on my finder again, might look totally different if you have a different kind of computer. And where did I save it? I saved it in `Documents > Northeastern > Align Online` > `scratch`, and you can see helloworld.py there it is.

So now I can click on this and it pulls up IDLE for me. There is my code, same thing I just wrote a second ago. And now I can run this over and over and over. So this is what happens in programming. We write our code one time, and we can run it as many times as we want, right?

So there we go, this is our Hello World program for today. So now you have a couple of to-dos, you have a few things I want you to do as soon as this video is over. Number one, I want you to download Python, python.org, click the Download look for the latest version.

Number two, play around in interactive mode just like we were doing. And you can do calculations, you can do addition, subtraction, division, give it a shot and play around with it. Number three, write a hello world program just like we did here, save it in the file, make sure it's in a good location so organized all the files that you're going to create as part of 5001.

Do those three steps just like that, you are a Python programmer. So much more to come, but that is all for now. Thanks for watching Align Online.