Hello World! Your first Python Program

In this exercise you will create a file containing the simplest Python program there is, and then you will run your program.

It is a long and venerable tradition that whenever you learn a new computer programming language or system, you first thing you do is cause the computer to display the phrase "Hello, World!" This dates back to the book "*The C Programming Language*" by Brian W. Kernighan and Dennis M. Ritchie. This is not as trivial as it sounds. You have to accomplish these major steps:

1. Create a new file, with the correct file extension.
2. Edit the file to put into it the correct instructions.
3. Cause the instructions in the file to be executed (i.e. "run it").

These are what you need to be able to do in order to run *any* Python program, so these are what you need to learn first.

Python "print"

A Python program is called a "script," because when you run it the computer reads instructions from the file, line by line, and does what each line tells it to do, similar to an actor reading lines from a script. One simple but important Python instruction is "`print`". Thus, to print the desired text requires a script with the single line:

```
print("Hello, World!")
```

That's all.

Learning Python involves first learning more of these basic instructions, and then learning how to put them together to tell the computer how to do something useful.

Creating and Editing Scripts

There are many ways to put this instruction into a script. You can use a simple text editor, such as Notepad or Wordpad (but not Microsoft Word!). You can use a more powerful text editor such as Emacs (which works the same on Windows, Mac, and Linux) or nano (on Raspberry pi, Mac, or Linux). But the easiest way to get started is to use IDLE, which comes with Python. IDLE stands for "Interactive DeveLopment Environment." It not only lets you edit your programs, it also provides you an easy way to run and test your programs.

So to get started, do the following:

1. Launch IDLE, as you learned to do in the previous lesson.

2. In the window that opens (which should be an interactive command shell for Python, not a file editor) pull down the "File" menu to "New File"

3. This opens an editing window. Type in the instructions for your Python script.

4. Pull down the "File" menu to "Save As" and save your file to your Desktop (or a folder you choose) with the name `hello.py`.

It is important that the file end with `.py`, because that is what distinguishes it to the computer as a Python script.

Comments

One of the most important computer commands in any computer language does nothing. It's called a "comment". A comment is text which is intended for a human reader, but which is ignored by the computer. Do not underestimate the importance of comments. You will want to leave information in your programs for others who read them. You can also leave information for yourself later on, when you've forgotten the details of what you intended. Well written programs always contain appropriate and instructive comments.

In Python the comment character is the "`#`" character. A line begining with `#` is simply ignored by the computer. You can also put comments on the same line as an instruction: anything on a line past the `#`, to the end fo the line, is ignored by the computer.

You can put anything in the comments of your program, but some information is so important that you should always include it. For every program you write you should begin the file with comments that include:

- The name of the author
- How to contact the author (eg. your e-mail address)
- The date the program was written, or at least started (or finished)
- A brief description of the purpose of the program

Other optional information could also be included, such as:

- A version number, if this is a revision of earlier work.
- A brief description of changes for a new version.
- Citing sources from which this work is derived. (Copying from someone and improving on their work is a very common thing, but give them credit for their part.)
- The name of the project or class for which it was written.
- The author's organizational affiliation (your school or company).
- The name of the file (but this might change some day)

- Licensing restrictions, if any. As the author of the work, you hold the copyright to the contents of the file (unless it is a copy of somebody else's work, or a work for hire), and you can decide if anybody else is allowed to copy it. You might wish to distribute it freely under an open source license, or you may wish to state how distribution is restricted. You can declare your intentions at the beginning of the file.

You can think of the comments at the beginning of your program as the functional equivalent of a cover sheet on a paper, in that – in the least – it should identify the author and date of the work, and possibly the class and purpose as well.

Another useful thing to know is that blank lines are also ignored by the computer. Why is this useful? Because you can add space to your programs to improve readability, just as blank lines between paragraphs or sections can make a research paper easier to read.

Running it

To run your script from within IDLE simply pull down the "Run" menu (at the top of the window) to "Run Module".

The first time you run a new script you will be asked to save it in a file. You can save it to the Desktop, or to a folder of your choice. After that, the latest version of the code will be stored in the file whenever you run it. A new window will appear – the interactive Python shell window – and the output from your script will appear there.

To make things even easier, there is a keyboard shortcut: simply press the F5 key.

Python Documentation

There are may useful sources of information on the Internet for new Python programmers. Perhaps too many. Here are some suggestions for how to learn more about Python:

- Very organized and complete information about Python can be found on the python.org website at `http://docs.python.org`.

- If you are a complete beginner, you may wish to start with the "*Python for Beginners*" page at `https://www.python.org/about/gettingstarted/` .

- There is also a Python Tutorial, at `https://www.python.org/tutorial/` .

- You can often find answers to particular questions using Google, which will often take you to the StackOverflow website.

There are also literally hundreds of books written about Python. The set of exercises you are now beginning does not depend on using any one book or tutorial or website. Pick whichever works best for you.

Assignment

Your goal for this exercise is to create a Python script (a `.py` file) containing the simplest Python program ever, and then to run it, to display the famous phrase "Hello, World!".

To complete this exercise you must do the following:

1. Create a Python script in a file called `hello.py` which uses `print()` to display the text "Hello, World!" (exactly as shown).

2. Your script should include comments at the beginning of the script (before any commands) which contain at least the minimal information listed above, and hopefully more than that.

3. Run your script, and save the the output (whatever appears in the interactive Python shell window) to a file. Be sure to save it to a `.txt` file, not a `.py` file.

4. Submit to your instructor copies of both your script (the `.py` file) and the output it produces (the `.txt`) file.