Covenant University
Raising a new Generation of Leaders

PET328

COMPUTER APPLICATIONS IN PETROLEUM ENGINEERING

PET328: COMPUTER APPLICATIONS IN PETROLEUM ENGINEERING

(With Python Programming)

python Programming

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OUTLINE

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  - The Toolbox
  - The Embedded Course
  - Introduction to Computer Programming
- Getting Started with Python
  - Basic Python Objects
  - Conditional Execution
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  - Functions
- Python Data Structures
  - Strings
  - Lists
  - Tuples
  - Dictionaries
- Application Projects
  - Oil Reservoir Volumetrics
  - Material Balance Analysis
  - PVT Properties

The Appetizer – a presentation

ACQUIRING NASCENT SKILLS FOR EMERGING OIL AND GAS OPPORTUNITIES: DATA ANALYTICS, MACHINE LEARNING AND ARTIFICIAL INTELLIGENCE

The Toolbox

- For this course, the following tools would be needed:
  - Python 3
  - Python Integrated Development and Learning Environment (IDLE)
  - Git and GitHub

PREAMBLES

The Toolbox

- Installing Python 3

To install the latest release of Python 3, go to Python download website: https://www.python.org/downloads/

PREAMBLES

The Toolbox

- Installing Python 3

Launch the downloaded executable file by double-clicking the file in your download folder.

Follow the steps as the installer leads

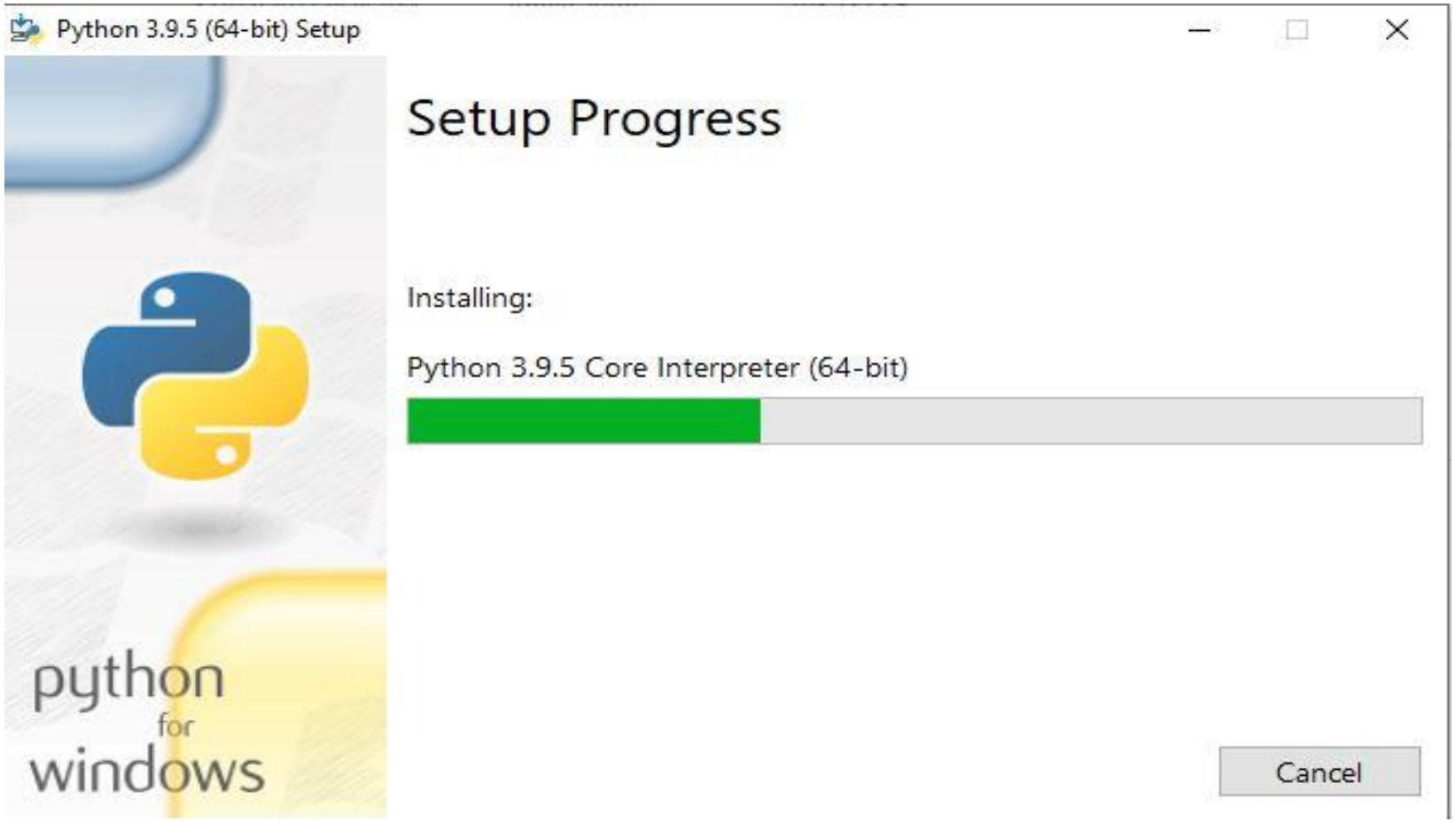
Click on the default installation option.

Ensure to check the Add Python 3.9 to PATH

PREAMBLES

The Toolbox

- Installing Python 3

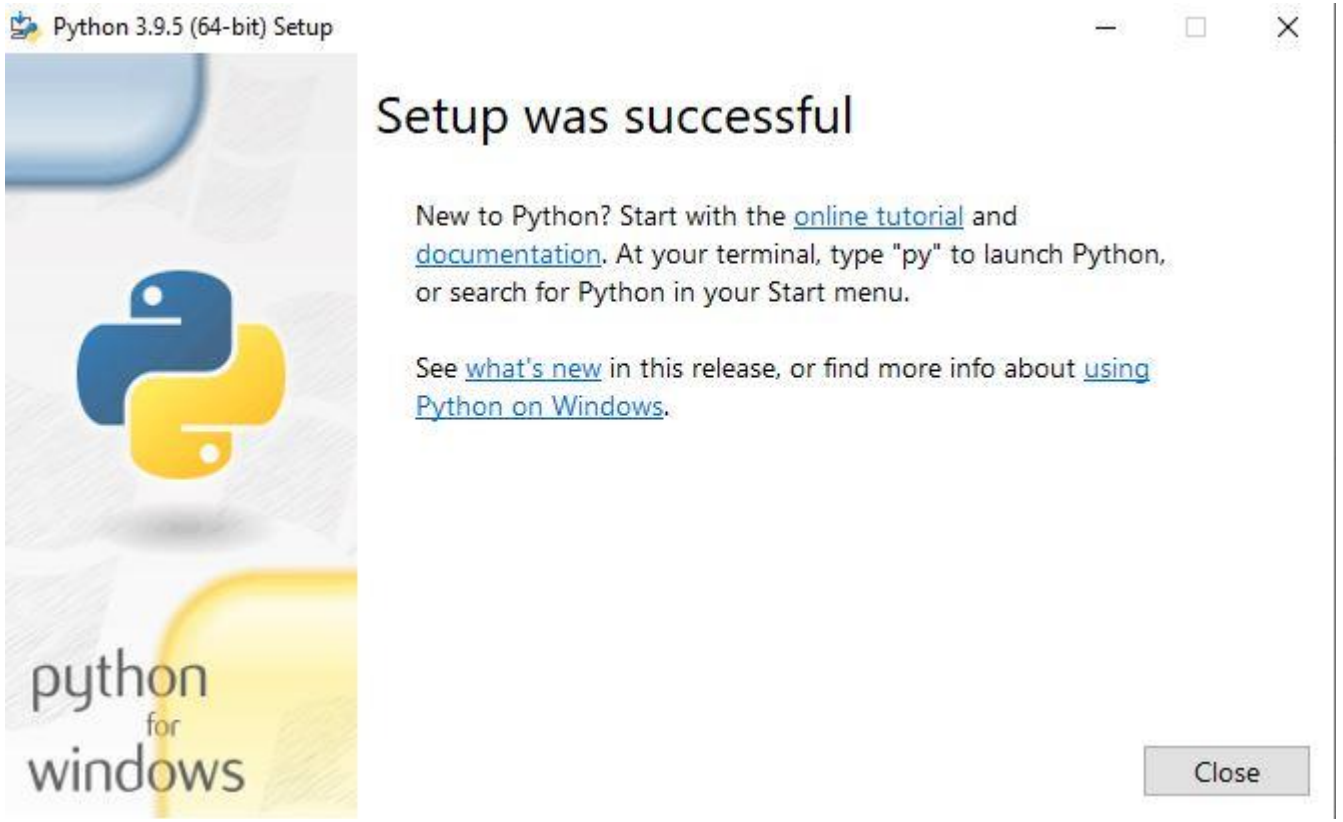


PREAMBLES

The Toolbox

- Installing Python 3

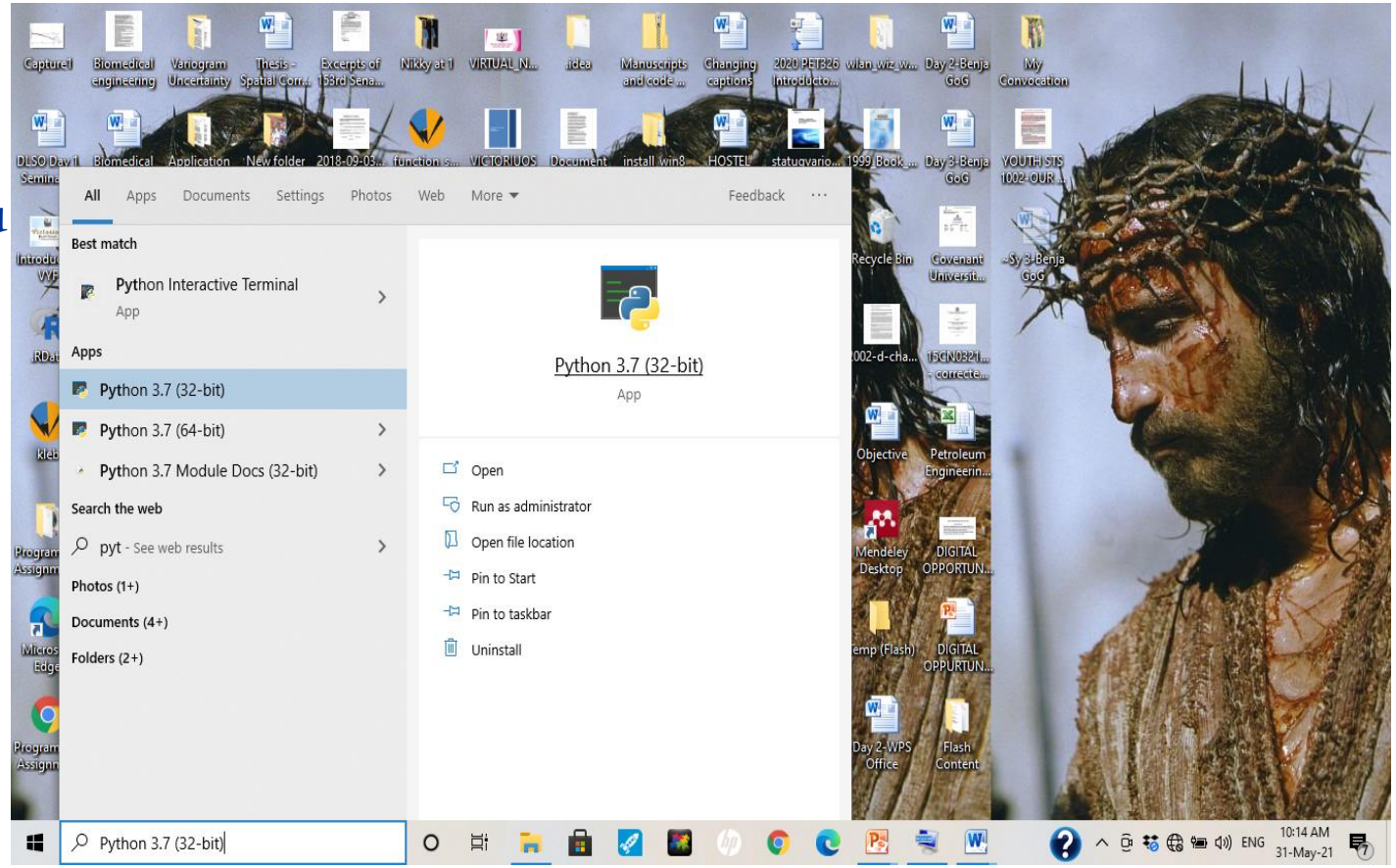
Click the close button when the installation is completed



The Toolbox

- Launching Python 3

Simply type Python into the Start Menu search box and click the Python program.



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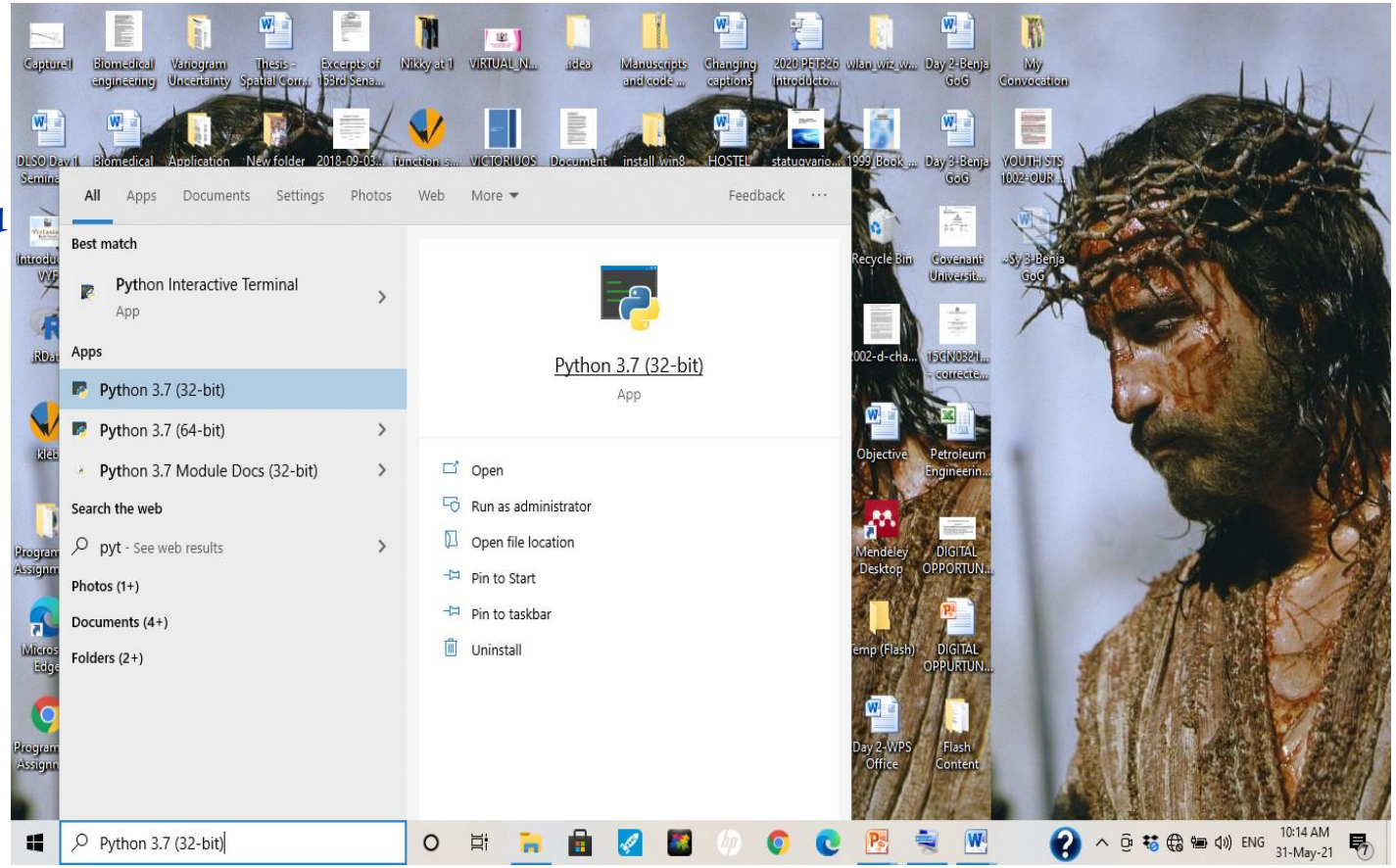
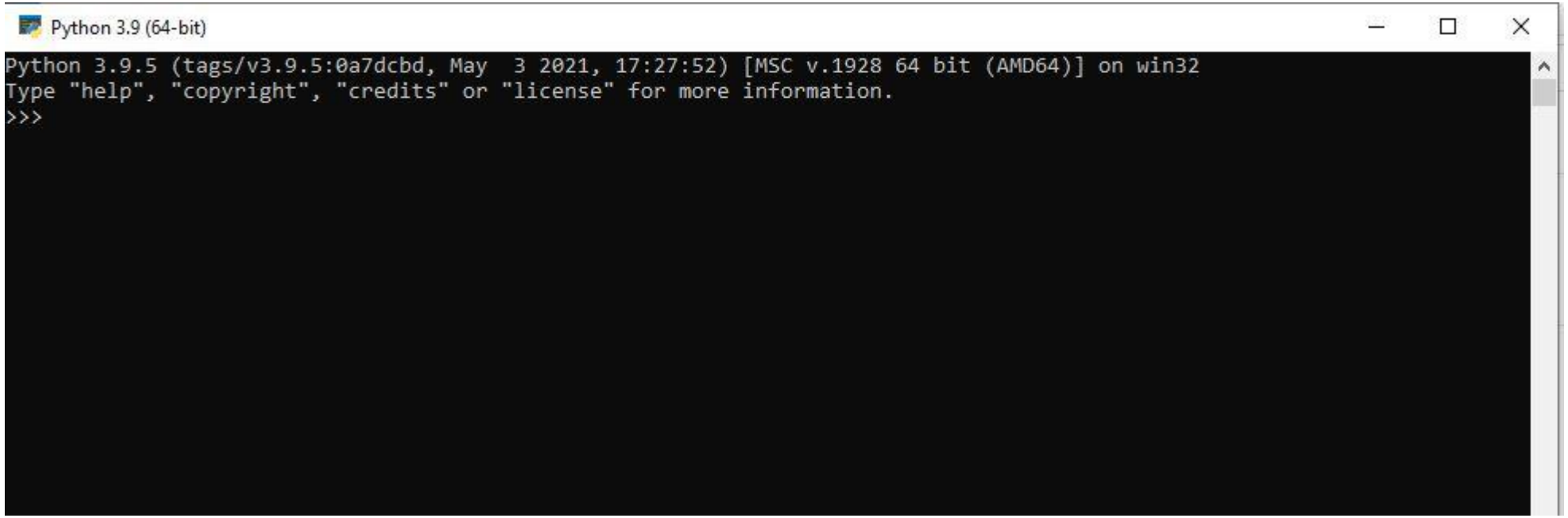


The Toolbox

- Launching Python 3



PREAMBLES

The Toolbox

- Python IDLE

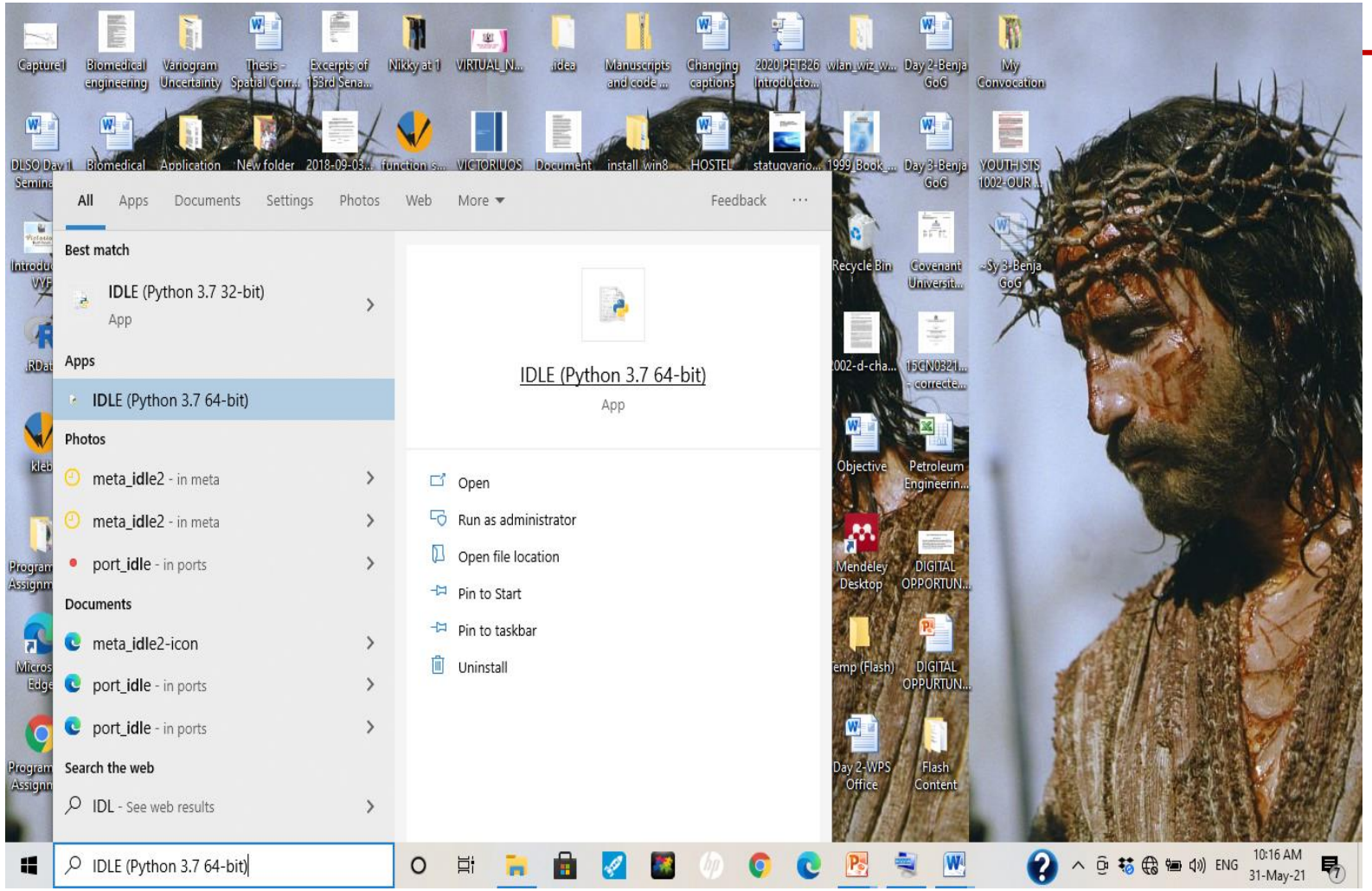
Now, the Python DOS-like environment seems boring. Good enough, we will typically not be working on that platform; rather we will interact with Python from a platform known as Interactive Development and Learning Environment (IDLE)

PREAMBLES

The Toolbox

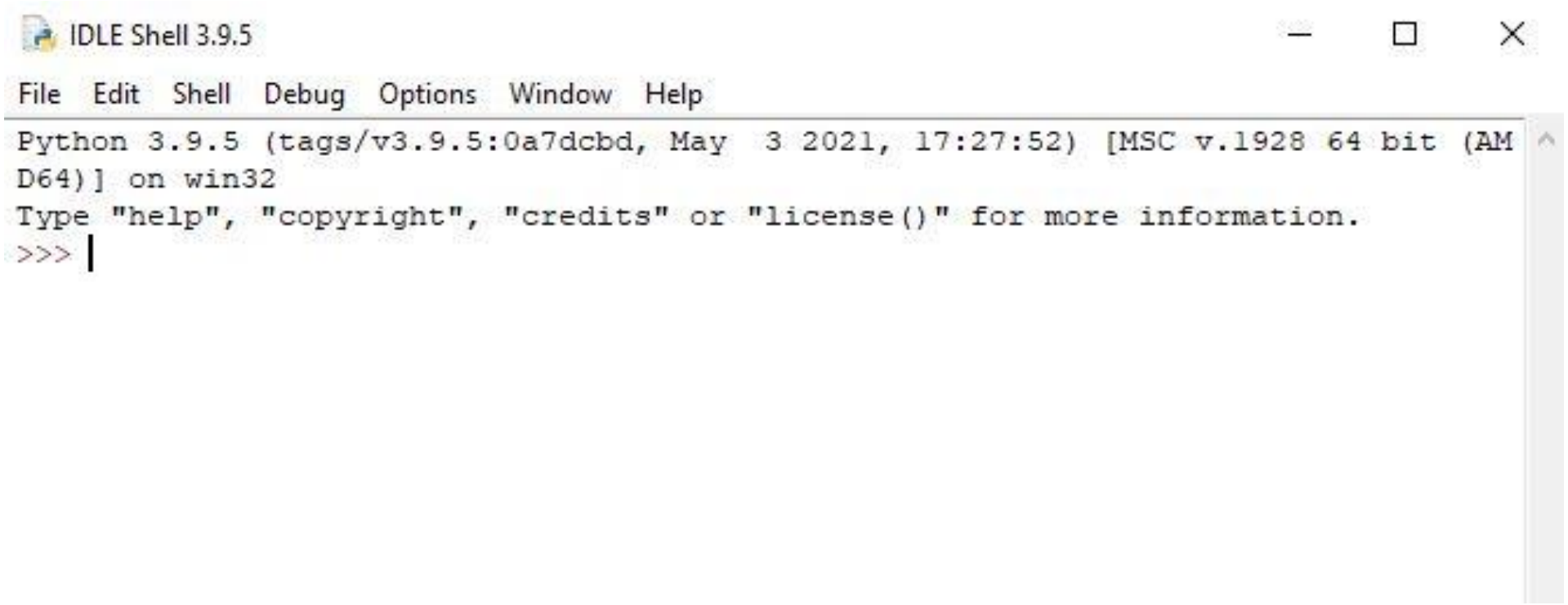
- Python IDLE

To launch IDLE, simply type IDLE into the Start Menu search box and click on the IDLE program.



The Toolbox

- Python IDLE



PREAMBLES

The Toolbox

- Python IDLE

There are two ways by which you could communicate with Python from the IDLE environment:

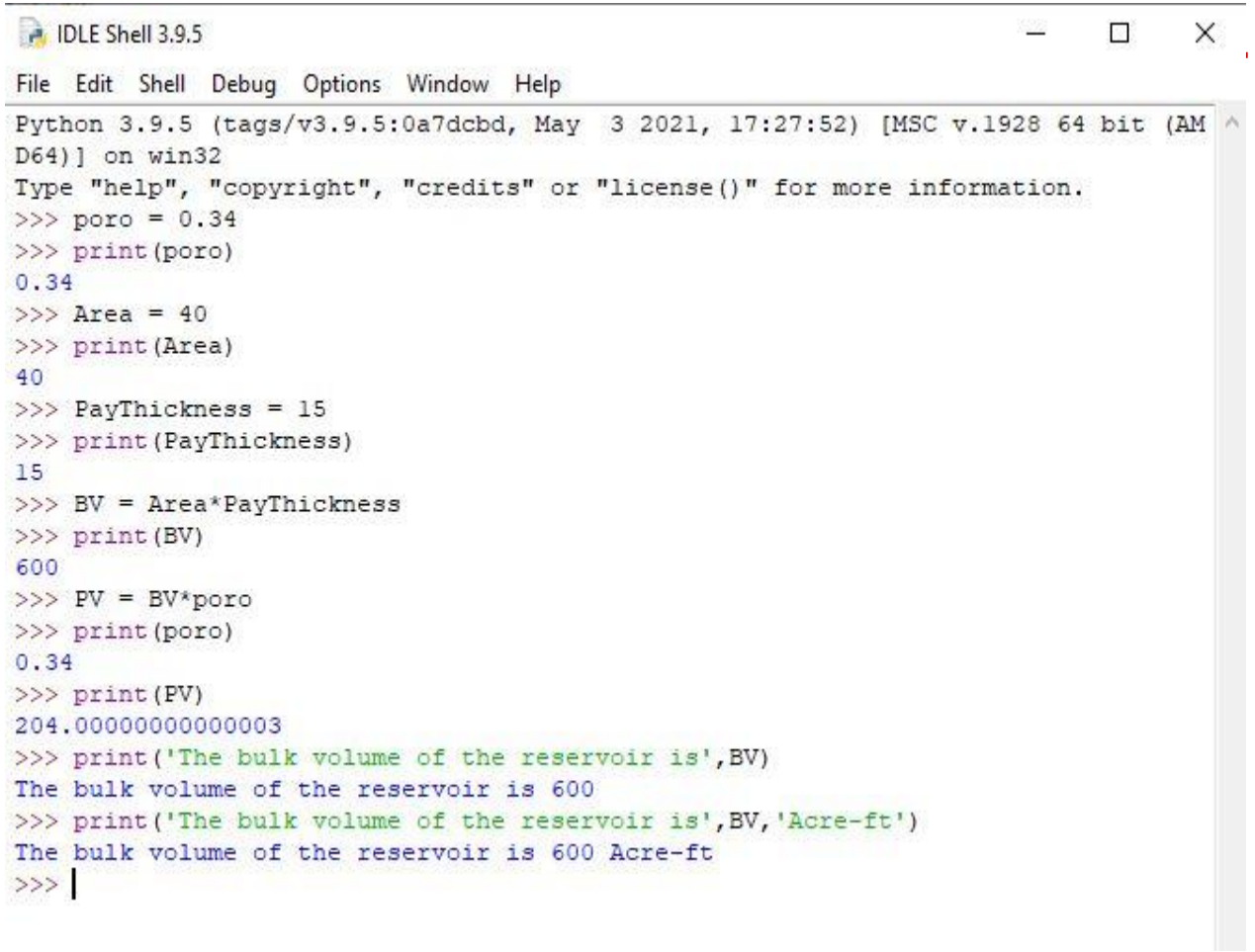
- Interactive
- From a file (script)

PREAMBLES

The Toolbox

- Communicating with Python interactively

In this case, you type in Python command (one at a time) into the console. Each command get executed once the 'Enter' key is pressed. Depending on the command, results may be displayed on the console once the command is executed.



PREAMBLES

The Toolbox

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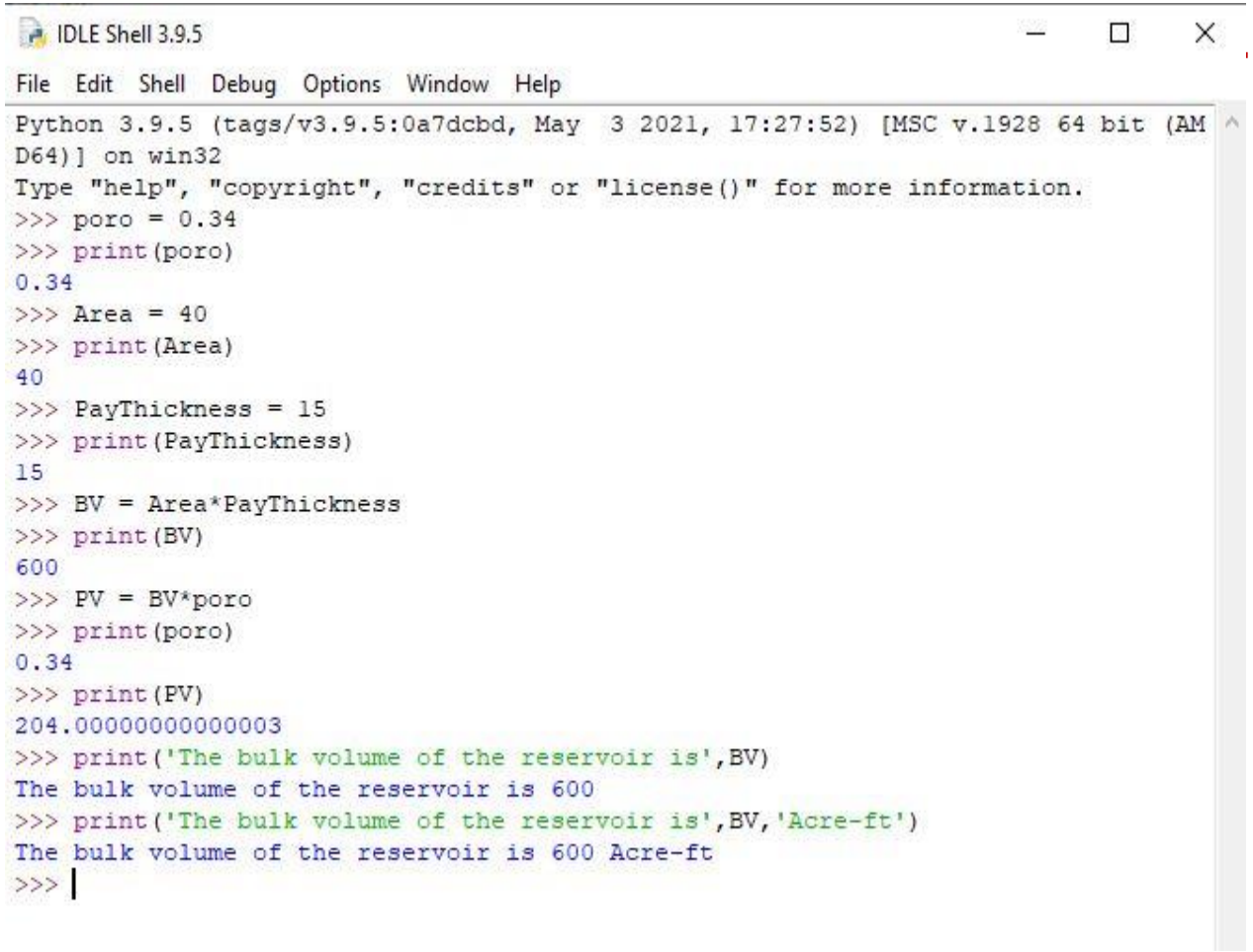


PREAMBLES

The Toolbox

- Communicating with Python from a file

In this case, you type in Python commands (all at a time) into a text file editor (code editor). The commands don't get executed as they are being typed. Rather, they get executed (sequentially) when submitted as a whole to the Python interpreter.

PREAMBLES

The Toolbox

- Communicating with Python from a file

Any text editor program could be used for this purpose, as long as the file is saved as a .py file.

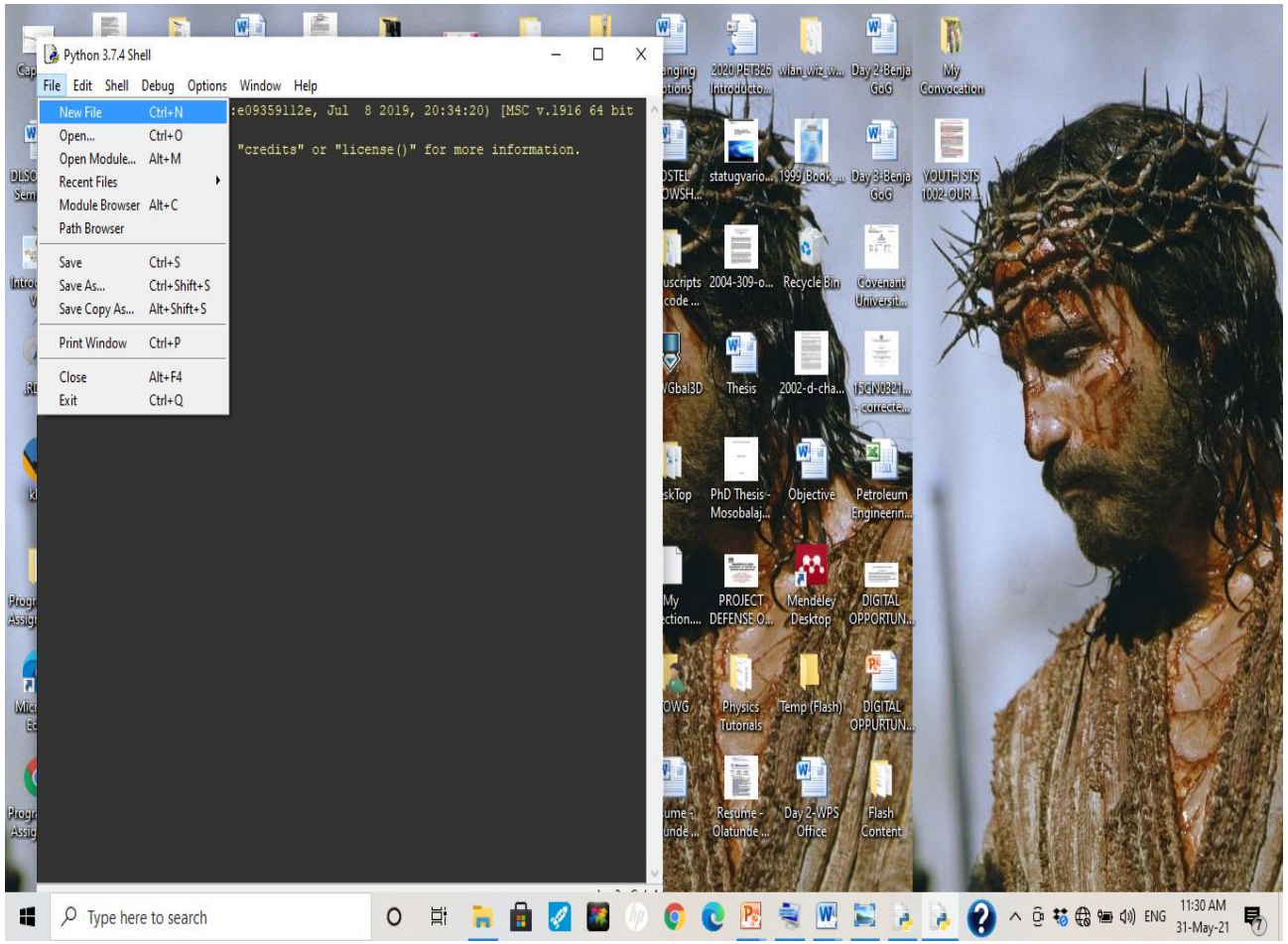
Good, Python has an in-built text editor for this purpose.

PREAMBLES

The Toolbox

- Communicating with Python from a file

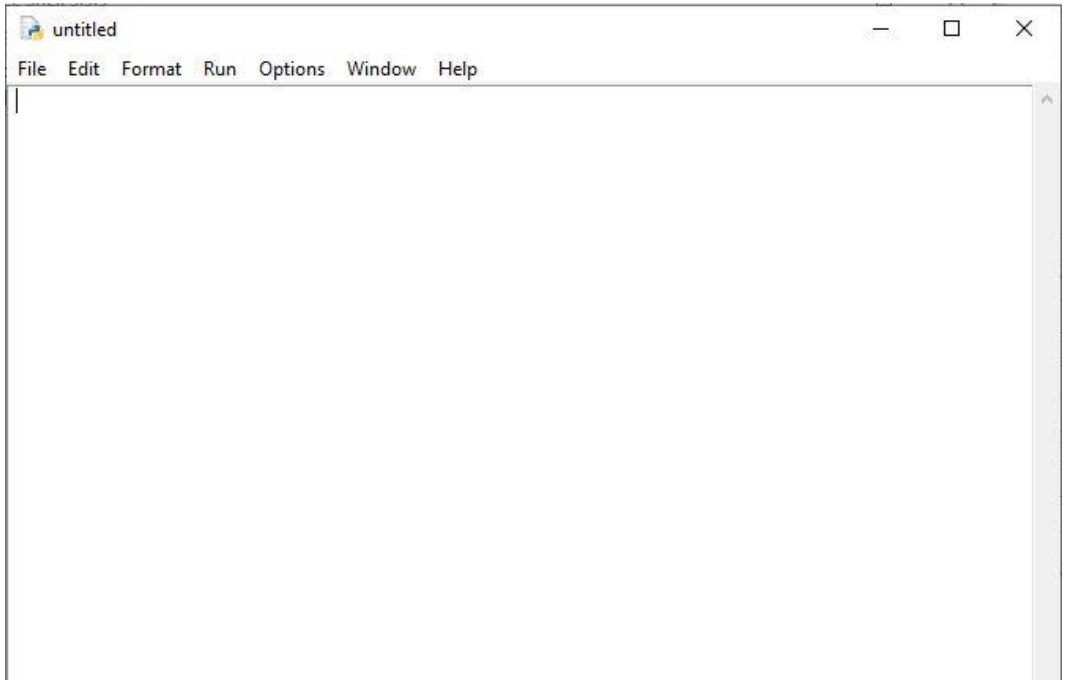
To launch Python's in-built code editor, just click on the File menu and choose New File.



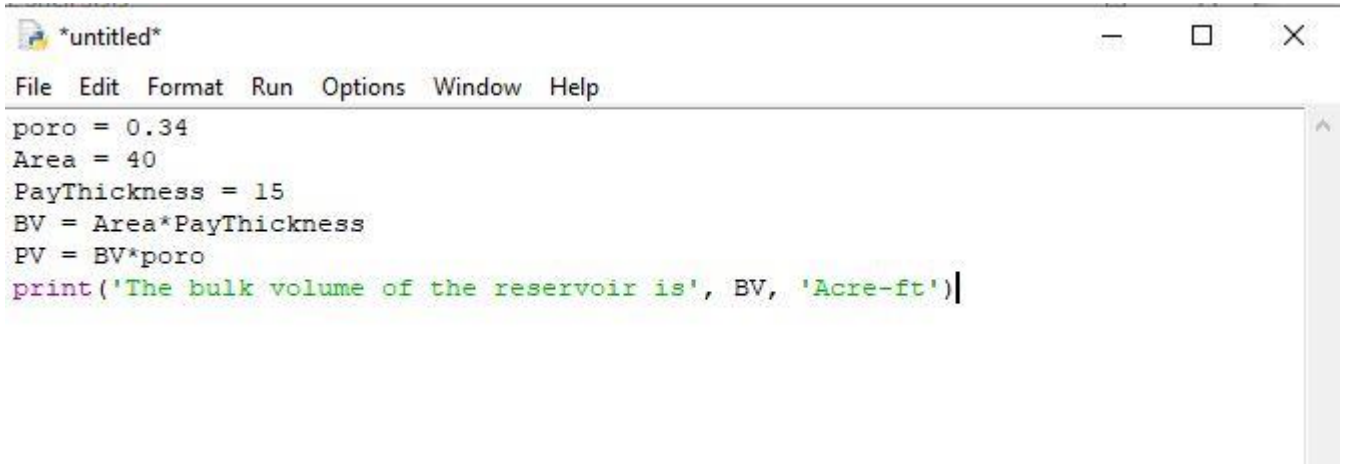
PREAMBLES

The Toolbox

- Communicating with Python from a file



Once the editor is opened, you can type in your lines of codes.



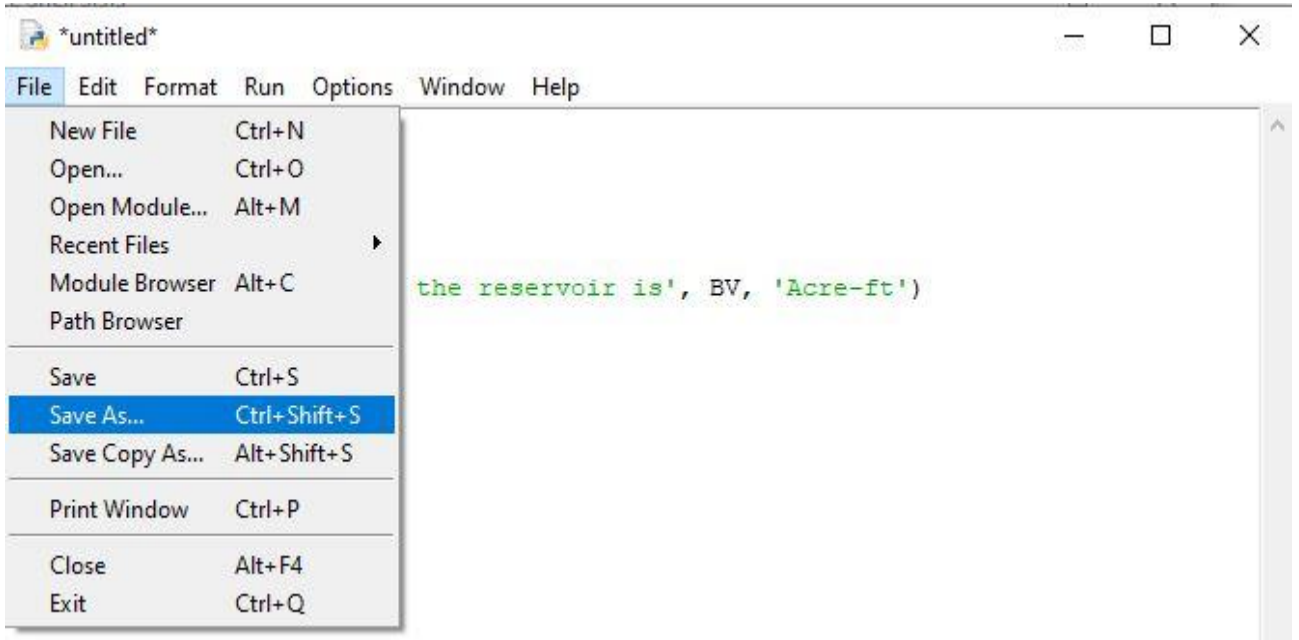
PREAMBLES

The Toolbox

- Communicating with Python from a file

Before submitting the lines of codes in the code editor to the Python interpreter, you need to save the editor file.

To save, simply go the File menu and choose Save As



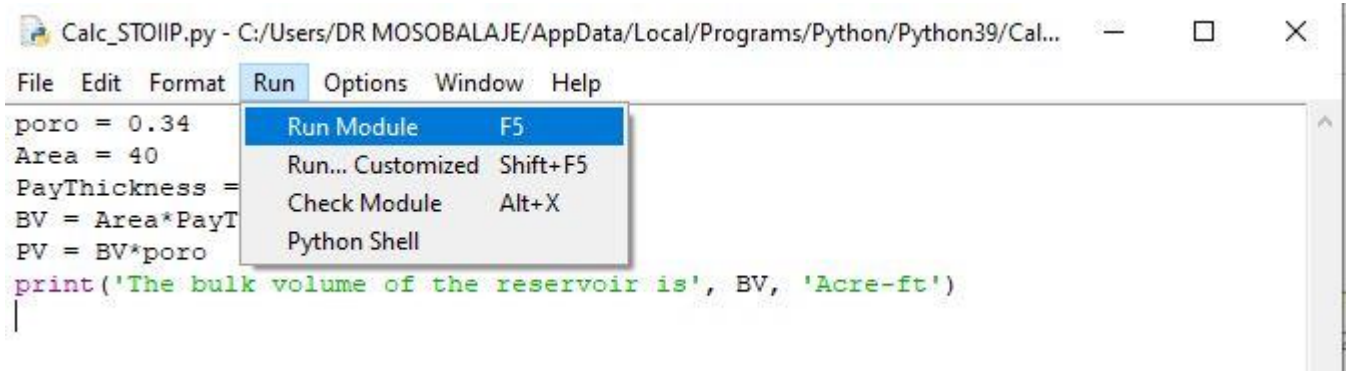
PREAMBLES

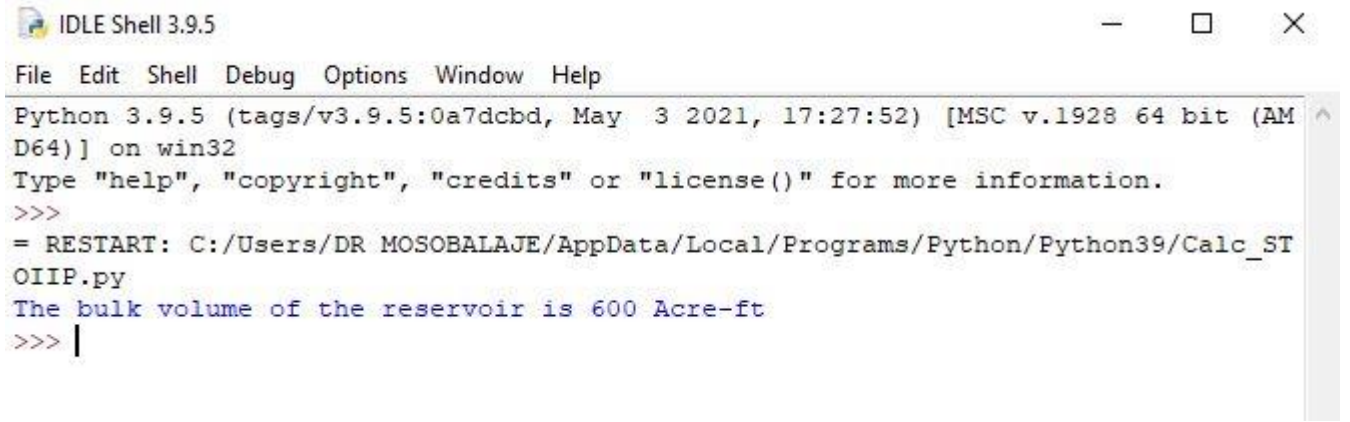
The Toolbox

- Communicating with Python from a file

Once the file (script) is saved, the code lines can be submitted to the Python interpreter by choosing item 'Run Module' in the Run menu.

The output of the code execution (if any) is subsequently displayed on the Python console.

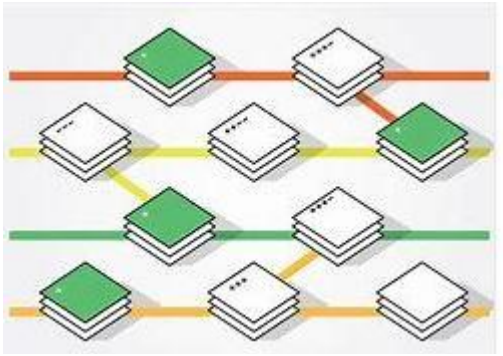




PREAMBLES

The Toolbox

- Git and GitHub



Git is an open source version control software.

What is Version Control?

Version control (VC) is a system used for keeping track of changes made to a file over time. As the changes are made, the system records and save the state of the file at instances indicated by the user. Such user can revert back to a previous version of the file when necessary.

Essentially, the VC system keeps the latest version of the file but also keeps a record of all changes between all versions.

PREAMBLES

The Toolbox

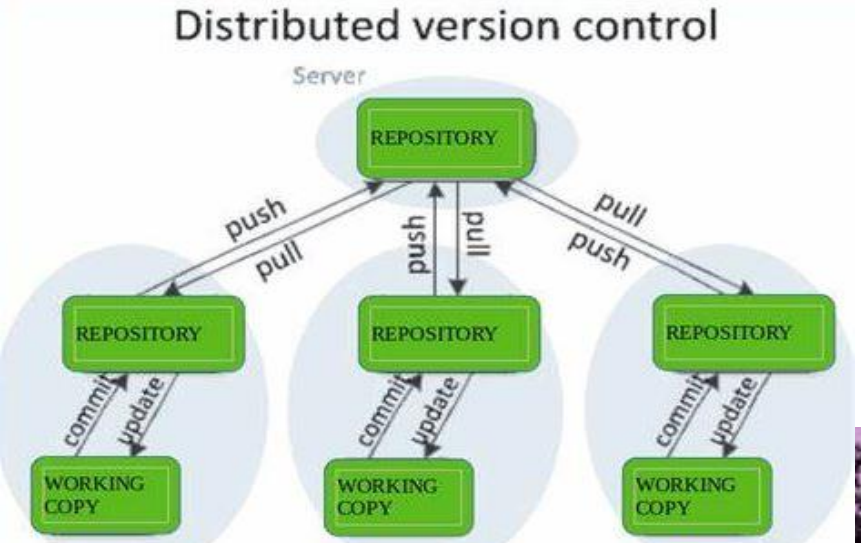
- Git and GitHub

And, there is something called Distributed Version Control (DVC)

What is Distributed Version Control?

Typically, real life projects (including oilfield digital projects) are done by teams whose members need to collaborate – work together on same files. Individual members of the team can make changes to such shared files. There is therefore a need to make such file available on a central server and to keep track of the following:

- who made what change?
- When was the change made?
- Why was the change made?



The Toolbox

Git and GitHub

And, there is something called Distributed Version Control (DVC)

What is Distributed Version Control?

A version control system that also comes with the capabilities for collaboration among several people is known as Distributed Version Control system.

Git is a version control system – locally hosted on your system.

GitHub is an online platform that interfaces with Git, hosting your files on remote servers thereby making them available for collaboration with others.

The Toolbox

Git and GitHub

In this course, we shall be working as a team, therefore, both Git and GitHub are part of tools we shall be using. Essentially, submissions to some assignments shall be in the form of code file editing and sharing between students and the Course Instructor.

Assignment 1

Get the following tools ready on your PC:

- Git - install
- A user account on github.com
- GitHub desktop - install

```
>>>#TTOWG!
>>>print('…to the only wise God')
```