

## Introduction

In order to perform tasks, you are required to install certain software on your Windows 64-bit OS system (laptop or computer). Below listed are the installation steps, Dos and Don'ts of the process. Links to software installation, tutorials of programming syntaxes and constructs are given in the “**Tutorials**” folder in the “References.pdf” file.

***You are expected to read the document carefully and completely first before diving into the installation process!***

### Python Installation

1. Visit the link: <https://www.python.org/downloads/windows/>. Click on the link “Latest Python 3 Release - Python3.7.4”. This will redirect you to the download page for the required Python3.7 version, i.e. the following link:

<https://www.python.org/downloads/release/python-374/>. Scroll down to the bottom of the page and you will see many files listed in the “Files” section. Click the “Windows x86-64 executable installer” file as highlighted and it will start downloading on your 64-bit Windows system (Laptop/Computer).

2. Once the download is complete, double click on the downloaded “.exe” file i.e. “python- 3.7.4-amd64.exe”. This will start installing Python on your system.

3. During installation of Python the following steps will occur:

a. The installation screen will ask you if you want regular or custom installation. Do not customize and hence do NOT select “Custom Install” as indicated in the figure below. This will thus install regular or default installation.



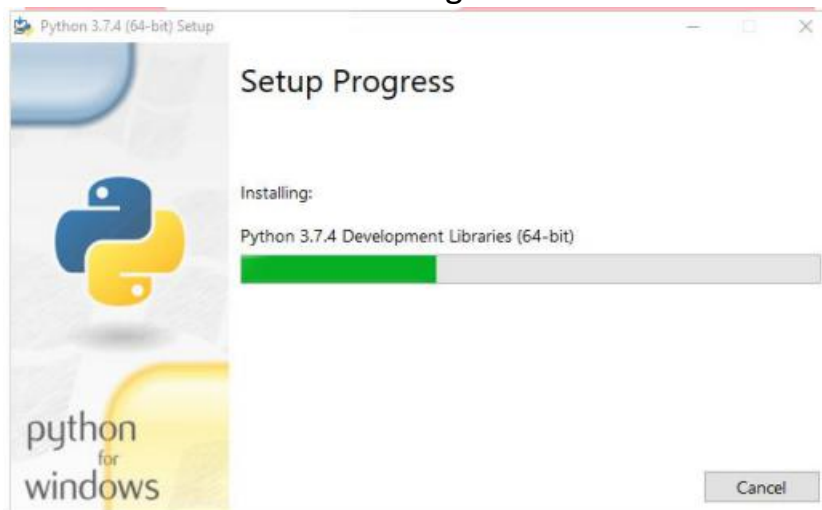
b. Before clicking “Install Now”, Click on “Add Python3.7 to PATH” in order to add Python’s installed path to environment variables as highlighted in the figure below.



c. Now click “Install Now”, highlighted in blue, link encircled in orange as in the figure below. This will start the installation of Python on your system. You might be asked for administrator permissions to install the same, select “Yes” in that case.



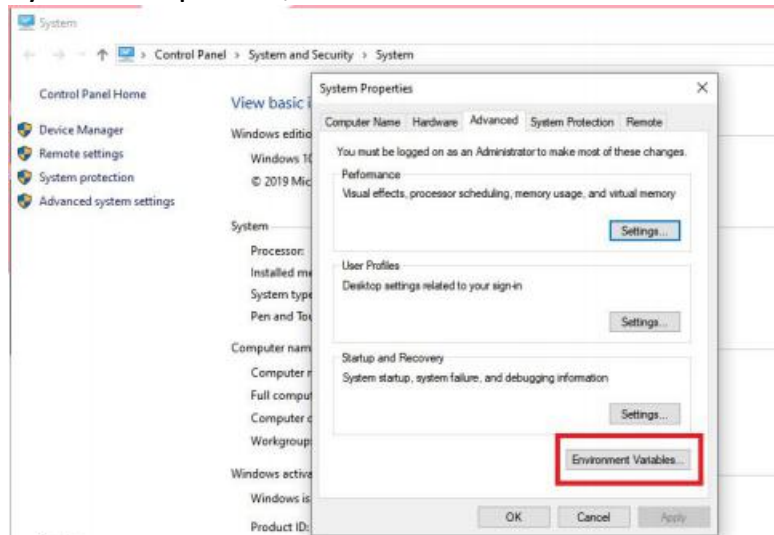
d. While installing a green progress bar will highlight the progress of the installation as shown in the figure below.



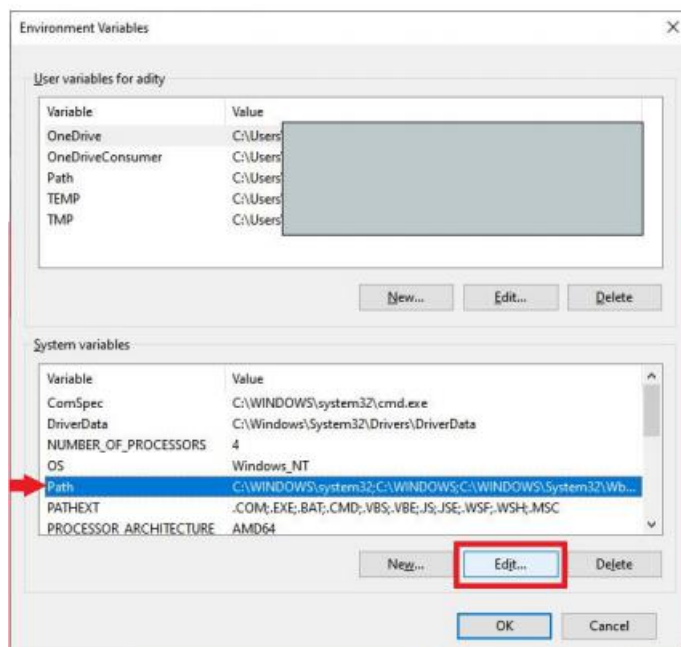
e. Once complete, a screen stating the setup was successful will appear with a “Close” button. Click on “Close” to end the installation as highlighted in the figure below. Now, you are all set using Python at the command prompt.



4. Before we move forward let's make sure that we are working only with Python 3.7 and no other version (as your system might have previous version(s) of Python already installed), a. Navigate to Environment Variables option on the System Properties, and click on the button as shown in the figure below:

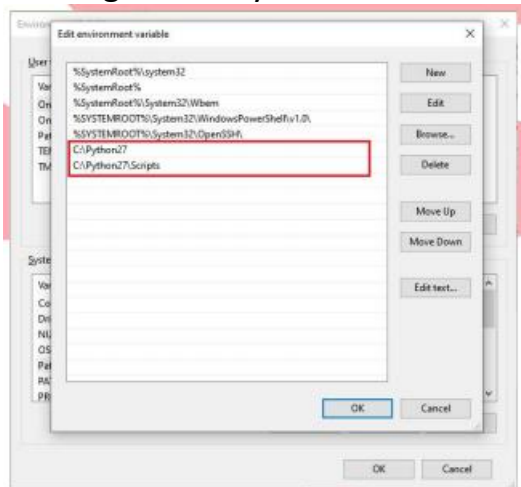


b. Select "Path" variable from the "System Variables" block in the Environment Variables window, and click on the edit button, as shown below:

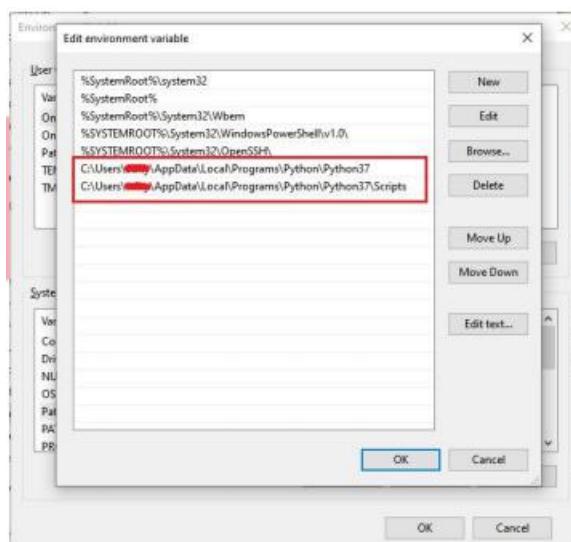


c. In the "Edit environment variable" window we will require all the current versions of the installed Python 3.7 on the system, we will change the paths to our required

Python version. In the figure below, we have Python 2.7 (older version) already running on the system



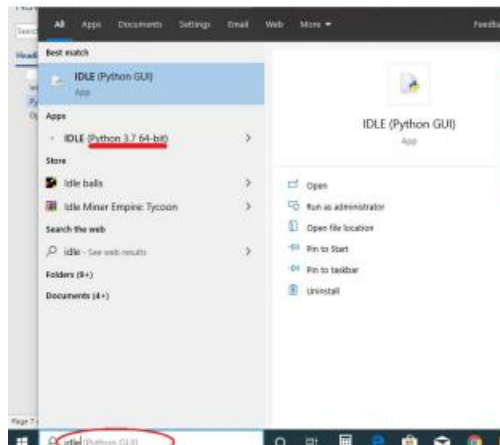
d. On successful installation of Python 3.7, we should see “python37” folder in path “C:\Users\xyz\AppData\Local\Programs\Python” and “Scripts” folder in path “C:\Users\xyz\AppData\Local\Programs\Python\Python37”. We need to delete the previous version paths and replace them with the current version paths, as shown below:



e. To save our Environmental Variables, Click “OK” button on each window until the Environment Variables window closes.

5. In order to edit the Python script via normal text, use IDLE which is installed along with Python install. This will show as “IDLE (Python 3.7 64-bit)” application in search as shown

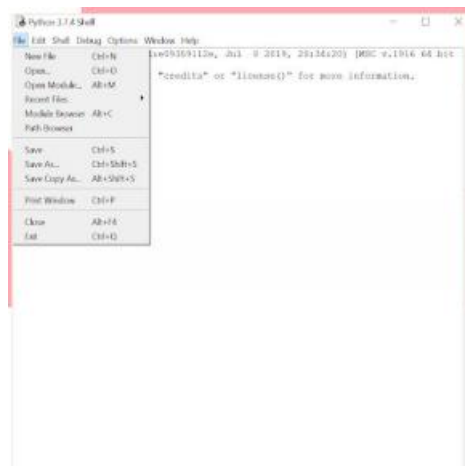
in the figure below, make sure you select “IDLE (Python 3.7 64-bit)”.



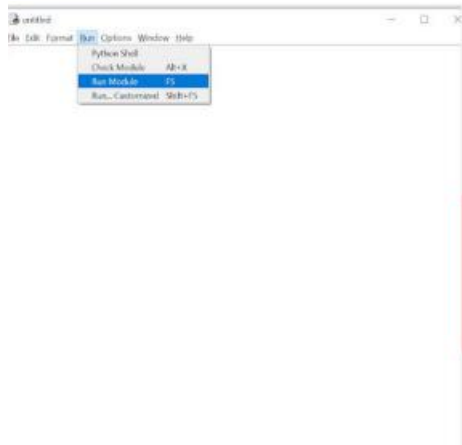
6. The scripting environment of python in IDLE will look like the figure shown below.



7. In order to write scripts, you want to code in IDLE, click on “File ? New File” or press the “Ctrl + N” keys on the keyboard together as shown in the figure below. This will open a script document for you in which you can type your code.

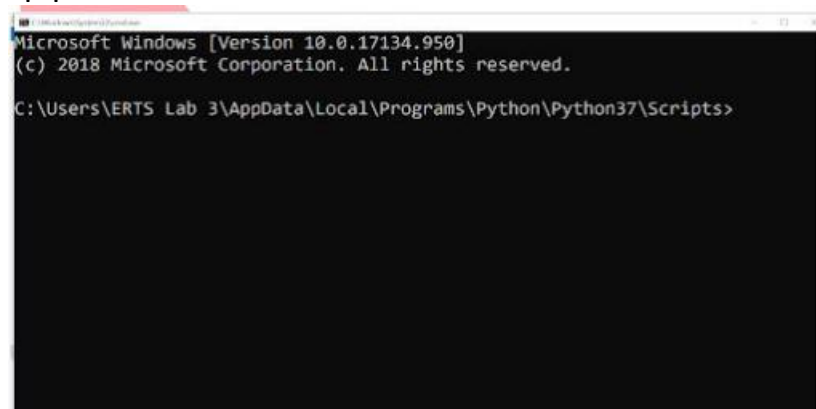


8. To execute or run your code from IDLE click in “Run ? Run Module” or press the F5 key on the keyboard as shown in the figure below.

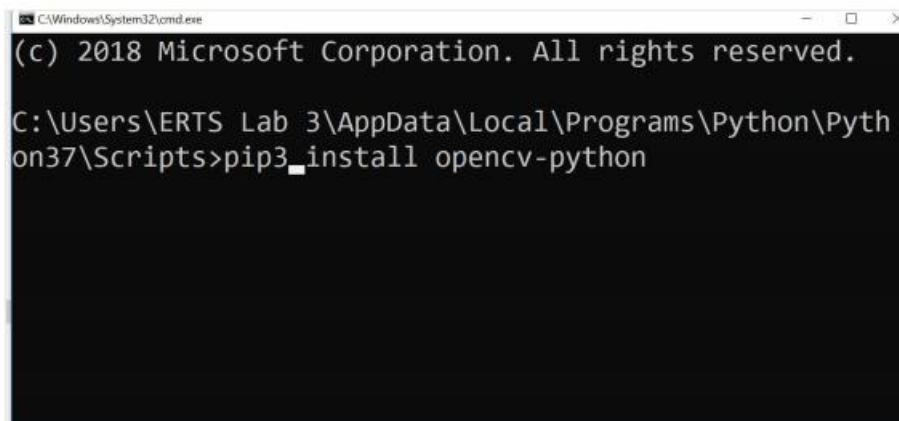


## OpenCV Installation

1. Go to the directory in your system where you have the folder for the installed Python version  
e.g. “C:\Users\Admin\AppData\Local\Programs\Python\Python37”.  
Within this folder go to the “Scripts” folder where “pip.exe” and “pip3.exe” files are there.

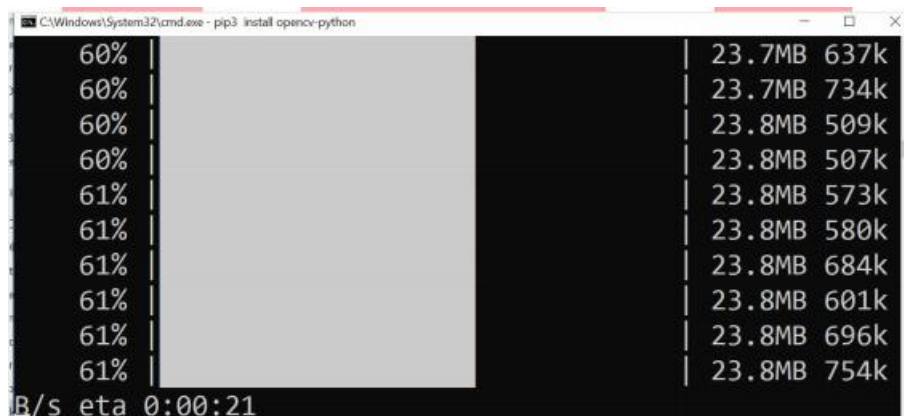


2. Within this folder start the command prompt by typing “cmd” in the address bar of the folder viewer. Once the command window is up as shown in the figure below, at the prompt type the following command. `pip3 install opencv-python` This will start installing python version of opencv on your system and the progress can be seen by a white progress bar increasing from left to right between two pipes `| -> |` as shown in the figures below.



```
C:\Windows\System32\cmd.exe
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\ERTS Lab 3\AppData\Local\Programs\Python\Python37\Scripts>pip3 install opencv-python
```



```
C:\Windows\System32\cmd.exe - pip3 install opencv-python

60% | 23.7MB 637k
60% | 23.7MB 734k
60% | 23.8MB 509k
60% | 23.8MB 507k
61% | 23.8MB 573k
61% | 23.8MB 580k
61% | 23.8MB 684k
61% | 23.8MB 601k
61% | 23.8MB 696k
61% | 23.8MB 754k

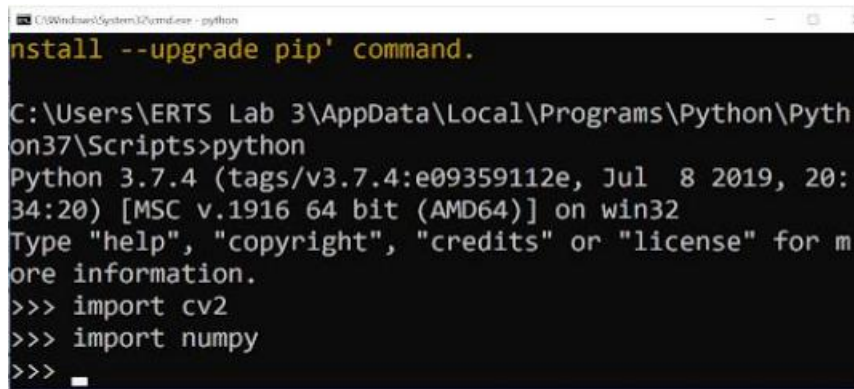
B/s eta 0:00:21
```

3. Once OpenCV is successfully installed it will specify the “numpy” and “OpenCV” versions installed. To verify in python, prompt the installation’s success start python environment on command prompt by just typing “python” followed by the command at python environment’s prompt (ensure ‘I’ is small for import): `import cv2`

**Note:** OpenCV is addressed as “cv2”!

If successfully installed there will be no message and python prompt will return; else the exact error will be shown at python prompt (i.e. cv2 does not exist) as depicted by success case in the figure below.





```
C:\Windows\System32\cmd.exe - python
install --upgrade pip' command.

C:\Users\ERTS Lab 3\AppData\Local\Programs\Python\Python37\Scripts>python
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul 8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> import numpy
>>>
```

4. Similarly, you can test numpy's installation by typing the command:

`import numpy`

Refer to the figure above. If successfully installed there will be no message and python

prompt will return; else the exact error will be shown at python prompt (i.e. numpy does not exist)

NumPy is a general-purpose library for processing data in arrays and matrices and in OpenCV

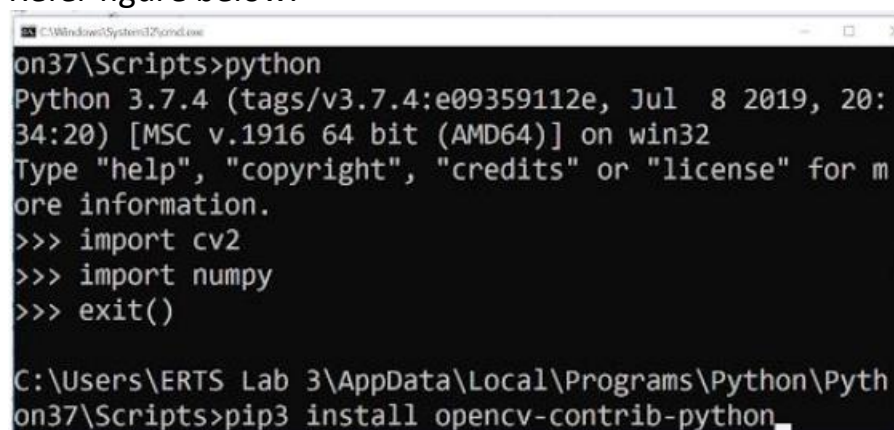
we process images as arrays or matrices hence they are coupled.

5. There are some additional features in OpenCV available in its "contrib" set of library

functions. These too need to be installed by typing the following statement at command prompt:

`pip3 install opencv-contrib-python`

Refer figure below.



```
C:\Windows\System32\cmd.exe
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul 8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import cv2
>>> import numpy
>>> exit()

C:\Users\ERTS Lab 3\AppData\Local\Programs\Python\Python37\Scripts>pip3 install opencv-contrib-python_
```

This will start installing python version of OpenCV's contrib modules on your system and the progress can be seen by a white progress bar increasing from left to right between two pipes | -> | as shown in the figure below.

```
C:\Windows\System32\cmd.exe - pip3 install opencv-contrib-python
29% | 13.6MB 518k
29% | 13.6MB 517k
30% | 13.6MB 521k
30% | 13.6MB 468k
30% | 13.6MB 517k
30% | 13.6MB 361k
30% | 13.6MB 362k
30% | 13.7MB 272k
30% | 13.7MB 252k
30% | 13.7MB 277k
B/s eta 0:01:55
```

6. Before this, to exit python prompt type the following command at python prompt:

**exit()**

7. Now you are all set to program Image Processing Algorithms in python using OpenCV and NumPy.

8. Next to ensure you have the correct versions of Python and OpenCV, please run the script `checkversion.py` given in the “**Codes**” folder.

**NOTE:** Use “IDLE (Python 3.7 64-bit)” for running the `checkversion.py` file also as previous version of IDLE might give error output

On running the `checkversion.py` script you should get the following output window:

```
Python 3.7.4 Shell
File Edit Shell Debug Options Window Help
Python 3.7.4 (tags/v3.7.4:e09359112e, Jul 8 2019, 20:34:20) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\adity\Desktop\Supply Bot (SB)-20191023T092916Z-001\Supply Bot (SB) afterupdate4mModi\Supply Bot (SB)\Task0.1\Test Setup\checkversion.py

Required Python Version is 3.7.x
Installed Python Version is: 3.7.4
Python Installation is OK!!

Required Opencv version is: 4.1.1
Installed Opencv Version is: 4.1.1
Opencv Installation is OK!!

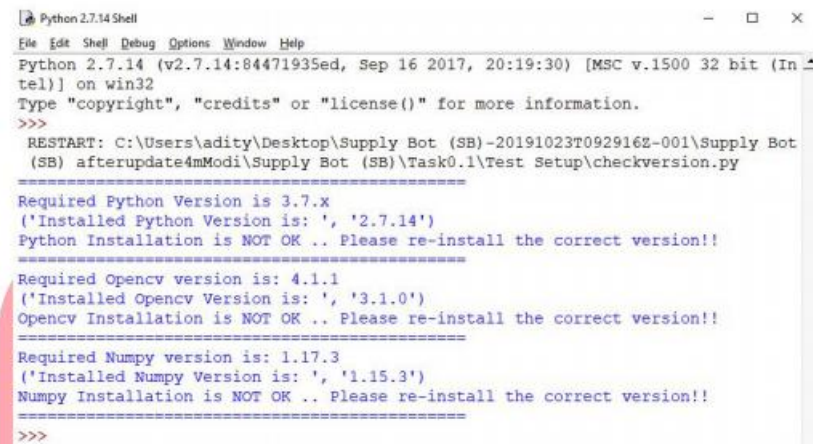
Required Numpy version is: 1.17.3
Installed Numpy Version is: 1.17.3
Numpy Installation is OK!!

>>> |
```

Correct Output

Correct Output

Following is an example of INCORRECT output window



```
Python 2.7.14 Shell
File Edit Shell Debug Options Window Help
Python 2.7.14 (v2.7.14:84471935ed, Sep 16 2017, 20:19:30) [MSC v.1500 32 bit (Intel)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\adity\Desktop\Supply Bot (SB)-20191023T092916Z-001\Supply Bot (SB) afterupdate4mModi\Supply Bot (SB)\Task0.1\Test Setup\checkversion.py
=====
Required Python Version is 3.7.x
('Installed Python Version is: ', '2.7.14')
Python Installation is NOT OK .. Please re-install the correct version!!
=====
Required Opencv version is: 4.1.1
('Installed Opencv Version is: ', '3.1.0')
Opencv Installation is NOT OK .. Please re-install the correct version!!
=====
Required Numpy version is: 1.17.3
('Installed Numpy Version is: ', '1.15.3')
Numpy Installation is NOT OK .. Please re-install the correct version!!
=====
>>>
```

Incorrect Output