

LAB 5 – USB Image File Storage Limits

Downloading and Installing Python (for installing on your own PC/laptop)

In this course, we will be using Python version 2.7. Python can be download and installed on your own computer by going to www.python.org, and clicking on the Download link shown below.

ABOUT	>>
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Help

Python Programming Language – Official Website

Python is a programming language that lets you work more quickly and integrate your systems more effectively. You can learn to use Python and see almost immediate gains in productivity and lower maintenance costs.

Python runs on Windows, Linux/Unix, Mac OS X, and has been ported to the Java and .NET virtual machines.

Python is free to use, even for commercial products, because of its OSI-approved [open source license](#).

New to Python or choosing between Python 2 and Python 3? Read [Python 2](#) or [Python 3](#).

Then, on the download page, click on the following link for installation a Windows system,

Download Python

The current production versions are [Python 2.7](#) and [Python 3.1.2](#).

Start with one of these versions for learning Python or if you want the most stability; they're both considered stable production releases.

If you don't know which version to use, start with Python 2.7; more existing third party software is compatible with Python 2 than Python 3 right now.

For the MD5 checksums and OpenPGP signatures, look at the [detailed Python 2.7](#) page:

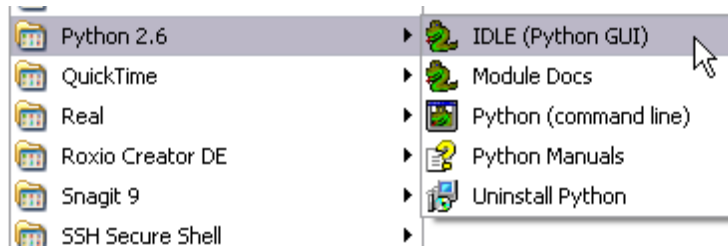
- ➔ [Python 2.7 Windows installer](#) (Windows binary -- does not include source)
- [Python 2.7 Windows X86-64 installer](#) (Windows AMD64 / Intel 64 / X86-64 binary [1] -- does not include source)
- [Python 2.7 32-bit Mac OS X Installer Disk Image](#) (for Mac OS X 10.3 through 10.6)
- [Python 2.7 PPC/i386/x86-64 Mac OS X Installer Disk Image](#) (for Mac OS X 10.5 or later)
- [Python 2.7 compressed source tarball](#) (for Linux, Unix or OS X)
- [Python 2.7 bzipipped source tarball](#) (for Linux, Unix or OS X, more compressed)

If you are installing on a Mac or Linux machine, the select the appropriate links shown above.

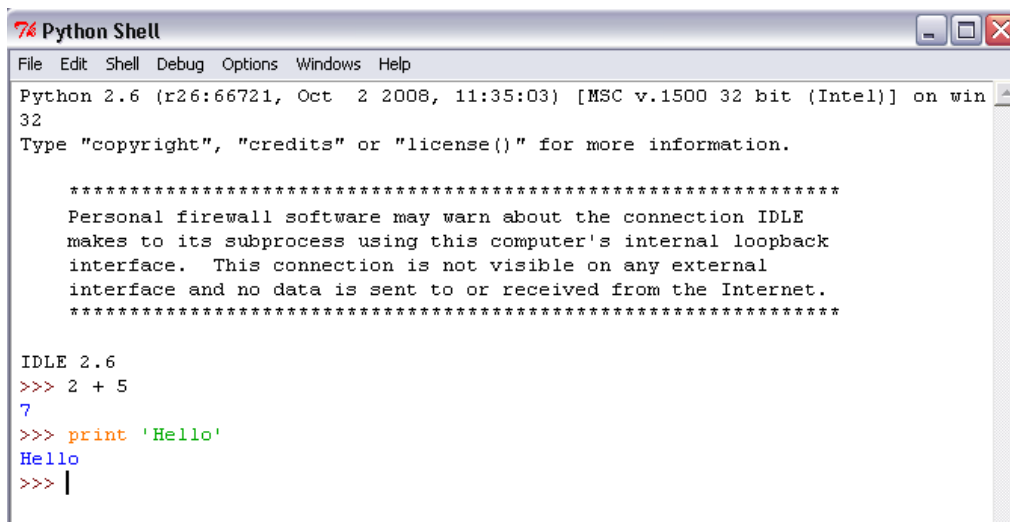
To install, just execute (double-click) the downloaded installer file.

Introduction to Python Program Development Using IDLE

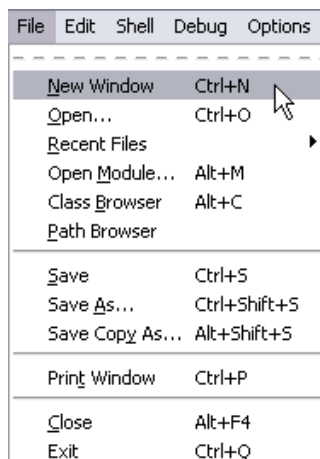
A Python development environment called IDLE is included with the Python download. Select the IDLE option as shown below.



You will get a screen as shown below. At this point you can just type instructions at the prompt and see the results, as shown below.



Or, you can start a new program file under File → New Window, which will create a new window to type and save a program in.



Python Instructions Needed for This Lab

Arithmetic Operators: * (mult) and // (truncated division)

print Statement: e.g., print 'Value of num is ', num

Relational Operators: == (equal), e.g. num == 10 (True/False result)

Assignment Operator: = (assign), e.g. num = 10 (assigns 10 to variable num)

For input of numerical values

age = input ('Enter your age: ')

Task

Develop and test a Python program that determines how many images can be stored on a given size USB (flash) drive. The size of the USB drive is to be entered by the user in gigabytes (GB). The number of images that can be stored must be calculated for GIF, JPEG, PNG, and TIFF image file formats. An example run of the program is given below.

```
Enter USB size (GB): 4
xxxxx images in GIF format can be stored
xxxxx images in JPEG format can be stored
xxxxx images in PNG format can be stored
xxxxx images in TIFF format can be stored
```

Image formats such as JPEG allow the user to select the degree of compression for the image quality desired. For this program, assume the image compression ratios given below. Finally, assume that the images to store all have a resolution of 600x800. Thus, for example, a 600x800 resolution image with 16-bit color depth would have a total number of bytes of $600 \times 800 \times 2$ (8-bits in one byte) = 960000. Then, if there is a compression rate of 25:1, then the total number of bytes needed to store the image would be $960000 / 25 = 38400$.

Finally, assume that a GB (gigabyte) equal 1,000,000,000 bytes.

Format	Full Name	Color Depth		Compression	
GIF	Graphics Interchange Format	256 colors	8 bits	lossless	5:1
JPEG	Joint Photographic Experts Group	16 million colors	24 bits	lossy	25:1
PNG	Portable Network Graphics	16 million colors	24 bits	lossless	8:1
TIFF	Tagged Image File Format	280 trillion colors	48 bits	lossless	n/a

What to Turn In

- printout of your program (shown at right)
- copy posted in BlackBoard

