PYTHON INTRODUCTION

Python is a simple, general purpose, high level, and object-oriented programming language.

Python is an interpreted scripting language also. Guido Van Rossum is known as the founder of Python programming.

Python is a general purpose, dynamic, high level, and interpreted programming language. It supports Object Oriented programming approach to develop applications. It is simple and easy to learn and provides lots of high-level data structures.

Python is *easy to learn* yet powerful and versatile scripting language, which makes it attractive for Application Development.

Python's syntax and *dynamic typing* with its interpreted nature make it an ideal language for scripting and rapid application development.

Python supports *multiple programming pattern*, including object-oriented, imperative, and functional or procedural programming styles.

Python is not intended to work in a particular area, such as web programming. That is why it is known as *multipurpose* programming language because it can be used with web, enterprise, 3D CAD, etc.

We don't need to use data types to declare variable because it is *dynamically typed* so we can write a=10 to assign an integer value in an integer variable.

Python makes the development and debugging *fast* because there is no compilation step included in Python development, and edit-test-debug cycle is very fast.

PYTHON 2 VS. PYTHON 3

In most of the programming languages, whenever a new version releases, it supports the features and syntax of the existing version of the language, therefore, it is easier for the projects to switch in the newer version. However, in the case of Python, the two versions Python 2 and Python 3 are very much different from each other.

A LIST OF DIFFERENCES BETWEEN PYTHON 2 AND PYTHON 3 ARE GIVEN BELOW:

Python 2 uses **print** as a statement and used as print "something" to print some string on the console. On the other hand, Python 3 uses **print** as a function and used as print("something") to print something on the console.

Python 2 uses the function raw_input() to accept the user's input. It returns the string representing the value, which is typed by the user. To convert it into the integer, we need to use the int() function in Python. On the other hand, Python 3 uses input() function which automatically interpreted the type of input entered by the user. However, we can cast this value to any type by using primitive functions (int(), str(), etc.).

In Python 2, the implicit string type is ASCII, whereas, in Python 3, the implicit string type is Unicode.

Python 3 doesn't contain the xrange() function of Python 2. The xrange() is the variant of range() function which returns a xrange object that works similar to Java iterator. The range() returns a list for example the function range(0,3) contains 0, 1, 2.

There is also a small change made in Exception handling in Python 3. It defines a keyword **as** which is necessary to be used. We will discuss it in Exception handling section of Python programming tutorial.

PYTHON FEATURES

Python provides lots of features that are listed below.

EASY TO LEARN AND USE

Python is easy to learn and use. It is developer-friendly and high level programming language.

EXPRESSIVE LANGUAGE

Python language is more expressive means that it is more understandable and readable.

INTERPRETED LANGUAGE

Python is an interpreted language i.e. interpreter executes the code line by line at a time. This makes debugging easy and thus suitable for beginners.

CROSS-PLATFORM LANGUAGE

Python can run equally on different platforms such as Windows, Linux, Unix and Macintosh etc. So, we can say that Python is a portable language.

FREE AND OPEN SOURCE

Python language is freely available at offical web (https://www.python.org) The source-code is also available. Therefore it is open source.

OBJECT-ORIENTED LANGUAGE

Python supports object oriented language and concepts of classes and objects come into existence.

EXTENSIBLE

It implies that other languages such as C/C++ can be used to compile the code and thus it can be used further in our python code.

LARGE STANDARD LIBRARY

Python has a large and broad library and provides rich set of module and functions for rapid application development.

GUI PROGRAMMING SUPPORT

Graphical user interfaces can be developed using Python.

INTEGRATED

It can be easily integrated with languages like C, C++, JAVA etc.

HISTORY

PYTHON HISTORY AND VERSIONS

Python laid its foundation in the late 1980s.

The implementation of Python was started in the December 1989 by **Guido Van Rossum** at CWI in Netherland (dutch).

In February 1991, van Rossum published the code (labeled version 0.9.0) to alt.sources.

In 1994, Python 1.0 was released with new features like: lambda, map, filter, and reduce.

Python 2.0 added new features like: list comprehensions, garbage collection system.

On December 3, 2008, Python 3.0 (also called "Py3K") was released. It was designed to rectify fundamental flaw of the language.

ABC programming language is said to be the predecessor of Python language which was capable of Exception Handling and interfacing with Amoeba Operating System.

Python is influenced by following programming languages:

- ABC language.
- Modula-3

PYTHON VERSION LIST

Python programming language is being updated regularly with new features and supports. There are lots of updations in python versions, started from 1994 to current release.

A list of python versions with its released date is given below.

Python Version	Released Date
Python 1.0	January 1994
Python 1.5	December 31, 1997
Python 1.6	September 5, 2000
Python 2.0	October 16, 2000
Python 2.1	April 17, 2001
Python 2.2	December 21, 2001
Python 2.3	July 29, 2003
Python 2.4	November 30, 2004
Python 2.5	September 19, 2006

Python Version	Released Date
Python 2.7	July 3, 2010
Python 3.0	December 3, 2008
Python 3.1	June 27, 2009
Python 3.2	February 20, 2011
Python 3.3	September 29, 2012
Python 3.4	March 16, 2014
Python 3.5	September 13, 2015
Python 3.6	December 23, 2016
Python 3.7	June 27, 2018

PYTHON APPLICATIONS

Python is known for its general purpose nature that makes it applicable in almost each domain of software development. Python as a whole can be used in any sphere of development.

Here, we are specifing applications areas where python can be applied.

WEB APPLICATIONS

We can use Python to develop web applications. It provides libraries to handle internet protocols such as HTML and XML, JSON, Email processing, request, beautifulSoup, Feedparser etc. It also provides Frameworks such as Django, Pyramid, Flask etc to design and delelop web based applications. Some important developments are: PythonWikiEngines, Pocoo, PythonBlogSoftware etc.

DESKTOP GUI APPLICATIONS

Python provides Tk GUI library to develop user interface in python based application. Some other useful toolkits wxWidgets, Kivy, pyqt that are useable on several platforms. The Kivy is popular for writing multitouch applications.

SOFTWARE DEVELOPMENT

Python is helpful for software development process. It works as a support language and can be used for build control and management, testing etc.

SCIENTIFIC AND NUMERIC

Python is popular and widely used in scientific and numeric computing. Some useful library and package are SciPy, Pandas, IPython etc. SciPy is group of packages of engineering, science and mathematics.

BUSINESS APPLICATIONS

Python is used to build Bussiness applications like ERP and e-commerce systems. Tryton is a high level application platform.

CONSOLE BASED APPLICATION

We can use Python to develop console based applications. For example: **IPython.**

AUDIO OR VIDEO BASED APPLICATIONS

Python is awesome to perform multiple tasks and can be used to develop multimedia applications. Some of real applications are: TimPlayer, cplay etc.

3D CAD APPLICATIONS

To create CAD application Fandango is a real application which provides full features of CAD.

ENTERPRISE APPLICATIONS

Python can be used to create applications which can be used within an Enterprise or an Organization. Some real time applications are: OpenErp, Tryton, Picalo etc.

APPLICATIONS FOR IMAGES

Using Python several application can be developed for image. Applications developed are: VPython, Gogh, imgSeek etc.

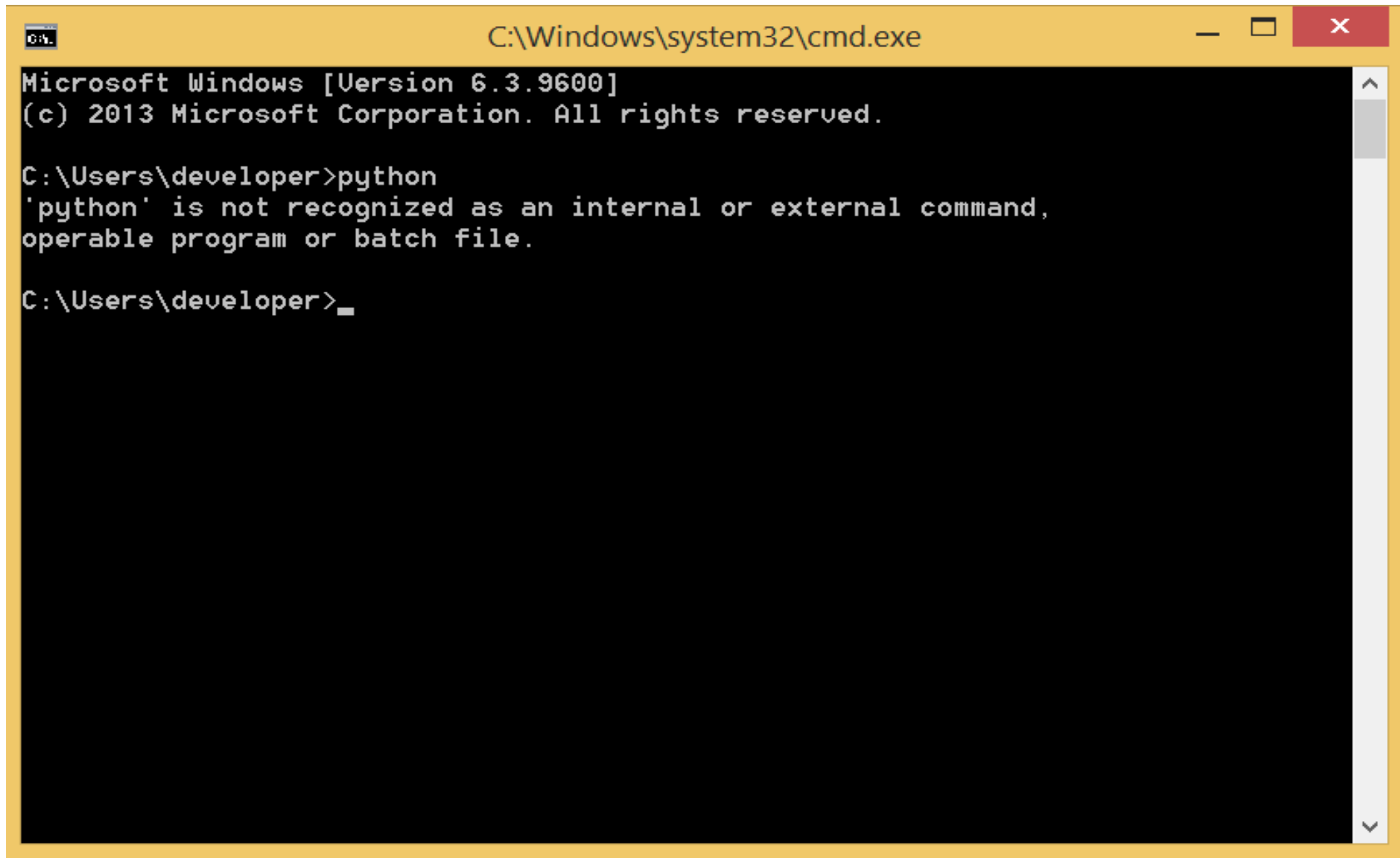There are several such applications which can be developed using Python

HOW TO INSTALL PYTHON (ENVIRONMENT SET-UP)

INSTALLATION ON WINDOWS

Visit the link *https://www.python.org/downloads/* to download the latest release of Python. In this process, we will install Python 3.6.7 on our Windows operating system.

Double-click the executable file which is downloaded; the following window will open. Select Customize installation and proceed.

Now, try to run python on the command prompt. Type the command **python** in case of python2 or python3 in case of **python3.** It will show an error as given in the below image. It is because we haven't set the path.

To set the path of python, we need to the right click on "my computer" and go to Properties → Advanced → Environment Variables.

Add the new path variable in the user variable section.

Type **PATH** as the variable name and set the path to the installation directory of the python.

Now, the path is set, we are ready to run python on our local system. Restart CMD, and type **python** again. It will open the python interpreter shell where we can execute the python statements.

FIRST PYTHON PROGRAM

Python provides us the two ways to run a program:

1. Using Interactive interpreter prompt

2. Using a script file

Let's discuss each one of them in detail.

INTERACTIVE INTERPRETER PROMPT

Python provides us the feature to execute the python statement one by one at the interactive prompt. It is preferable in the case where we are concerned about the output of each line of our python program.

To open the interactive mode, open the terminal (or command prompt) and type python (python3 in case if you have python2 and python3 both installed on your system).

It will open the following prompt where we can execute the python statement and check their impact on the console.

USING A SCRIPT FILE

Interpreter prompt is good to run the individual statements of the code. However, we can not write the code every-time on the terminal.

We need to write our code into a file which can be executed later. For this purpose, open an editor like notepad, create a file named first.py (python used .py extension) and write the following code in it.

Print ("hello world"); #here, we have used print() function to print the message on the console.

To run this file named as first.py, we need to run the following command on the terminal.

$ python3 first.py

GET STARTED WITH PYCHARM

In our first program, we have used gedit on our CentOS as an editor. On Windows, we have an alternative like notepad or notepad++ to edit the code. However, these editors are not used as IDE for python since they are unable to show the syntax related suggestions.

JetBrains provides the most popular and a widely used cross-platform IDE **PyCharm** to run the python programs.

PYCHARM INSTALLATION

As we have already stated, PyCharm is a cross-platform IDE, and hence it can be installed on a variety of the operating systems.

CONTINUE IN NEXT UNIT ....