

# Python4All

By Ram

Course Duration : appx 15 days

Course Timings : Daily from 7:30 AM IST - 8:30 AM IST, Except Sunday

Target Audience: Everyone with computer knowledge

## Course Overview

# Course Content

## Understanding the IT and important keywords

- Software
- Program
- Application
- Instructions
- Framework
- Library
- Package
- API
- Algorithm
- Programming language
- translators
- Compilers
- Interpreters
- assemblers
- IDE

## Installations

- Python installation
- IDE installation

## Introduction

- Python introduction and history
- Programming Paradigm -
  - Procedural vs Functional vs Object oriented programming
- Python2 vs python3
- Compiler vs Interpreter
- Scripting vs Programming
- Interactive mode vs scripting mode
- Python program structure
- Working with Visual studio
  - Create new project
  - Install python extension
  - Install code runner extension
  - Preference settings

# Course Content Contd..

## Getting started with python

- First program
- Print function
- Input function
- Strings
- Escape characters
- Comments

## Variables

- Variable naming convention
- Single variable assignment
- Multiple variable assignment
- Local and global variables
- Global keyword
- conversion functions

## Data Types

- Built-in Data Types
- Type()
- casting
- Data type example programs

# Course Content Contd..

## Operators

- Arithmetic Operators
- Assignment Operators
- Comparison Operators
- Logical Operators
- Identity Operators
- Membership Operators
- ternary operators
- Bitwise Operators

## Program Flow control

- If
- If-else
- If-elif-else
- Nested-if
- Loop control statements
- for
- while
- Nested loops
- Branching statements
- Continue
- Break
- Pass
- Examples

# Course Content Contd..

## Python Strings

- Slicing
- Manipulation
  - Upper function
  - Lower function
  - Replace function
  - Remove function
  - Split function
- Concatenate
- String format
- String functions
  - Strip
  - Swapcase
  - Find
  - Isupper
  - Islower
  - Isdigit
  - Capitalize
- String programs
- Immutability vs mutability

# Understanding IT and Important Keywords -

Where do you fall under?

- ▶ Project Management Team
- ▶ Development Team
- ▶ Quality Assurance Team
- ▶ IT Operations/DevOps/SRE Teams
- ▶ Support Team
- ▶ Security Team



# Important Keywords

## - software

### ► Examples of Software -

#### ► System software

- Operating System, Compiler, Loader, Linker and Assembler

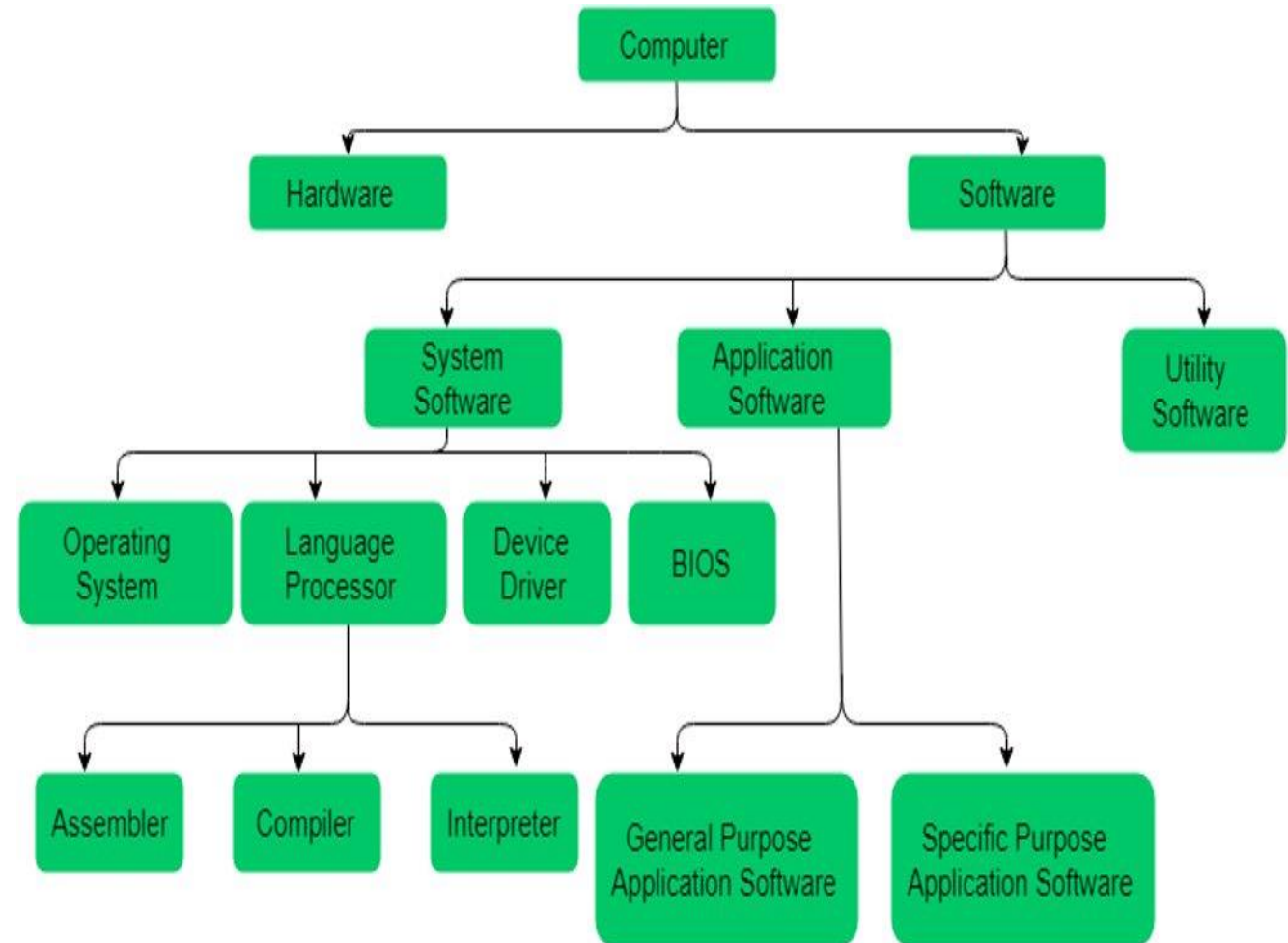
#### ► Application software

- Database - Oracle, Mysql, Browser, Zoom, teams, Web browser,

Word, power-point

#### ► Utility software

- Antivirus
- Disk formatter
- File manager

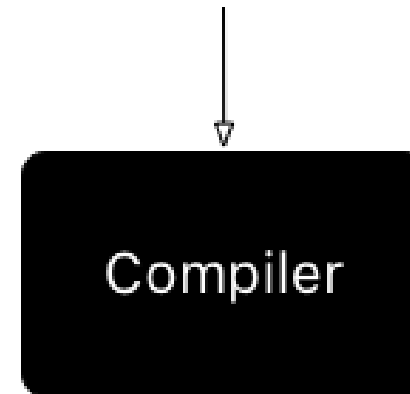




# Important Keywords Contd.. - Program, compiler, Instructions

- ▶ **Instruction** - addition, subtraction, copy, move, delete, send req over http.
- ▶ **Program** - set of instructions executed by computer to perform some task
- ▶ **Compiler/interpreter** - which converts human readable code to Machine understandable code
- ▶ **Assembler** - which converts assembly code to machine understandable code

```
func greet() = {  
    Console.println("Hello, World!")  
}
```



Magic happens here!

```
10100111100  
11110011001  
10010010010  
10110111001  
11101111011
```

# Important Keywords Contd.. - Programming languages

## ► Programming languages-

### ► Procedural programming languages -

C, C++, JAVA, Python, FORTRAN, PASCAL and etc

### ► Functional programming language -

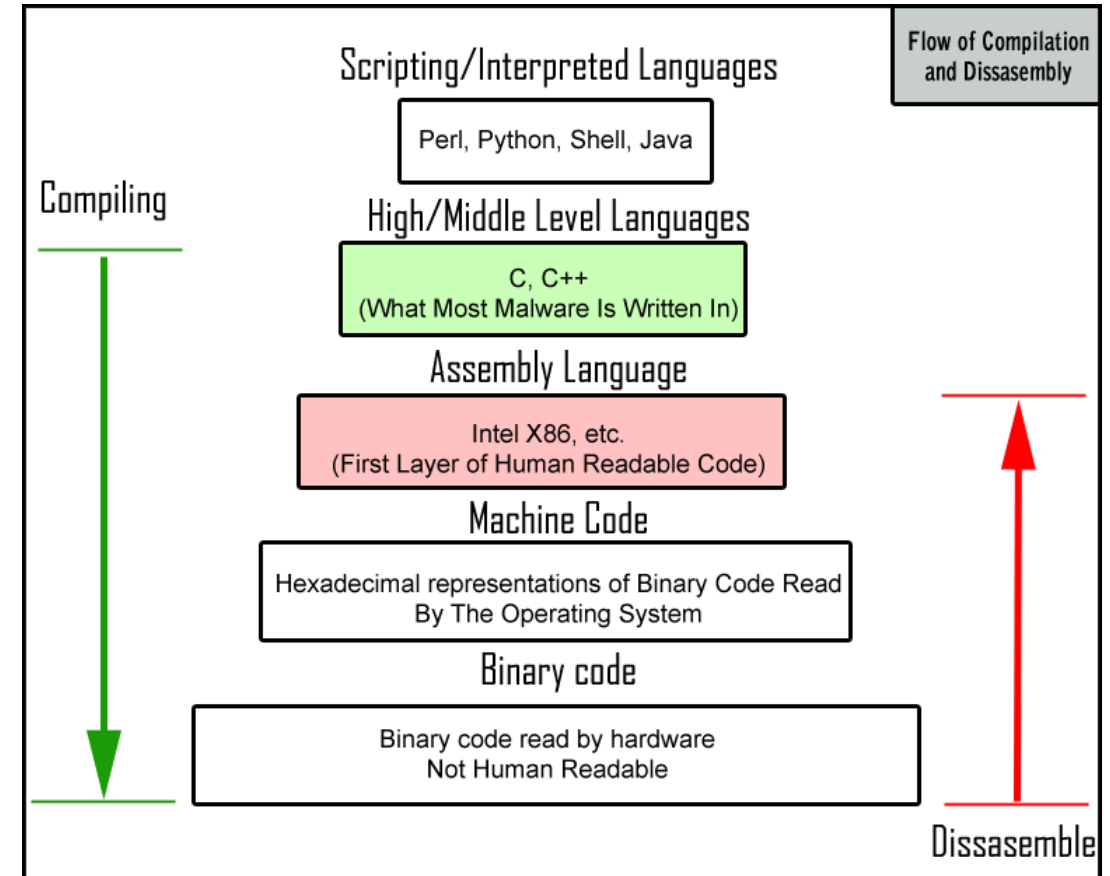
HASKEL, SCALA and etc.,

### ► Object-Oriented Programming language -

Java, C++, Python and etc.,

### ► Scripting programming language -

java script, pearl, ruby, python, jquery, bash, batch, powershell, Ajax and etc.,



# Important Keywords Contd.. - SDK, FRAMEWORK, Package, API, Library, Algorithm

- ▶ **SDK**- Python, Java , etc.,,
- ▶ **FRAMEWORK**- webpy, web2py, Django, Flask, etc.,
- ▶ **Libraries**- Pandas, Scikit-Learn, matplotlib, etc.,
- ▶ **Package** - It is simply a directory/folder that contains several program files
- ▶ **API**- RestFul Services
- ▶ **Algorithm**- simple functions to add two numbers, function to remove files.
- ▶ **IDE** - Eclipse,jDeveloper, Visual Studio code, intelliJ and etc.,

## Applications we can develop using python software



Desktop GUI - TKinter, Kivy and so on



Enterprise application - business applications (ERPNext, ERP5, Tryton)



Data science and data visualisation - numpy, pandas & data extraction - matplotlib, scikit learn - graph plotting



Machine learning and Artificial Intelligence



Gaming development - pyjama, pySoy



Web development - Django, flask, webpy, web2py



Embedded applications



Process automations

# Popular Software written using Python

Youtube

Dropbox

Instagram

Google

Quora

Netflix



# Translators



# Translators

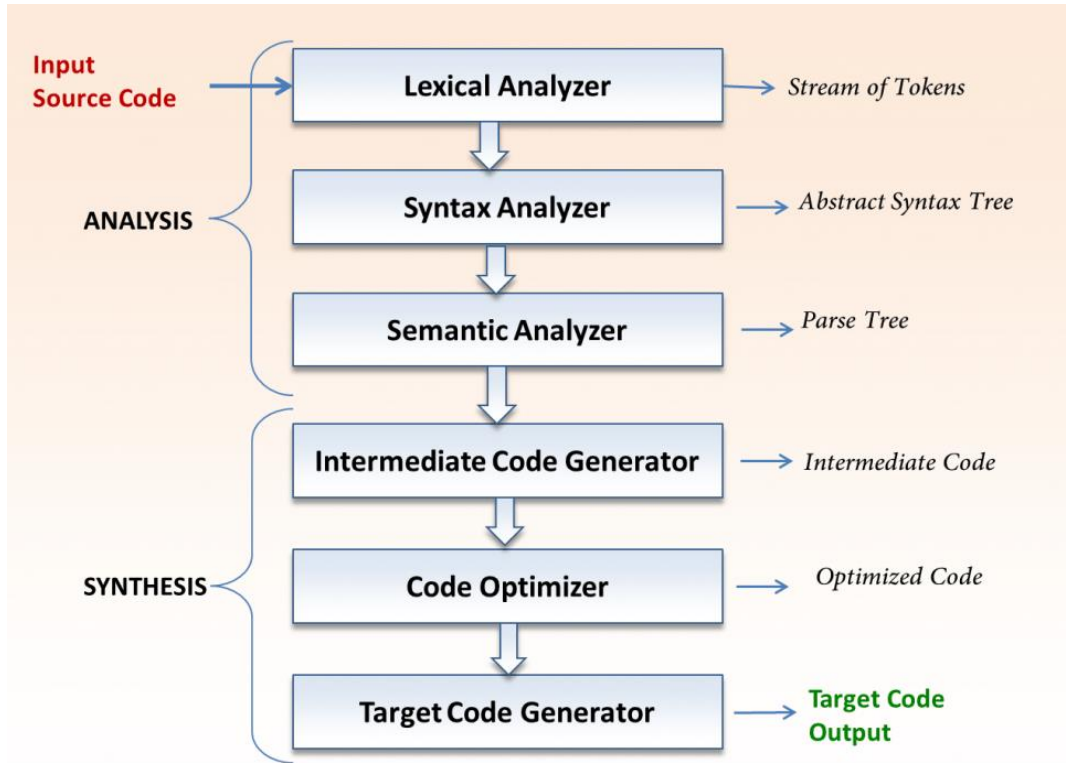
- ▶ A translator is a program that converts source code into object code. Generally, there are three types of translator

**COMPILER** - converts whole program into machine language at a same time

**INTERPRETER** - converts program into machine language one line at a time.

**ASSEMBLER** - converts assembly language code to machine language

# Compiler





# Lexical Analysis



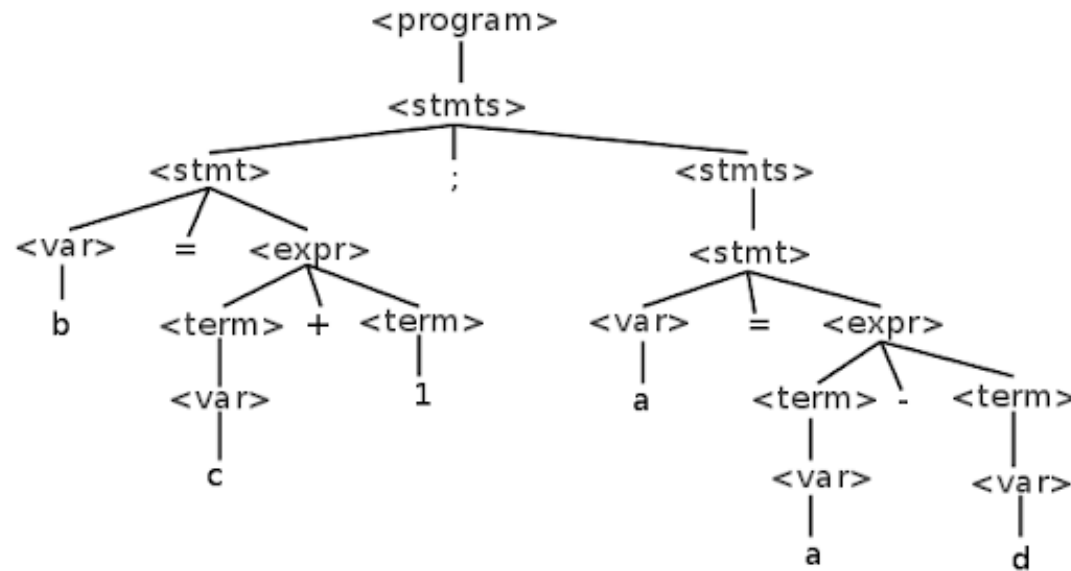
- A Lexical Analyzer (Lexer, or Scanner) groups input characters into tokens

input	token	value
x = x * (acc+123)	identifier	x
	equal	=
	identifier	x
	star	*
	left-paren	(
	identifier	acc
	plus	+
	integer	123
	right-paren	)

- Tokens are typically represented by numbers

# Syntax analyser - Checks for syntax

b=c+1  
a=a+d



# Semantic analyser - Checks for meaning

Semantically wrong as  
c,a are not initialized

# Compiler phases contd..

Intermediate code  
generator phase

Code optimiser- tries to  
optimise intermediate  
code

Target code generator -  
generate byte code

C,C++,JAVA, FORTRAN,  
COBOL etc are compiled  
languages

```
int a[10], b[10], dot_prod, i; int* a1; int* b1;  
dot_prod = 0; a1 = a; b1 = b;  
for (i=0; i<10; i++) dot_prod += *a1++ * *b1++;
```

Intermediate code

dot_prod = 0;		b1 = T6
a1 = &a		T7 = T3*T5
b1 = &b		T8 = dot_prod+T7
i = 0		dot_prod = T8
L1: if(i>=10) goto L2		T9 = i+1
T3 = *a1		i = T9
T4 = a1+1		goto L1
a1 = T4		L2:
T5 = *b1		
T6 = b1+1		

# Interpreter

- ▶ Unlike compiler, interpreter converts one line at a time to machine code. Similar to real life interpreter who translates one sentence at a time.
- ▶ Interpreter internally contains some of the phases of compiler for syntax and semantic verification
- ▶ If a program contains multiple errors python program displays one error at a time.
- ▶ Python, java script, java, ruby .. are the some of the examples of interpreter programming languages