

Python4All

By Ram

<https://github.com/bachinaram/python4all>

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

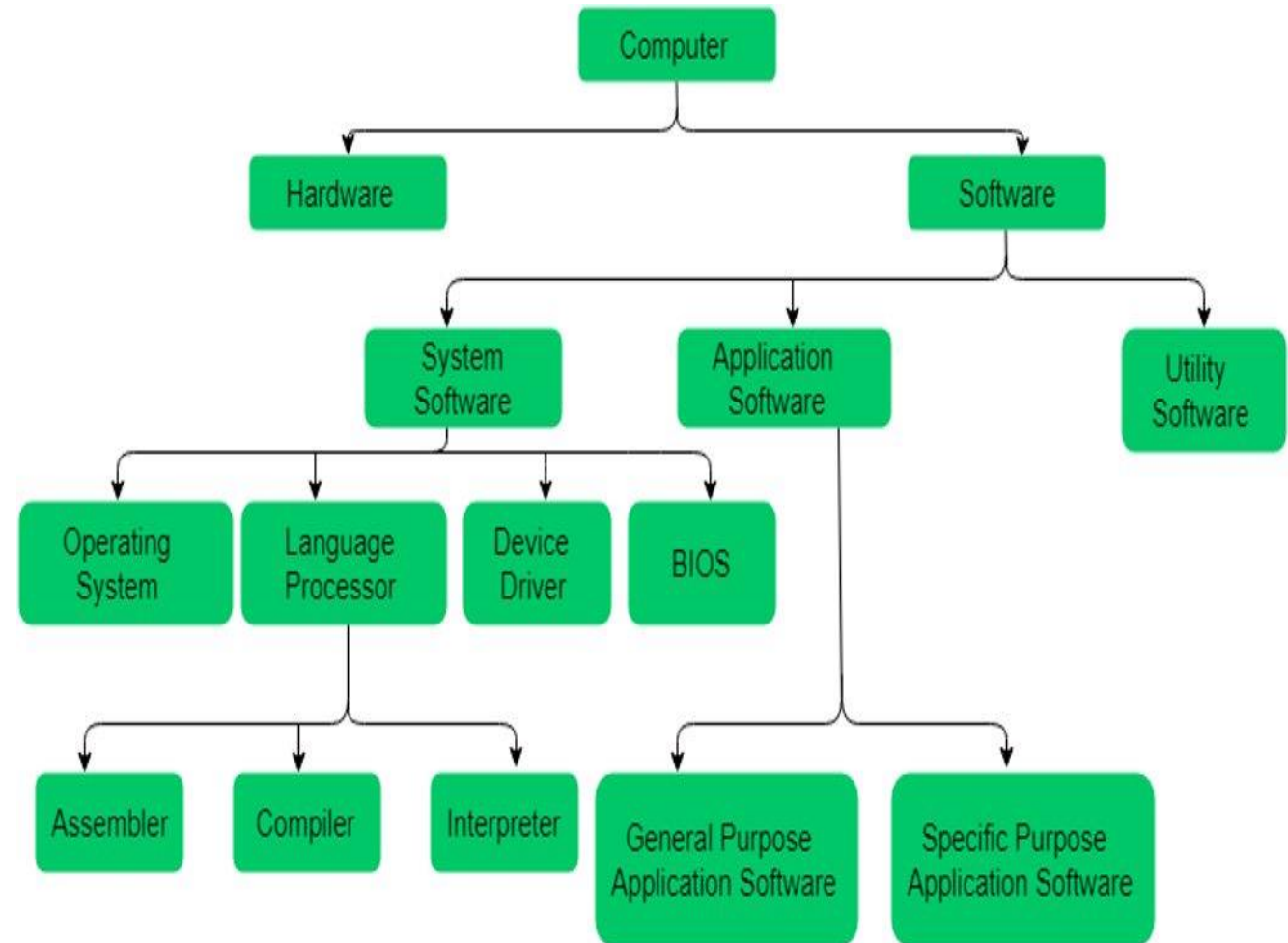
► Application software

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

Word, power-point

► Utility software

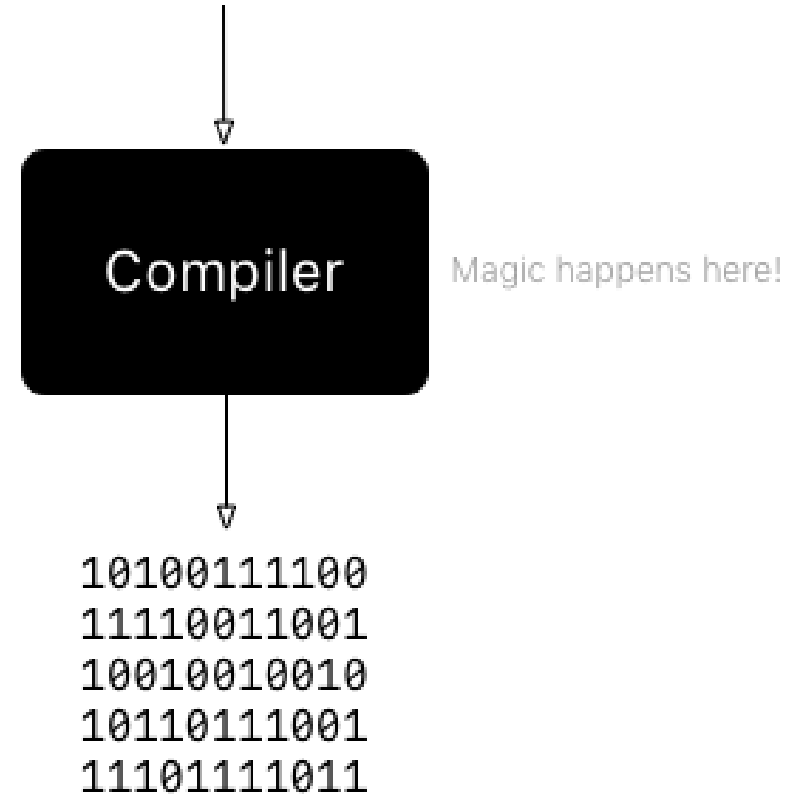
- Antivirus
- Disk formatter
- File manager



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 understand code

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



Important Keywords Contd.. - Programming languages

► Programming languages-

► Procedural programming languages -

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

► Functional programming language -

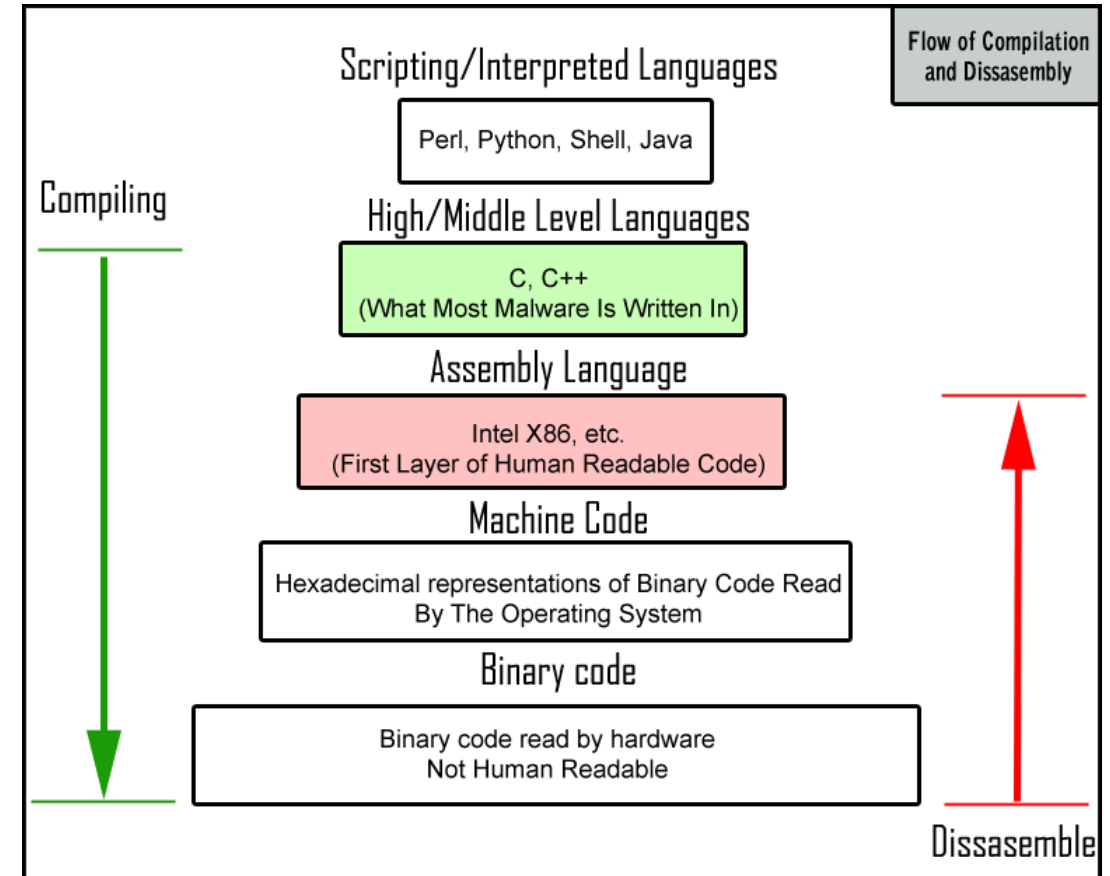
HASKEL, SCALA and etc.,

► 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

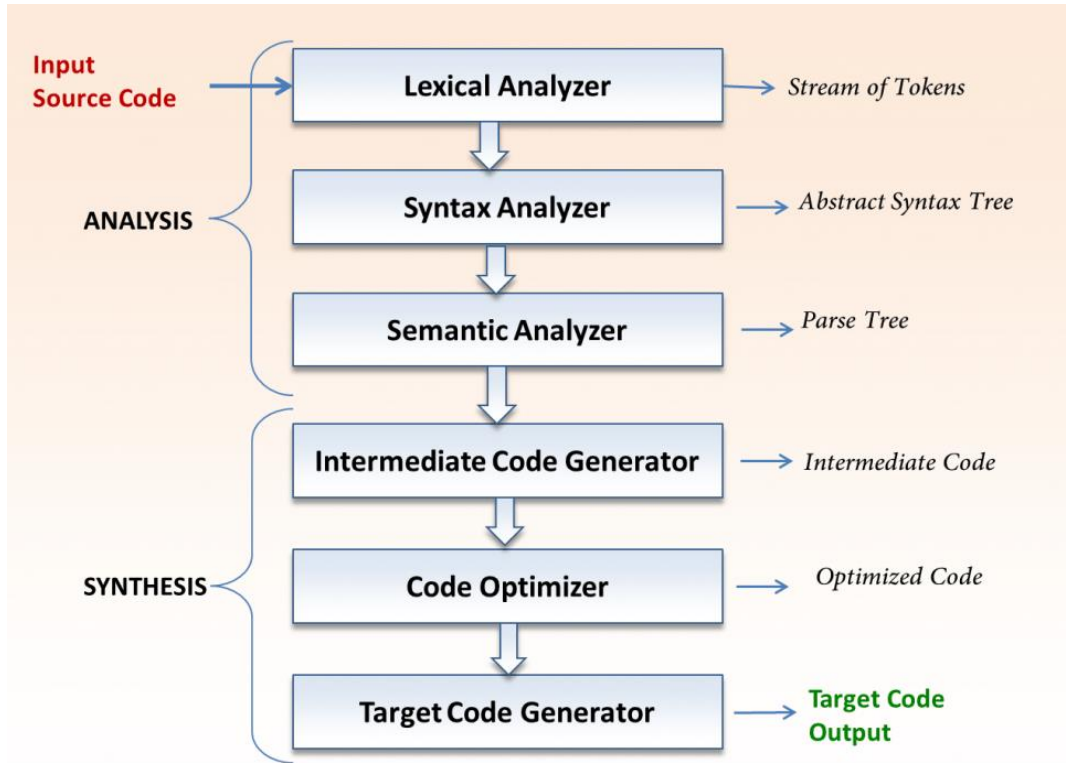
- ▶ A translator is a program that converts source code into object code. Generally, there are three types of translator

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



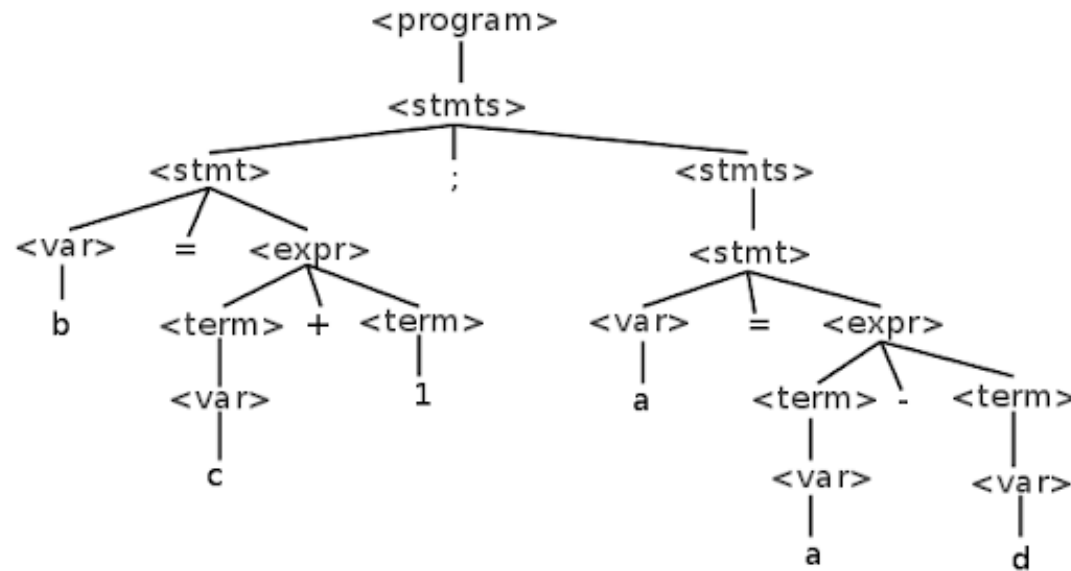
- A Lexical Analyzer (Lexer, or Scanner) groups input characters into tokens

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