## UNIT I (GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING)

### Programming languages

Programming languages are used to communicate instructions to the computer.

Programming languages are written based on syntactic and semantic rules.

Programming languages can be divided into nine major categories.

i) Interpreted programming language

ii) Functional programming language

iii) Compiled programming language

iv) Procedural programming language

v) Scripting programming language

vi) Markup programming language

vii) Logic-based programming language

viii) Concurrent programming language

ix) Object-Oriented programming language

**i) Interpreted programming language**

An interpreted programming language is a programming language that executes instructions directly, without compiling a program into machine-language instructions.

***Example:*** BASIC (Beginners All Purpose Symbolic Instruction Code), LISP (List Processing Language), Python.

**ii) Functional programming language**

Functional Programming languages define every computation as a mathematical evaluation. They are based on mathematical functions. They focus on application of functions.

***Example:*** Clean, curry, F#, Haskell and Q

**iii) Compiled programming language**

Compiled Programming language is a programming language which uses compilers to convert the source code into machine code.

***Example:*** Ada, algol, C,C++,C#, COBOL, Java, Fortran, VB

**iv) Procedural programming language**

A procedural language is a type of computer programming language that specifies a series of well-structured steps and procedures within its programming context to compose a program. These languages specify the steps that the program should take to reach to an intended state. Procedure is a group of statements. It makes the program structured and helps to reuse the code.

***Example:*** CLIST, Hypertalk, MATLAB, PL/I

**v) Scripting programming language**

Scripting languages are Programming languages that control applications.

***Example:*** AppleScript, AWK, MAYA, PHP, VBSCRIPT.

**vi) Markup programming language**

Markup language is an artificial language that define how the text to be displayed.

***Example:*** CURL, SGML, HTML, XML, XHTML.

**vii) Logic-based programming language**

Logic-based programming language is a type of programming language that is based on logic.

***Example:*** ALF, Fril, Janus, Leda, Prolog.

**viii) Concurrent programming language**

It is a computer programming language that executes the operations concurrently.

***Example:*** ABCL, Afnix, E, Joule, Limbo.

**ix) Object-Oriented programming language**

It is a Programming languages based on concepts of objects. Objects contain data and functions.

***Example:*** Agora, Beta, Lava, Moto, Scala, Slate.

**Machine language:**

In machine language, instructions are in the form of 0's and 1's. Instructions in machine language consist of two parts.

| OPCODE | OPERAND |
|---|---|

⟶ OPCODE tells the computer what functions are to be performed.

⟶ OPERAND tells the computer where to store the data.

**Assembly language:**

In assembly language, mnemonic code is assigned to each machine language instruction which is easy to remember and write. Instruction in assembly language consists of 4 parts.

| LABEL | OPCODE | OPERAND | COMMENT |
|---|---|---|---|

**4GL language:**

4GL (Fourth generation languages) are simple which is used to access databases.