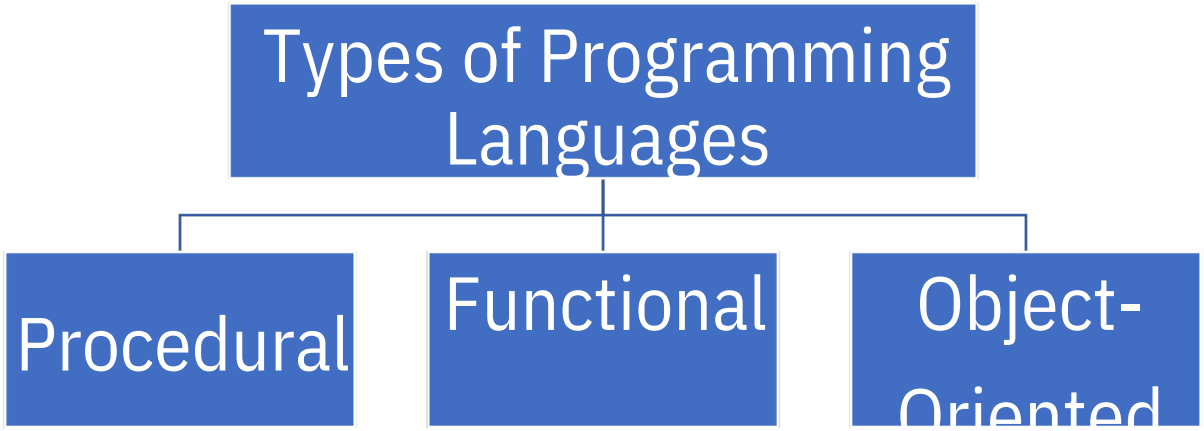
leCture – 1

Introduction to programming

Programming is a way to instruct the computer to perform various task.

Computers only understands Binary i.e., 0's and 1's. Instructing computers in Binary i.e. 0's and 1's are very difficult for humans so,
to solve this issue we have programming languages.

Programming language: - It is a computer language used by programmers
to communicate with computers.



Procedural

- Specifies a series of well-structured steps and procedures to compose a program.
- Contains a systematic order of statements functions and commands to complete a task.

Functional

- Writing a program only in pure functions i.e., never modify variables but only create new ones as an output.
- Used in a situation where we have to perform lots of different operations on the same set of data like ML.

Object Oriented

- Revolves around objects.
- Code + Data = objects
- Developed to make it easier to develop, debug, reuse and maintain software.

“One programming language can be of all 3 types like- Python”

Java Follows procedural and object oriented both types

Static VS Dynamic Languages

Static	Dynamic
Perform type checking at compile time	Perform type checking at runtime
Errors will show at compile time	Error might not show till programs run
Declare datatypes before use	No need to declare datatype of variables
More control	Saves time in writing code but might give error at runtime.

Memory Management

There are 2 types of memory Stack and Heap

When we declare a variable then the reference variable stored in stack memory points to the object of that variable stored in heap memory.

For ex:- $a = 10$

Here “a” is called reference variable, and “10” is the object of That reference variable

- Reference variable are stored in stack memory.
- Heap memory stores the objects of reference variable.

Points to remember:-

- More than one reference variable can points to the same object.
- If any changes made to the object of any reference variable that will be reflected to all others variable pointing to same object.
- If there is an object without reference variable then object will be destroyed by “Garbage Collection”