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* Introduction to Programming

Programming is a way to instruct the computer to perform various task. Computers only understand Binary i.e. 0's & 1's.

Instructing computers in Binary i.e. 0's & 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.

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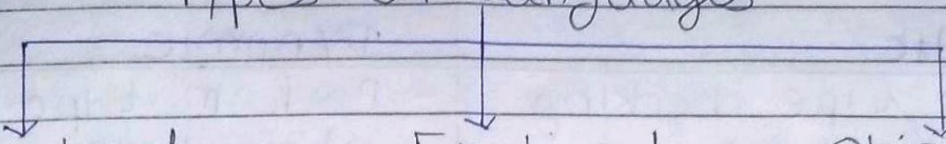
Types of Languages



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 situations where we have to perform lots of different operations on the same set of data, like ML
- First class functions?

Object-Oriented

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

"One programming language can be of all 3 types like — Python"

Java follows procedural and object oriented both types.

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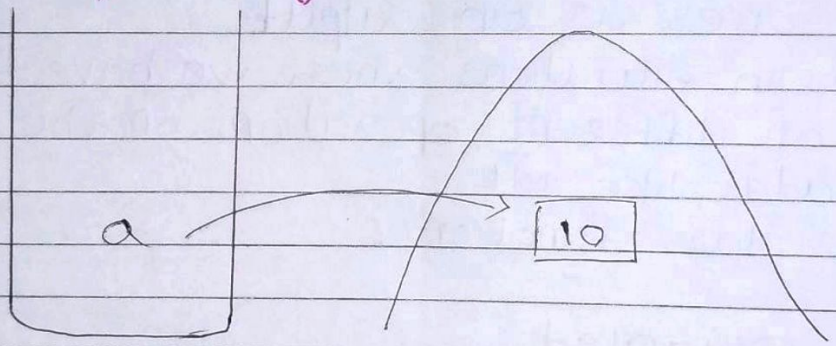
* Static vs Dynamic Languages *

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

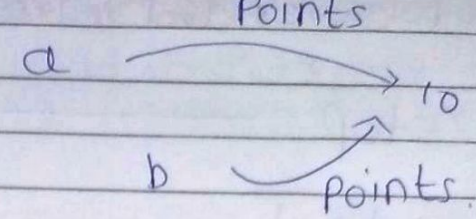
* Memory Management *



a = 10.

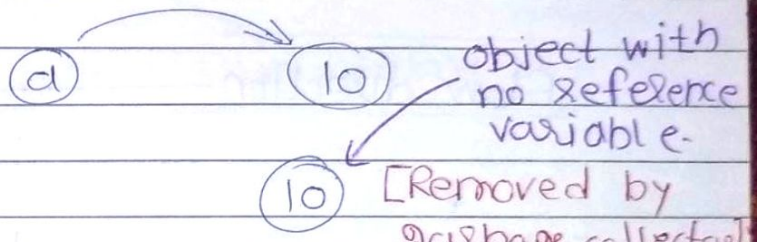
ref. variable → object.

Now suppose,
a = 10
b = a

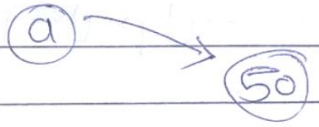


→ More than one reference variable can point towards any object
→ If any of the reference variable changes the object then it is changed for all reference variable that points towards same object.

Now initially,
a = 10



Then,
a = 50



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

- So that's how garbage collection works.