Introduction to Programming Language.
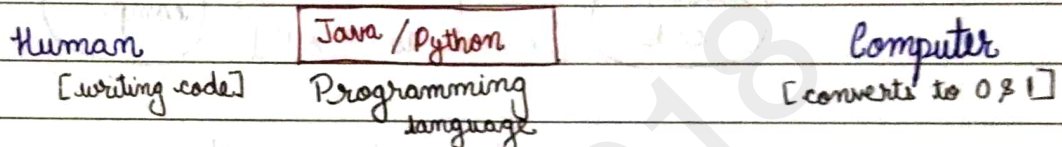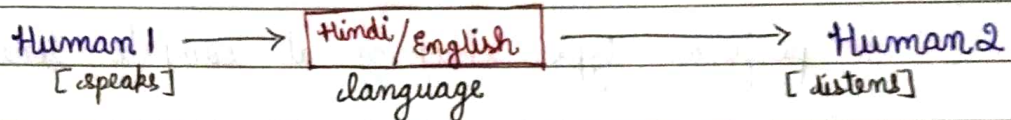
- computer at very minute level understands 0 & 1 only.

- What is programming language?

Human 1 ——→ | Hindi/English | ——————→ Human 2
[speaks]   language   [listens]

Human | Java / Python | Computer
[writing code]   Programming   [converts to 0 & 1]
                    language

- Types of Programming language.

Procedural :
→ series of well-structured steps and procedure to compose a program
→ contains a systematic order of statements functions and commands to complete the task.

Functional :
→ writing a program only in pure functions i.e never modify variables but only create new ones as an output.
→ used in situation where we have to perform lot of different operation on same set of data like ML.

Object Oriented :
→ revolves around objects
→ code + data = objects
→ developed to make it easier to develop, debug, reuse & maintain.
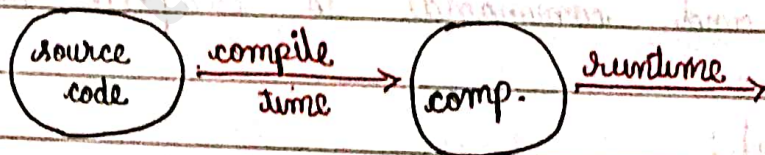
Static Language :

→ perform type checking at compile time

source code → compile time [converts to 0's & 1's] → comp.
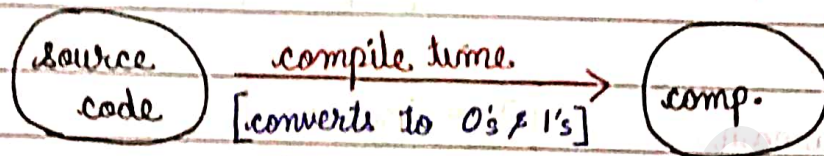
→ errors will show at compile time
→ declare datatype before use.
        int   a = 10
→ more control over the program.

Dynamic Language :

→ perform type checking at runtime
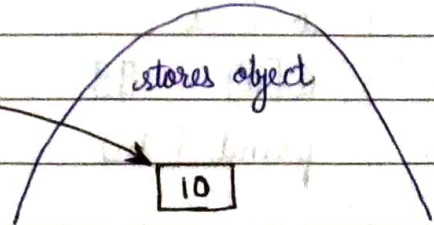
source code → compile time → comp. → runtime →

→ error might not show till program run
→ no need to declare datatype of variable.
        a = 10 [language by itself figure of it data type]
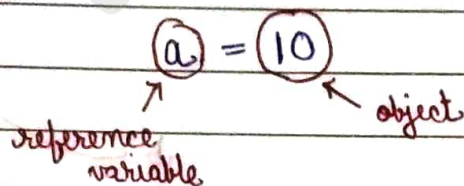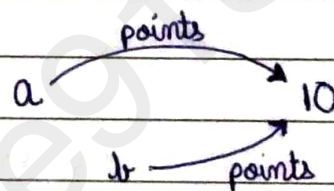→ save time in writing code by might give error sometimes.

Memory Management

$$a = 10$$
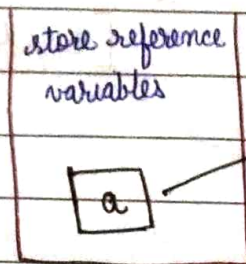
reference variable — object
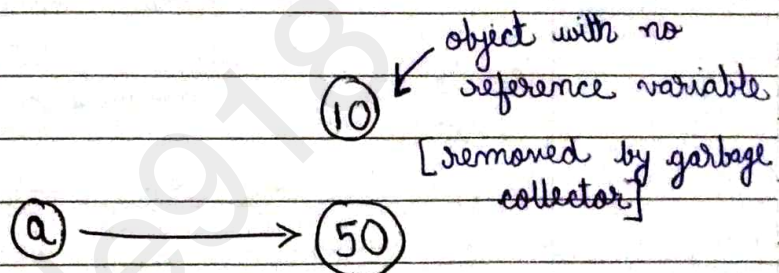
Now suppose,

$$a = 10$$
$$b = a$$

- more than one reference variable can point toward one object
- if one of the reference var variable changes the object then it is changed for all reference variable that point to same object.

Now initially
$$a = 10$$

then
$$a = 50$$

object with no reference variable
[removed by garbage collector]

* Important

```
a = [5, 4, 16, 1]
b = a
a[0] = 99
print [b]
```

a → [5, 4, 16, 1]

b →

Output: [99, 4, 16, 1]

a →   99

b →   [5̷, 4, 16, 1]