

# INTRODUCTION TO PROGRAMMING

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

**Programming language** is a computer language used by programmers to communicate with computers.

Instructing computers in Binary i.e 0 and 1 are very difficult so to solve this issue we have programming language.

## TYPES OF PROGRAMMING LANGUAGES

PROCEDURAL

FUNCTIONAL

OBJECT-ORIENTED

### Procedural -

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

### Functional -

- Writing a program only in 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 same set of data.

### Object + Oriented +

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



- Java follows both procedural and object oriented both types.

STATIC	DYNAMIC
Perform type checking at <u>compile time</u>	Perform type checking at <u>runtime</u>
Error will show at compile time	Error might not show till program run
Declare data type <u>before</u> use	No need to declare data-type of variables
More Control	Saves time in writing code but might give error at runtime.

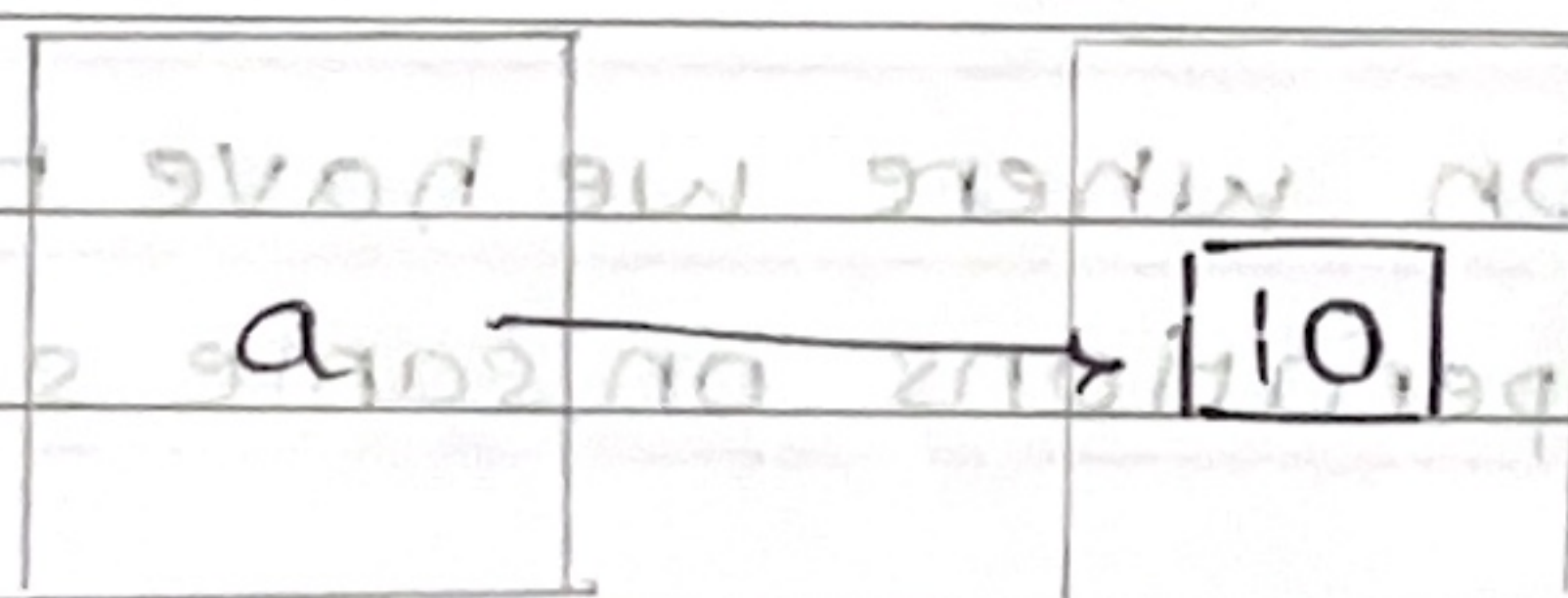
## Memory Management

It has 2 types of memory **Stack** and **Heap**  
 for eg:

$a = 10$   
 ↓      ↓  
**reference**   **Object**  
**Variable**

Reference variable is stored in Stack.

Object of reference variable stored in Heap.



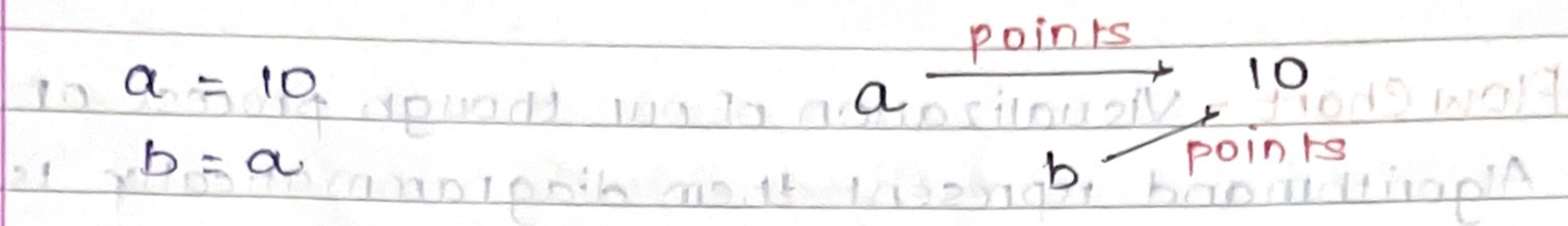
Stack

Heap

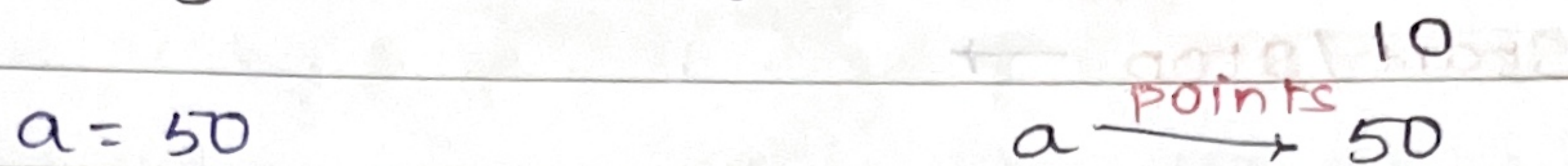
Reference variable  
 stored in stack memory  
 points to the object of  
 the variable in heap



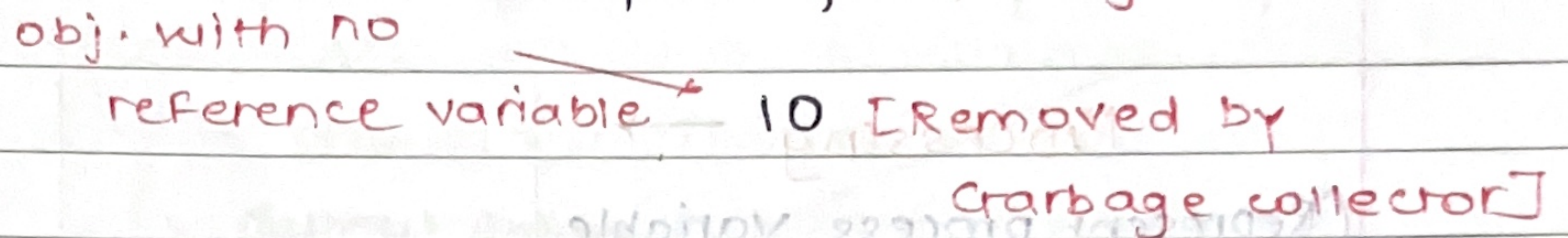
- More than one reference variable can point to same obj.



- IF any changes made to the objects of any reference variable that will be reflected to all other variable pointing to same object.



- IF there is an object without reference variable then object will be destroyed by "Garbage collector"



- Pseudocode - It is like rough code which is present before the algorithm of a program works.
- Pseudocode does not require syntax.

Example -  
 Take input of salary. If a salary is greater than 10000/- add bonus 2000/- otherwise add bonus 1000/-