

01. Introduction to Programming

Type of Language, Memory Management

Page

* What are programming language.

Programming language are formal languages used to communicate instruction to a computer.

* Type of Languages.

→ Procedural Language.

- Specifies a series of well structured steps and procedure to compose a program.
- contain a systematic order of statements, function and command to complete a task.

→ Functional Language.

- writing a program only in pure function i.e never modify variable, but only create new ones as an output.
- used in situation where we have to perform lots of different operation on the same set of data.

→ Object Oriented Language.

- Revolves around object.
- code + data = object
- developed to make it easier to developed, debug, reuse and maintain software.

* Static and Dynamic Languages.

→ static

- 1) perform type checking at compile time.
- 2) Error will show at compile time.
- 3) declare datatype before you use it.
- 4) more control.

→ dynamic

- 1) perform type checking at runtime.
- 2) Error might not show till program is run.
- 3) No need to declare datatype of variable.

Example: $a = 10$

there are two type of memory

1) stack 2) heap

$\therefore a = 10 \rightarrow$ object



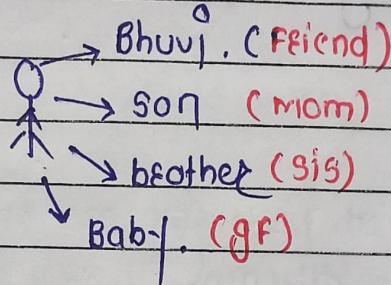
Reference variable

'a' is in variable of stack memory pointing towards the heap memory. object.

* Important Memory example.

- 1) More than one reference variable can point to the same object.
- 2) If any one of the reference variable changes the object original object going to be changed and it's going to change for all ref. variable.

* Example:



→ Let's take example for above point.

• Scenario :

If mom told me to get haircut, it's not like, my sister not see haircut.

even, if change was made via any reference, original object was change and change will also visible to all variable.

$a = [1, 2, 3, 4, 5]$

$b = a$

$a[0] = 99$

output of b : $[99, 2, 3, 4, 5]$

* Garbage collection

object with no reference variable.

Meaning no variable pointing towards the object.

So, this will remove from memory when "garbage collection" hits.

Garbage collection :

that object that do not have reference variable pointing towards object then garbage collection hits.

→ Example

$a = 10$

$a = 37$

$a \rightarrow 10$

$a \rightarrow 37$

} a

37

in that scenario no one
pointing 10, so in that
case garbage collection
come & remove it.

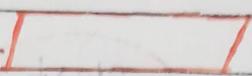
02. Flow of program

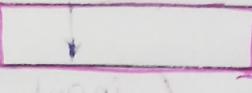
Flowchart & pseudocode.

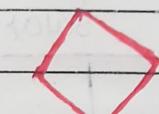
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* Flowchart symbolizing.

start / stop → 

input / output → 

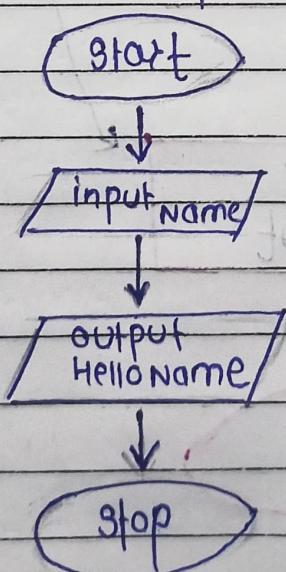
processing → 

condition → 

* What are flowcharts?

Flowcharts are basically used to visualize particular thought process, what ever algorithm may create.

Ques: 01 Take a name and output Hello Name.



Ques: 02

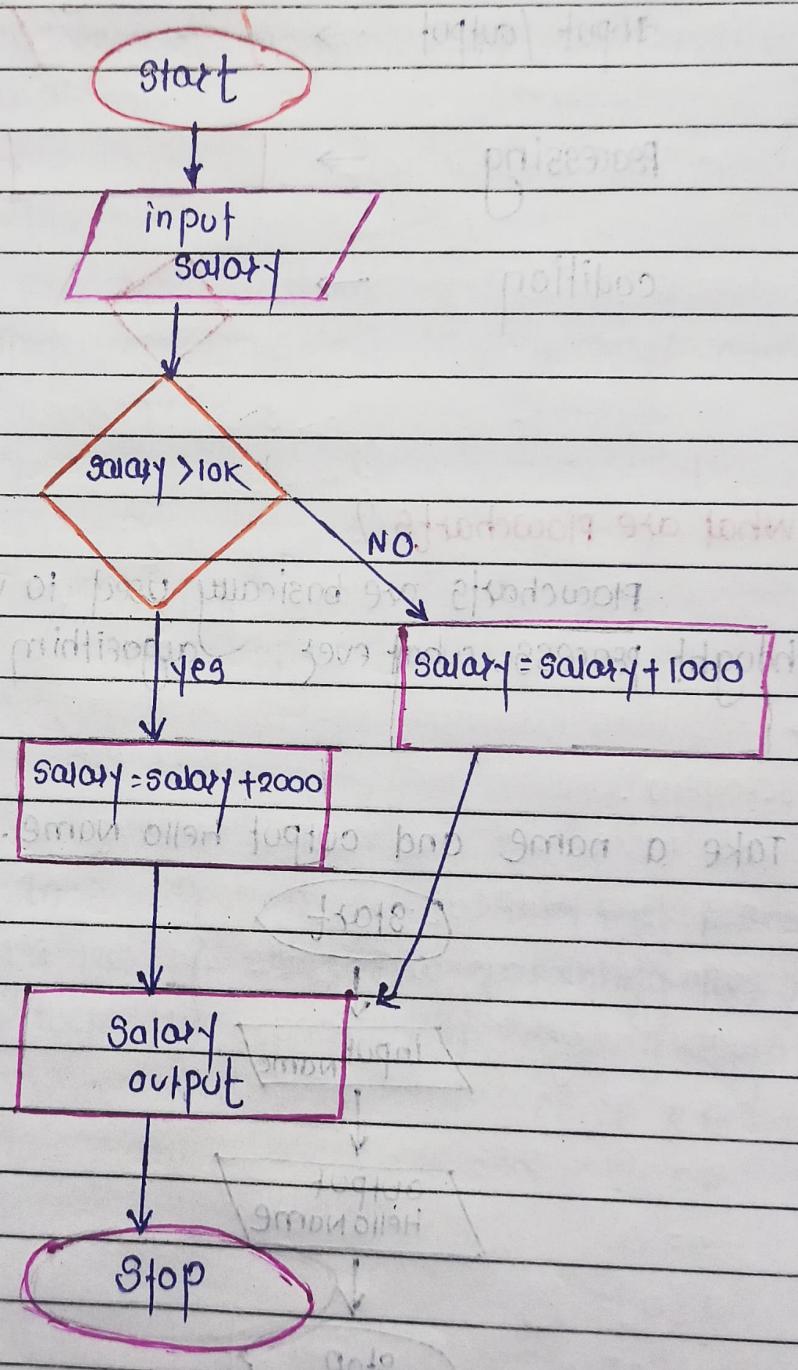
Take a input of salary. If salary is greater than 10.000
add bonus as 2000, otherwise add bonus as 1000.

// pseudocode

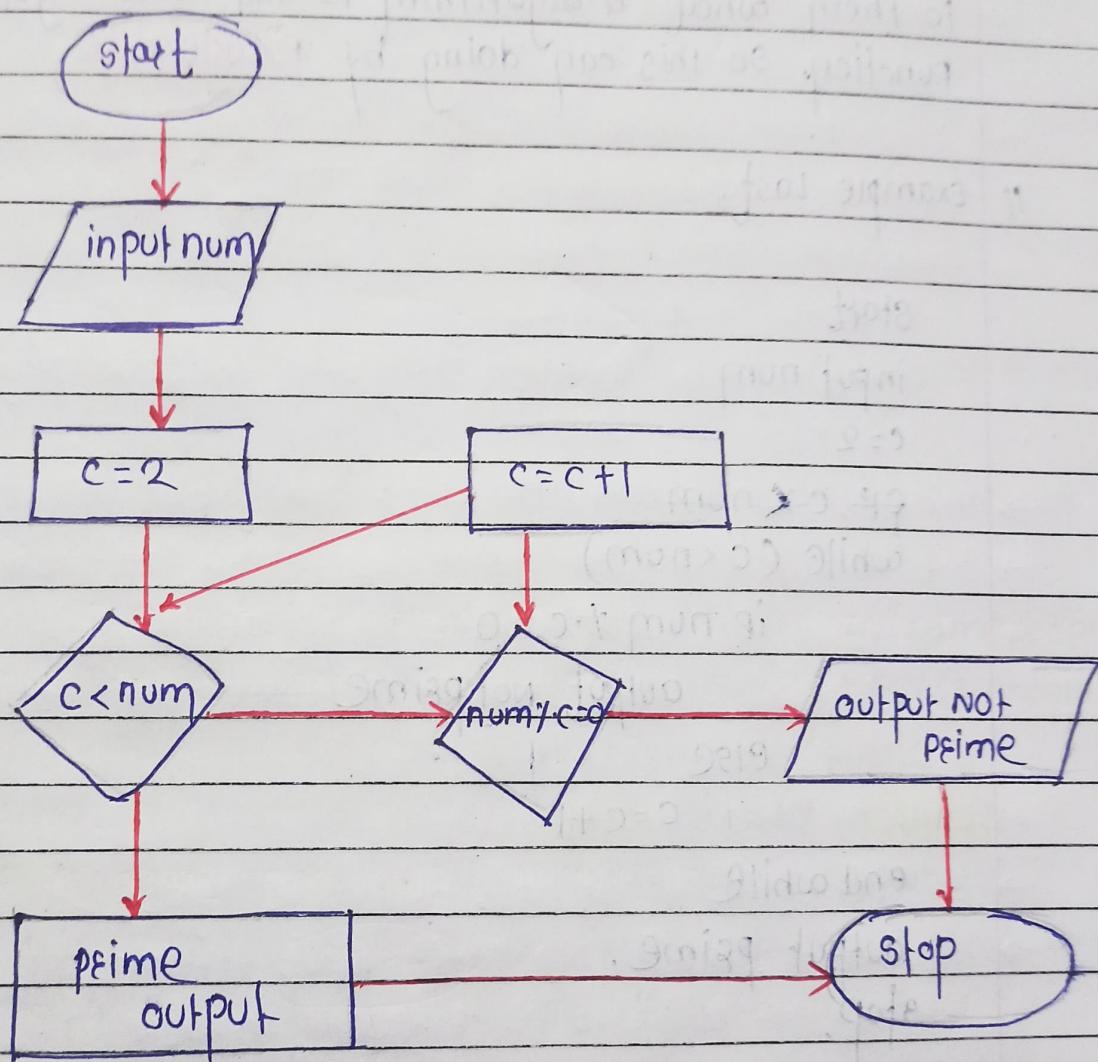
```
start
input salary
IF salary > 10K
    Salary = salary + 2K
ELSE
    Salary = salary + 1K
```

output salary

stop.



Que: 03 Input Number and print whether it is prime or not.



* Pseudocode.

Sometimes we want to share our program algorithm we don't really think about syntax we just explain to them what a algorithm is and how algorithm function. so this can doing by Pseudocode.

II Example last.

```

start
input num
c=2
if c < num
    while (c < num)
        if num % c == 0
            output not prime
        else
            c=c+1
    end while
    output prime.
stop.

```