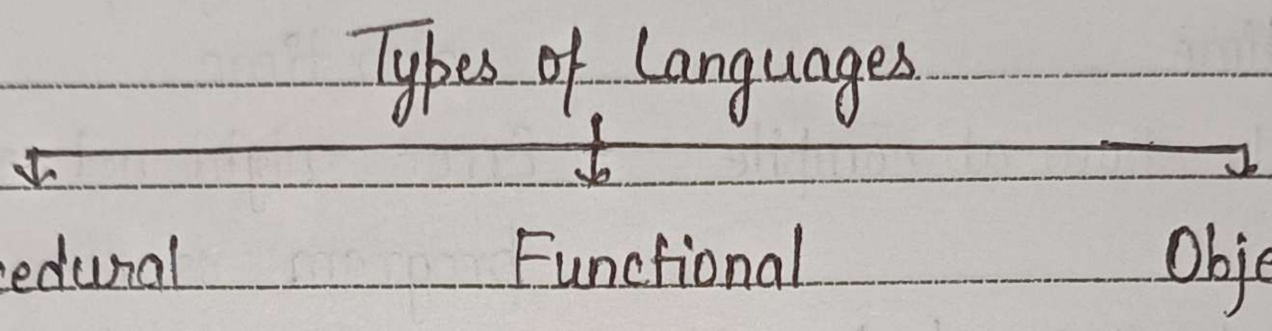
INTRODUCTION TO PROGRAMMING

Types of languages :-



- Procedural language :-
  - Specifies a series of well structured steps and procedures to compose a program
  - Contains a systematico order of statements, function and comands to complete a task.

- Functional language :-
  - Writing a program only in pure functions i.e. never modify variables, but only create new ones as an output.
  - used in sitiations were we have to perform lots of different operation on the same set of data.
  - First class function :-
    - Be assigned to variables
    - Be passed as arguments to other function
    - Be ~~resta~~ returned from other function.

- Object Oriented :-
  - Revolves around objects (instances of classes)
  - Code + Data = object
  - Developed to make it easier to develop, debug, reuse and maintain software.

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Stack Memory	Heap Memory
- Used for storing local variables function parameters and return addresses.	- Used for dynamically allocated Memory
- Memory allocation :- Automatically managed, LIFO. (Last In, First Out)	- Memory allocation : Manual
- Size is smaller & limited	- Larger but more fragmented
- Faster access	- Slower access
- Variables are destroyed once the function calls end	- Remains until explicity deallocated.

Notes :-

- one or more than one reference variables can point to the same object
- If any one of these reference variables change the object original object is going to be changed and going to be changes for all
- If there is no variable (reference variable) pointing towards an object, it will be removed from the memory when garbage collection hits.

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Static Vs Dynamic languages

Static languages	Dynamic
- perform type checking at compile time	- Performe type checking at run time
- Errors will show at compile time	- Error might not show till program is run.
- Declare datatypes before you use it.	- No need to declare the datatypes of variable.
- Have more control on code	- Saves time in writing code but might give error at runtime.

Memory Management :-

Types of Memory :-

- Stack Memory
- Heap Memory

- a = 10 —— object
  └ reference variable
- reference variable stored in stack memory
- object is stored in heap memory
- reference points towards the object.

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- Garbage Collection :— It ~~mean~~ is a process in which ~~the~~ objects which are not pointed by any reference variable are deleted to free the memory.
  It is process that happens automatically