

Introduction to programming

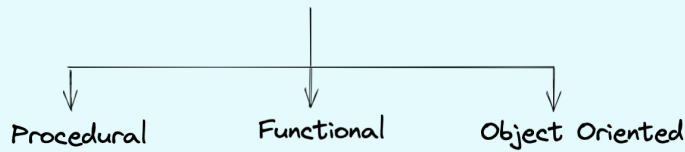
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What are programming languages? Why do we need them?

Internally everything is 0s and 1s in computers. Say I want to write a program to add two numbers or print my name, or print today's date. Basically these are just instructions I will have to give the computer instructions to do this and it would be hard to write this in 0s and 1s so the computer can understand it (because computers only understand 0s and 1s). ***This is why we have programming languages, so we can write these instructions in a human readable format.***

Types of Languages.

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 ie. never modifying variables but only creating new ones as an output.
- Used in situations where we have to perform a lot of different operations on the same set of data, like ML.
- First class Functions??

Object Oriented

- Revolves around objects
- Code + data = objects
- Developed to make it easier to develop, debug, reuse, and maintain software

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<https://excalidraw.com/>

Different languages can be of different types

Java , C++ supports both Procedural and Object Oriented, Python Supports all three. So languages can be of more than one type.

Static vs Dynamic Languages.

Static vs Dynamic Languages

Static

- Perform type checking at compile time
- Errors will show at compile time
- Declare datatype before you use it
- More control

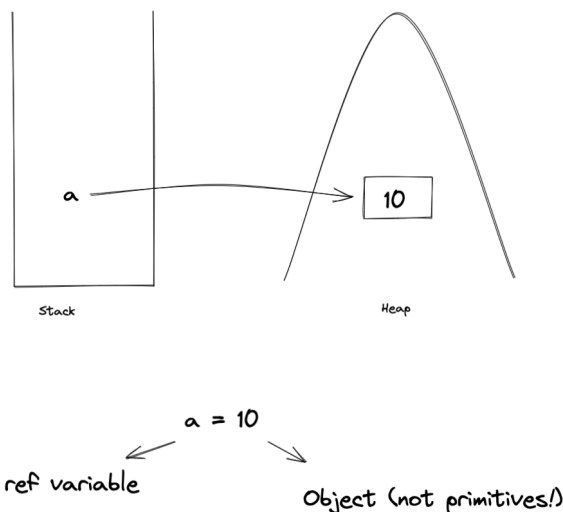
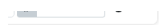
Dynamic

- Perform type checking at runtime
- Errors will not show till the program is run
- No need to declare datatype of variables
- Saves time in writing code but might give error at runtime

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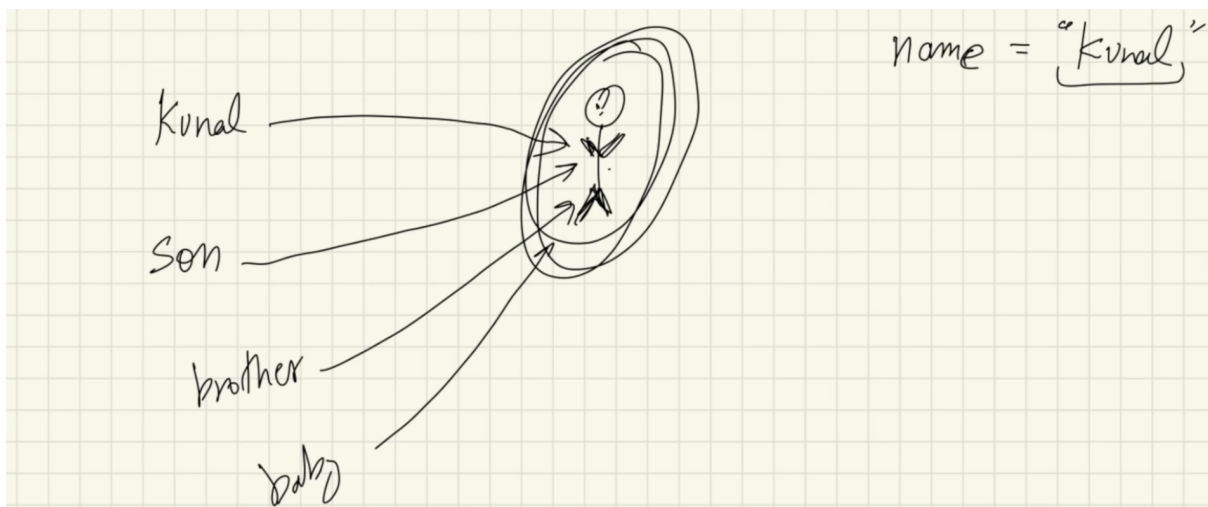
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Types of memory



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Important memory example



- More than one reference variable can point to the same object
- If any one of these reference variable changes the object the change will be visible to all these reference variable

Garbage Collection

https://developer.mozilla.org/en-US/docs/Web/JavaScript/Memory_Management

<https://javascript.info/garbage-collection>
