Introduction to Programming

1. The need of programming languages:-
   - Machine understands 0s and 1s language and that are difficult for a human to write when it comes to large problems.
   - So programming languages were introduced, that are human readable and when compiled can be run on machine.

Functions:- a block of code that can be reused again and again.

Class:- set of properties and data that can be manipulated.

Object:- the real life implementation of class in code or an instance of class is called object.

2. Memory Management

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
- Error might not show till program is run
- No need to declare datatype of variables
- Saves time in writing code but might give error at runtime

```
int a = "Kunal"
```

- Types of Memory

Stack   Heap

$$a = 10$$

Reference to the object 10, Pointer to value

Actual object or value

$$a = 10 \longrightarrow$$
$$b = a$$

01x FF	10

A and B are pointing to same memory

Name = "Dheeraj"

Name is reference to object

Let's say "Human" is a class and body is the object and
Our name is reference to the object

Body is object

$a = 10$

$b = a$

$0\text{I}\text{x}FE \quad 10$

$a = 11$

$b?$

$b = 11$

$0\text{I}\text{x}FF \quad 11$

If value of a is changed than
Value of b also change as b is pointing towards a