

# Creational Design Patterns - 2

Agenda



- Builder DP
- Prototype DP
- Factory DP

Concurrency<sup>1, 2, 3</sup> ↗ git ↗ Projects

- ⇒ Threads
- ⇒ Serialization
- ⇒ Java Reflector

→ Practical factory  
→ Factory Method  
→ Abstract factory

## Builder Design Pattern

Class

①

T → Multiple attributes (5+ attributes)

②

When you create an instance of the class, you want to validate the value of attributes before an instance is created

Class

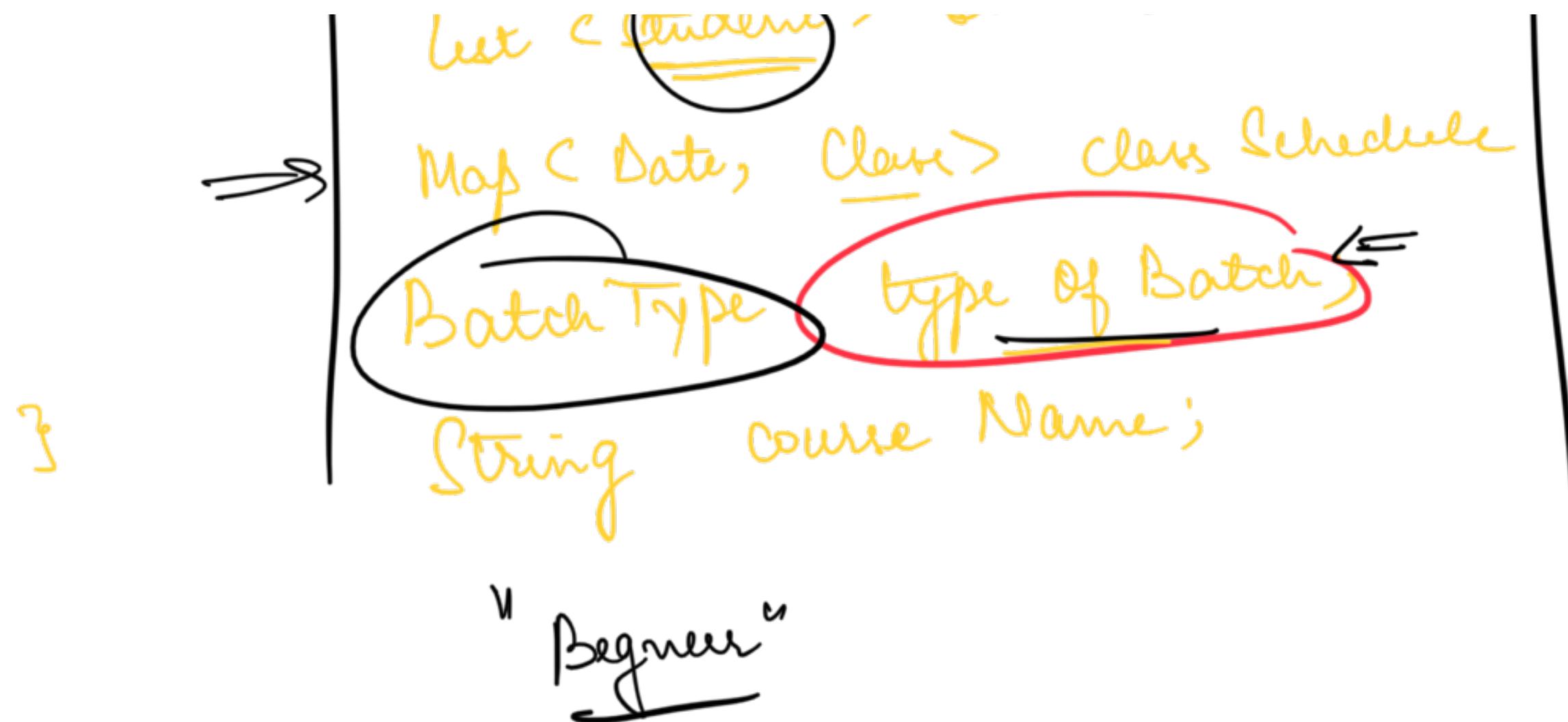
Scatter Batch

→ int NO of Students

String name

long id

Students

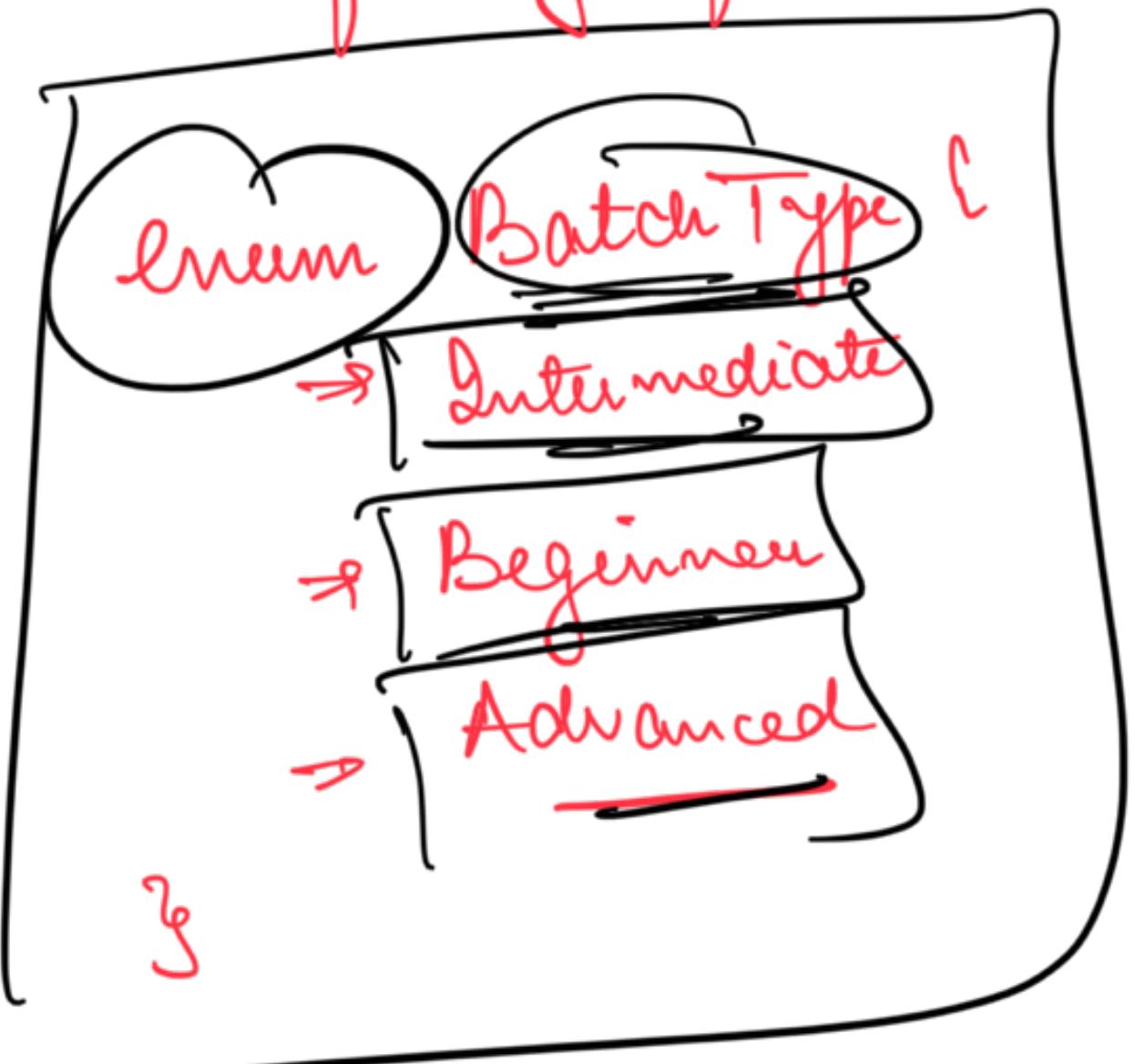


Eg of validations

- ① No 2 Batches should have the same name
- ⇒ ② Before a batch is created, ~~there~~ the list of classes must be null

③ Batch MUST

have a type of Batch.  
If any of the attribute is invalid  $\Rightarrow$  I want  
to throw exception before  
creating object



$\Rightarrow$  when a particular  
attribute will have  
value amongst one of  
the previously defined

class ScooterBatch {

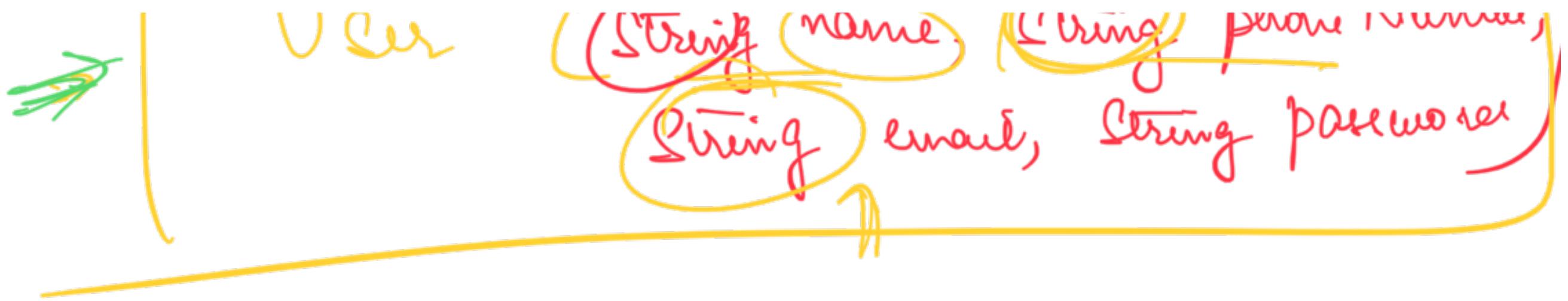
10

Scaler Batch

Attributes

User lexam

( int math Mark, int English Mark,  
int L'ecance Mark, int comp mark )



Client {

PSum() {

User u = new User {  
    "Namam Braller",  
    "namam@lester.com",  
    "999-\_\_\_\_-",  
    "password"  
}

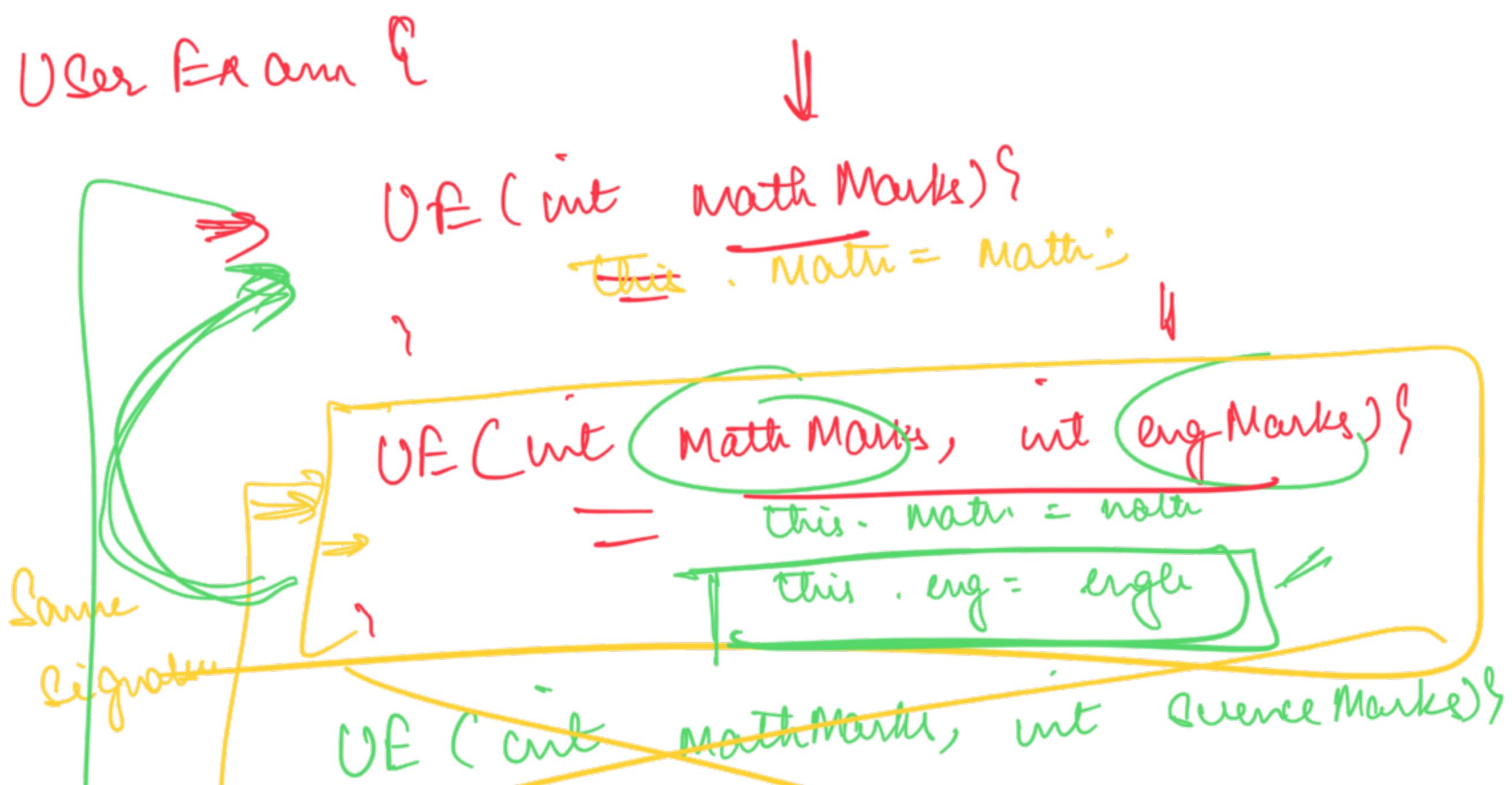


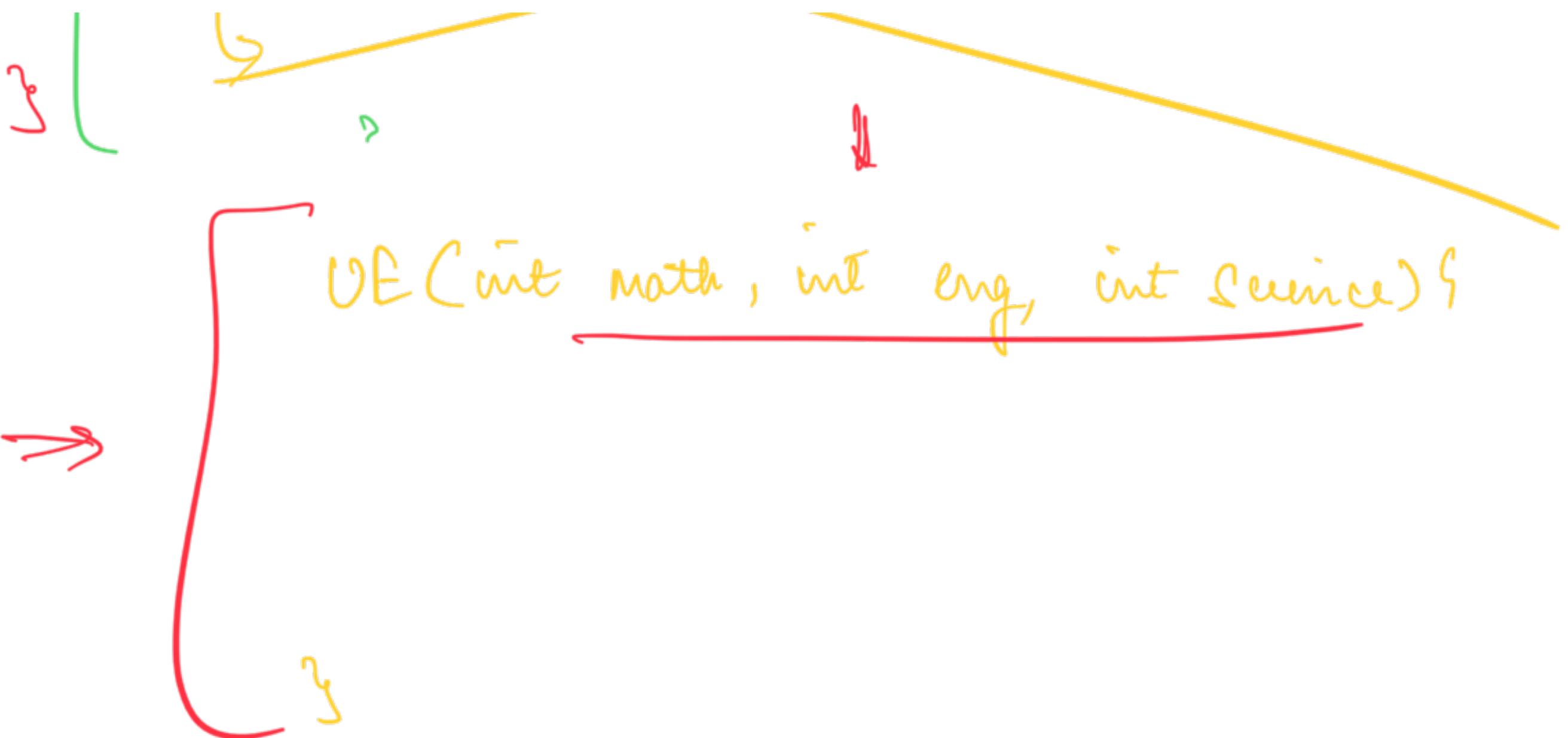
PS

- ① Class with Many Attributes
- Those attributes might have repeated  
data types

→ for such a class creating an obj off

the class via constructor might make the code unreadable





UE (eng, maths)

UE (Dma)

Ans:  $\text{list} \leftarrow \emptyset$

-this. Maths = Math

User Exam

→ value of marks of a student in  
every subject

→ (English)

→ (English, Maths) =

→ (English, Maths, Science)

I User Exam {

1 Big constructor

User Exam (English, Maths, Science) {

  =

  ?

  ?

Client {

  PSVM () {

  Jail

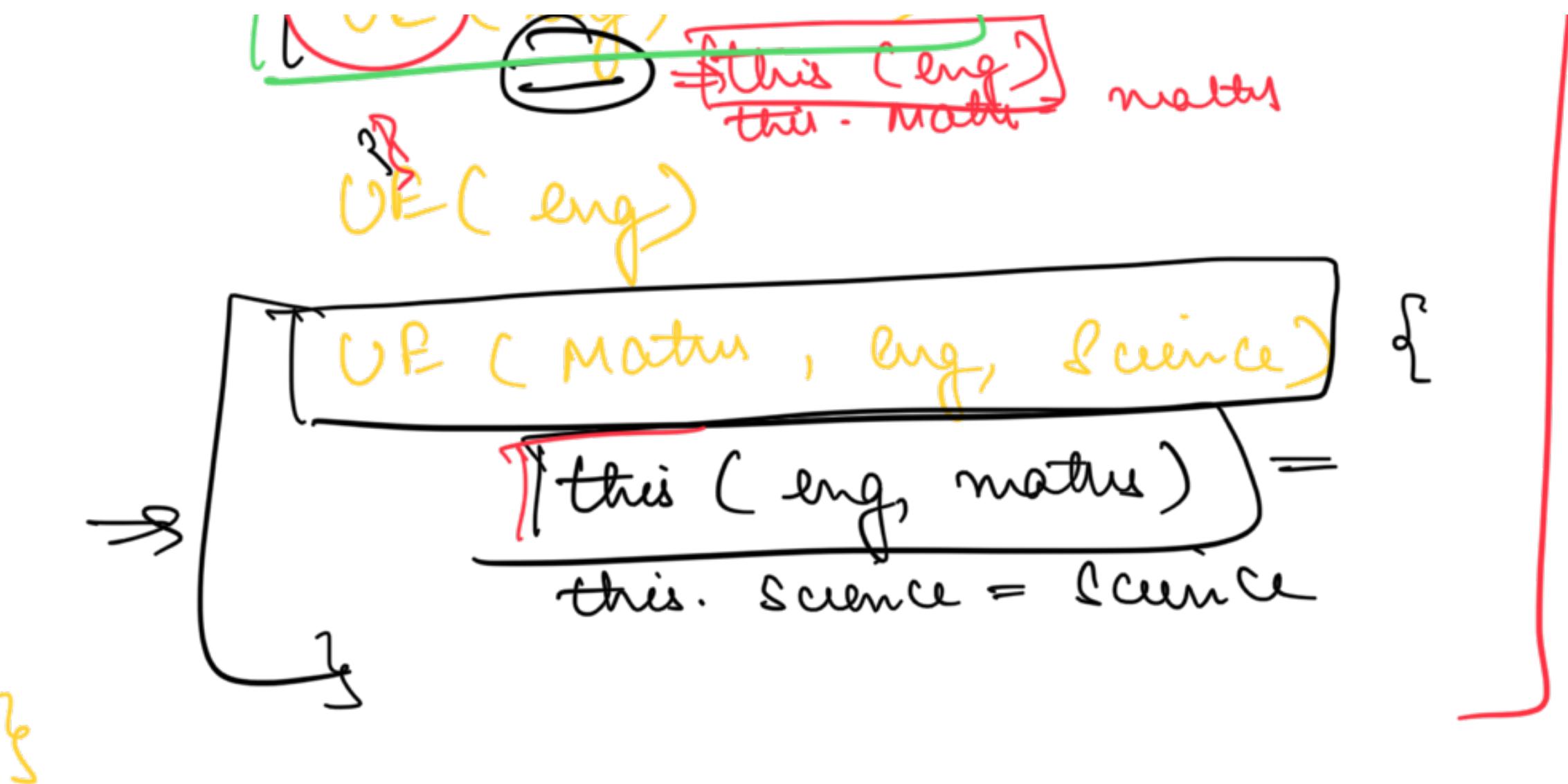
  I

UE ue = new UE(18, 12, null)

- 
- ① Unreadable code
  - ② Prone to errors

## II Multiple Construction





Goal Telescoping Constructor

Constructor which internally calls another  
constructor

Wins ~~~~~~

## Problems

①

Telescoping Constructor

ANTI  
PATTERN

②

Might not be able to create  
multiple constructors because of  
signature match.

③

Still unreadable code

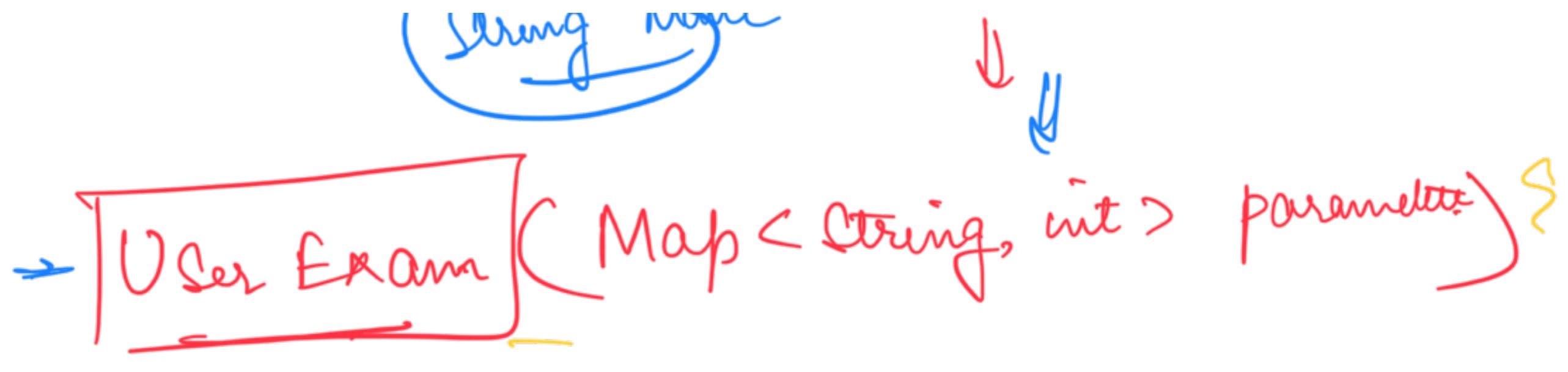
end

Pyth<sup>n</sup>  
SS

User Exam (eng=0, science=0, maths=0, hindi=0)

User Exam (eng = 20,  
science = 40,  
maths = 50,

Pass Multiple Values



Client

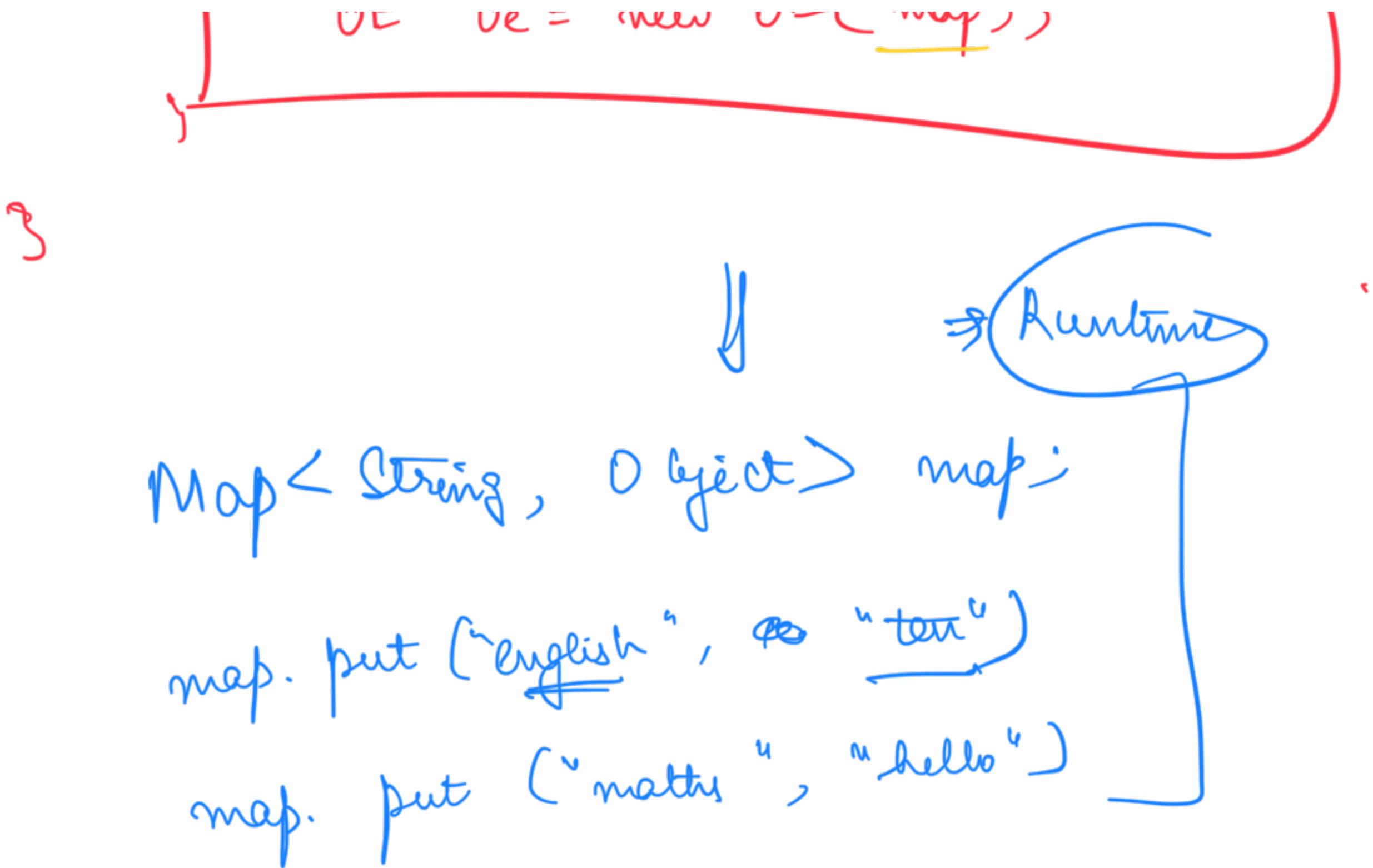
PSum () {  
    Map<String, int> map;

    map.put("engles", 20)

    map.put("maths", 10)

    map.put("Name", Naman)

    ... = ... INF math);

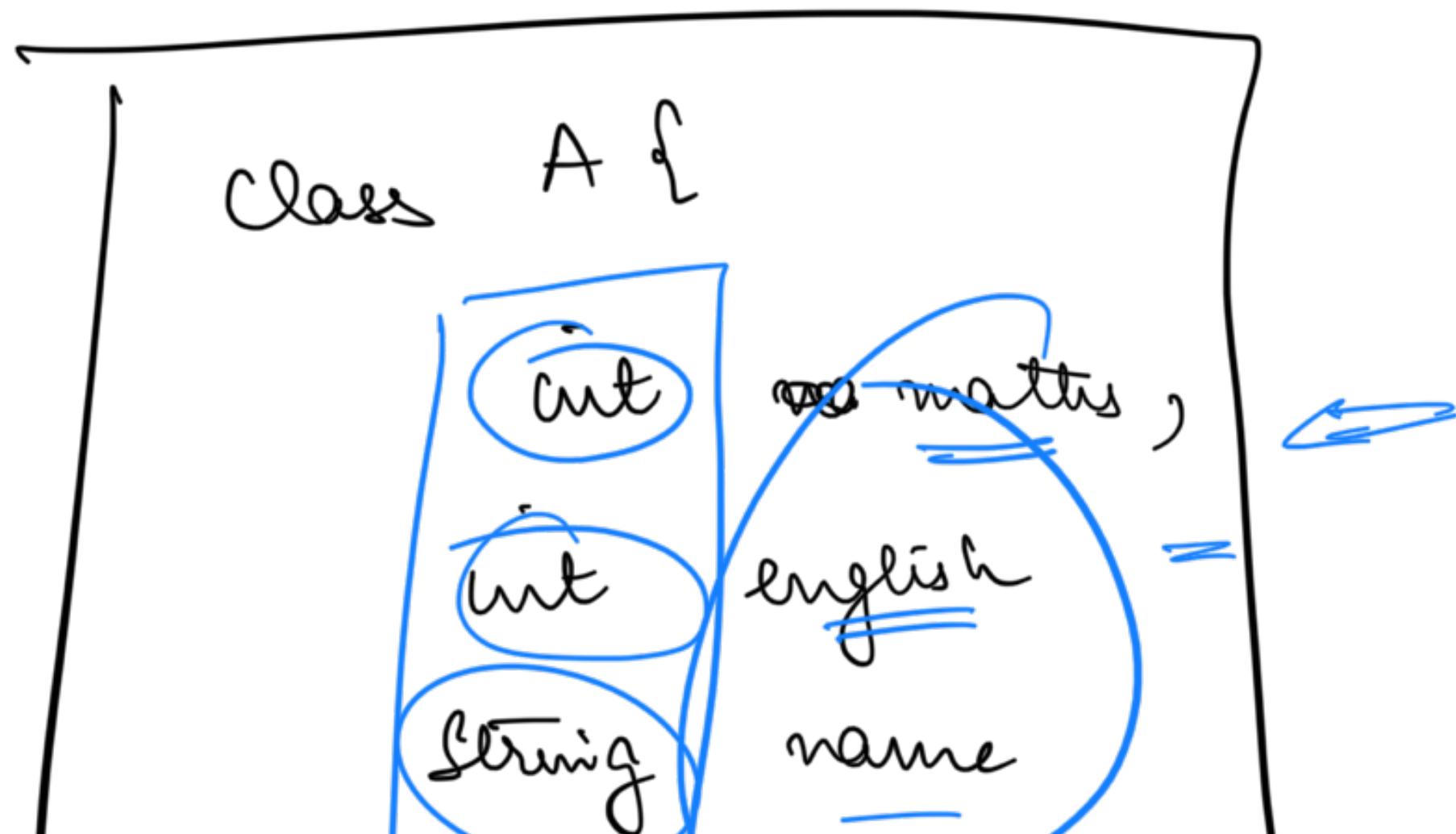


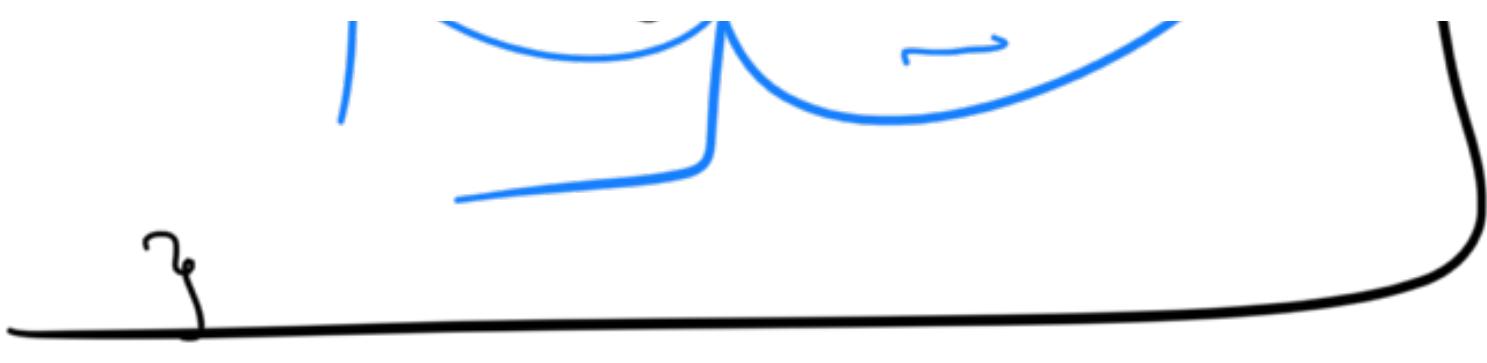
map is a collection that is like a map

Think of something ---

T

(→ allows you to have many values) but  
each value can be of different type and  
can be identified via a diff name.





class Parameters {  
    int english  
    int maths  
    int science  
    String Name

}

UE (Parameter params)

Program Client {

    Parameter param = new Parameter();

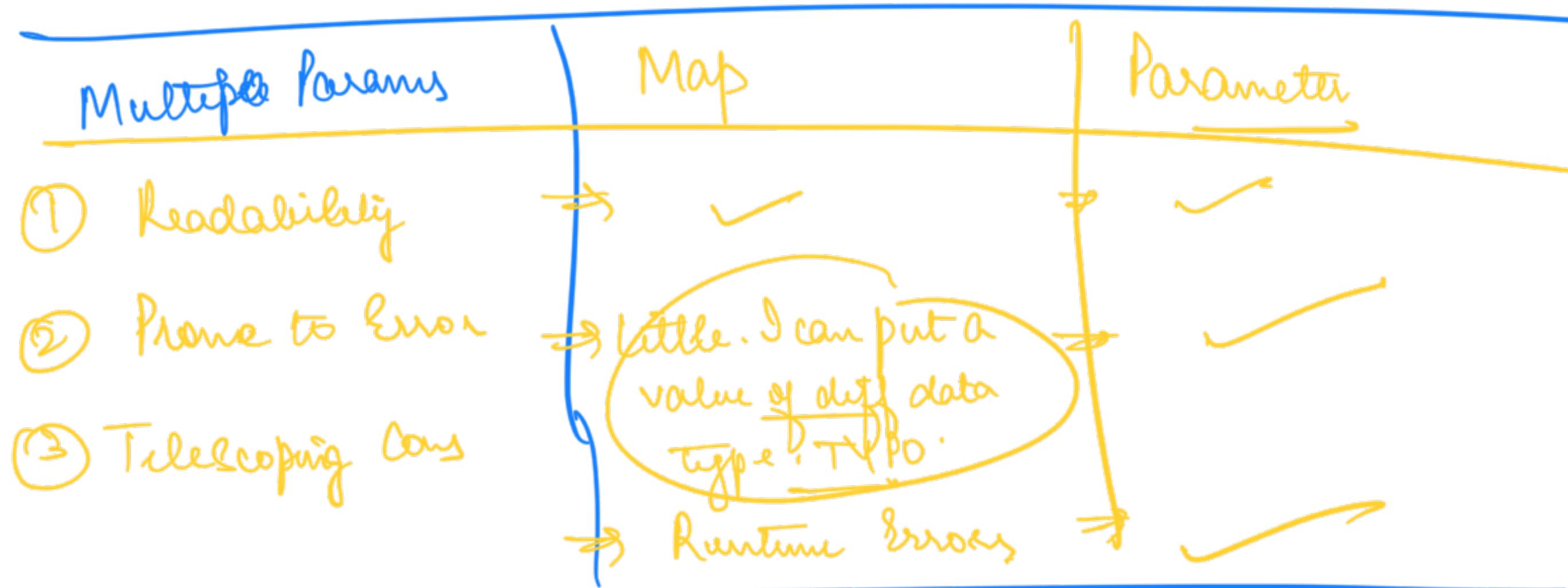
        param. english = 100, ~~science~~

        param. science = 20;

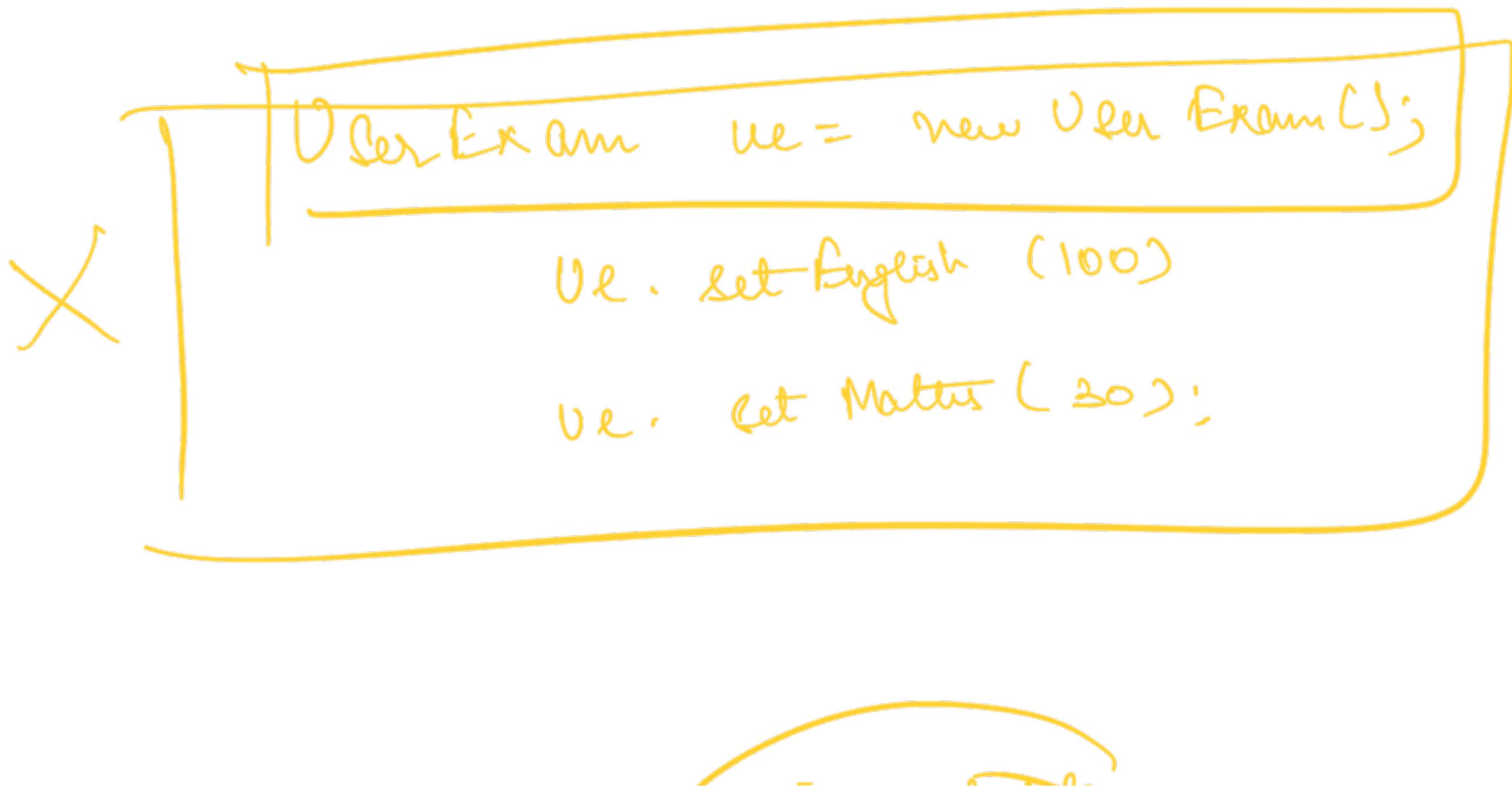
        param. math = 40,

UE ue = new UE(param);

}



→ Before I create an object of user exam I want to validate that



③ When objects are immutable



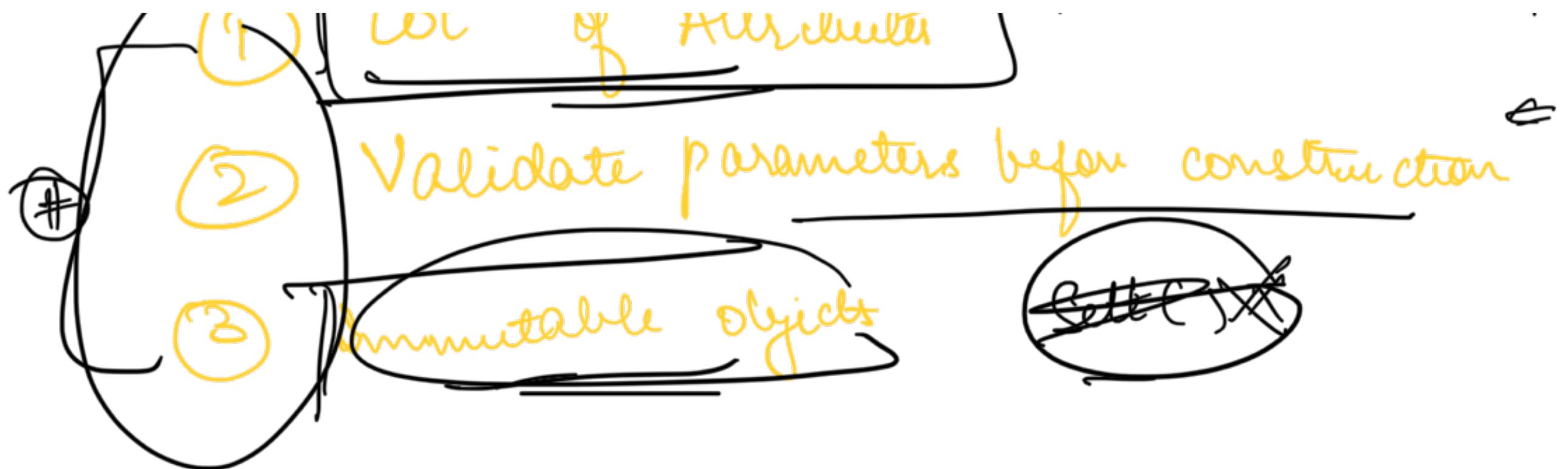
for whom you can't change the  
value of attributes once the  
object ~~can't~~ has been created

→ `Setters()`

---

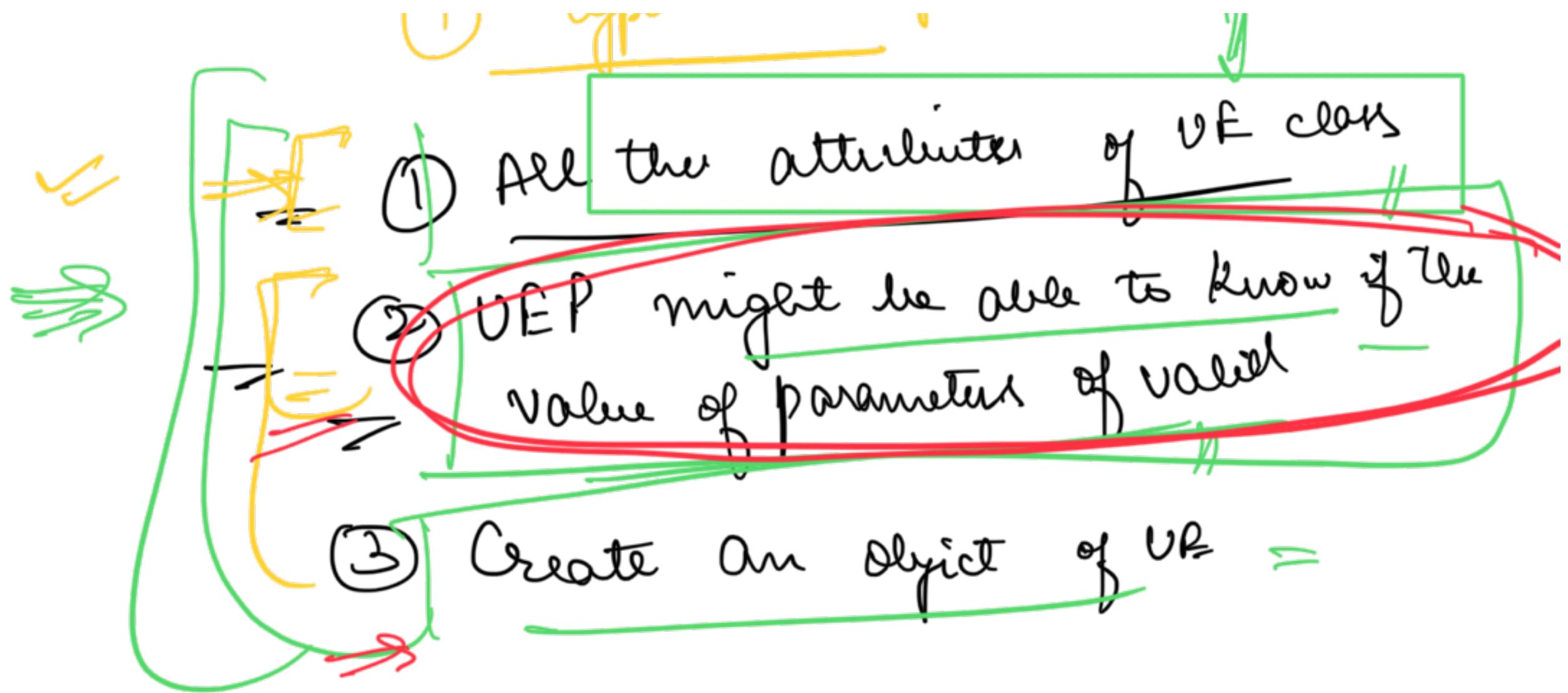
When to use Builder DP

Complex objects



Tic Tac Toe





As it can create an obj of user func  
which

## User Exam Builder

```
class UserExamBuilder {  
    private int englishMarks;  
    private int scienceMarks;  
    private int mathsMarks;  
    public setEnglish(eng){  
        this.eng= eng  
    }  
    public setMaths(maths)  
        this.maths= maths  
    }  
}
```

$\Leftarrow$

}

|

public UserForm build() {

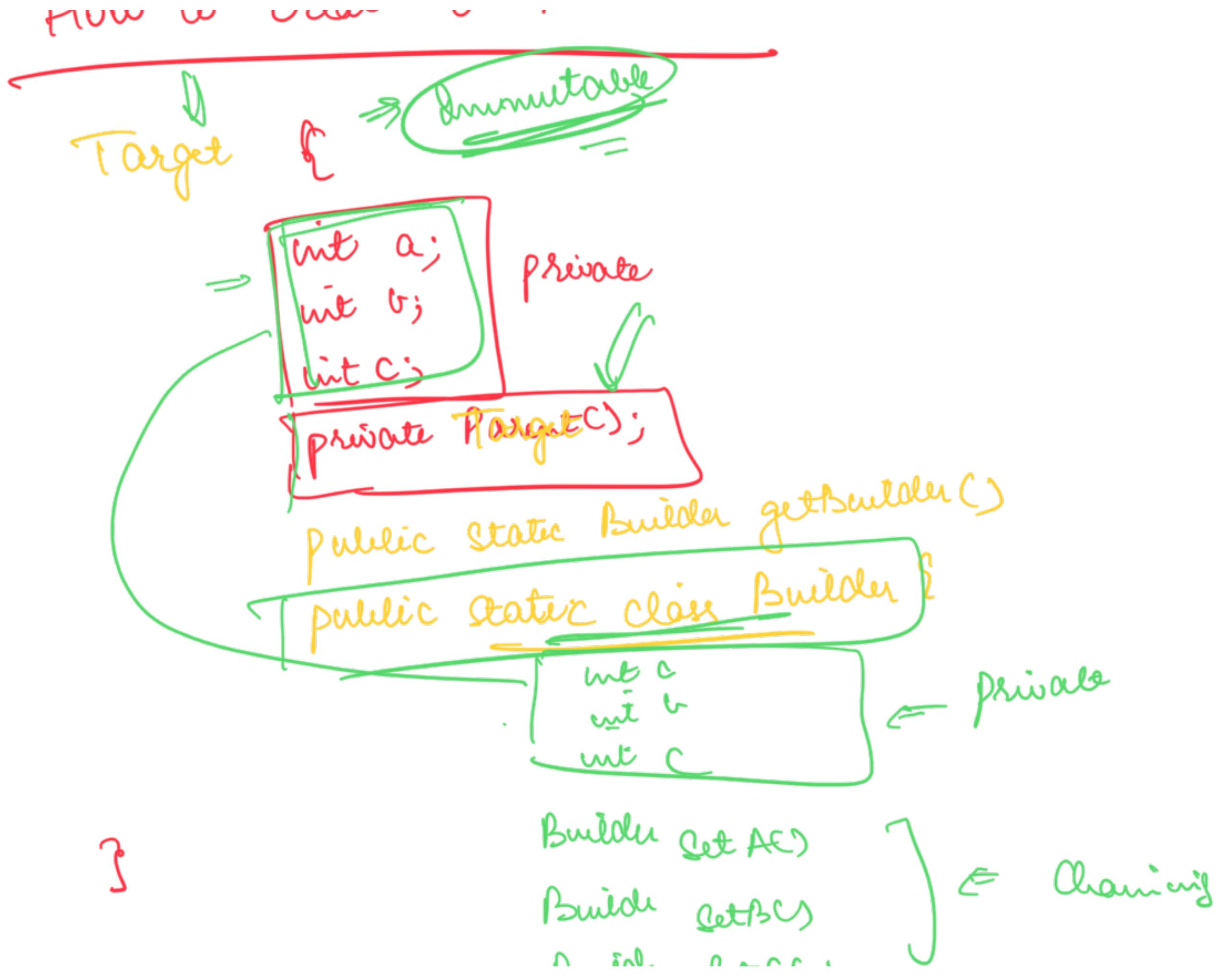
Validation



Object Creation

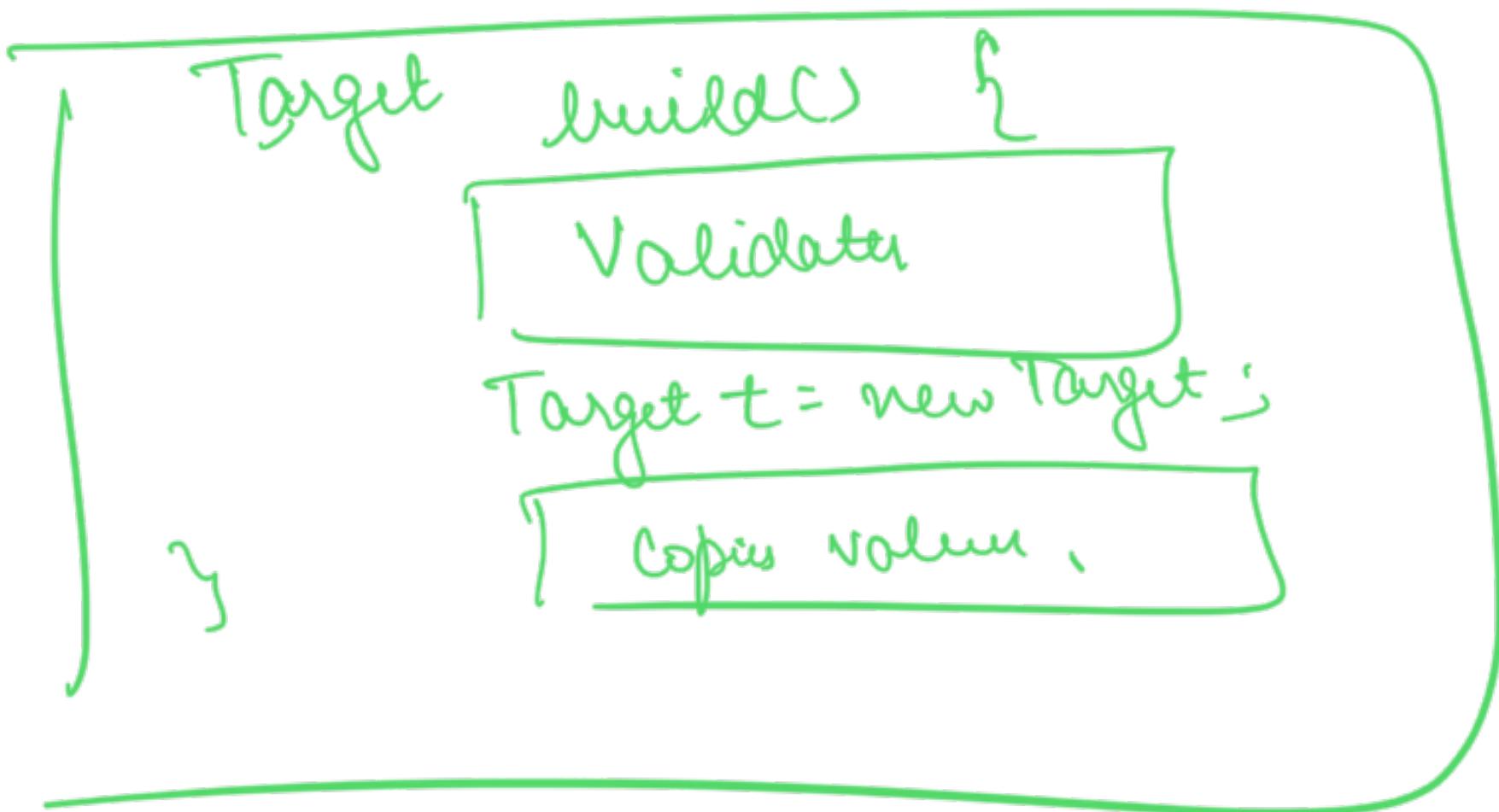
}

Want to create a Builder



Power set (1)

3



11:16 PM



### ③ Prototype Design Pattern

Make copy of an object that you have

```
Student s1 = new Student()
s1.setName("Name") → s1.setAge(20)
```

// copy s1

```
Student s2 = s1
```



new Scaler Academy Student

```
+ Student s1 = new Student()
```

~~S1. SetName (Name)~~

~~S1. SetAge ( →~~

Student C2 ⇒ New Student

~~S1. Set Name (S1. getName)~~

~~S2. Set Age (S1. get Age)~~

Multiplex  
child  
class

~~Parent and Child Student~~



Make a copy of `s1` // Copy the object  
that is there in  
a variable.

Client

if `s1` is instance of Scaler Acad Grade:

~~ScalerAcademyStudent s2 = new ScalerAcademyStudent~~

s2. —

=

g2. —

elif

else

}

↓

- ① I might not know about real class of object in the variable

② We might not have access to all attr  
of the class

## ③ Tight Coupling

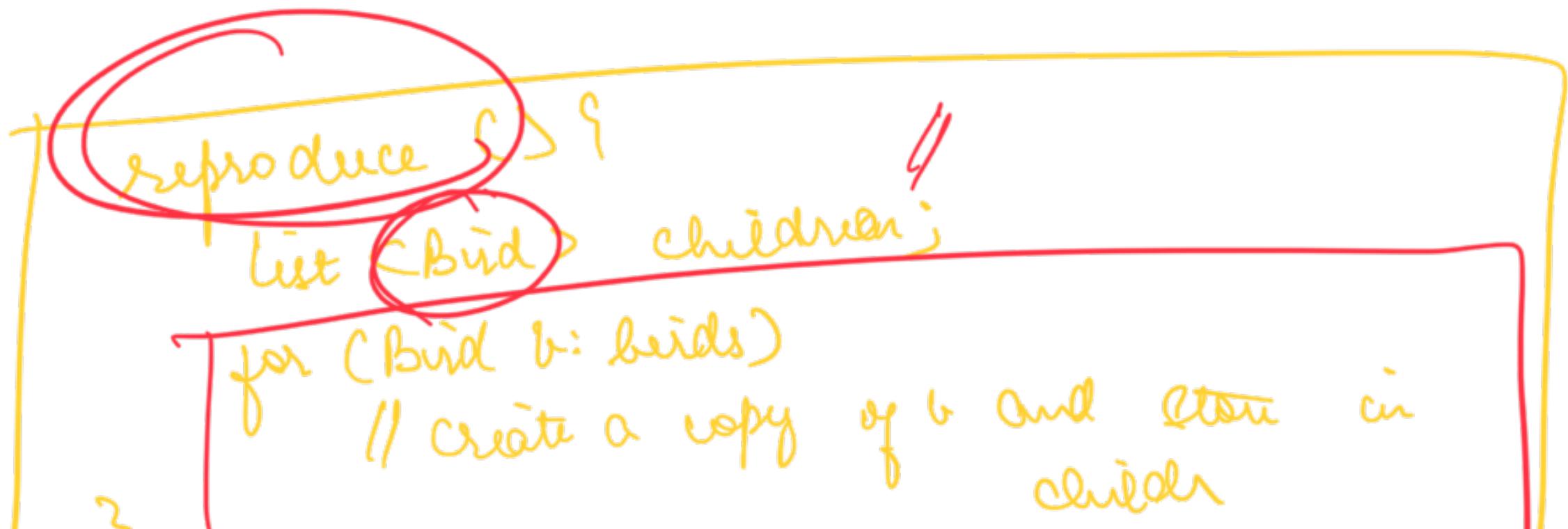
→ Sol<sup>n</sup> to create b copy will not work

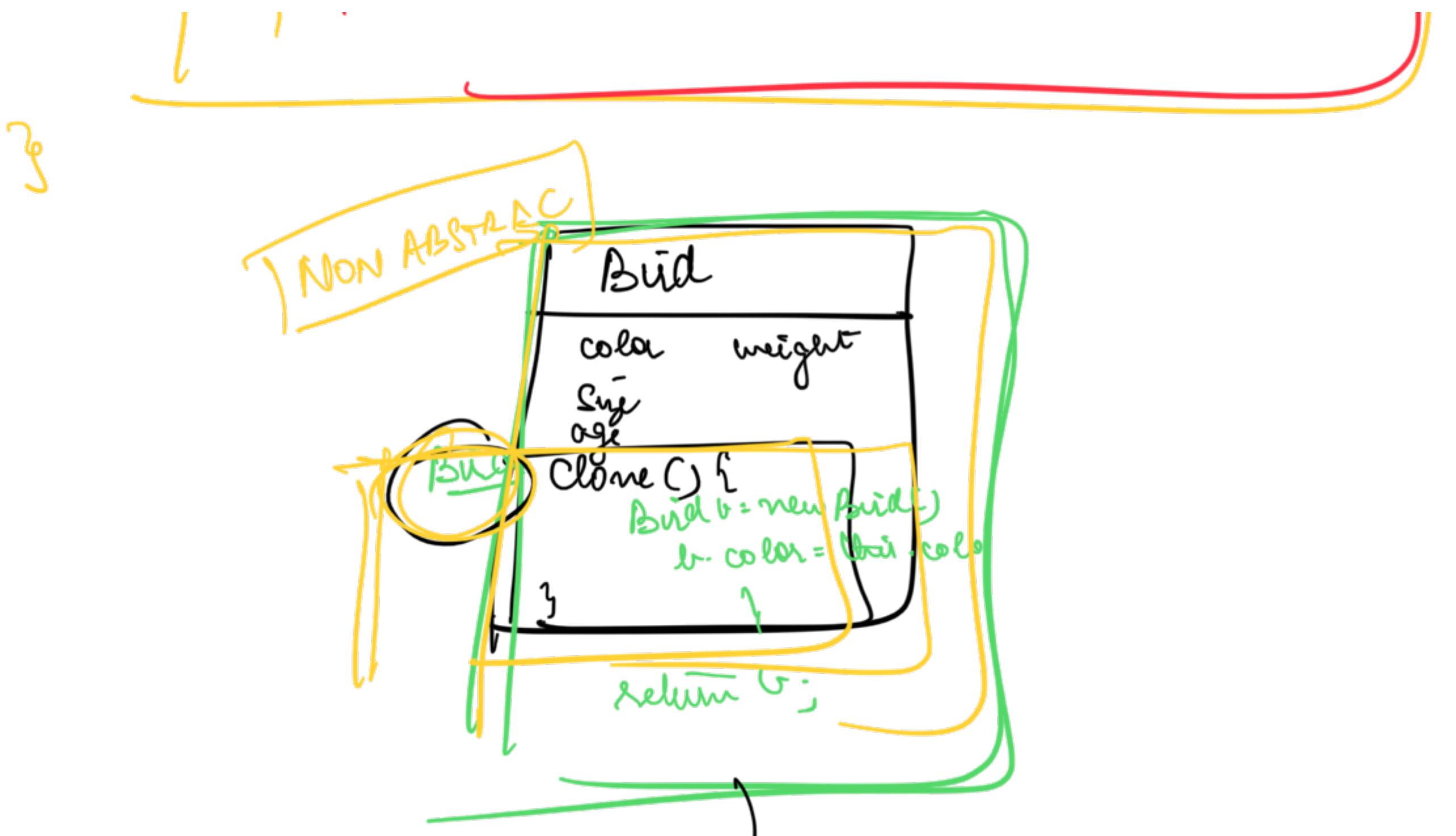
Let the object class create a copy of  
itself → close

C

How?

= By having a clone() method in  
the classes -







Penguin  $p1 = \text{new Penguin()}$

$p1.\underline{\underline{\text{clone()}}}$

→ If I have inheritance  $\Rightarrow$  for cloning  
I must ensure that all child classes also

implement the Clone method

OTHERWISE

we might get wrong / undesirable obj

