

Python

class Student:

def __init__(self, fN, lN)

self.fN = fN

self.lN = lN

def fullName(self):

return self.fN + " " + self.lN

def static_method(): ...

self reference

Java

class Main {

public static void main (String[] args)

... this

}

}

distinction between static & dynamic methods

C++

class Student {

public:

std::string fullName();

private:

std::string fN; std::string lN; }

Rust

struct Student {

pub fN: String,

pub lN: String,

}

information exposure

impl Student {

pub fn fullName(

self

) { ... }

What we added as sugar

$(jane \leftarrow full_name) \{ \}$

Mutation

F^bSR

{

$FN = Ref \text{ "Jane" };$

$LN = Ref \text{ "Doe" };$

...

change First Name = F_{FN} this \rightarrow F_{LN} newFN \rightarrow

$this.FN := newFN; \{ \}$

}

τ_{FN}

"Jane"

τ_{LN}

"Doe"

$(F_{FN} x \rightarrow e_2) \quad e_1$
 $x \notin FV(e_2)$

$(1 + (2 * 3))$

* has a higher precedence than +

Information Hiding F^bSR

Let jane =

```
Let jane Impl = {  
  FN = Ref "Jane";  
  LN = Ref "Doe";  
} In Let jane Interface = {  
  full-name = Fun this → Fun _ →  
    janeImpl.FN + " " + janeImpl.LN  
} In jane Interface
```

In

self-app

→ (jane ← full-name ??) Accepted

→ (jane.FN) Denied / Rejected / cannot evaluate to a value

Java class Expr {

public Expr add (Expr e) {

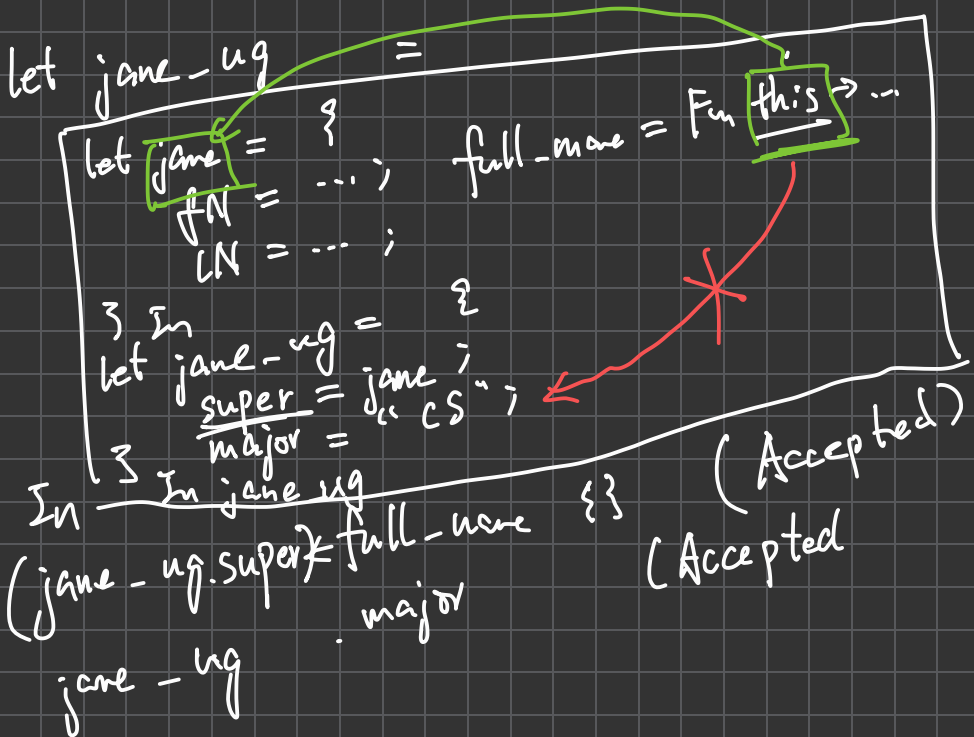
}

}

Self-application
f f

Inheritance

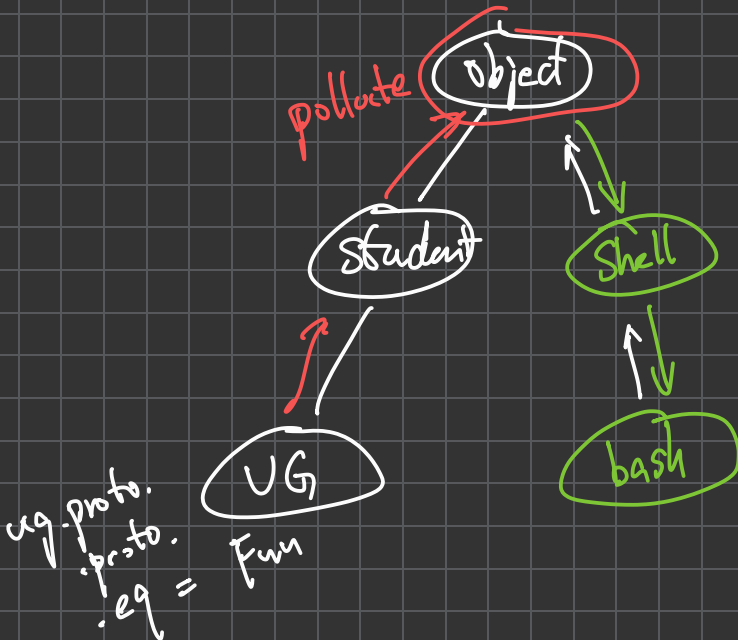
```
Java class Undergrad extends student
    String major;
    f() {
        super.method();
    }
```



Javascript:

Prototype Chain / List

by obj. field
failed → obj. prototype. field
faild ↪ obj. prototype. prototype. field
↪ ...
↪ ...



Constructor

$p = \text{Point}(1, 2)$

F^bSR

Let $\text{Point} = \text{Fun } \underline{x} \rightarrow \text{Fun } \underline{y} \rightarrow$

label $\{ \rightarrow \underline{x} = \text{Ref } \underline{x}; \leftarrow \text{expv} \Rightarrow 1$
 $\underline{y} = \text{Ref } \underline{y};$

move = Fun self \rightarrow

Fun dx \rightarrow

Fun dy \rightarrow

self.x := !self.x + dx;

self.y := !self.y + dy;

{}

}

In

[...]

P_y

$p = \text{Point}(1, 2)$

$p.\text{move}(3, 4)$

F^b_{SR}

Let $p = \text{Point } 1 \ 2 \ \text{In}$

$p.\text{move } p \ 3 \ 4 \ // \ p \leftarrow \text{move } 3 \ 4$