

Thursday Oct. 4
Lecture 9

- Lab 2 (next Sat)

- Lab 3 (next Wed)

- Midterm: Oct. 24 Wednesday

After reading week:

Tue Oct. 16 (will be covered)

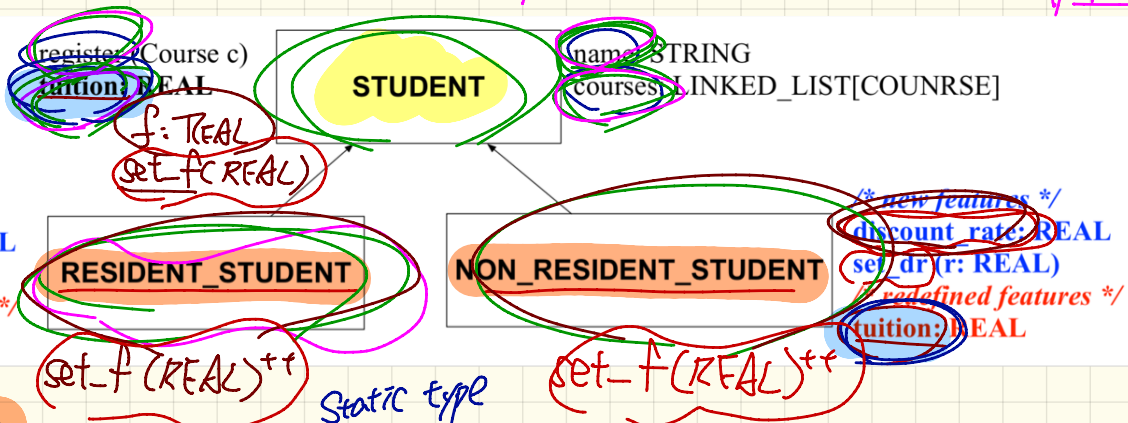
Thu Oct. 18 (covered? to be confirmed)

Inheritance Architecture: Students

create {RS} s. make
 s →

RS
pr

S: STUDENT
 S. tuition



/* new features */
 premium rate: REAL
 set_pr(r: REAL)
 /* redefined features */
 tuition: REAL

/* new features */
 discount rate: REAL
 set_dr(r: REAL)
 /* redefined features */
 tuition: REAL

set_f(REAL)++

set_f(REAL)++

Static type

EXPECTATIONS

rs: RS

S: STUDENT
 create {RS} rs. make callable
 create {RS} s. make features

S. f ← inherited version of STUDENT

S. set_f
 S := rs ← S. set_f

	(S) <u>STUDENT</u>	(RS) <u>RESIDENT_STUDENT</u>	(NRS) <u>NON_RESIDENT_STUDENT</u>
	S. name	rs. name	nrs. name
	S. CS	rs. CS	nrs. CS
	S. reg	rs. reg	nrs. reg
	S. tuition	rs. tuition	nrs. tuition
	S. pr	rs. pr	nrs. dv
	S. set_pr	rs. set_pr	nrs. set_dv
		rs. dv X	

Student

ST

NRS

S = new RS ("Abn");

nrs = new NRS ("Mark");

local

S: STUDENT s

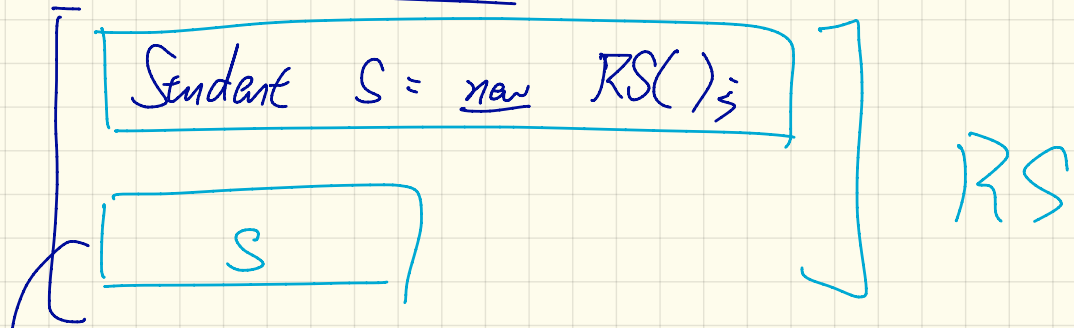
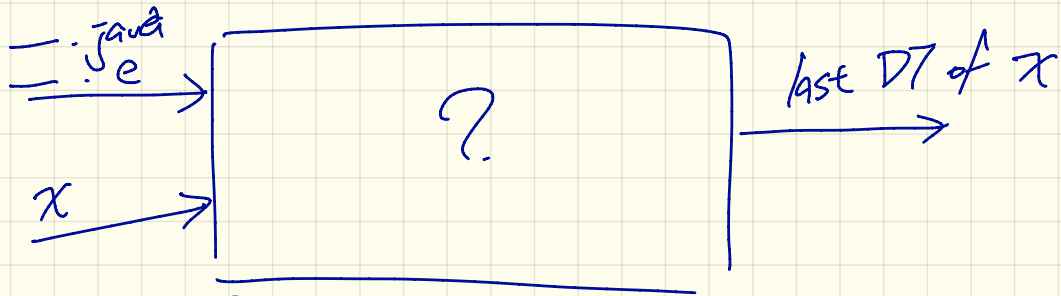
nrs: NRS

do

create { RS } s. make

↙ create { NRS } nrs. make

↘ create nrs. make



```
while (true) {  
    Student S = new RS();  
}
```

Polymorphism: Intuition

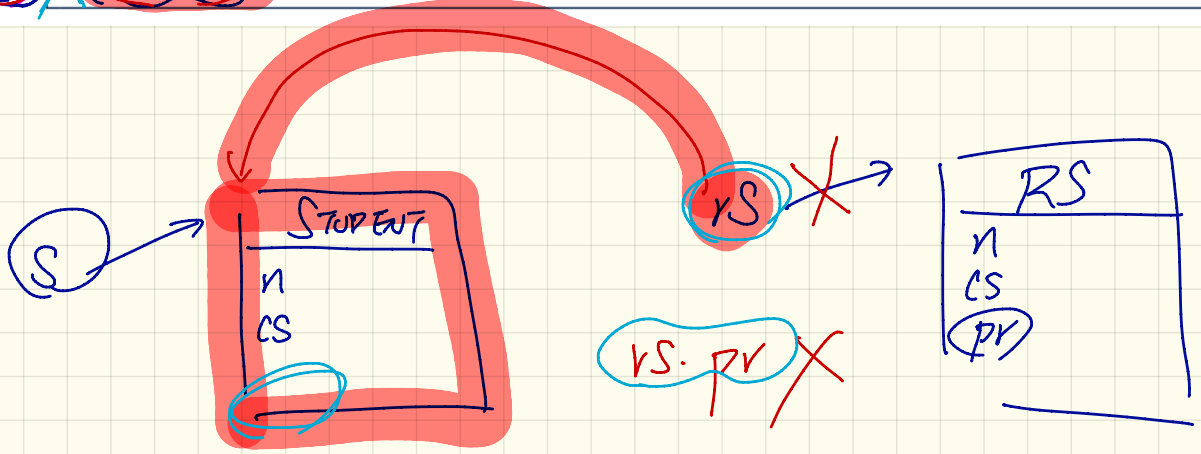
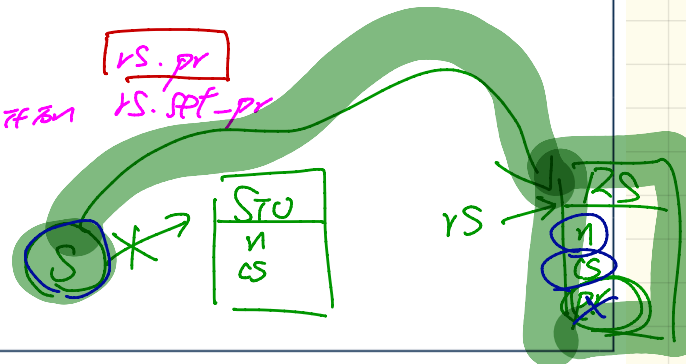
```

1 local
2   (s) STUDENT
3   (rs) RESIDENT_STUDENT
4 do
5   create (s).make ("Stella")
6   create (rs).make ("Rachael")
7   rs.set pr (1.25)
8   (s) := (rs) * Is this valid? */
9   (rs) := (s) * Is this valid? */

```

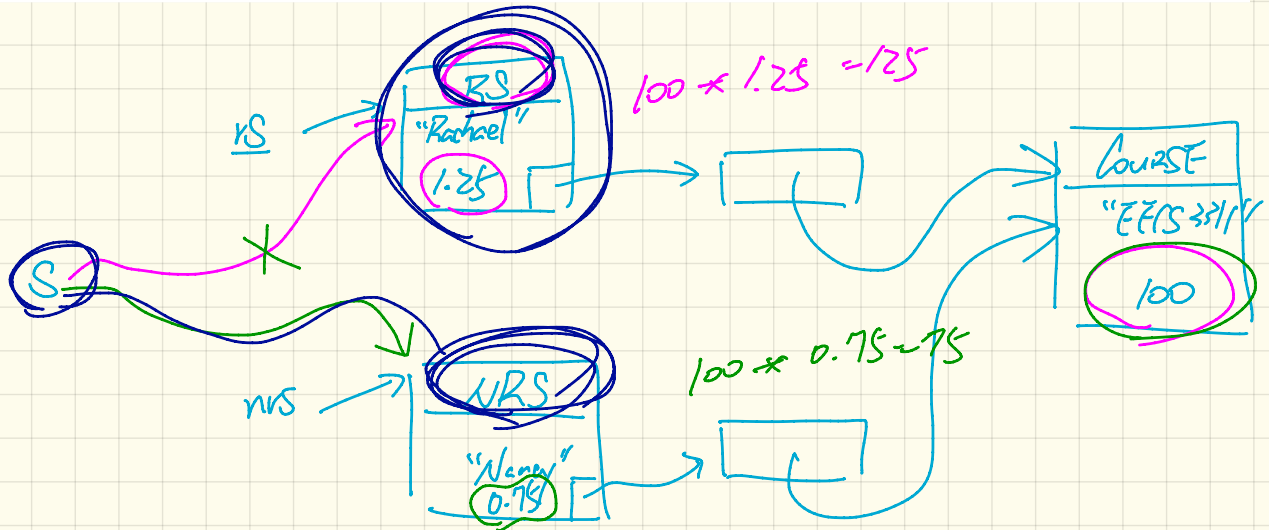
rs.n
rs.cs
rs.pr

rs.pr
rs.pr-pr



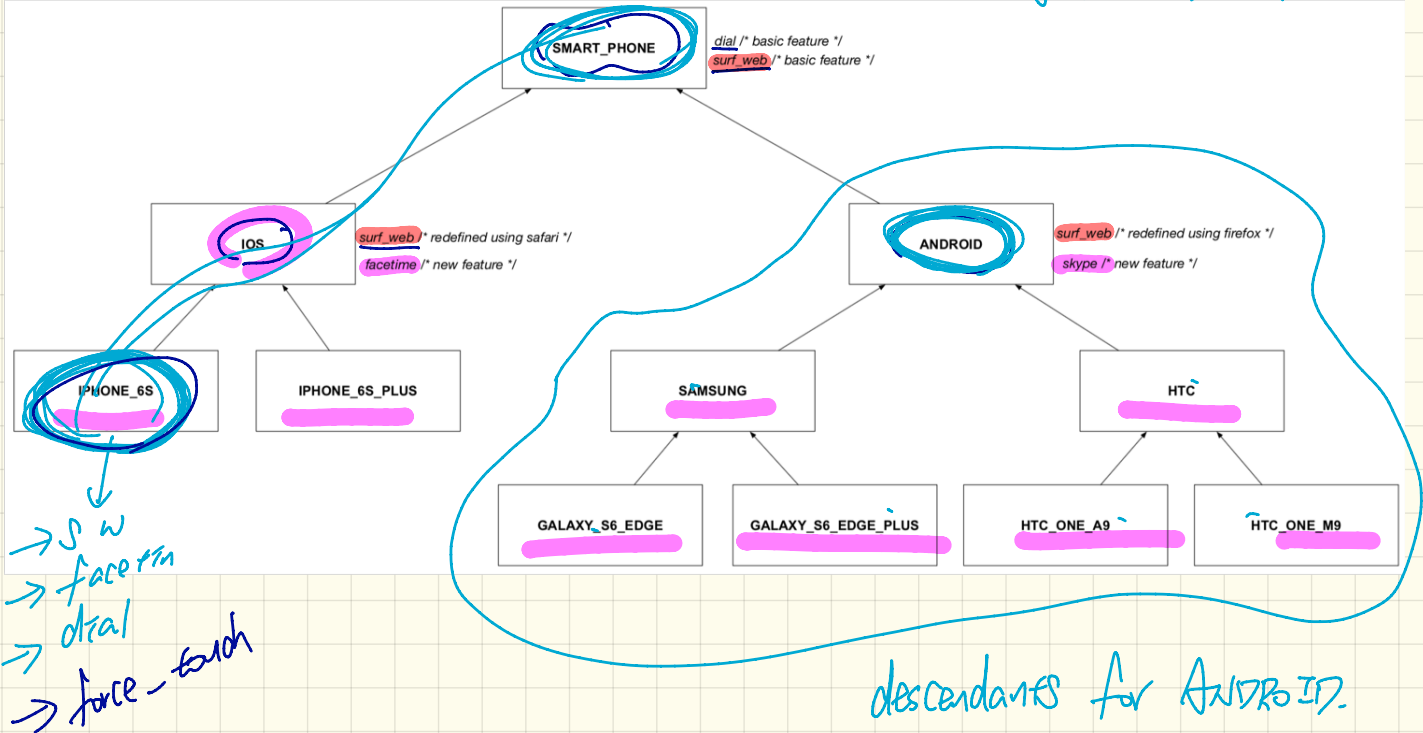
Dynamic Binding: Intuition

```
local c : COURSE ; s : STUDENT
do crate c.make ("EECS3311", 100.0)
  → create {RESIDENT_STUDENT} rs.make("Rachael")
  → create {NON_RESIDENT_STUDENT} nrs.make("Nancy")
  rs.set_pr(1.25); rs.register(c)
  → nrs.set_dr(0.75); nrs.register(c)
  s := rs; ; check s.tuition = 125.0 end
  → s := nrs; ; check s.tuition = 75.0 end
```

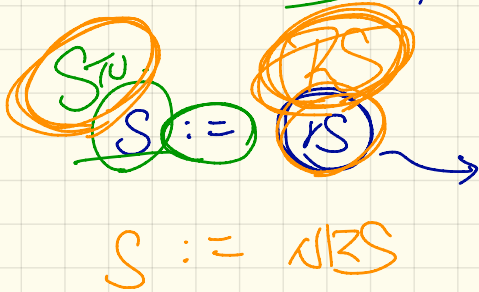
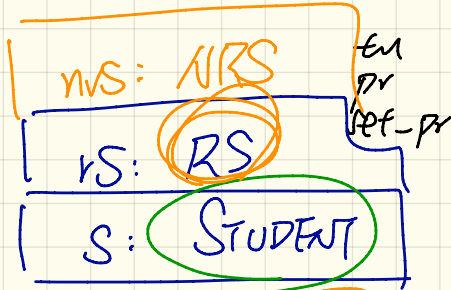
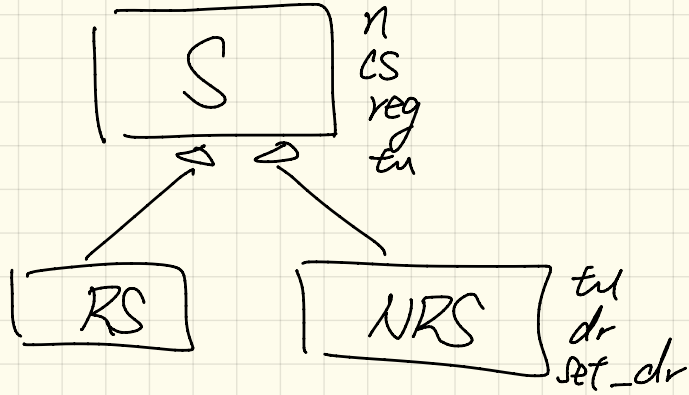


Inheritance Hierarchy: SmartPhones

ancestors for ANDROID:
ANDROID, SP



Substitution

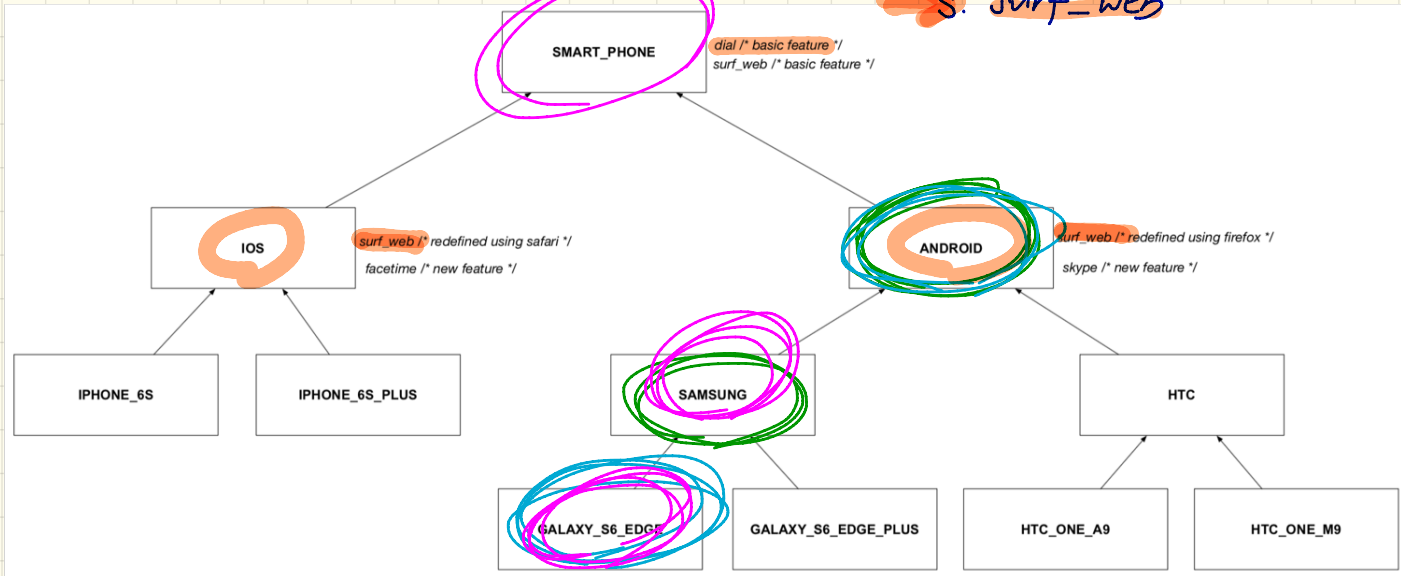


When expecting a STUDENT
you can substitute it by
any of its derendant classes.

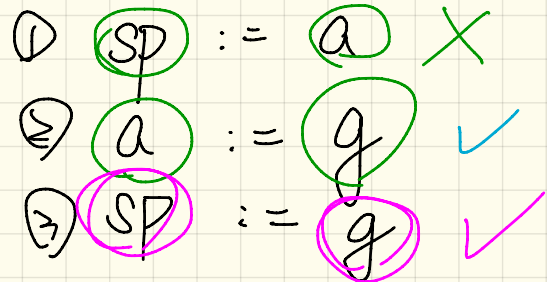
Inheritance Hierarchy: SmartPhones

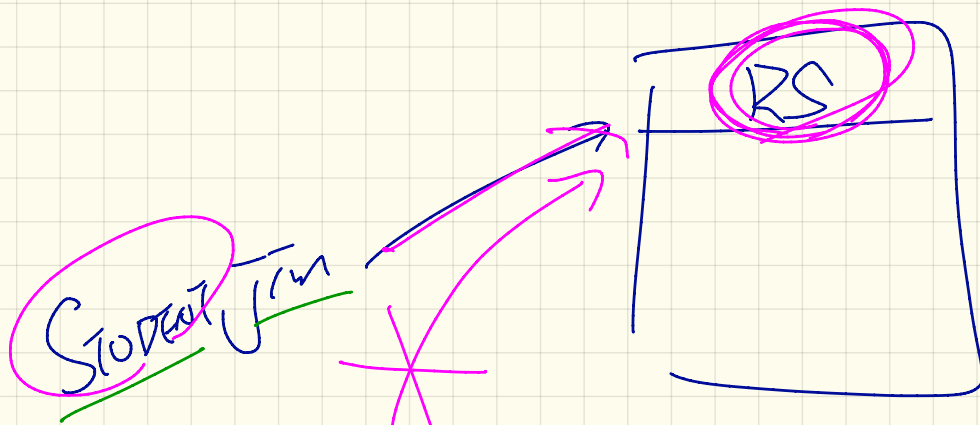
S: SMART_PHONE

S: surf_web



- sp : SAMSUNG
- a : ANDROID
- g : GALAXY_S6_EDGE





RS

✓ (RS). set-prc. ->

rs : RS

instance of

Boolean expression

check

attached

{RS}

Jim

as

rs_jim

then

rs := rs_jim × rs

rs. set_pr (1.75)

rs_jim : RS

end