EECS2030 Advanced Object-Oriented Programming (Fall 2021)

Q&A – Lecture 5c

Wednesday, November 17

Announcement
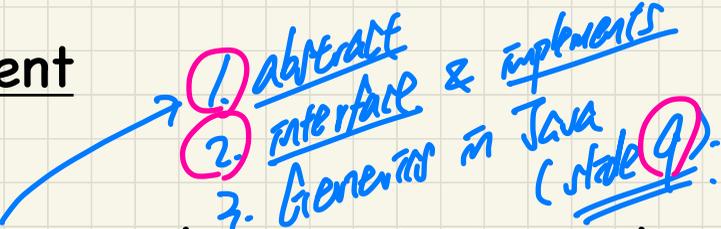
1. abstract
2. interface & implements
3. Generics in Java (state).

- <u>Lecture W10</u> (released: Nov. 16)
- <u>Lab4</u> due <u>Monday, November 22</u>
- <u>Written Test 3</u>   2pm EST.

expectation
↳ public methods ← which depend on private/protected attributes
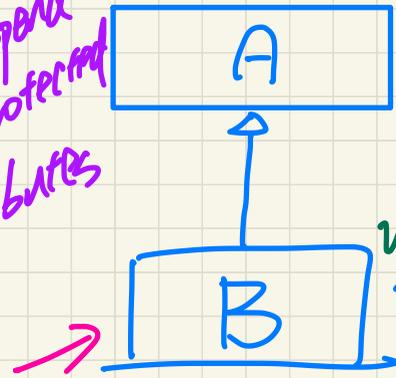
A   void ma()

B   void ma(){...}

→ in the future, it's expected that some new methods will be there.

B obj = new A(); X

From compiler's point of view,

B has strictly more expectation than A

(in the long run, subject to extension)

I know that we can only call the methods that are within the expectations of the Static type and methods that are not part of the expectation of the Static type can not be called unless casted downward or upward if possible.

But, when we assign a variable with certain Static type to a new Dynamic type,

for example: SmartPhone sp = new iPhone13Pro()

ST ✓ DT
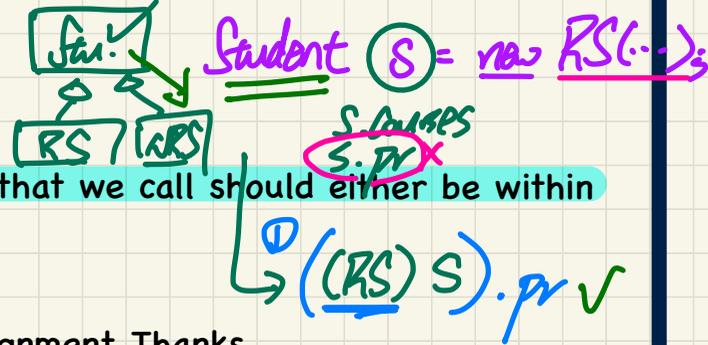
what is the good use of Dynamic type if every method that we call should either be within the expectation of static type or should be casted.

Then what is the good use of IPhone13Pro() in this assignment. Thanks

(handwritten annotations):

Student S = new RS(...);

S.courses
S.dr ✗

↳ ① ((RS) S).pr ✓

(boxed):
- ✓ overridden methods & dynamic binding → sp.dial
- ✓ polymorphic array & dynamic binding
- – cast only for methods unique to a DT

sp.dial
sp.surfweb — Compiles

DT: IP13Pro

② ((NRS) S). dr

overridden — ClassCastException
version of methods
defined in DT will be invoked.

✓ sp. dial
✓ sp. surfweb

sp. QuickTake ✗
((IP13Pro) sp). QuickTake

Consider

SmartPhone [ ] spa;

IOS [ ] ✓
ios;

spa[i]. dial ✓
    • surfweb ✓
    • spa[i]. facetime ✗
        ↓
       ST: SmartPhone

ios[i]. dial ⁻
    • surfweb ✓
    ios[i]. facetime ✓
      ↓
    ST: IOS — ⁻

① If the intention is to invoke the parent-level methods more often (e.g, dial, surfweb), then ST of array elements should be SmartPhone.

② If the intention is to invoke child-level methods more often (e.g. facetime) then ST of array elements should be IPBPo.

Student S = _new_ ResidentStudent(...);

S getTuition

S. getPr() X →pr RS WRS dr

$getTuition^+$ (circled) $getTuition^+$

S. getTuition() ① Compiles

∴ getTuition declared in Student class

② ∴ dynamic binding version of getTuition in RS is invoked.

RS
not	
courses	
→pr	1.05

Student S =