Presentation 19

Subclasses & Inheritance

Announcements for Today

Assignments

- A4 graded by next week
  - Last call for the Survey
- A5 was posted **Tuesday**
  - Shorter written assignment
  - Due Tuesday at Midnight
- A6 also posted **Tuesday**
  - Due **Sunday** after classes
  - Designed to take two weeks
  - Follow **micro-deadlines!**

Video Lessons

- **Lesson 22** for today
- **Videos 23.1-23.7** next time
- **Video 23.8** is *very* optional

Second Prelim is Coming!

- We are now two weeks out!
  - Thursday November 19th at 9:30 am (Eastern)
  - Will cover up to November 12th
  - **Topics:** Loops, Recursion, and Classes
- **CMS** is now open for conflicts again
  - Time zone conflicts will be resolved *later*
  - Submit if you want/need to move online
  - SDS students should submit again
  - Want to assign groups by next Thurday

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Study Guide posted next week

Subclass Constructors

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class A(object):

12    def __init__(self,x):
13        self.x = x
14        self.y = x

class B(A):

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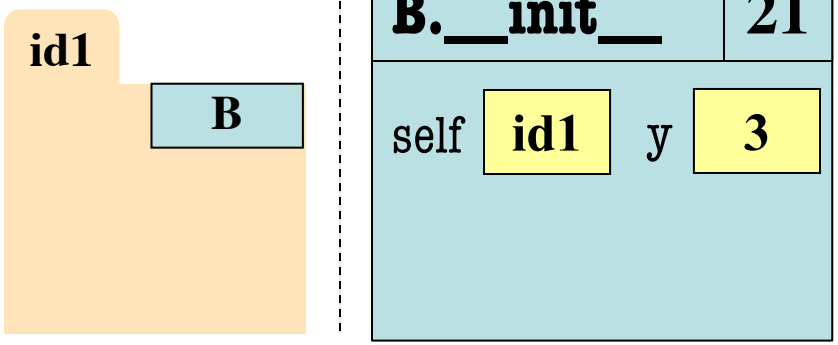
```
>>> b = B(3)
```

Ignoring the **class folder** what does the **call stack** and the **heap** look like?

Which One is Closest to Your Answer?

A:



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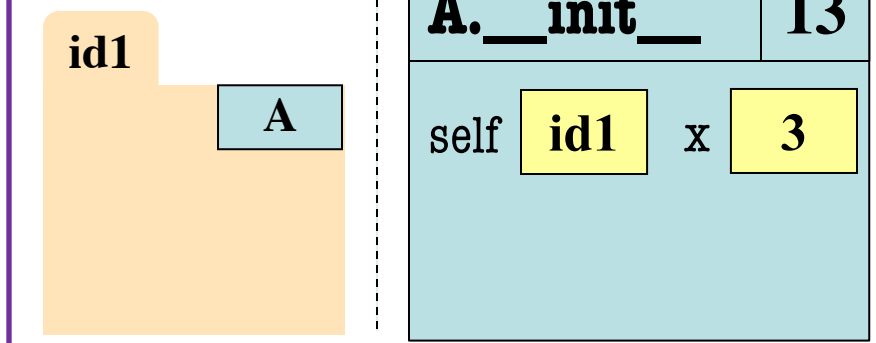

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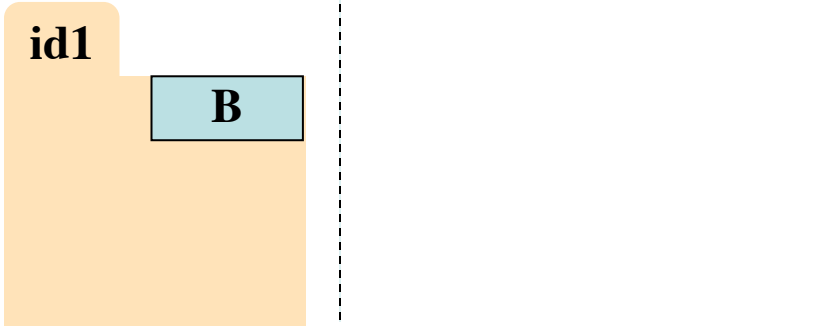

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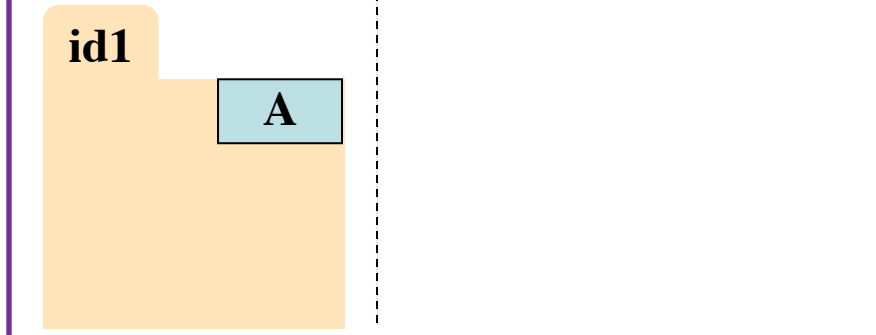

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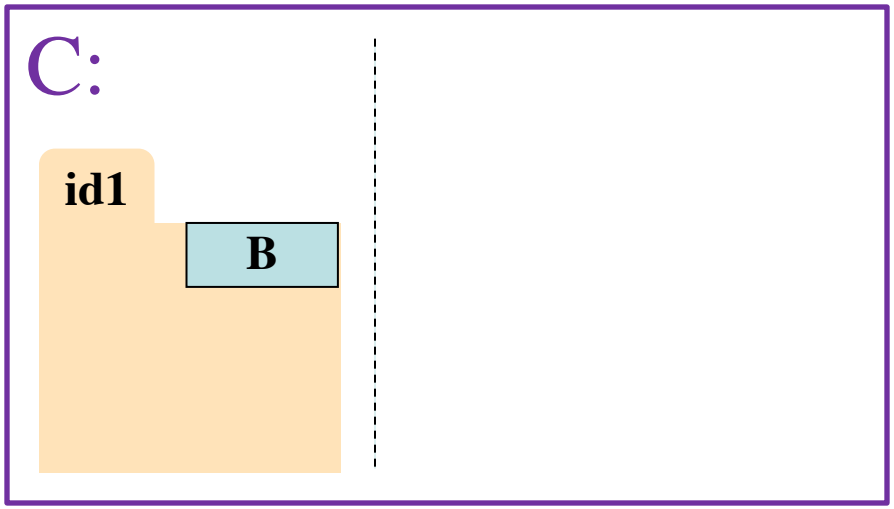

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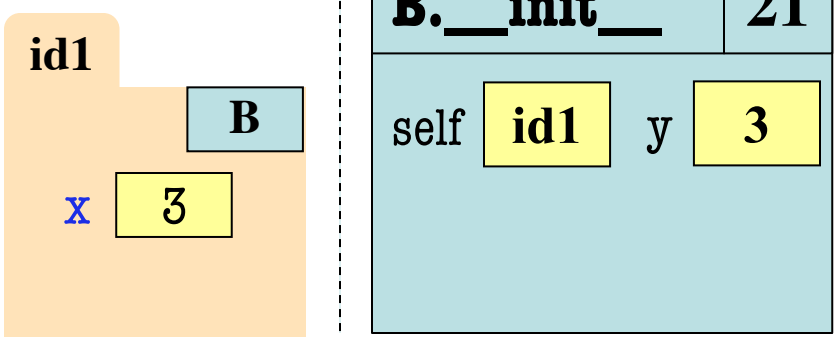

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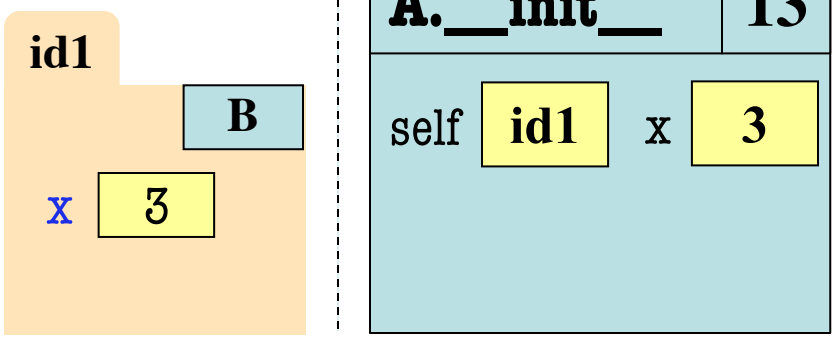

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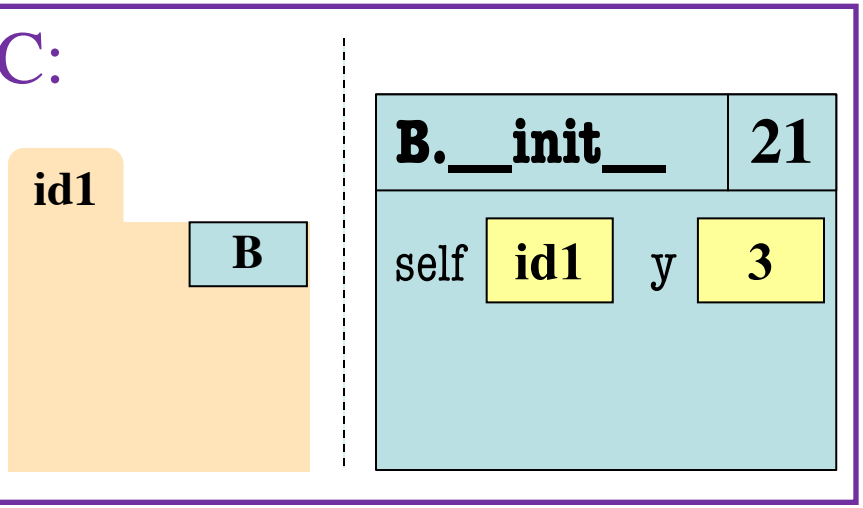

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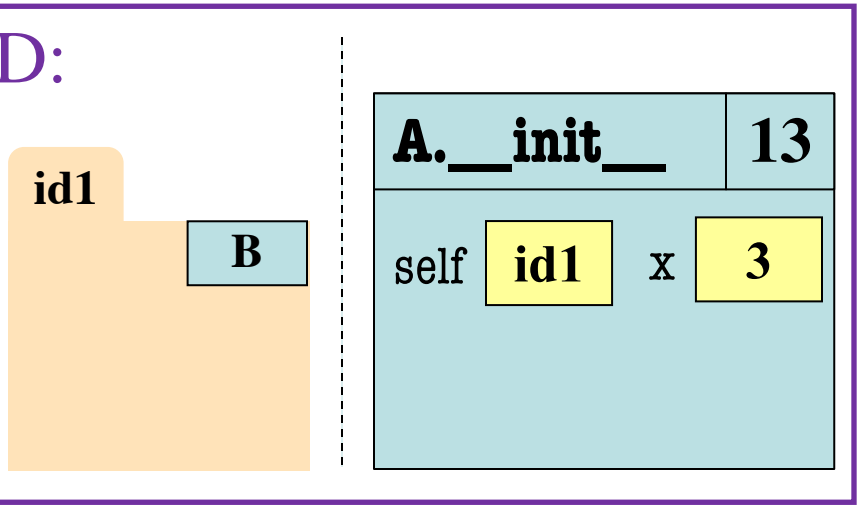

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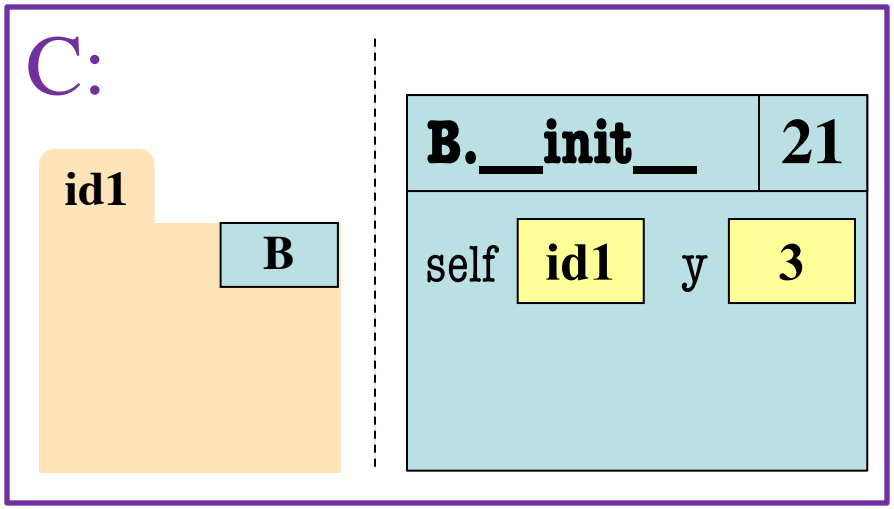

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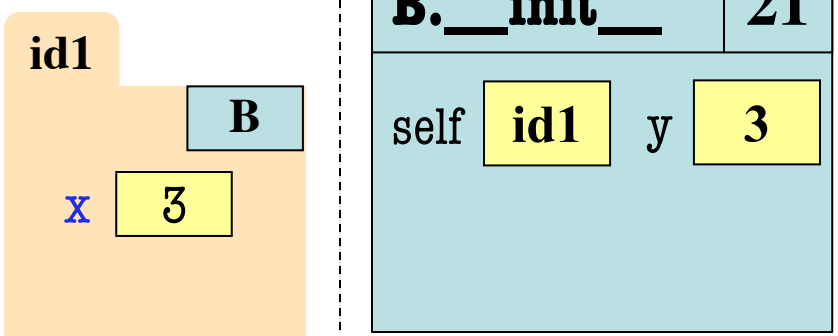

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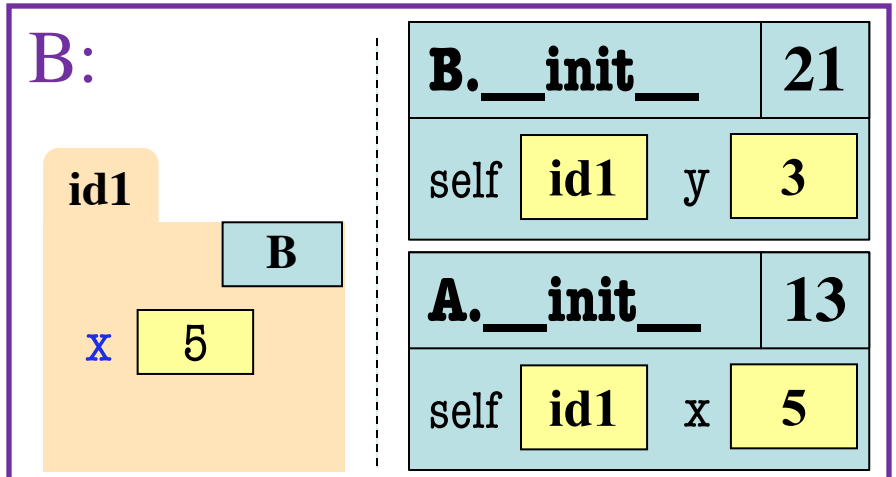

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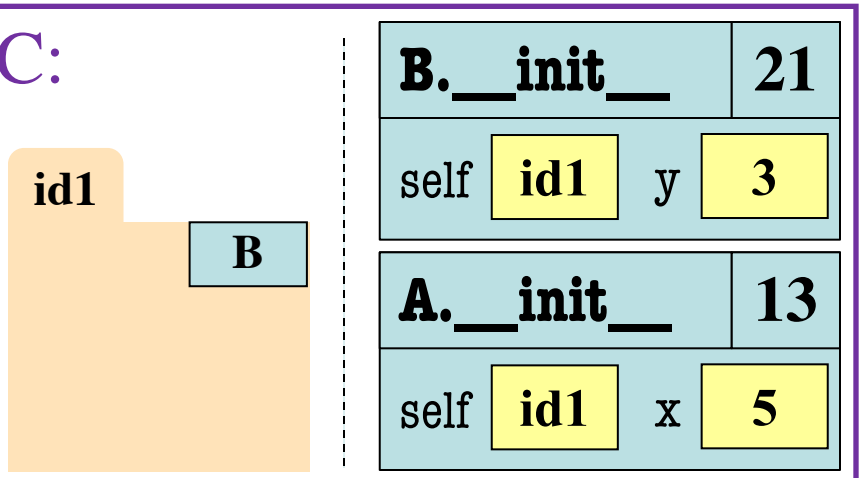

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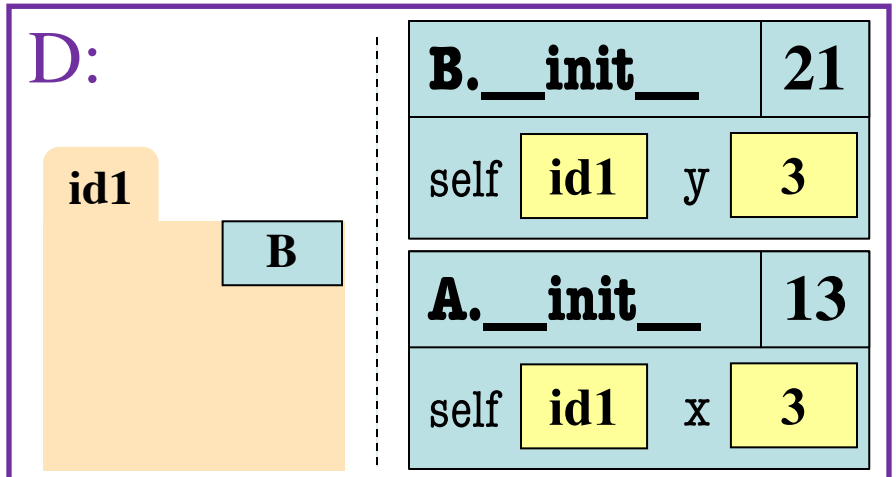

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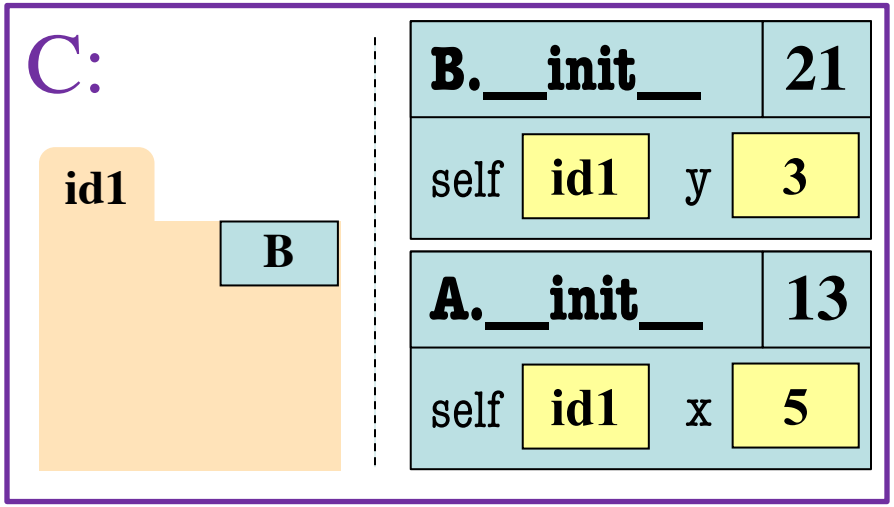

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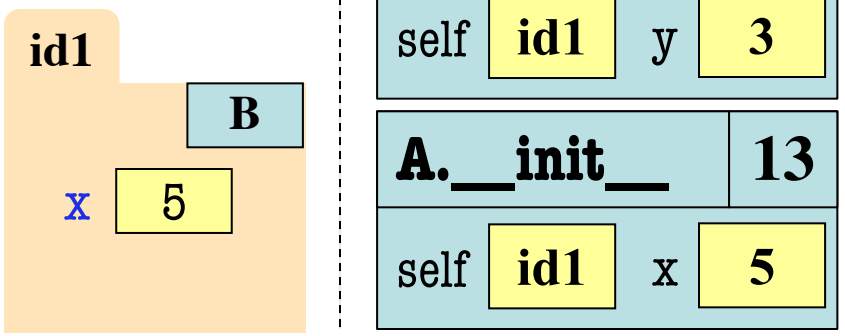

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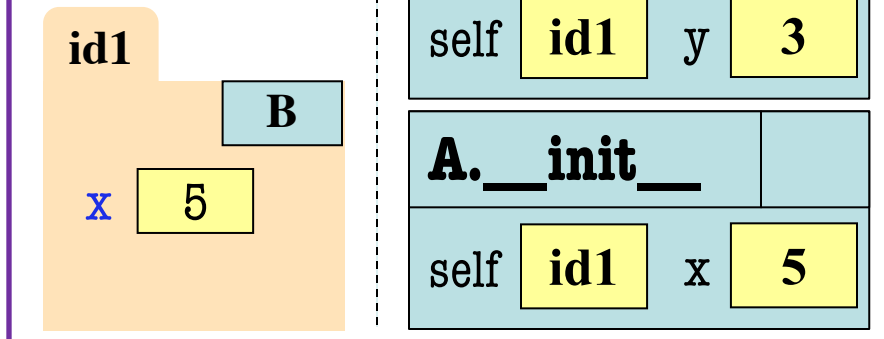

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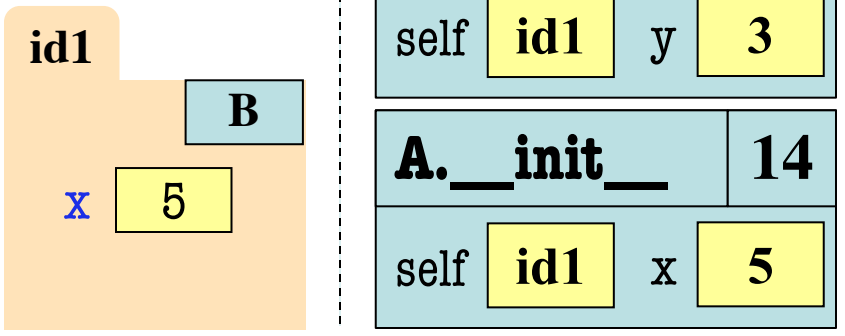

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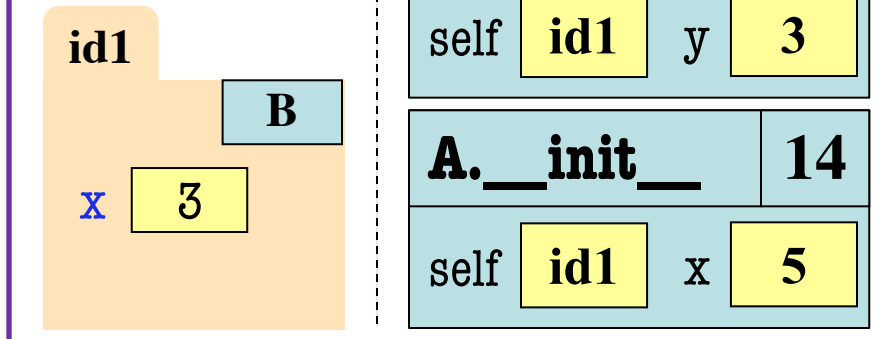

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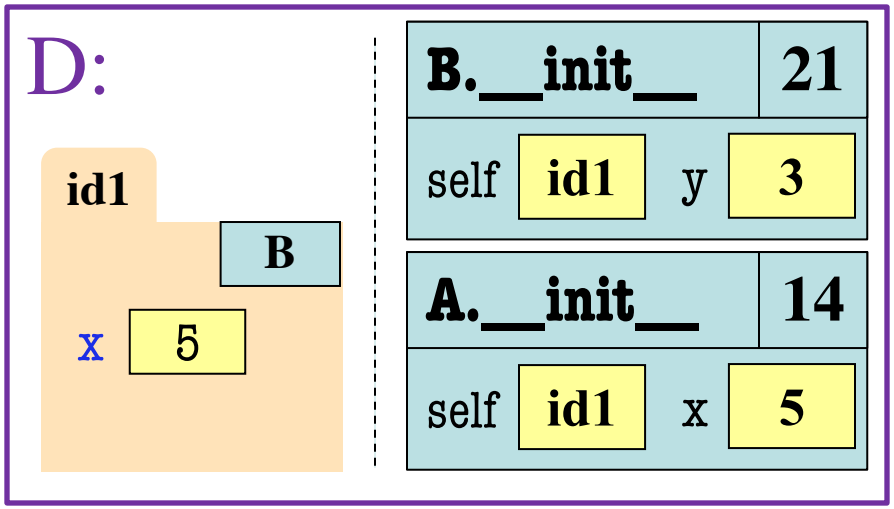

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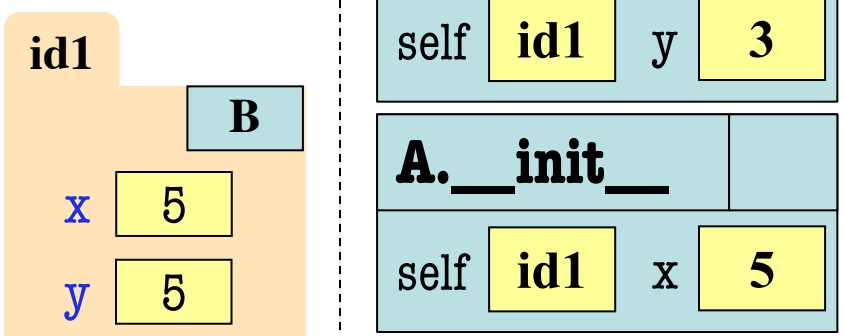

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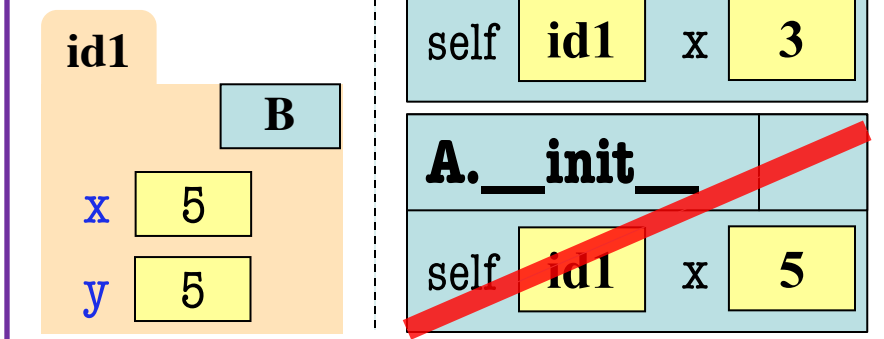

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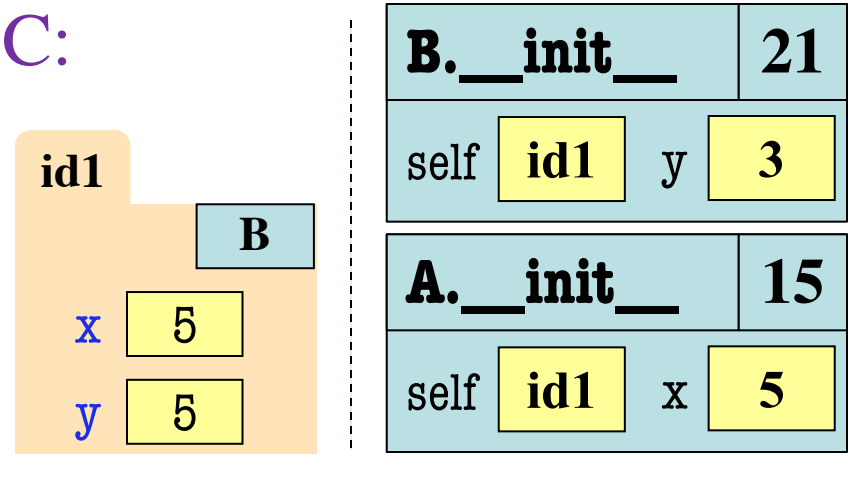

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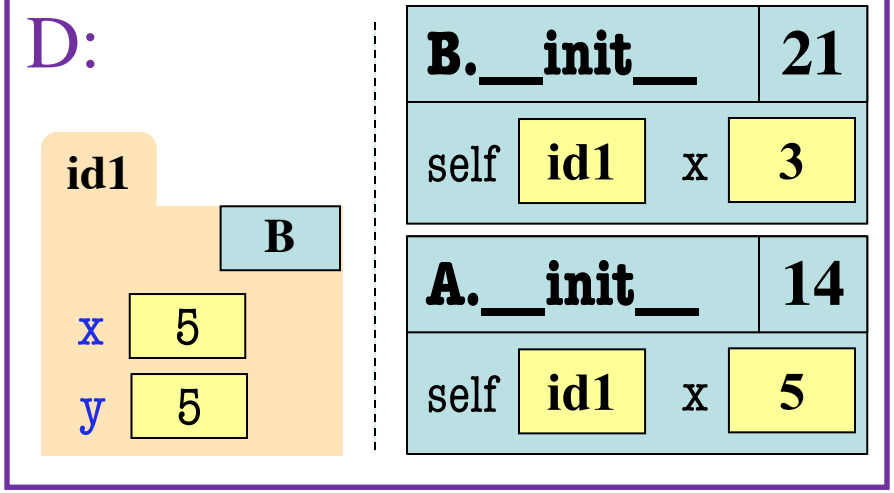

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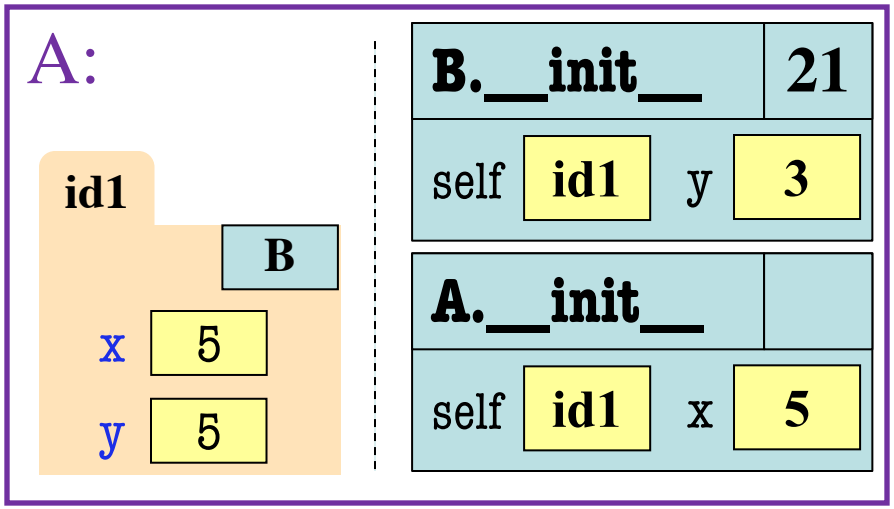

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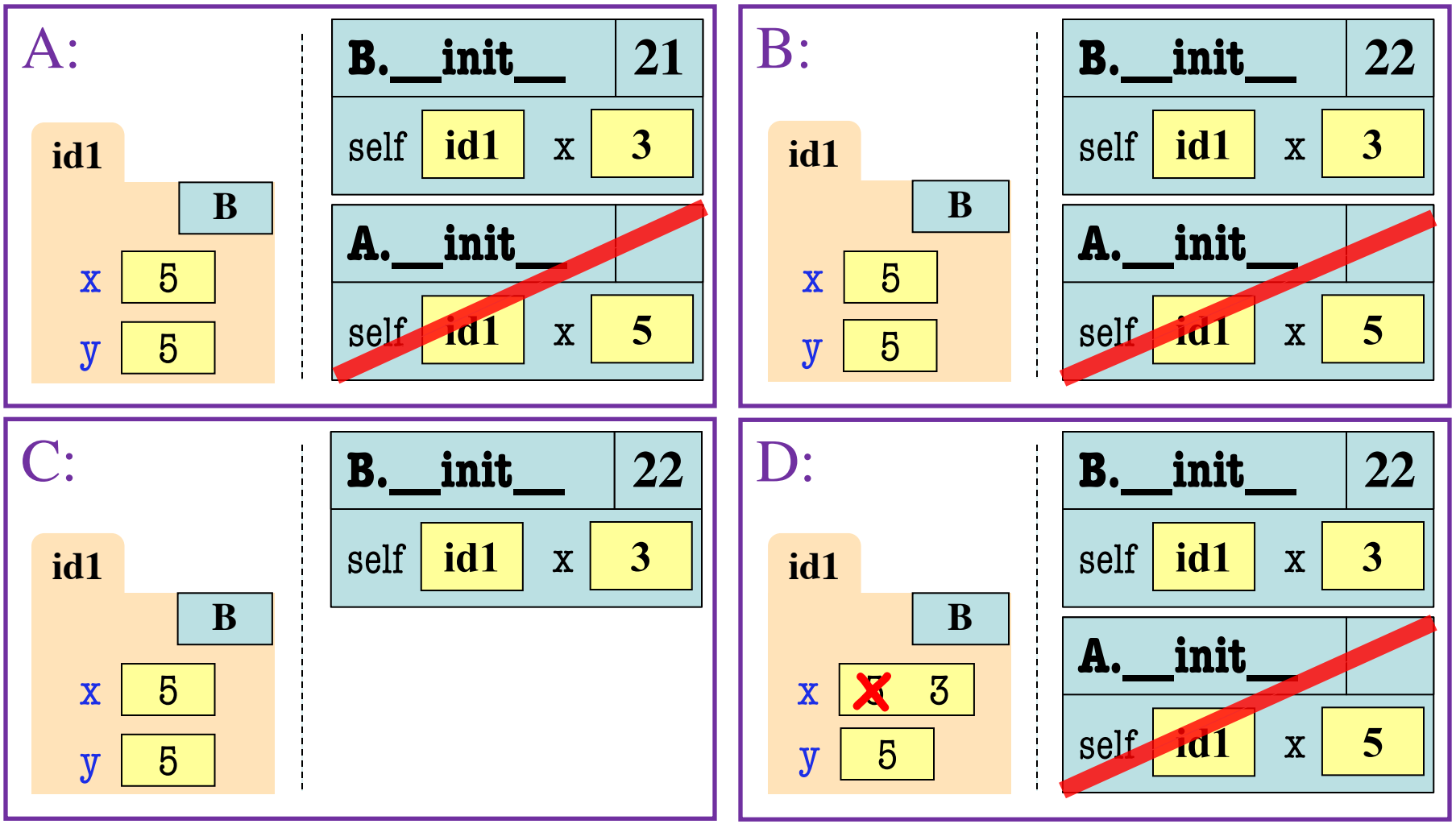

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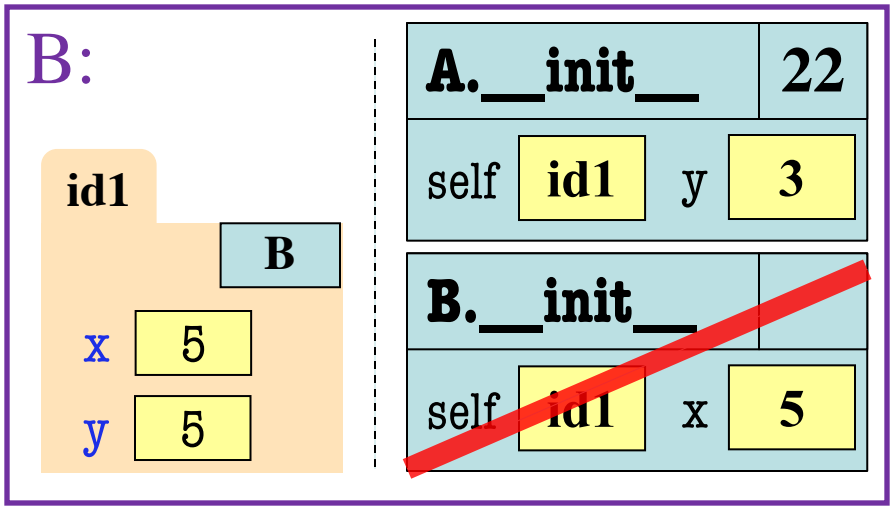

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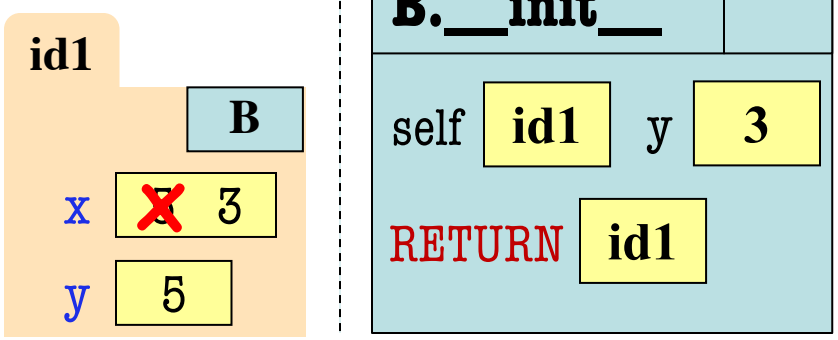

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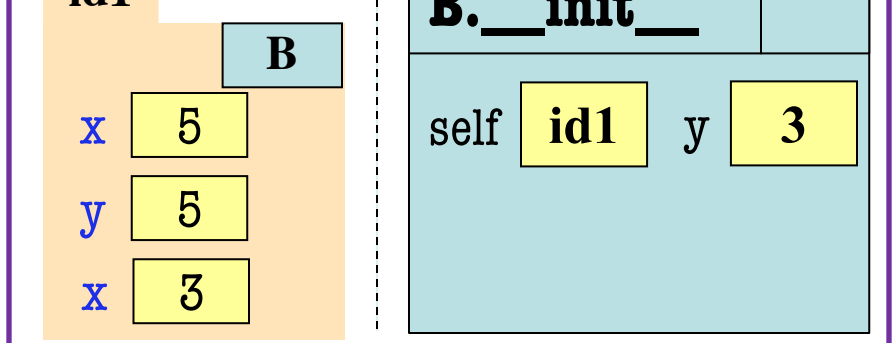

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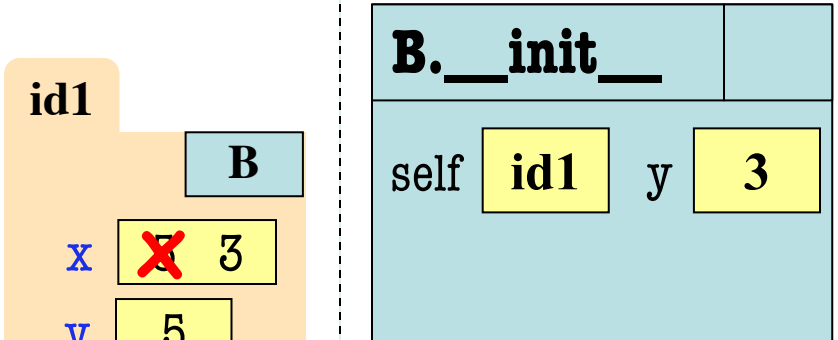

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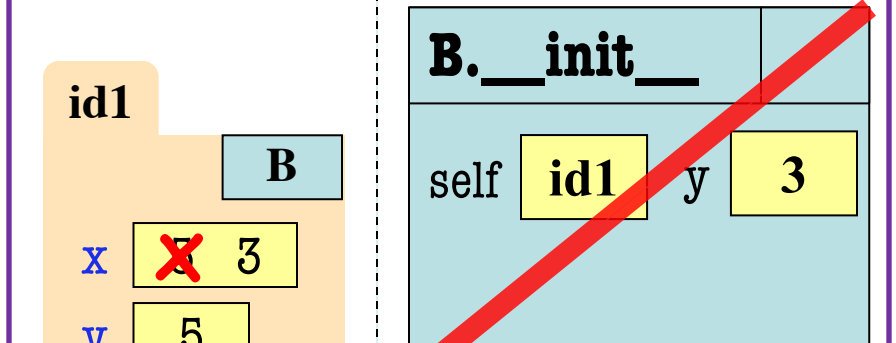

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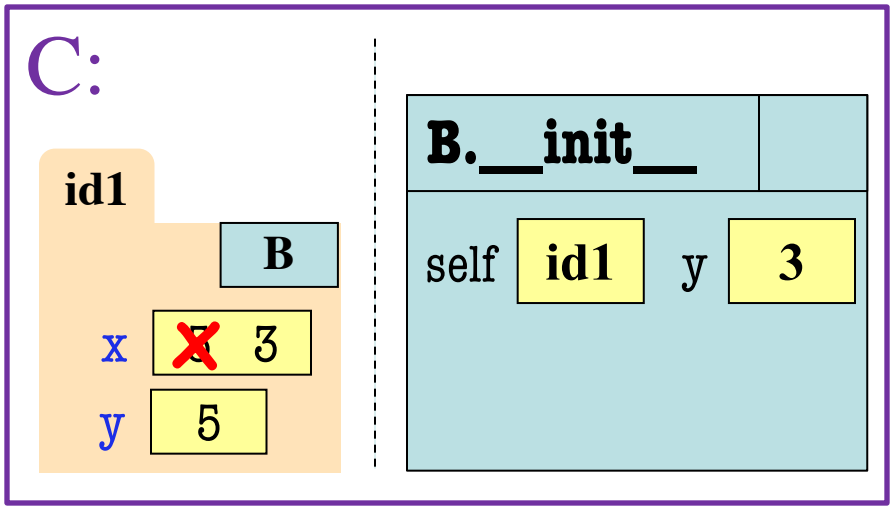

Final step is **erase frame**

Name Resolution

```
class A(object):
    x = 3 # Class Attribute
    y = 5 # Class Attribute

    def f(self):
        return self.g()

    def g(self):
        return 10

class B(A):
    y = 4    # Class Attribute
    z = 42   # Class Attribute

    def g(self):
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    def h(self):
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- Execute the following:

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>>> a = A()
>>> b = B()
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- What is value of a.f()?

A: 10
B: 14
C: 5
D: **ERROR**
E: I don't know

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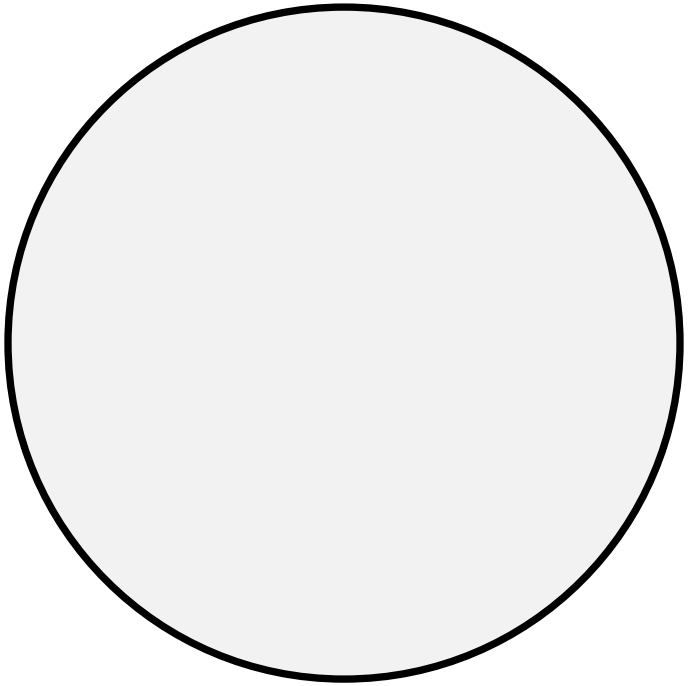
Design Time: A (2D) Circle



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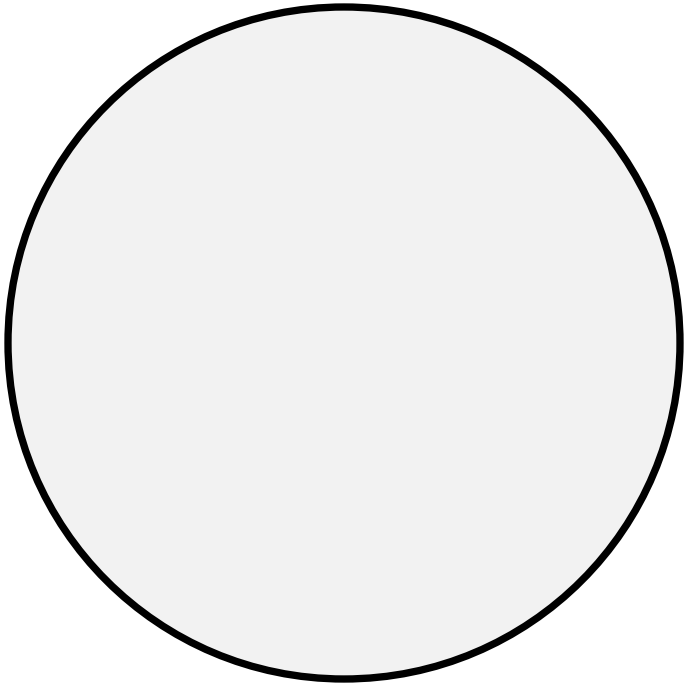

What are the **Attributes**?

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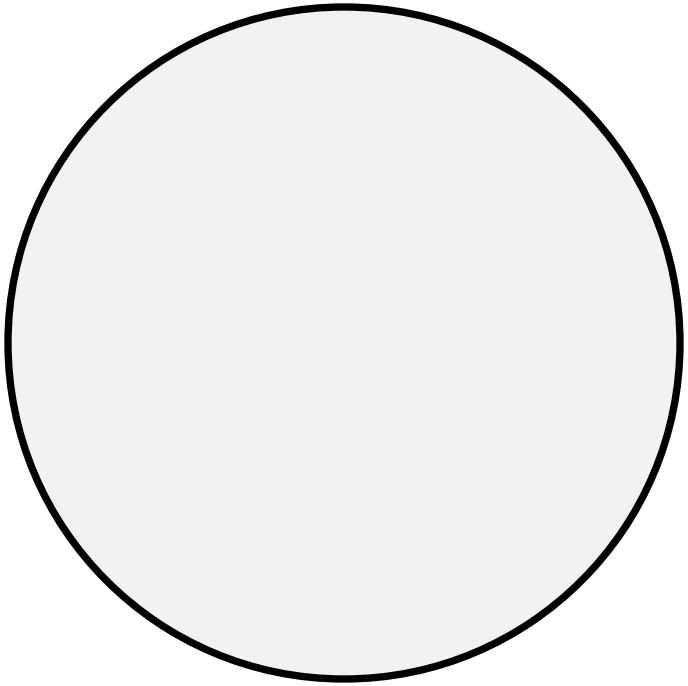
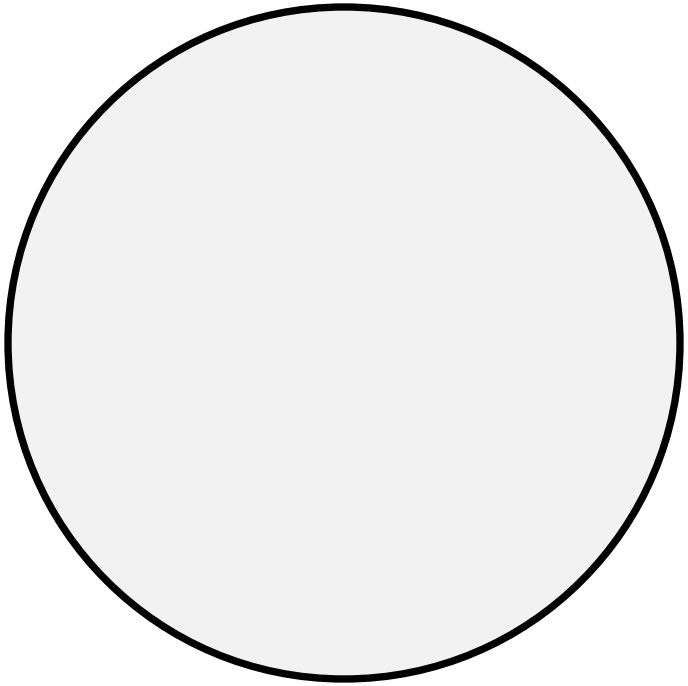


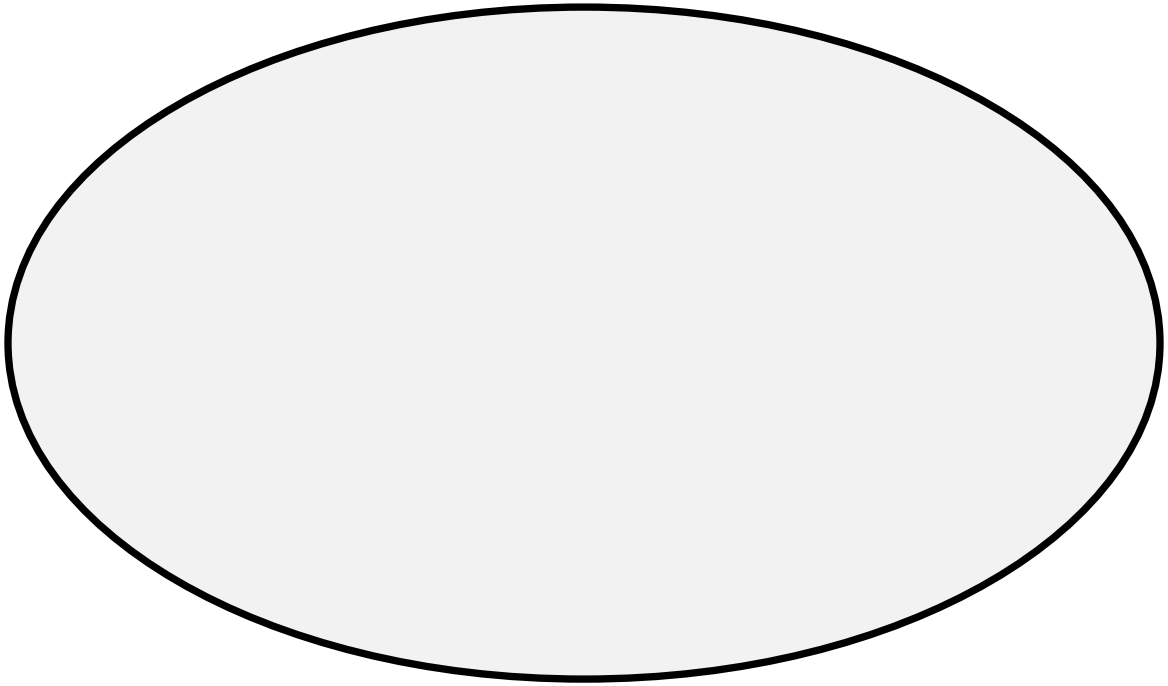
What are the **Methods**?

Design Time: A (2D) Circle



What are the **Invariants**?

Design Time: A (2D) ~~Circle~~ Ellipse



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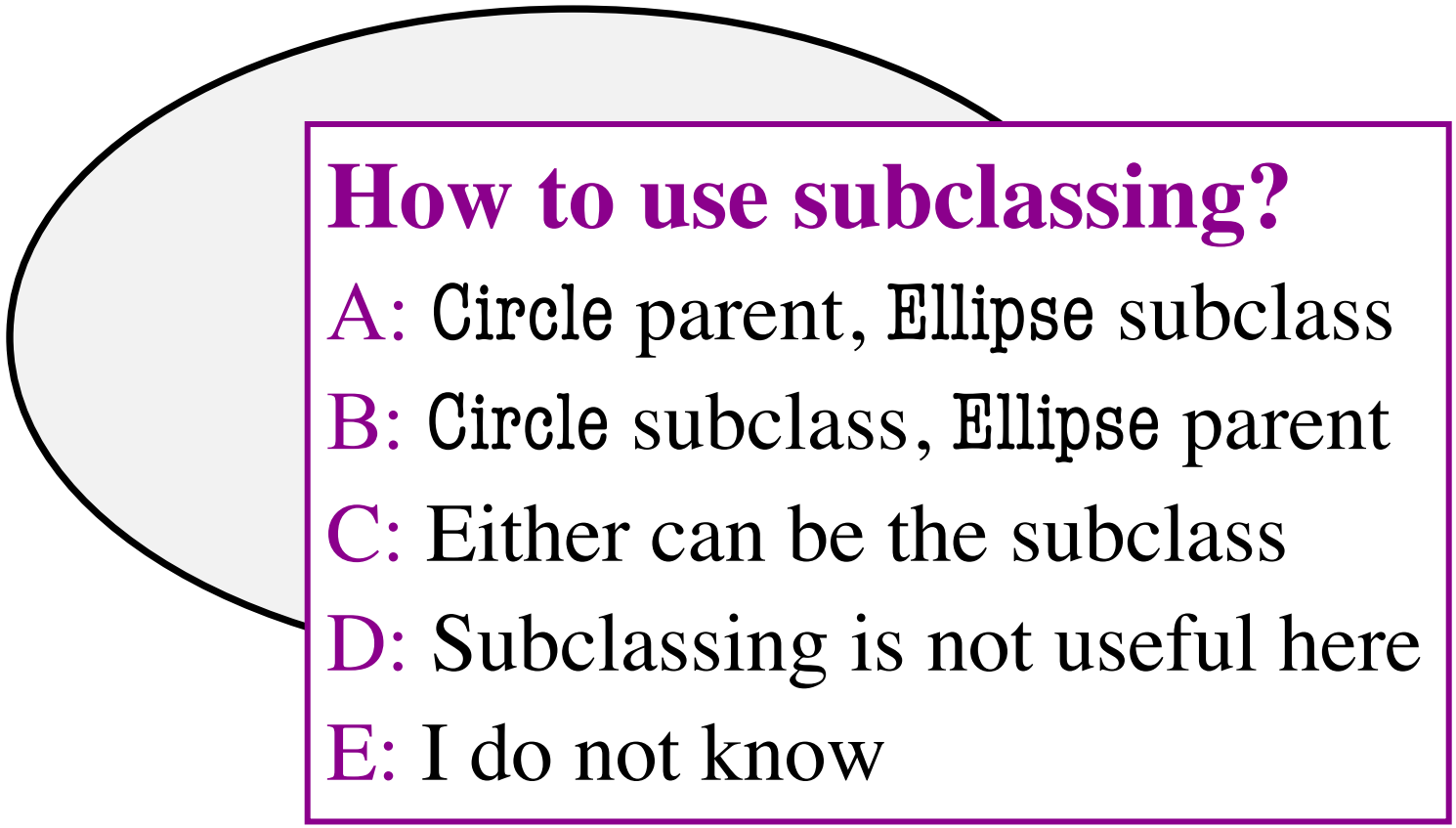

How to use subclassing?

A: Circle parent, Ellipse subclass

B: Circle subclass, Ellipse parent

C: Either can be the subclass

D: Subclassing is not useful here

E: I do not know

Questions?