Homework 5 Collaboration

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Problem 1:
Which of the B.m methods below are function subtypes of A.m? For each of the B.m methods answer whether the method would overload or override A.m in Java.

```
class A
{
        Object m(X y, String s);
}
```

(a). X m(X y, String s); is a subtype of A.m and it overrides it.
(b). Y m(Object y, Object s); is a subtype of A.m and it overloads it.
(c). Object m(X y, String s) throws RuntimeException; is not a subtype of A.m and it overrides it.
(d). Z m(Y y, String s); is not a subtype of A and it overloads it

Problem 2. For each pair of specifications below, answer whether the extending class is a true subtype of its superclass. Explain your answer.

1. IsoscelesTriangle is not a true subtype because it does not have a stronger specification than Triangle, and its specifications don't imply the other's. Essentially because they are distinct it is nearly the same as the Rectangle and Square classes we compared in class.

2. Squid is not a true subclass because it does not have a stronger specification since Vertebrae asks for >0 and Squid returns 0, they are distinct. Essentially a Squid object cannot be used as a substitute for a Vertebrae object, so it is not a true subtype. Since squid is not a true subtype it does not matter that Human is (since it is stronger and can be used to substitute).

3. MountainBike is a true subclass of Bicycle because it can be substituted when a Bicycle object is expected since it has all the same parameters as Bicycle (a bit more specific with height) and access to its functions because of extend.

4. ConcurrenceAccount is not a true subtype because it throws an exception the user is not expecting or ready to handle, so it cannot be a true subtype.