Questions

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risky #2

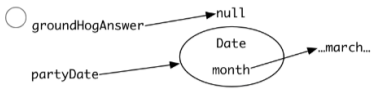
1/1 point (graded)

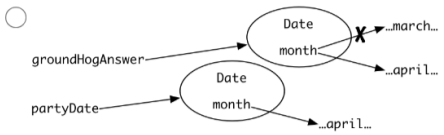
```
/** @return the first day of spring this year */
public static Date startOfSpring() {
    if (groundhogAnswer == null) groundhogAnswer = askGroundhog();
    return groundhogAnswer;
}
private static Date groundhogAnswer = null;
```

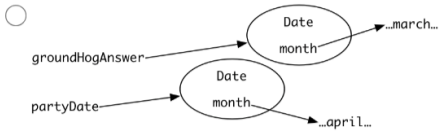
```
// somewhere else in the code...
public static void partyPlanning() {
    // let's have a party one month after spring starts!
    Date partyDate = startOfSpring();
    partyDate.setMonth(partyDate.getMonth() + 1);
    // ... uh-oh. what just happened?
}
```

We don't know how `Date` stores the month, so we'll represent that with the abstract values `...march...` and `...april...` in an imagined `month` field of `Date`.

Which of these snapshot diagrams shows the bug?







✔

Explanation

The problem arises because the cached `groundhogAnswer` points to the same mutable `Date` that is updated from March to April.

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understanding risky example #2

1/1 point (graded)

`partyPlanning` has unwittingly changed the start of spring because `partyDate` and `groundhogAnswer` happen to point to the same mutable `Date` object.

Worse, this bug will probably *not* be discovered in `partyPlanning()` or `startOfSpring()` right away. Instead, it will be some innocent piece of code that subsequently calls `startOfSpring()`, gets the wrong date back, and goes on to compute its own wrong answer.

Globalization?
Is one problem here that `groundhogAnswer` is a global variable?

- ( ) It's global, that's OK
- ( ) It's global, that's terrible
- (•) It's not global ✔

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✔ Correct (1/1 point)

arithmonthmatic

1/1 point (graded)

A second bug
The code has another potential bug in how it adds to the month.

Take a look at the Java API documentation for `Date.setMonth`.

For what result of `partyDate.getMonth()` could there be a problem?

11 ✔ **Answer:** 11

Explanation
According to the specs of `getMonth` and `setMonth`, 0 represents January and 11 represents December.
So if `partyDate` is in December, `getMonth` returns 11, and the code makes an invalid call to `setMonth(12)`.

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NoSuchMonthException

0/1 point (graded)

The documentation for `Date.setMonth` says: `month – the month value between 0-11`.

Based on that statement and what you've read so far...

Which of the following *might* happen when this month-adding bug is triggered? Check all that apply.

- [x] The method call will do nothing ✔
- [x] The method call will actually do the thing we wanted ✔
- [x] The method call will cause the Date object to become invalid and report incorrect values ✔
- [ ] The method call will throw a checked exception
- [x] The method call will throw an unchecked exception ✔

- [x] The method call will set our computer clock to 9/9/99 ✔
- [ ] The method call will cause other Date objects to become invalid ✔
- [ ] The method call will never return ✔

Explanation
If that restriction on `month` is a precondition, when we call `setMonth(12)`, we have violated the precondition. The function is free to do *whatever it wants*... except that the method declares no checked exceptions, so the compiler will not allow that option.
All the other options are possible even if several of them are very unlikely.

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SuchTerribleSpecificationsException

1/1 point (graded)

Elsewhere in the documentation for `Date`, it says: "arguments given to methods [...] need not fall within the indicated ranges; for example, a date may be specified as January 32 and is interpreted as meaning February 1".

What looks like a precondition... isn't!

Which of these is an argument against this feature of `Date`?

- ( ) Don't repeat yourself (DRY)
- (•) Fail fast
- ( ) Groundhog algorithm
- ( ) Exceptions for special results
- ( ) Preconditions restrict the client

✔

Explanation
Some clients might appreciate the flexibility of this approach, but other clients will have bugs that `Date` makes it harder to find. If the spec says values need to be in particular ranges, it would be better to fail fast when they're not.

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