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Homework 10 – *Due: Friday, in class*

Please answer the following questions for Friday's class.

Java and Python are popular object-oriented languages that differ in important ways. We consider these differences in the following problems.

1. Python is *interpreted*, while Java is *compiled*. Describe what this means.
2. What is the main difference between *a typed language*, like Java, and *an untyped language*, like Python.
3. Despite being object-oriented, Java has some *primitive types* that are not objects. What is an example of a primitive type in Java? How does this make the language slightly more difficult to use?
4. There is no “underscore guilt” in Java. Explain how Java's `private` keyword helps to support *data abstraction* in its classes.

5. Java, unlike Python, has a *basic* or *C-style* for loop, consisting of three parts: (1) an initialization expression, (2) a condition expression, and (3) an update expression. Demonstrate how you would use a for loop to see if a number, n , was prime. (Recall, a number $n > 1$ is prime if it has no divisors other than 1 and itself.)

6. Python allows parallel assignment, as demonstrated by following idiom for exchanging two int values:

```
a, b = b, a
```

Parallel assignment is not possible in Java. Write Java code to exchange two int values a and b :

```
int a = 1;  
int b = 2;
```

7. In Java, the `contains` method is typically implemented to allow users to check to see if a container class holds a value that is equal to a value, v . Write a recursive `contains` method for the `Tree` class we're developing in this week's lab.

```
public boolean contains(String v)
```