

## CSE 331 – Subtyping Worksheet

1. Suppose that you are working at a vehicle manufacturer. Your job is to write software related to the company's new environment-friendly product – an electric scooter. To do this, you wrote the following `Vehicle` class and its Java subclasses .

```
class Vehicle { ... }

class ElectricVehicle extends Vehicle { ... }

class Scooter extends ElectricVehicle { ... }
```

In the `ElectricVehicle` class, you chose to implement a function with the following method signature:

```
class ElectricVehicle extends Vehicle {
    public ElectricVehicle convert(ElectricVehicle ev);
}
```

Now, you need to override this method in the `Scooter` class. Which of the following method signatures would be valid if your goal was to implement a true subtype? Fill in the corresponding column.

	True Subtype?	Java Subtype?
<code><b>ElectricVehicle</b> convert(<b>Vehicle</b> ev);</code>		
<code><b>Vehicle</b> convert(<b>ElectricVehicle</b> ev);</code>		
<code><b>Scooter</b> convert(<b>Vehicle</b> ev);</code>		
<code><b>Scooter</b> convert(<b>ElectricVehicle</b> ev);</code>		
<code><b>ElectricVehicle</b> convert(<b>Scooter</b> ev);</code>		
<code><b>Scooter</b> convert(<b>Object</b> ev);</code>		
<code><b>Object</b> convert(<b>ElectricVehicle</b> ev);</code>		

In the previous problem, you identified some method signatures which would be valid in a true subtype. Of these signatures, which would Java override and which would they overload?