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Lab 3 Write Up

1)
An example of dynamic scoping providing a different answer than static scoping is:

```
const x = 20
const add = function(x) { return function(y) {return x + y} }
add(1)(10)
```
Static scoping returns: 11
Dynamic scoping returns: 30

This occurs because static scoping ignores the initial assignment of 20 to x, while the dynamic version does not.

2)
The evaluation order is deterministic because it evaluates from left to right, which is the way eval is written in the lab to interpret expressions. This is guaranteed by calling step always on the leftmost expression first then only if it is verified that the left has been evaluated that the right will then be evaluated.

3)
The evaluation order of e1 + e2 is e1, e2, and finally the + operator. e1 and e2 are first checked if they are strings or numbers before they are evaluated with the operator. If the variables were dynamically type-checked instead of statically, we could change the rules to get an opposite evaluation order.

4)
a) Short circuiting is when an expression does not fully execute if only a few steps of it need to be evaluated for some desired result. For example, “a ||= b” short circuits in Ruby if a is already set to some value and returns the value of a. Otherwise, a is then set to b.

b) e1 && e2 short circuits because it first checks if e1 = false, which if it is, the expression short circuits since there is no way for e1 && e2 = true to be valid if one of the statements is false.