Exercise 2.24.

Suppose we evaluate the expression `(list 1 (list 2 (list 3 4)))`. Give the result printed by the interpreter, the corresponding box-and-pointer structure, and the interpretation of this as a tree (as in figure 2.6).

Answer.

In evaluating the expression `(list 1 (list 2 (list 3 4)))`, the interpreter simply prints:

```
(1 (2 (3 4)))
```

Before setting out to draw the box-and-pointer structure, we'd better transform this expression to show the structure more intuitively, that is, in the form of conses:

```
(list 1 (list 2 (list 3 4)))

(cons 1
      (cons (list 2 (list 3 4))
            nil))

(cons 1
      (cons (cons 2
                  (cons (list 3 4)
                        nil))
            nil))

(cons 1
      (cons (cons 2
                  (cons (cons 3
                              (cons 4 nil))
                        nil))
            nil))
```

Like figure 2.5, Figure 1 shows the box-and-pointer structure of this expression. And figure 2 gives the interpretation of this as a tree.

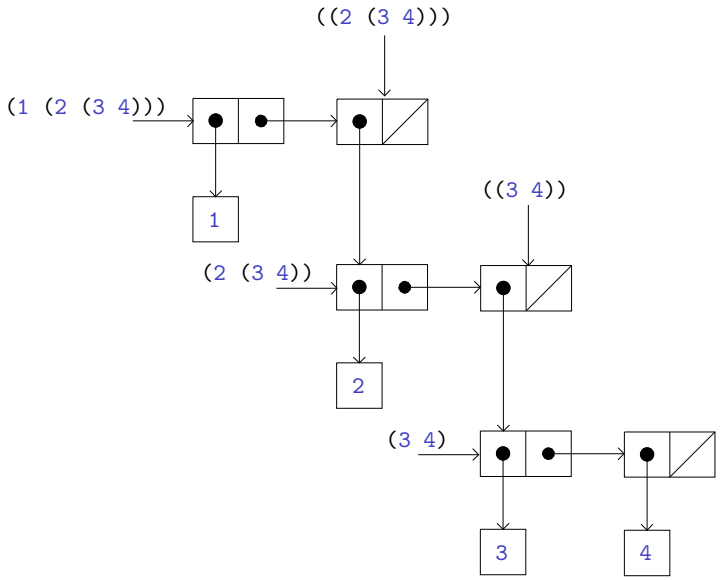

Figure 1. Box-and-pointer structure form by `(cons (list 1 (list 2 (list 3 4))))`.

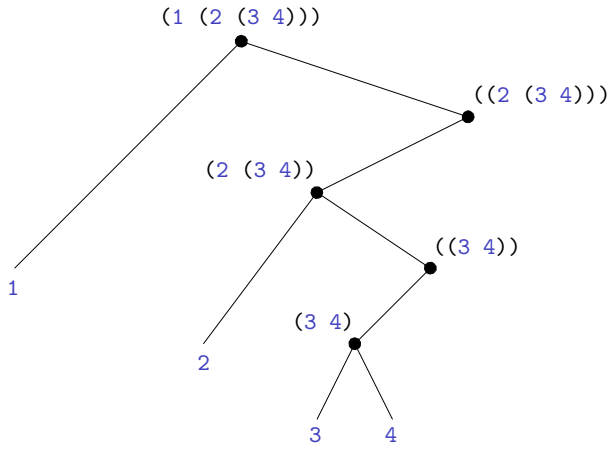

Figure 2. The list structure in figure 1 viewed as a tree.