

61A Lecture 21

Announcements

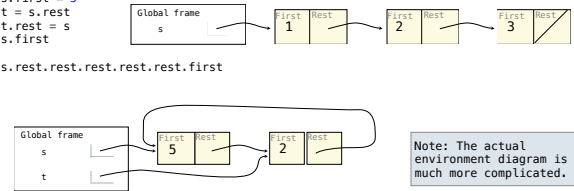
Linked Lists

Recursive Lists Can Change

Attribute assignment statements can change first and rest attributes of a Link

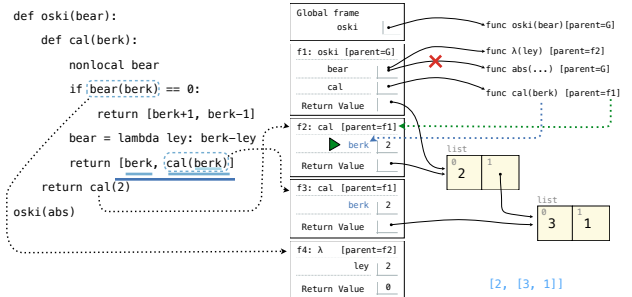
The rest of a linked list can contain the linked list as a sub-list

```
>>> s = Link(1, Link(2, Link(3)))
>>> s.first = 5
>>> t = s.rest
>>> t.rest = s
>>> s.first
5
>>> s.rest.rest.rest.rest.rest.first
2
```



Environment Diagrams

Go Bears!



Objects

Land Owners

Instance attributes are found before class attributes; class attributes are inherited



Trees

Morse Code

Morse code is a signaling protocol that transmits messages by sequences of signals

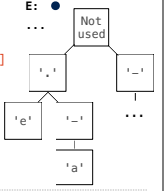
Problem: Implement `morse` so that `decode` works correctly

```
abcde = {'a': '-.-', 'b': '-...', 'c': '-.-.', 'd': '-..', 'e': '..'}
```

```
def decode(signals, tree):  
    """Decode signals into a letter.  
    """  
    >>> t = morse(abcde)  
    >>> [decode(s, t) for s in ['-..', '-.-.', '-.-', '..']]  
    ['d', 'e', 'c', 'a', 'd', 'e']  
    """  
    for signal in signals:  
        tree = [b for b in tree.branches if b.entry == signal][0]  
    leaves = [b for b in tree.branches if not b.branches]  
    assert len(leaves) == 1  
    return leaves[0].entry
```

```
def morse(code):  
    ....
```

A: ● ■ ■ ■
B: ■ ■ ■ ● ●
C: ■ ■ ■ ■ ● ●
D: ■ ■ ■ ● ● ●
E: ● ● ● ● ●



An empty list is a false value