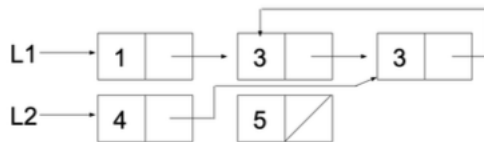


## 1 Pointers

1. Draw the resulting box and pointer diagrams for the following lines of code. The head of an IntList is its value, and the tail is a pointer to the next node in the list.

```
IntList L1 = IntList.list(1, 2, 3);
IntList L2 = IntList.list(4, 5);
L1.tail.head = 3;
L2.tail = L1.tail.tail;
L2.tail.tail = L1.tail;
```

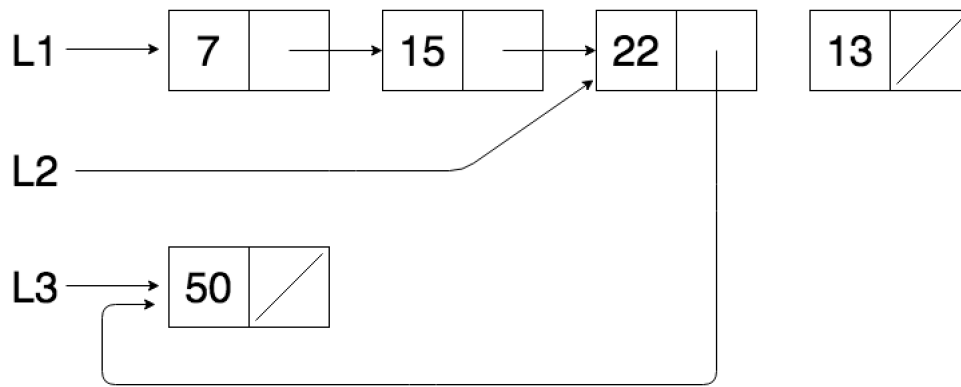
**Solution:**



2. Draw the resulting box and pointer diagrams for the following lines of code.

```
IntList L1 = IntList.list(7, 15, 22, 31);
IntList L2 = L1.tail.tail;
L2.tail.head = 13;
L1.tail.tail.tail = L2;
IntList L3 = IntList.list(50);
L2.tail.tail = L3;
```

**Solution:**



3. What would the output of the following lines of code be? Be sure to draw a box-and-pointer diagram!

```

public static void main(String[] args) {
    IntList L1 = IntList.list(8, 3, 6, 4);
    IntList L2 = IntList.list(4, 5, 9, 0);
    IntList L3 = L2;
    int x = 4;
    mystery(L1, L3, x);
    System.out.println(L1);
    System.out.println(L2);
    System.out.println(x);
}

```

```

public static void mystery(IntList L1, IntList L2, int x) {
    L1.head = 23;
    L2.tail.tail = L1.tail;
    L1.tail.tail.head = L2.tail.head;
    x += 16;
    L2 = IntList.list(1, 2);
}

```

**Solution:**

[23, 3, 5, 4]  
 [4, 5, 3, 5, 4]  
 4

4. Let's say a method has the following signature: "public int foo(int x)". What is stored in the variable x?

The value 4 is stored in x, since x is of primitive int type.

5. Similarly, let's say some other method has the following signature: "public boolean boo(IntList y)". What is stored in the variable y? What happens if we change the value of y in boo?
- Since y is of type IntList (an object), it stores a pointer to an IntList (in other words, it stores the address where the IntList is located in memory). When this pointer is changed in boo, the original IntList that y pointed to will remain unchanged.