UNIVERSITY OF CALIFORNIA
Department of Electrical Engineering
and Computer Sciences
Computer Science Division

CS61B
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CS 61B: Midterm Exam I

This is an open book, open notes exam. **Do not open your exam until you are told to do so!**

Name:______________________________________

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For grading purposes only.

Problem #	**Possible**	**Score**
1	2	
2	8	
3	12	
4	6	
Total	28	

Problem 1. (2 points) What is `y` after the following code executes?

```
static void addOne (int x) {
   x += 1;
}
int y = 3;
addOne(y);
```

Answer:

Problem 2. (8 points) Answer questions about the following classes. For parts b-e, choose one of the following:

CE: The code will result in a compiler error from `javac`.

RT: The code will compile without errors, but will cause an error of some kind run time.

OK The code will compile and run without errors. Show what the program will print.

```
abstract class A {
  abstract public void foo ();
}
class B extends A {
  public void foo () { System.out.println("Calling B.foo"); }
  protected int value = 0;
}
class C extends B {
   public void foo () { System.out.println("Calling C.foo, " + value); }
}
class D extends C {
  public void foo () { System.out.println("Calling D.foo(), " + value); }
}
```

a. (2 points)
```
A a1 = new A();
a1.foo();
```
Answer:

b. (2 points)
```
A a2 = new B();
a2.foo();
```
Answer:

c. (2 points)
```
A a3 = new C();
a3.foo();
```
Answer:

d. (2 points)
```
B b4 = new D();
((C) b4).foo();
```
Answer:

Problem 3. (12 points) Consider the following `ListNode` class definition.

```
class ListNode {
  int item;
  ListNode next;
  /** Postcondition: Constructs a new listnode containing i and n */
  ListNode (int i, ListNode n) { item = i;  next = n; }
}
```

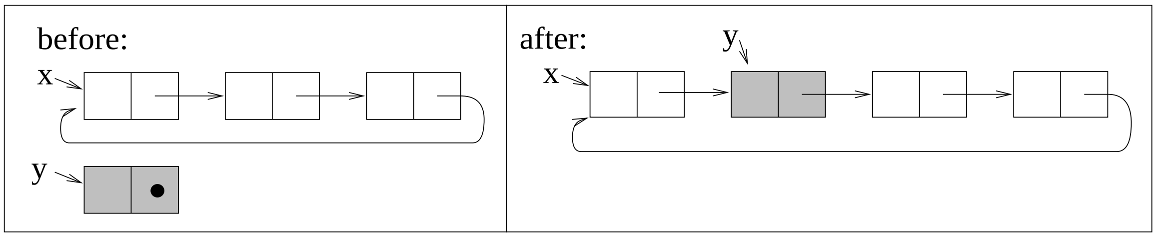
a. (4 points). Complete the following code to copy a list.

```
/** Postcondition: returns a copy of l. (Copies all the nodes).  */
private static ListNode copy(ListNode l) {
    if (l == null) return l;
    else {
      return(new ListNode(______________________ ,

                          _______________________ ));
    }
}
```

b. (4 points). Complete the following code to merge 2 sorted lists.

```
/** Precondition: ln1 and ln2 are sorted
 *  Postcondition: returns a new sorted list with all the
        elements of ln1 and ln2, modifying ln1 and ln2 in the process. */
private static ListNode merge(ListNode ln1, ListNode ln2) {
    if (ln1 == null) return (ln2);
    if (ln2 == null) return (ln1);
    if (ln1.item < ln2.item) {

       ____________________________________________

       return ln1;
    }
    else {

       ____________________________________________

       return ln2;
    }
}
```

c. (4 points). Given a non-empty cyclic list `x` and a single node `y`, write 2 lines of code to insert `y` into `x` after the position pointed to by `x`. Here is an example:



Solution:

____

____

Problem 4. (6 points) The following function will sort a stack, placing the smaller elements towards the bottom of the stack. Fill in the missing 2 lines.

```
public static void stackSort (IntStack s1) {
    if (s1.isEmpty()) return;
    IntStack s2 = new IntStack();
    int tmp;
    int count = s1.size();
    while (count > 0) {
      int min = s1.pop();
      for (int j = 1; j < count; j++) {
          tmp = s1.pop();
          if (tmp < min) {

                        ______________________________

                        ______________________________

          }
          else {
              s2.push(tmp);
          }
      }
      s1.push(min);
      while (!s2.isEmpty()) {
        s1.push(s2.pop());
      }
      count--;
    }
}
```