Computer Science 2711
Fall 2004
Lab Quiz #5
Answers

a) (10 marks) Consider the following diagram of an IntNode-based linked list:

![Linked List Diagram]

Execute the following Java code-fragment as it operates on this linked list, and draw a diagram of the resulting linked list (with the positions of references a and b) each time statement DISPLAY is reached.

```java
IntNode cursor, a, b, temp, head;
int i;

a = head; b = head.getLink(); i = 1;

DISPLAY

while (b.getLink().getLink() != null) {
    if ((i % 2) == 1) {
        temp = a; a = b; b = temp;
    } else {
        temp = b; b = a.getLink();
        a = temp.getLink();
    }
    b.setData(a.getLink().getData());

    DISPLAY

    i++;
}
```

Start: head -> 4 [a] -> 7 [b] -> 5 -> 2 -> 9
Turn # 1: head -> 5 [b] -> 7 [a] -> 5 -> 2 -> 9
Turn # 2: head -> 5 -> 7 [a] -> 5 [b] -> 2 -> 9
Turn # 3: head -> 5 -> 2 [b] -> 5 [a] -> 2 -> 9
Turn # 4: head -> 5 -> 2 -> 5 [a] -> 2 [b] -> 9
b) (10 marks) Consider the following diagram of an **IntNode**-based linked list:

```
head
-→ 2 -→ 1 -→ 2 -→ 3 -→ 1
```

Execute the following **Java** code-fragment as it operates on this linked list, and draw a diagram of the resulting linked list (with the position of reference a) each time statement **DISPLAY** is reached.

```java
IntNode cursor, a, b, temp, head;
int   i, val;

a = head; i = 1;

DISPLAY

while (a.getLink() != null) {
    if ((i % 2) == 1)
        temp = a.getLink();
    else
        temp = a;
    val = 0;
    while (temp != null) {
        val += temp.getData();
        temp = temp.getLink();
    }
    a.getLink().setData(val);
    a = a.getLink();

DISPLAY

    i++;
}
```

Start: head -> 2 [a] -> 1 -> 2 -> 3 -> 1
Turn # 1: head -> 2 -> 7 [a] -> 2 -> 3 -> 1
Turn # 2: head -> 2 -> 7 -> 13 [a] -> 3 -> 1
Turn # 3: head -> 2 -> 7 -> 13 -> 4 [a] -> 1
Turn # 4: head -> 2 -> 7 -> 13 -> 4 -> 5 [a]