

## SECOND QUIZ

You have 15 minutes from the start of class to complete this quiz. Read the questions with care; work with deliberate speed. Don't give us more than we ask for. The usual instructions apply. Good luck!

### Problem 1 (9 points)

Fill in the `averageAmountDue()` method in the following code.

```
class Patient {
    private String name;
    private double amountDue;

    public String getName() {return name;}
    public double getAmountDue() {return amountDue;}
}

class PatientList {
    private ArrayList<Patient> thePatients;

    // Return the average amount due over all the patients.
    // If there are no patients, return zero.
    public double averageAmountDue() {

}

}
```

**Problem 2** (13 points)

**(a.1)** (5 points) What is the polynomial representing the execution time of the following code in terms of  $n$ ? Count assignments (except in for-loops) and function calls.

```
System.out.println("The sun did not shine; it was too wet to play");
System.out.println("So we sat in the house all that cold, cold wet day.");
for (a = 0; a < n; a++)
{
    doSomethingGood( a );
    for ( i = n; i >= 1; i-- )
    {
        doSomethingBad( a, i );
        handleSomething( a*i );
        handleSomethingElse( a/i );
    }
    System.out.println("I sat there with Sally. We sat there, we two.");
}
System.out.println("And I said, 'How I wish we had something to do.'");
```

**(a.2)** (2 points) What is the  $O$ -notation of the execution time of the code in part **(a.1)**?

**(b)** (6 points) Give the  $O$ -notation of each of the following polynomials. Read them carefully.

**(b.1)**  $17n^2 + 35n + 1355$

**(b.2)**  $23 \log n + 4n \log n + 15n + 6$

**(b.3)**  $1 + 2n + 3 \log n$

**Problem 3** (3 points)

**(a)** Suppose we get a shipment of new computers. As each box is unloaded from the truck, we slide it down the loading dock, as far away from the truck as possible, to make room for the rest of the boxes. Then workers with wheeled carts come up to the loading dock, at the same place the delivery truck parked, and remove the boxes one by one to the lab for installation. Is this arrangement of boxes on the loading dock more like an array, a stack, a queue, a tree, or a graph?

**(b)** Suppose there were a door at the far end of the loading dock, away from where the truck parked. Suppose that each worker brings a cart to the other side of this door, opens the door, and takes the first box available. Is this arrangement more like an array, a stack, a queue, a tree, or a graph?

**(c)** Suppose there were shelves on the loading dock, so that each box could be put in its own place on a shelf, in order by its serial number, as it was unloaded from the truck. Is this arrangement more like an array, a stack, a queue, a tree, or a graph?