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. A copy of the restaurants program is included for reference. Good luck!

Problem 1 (15 points)

Fill in the body of the method `averageSongLengthInYears` in the `SongList` class below. (Remember that the operator in Java to combine two boolean expressions with ‘and’ is `&&`.)

```java
class Song {
    private String title;
    private String artist;
    private int year;
    private int length;

    public String getTitle() { return title; }
    public String getArtist() { return artist; }
    public int getYear() { return year; }
    public int getLength() { return length; }
}

class SongList {
    private ArrayList<Order> theSongs;

    // Return the average length of all the songs in the list whose year is in or after
    // the first argument and in or before the second argument. For example, a song
    // from 1995 would be counted in `averageSongLengthInYears(1990, 1995)`.
    // If there are no songs between the specified years, return zero.
    public double averageSongLengthInYears(int startYear, int endYear) {
        double total = 0; int count = 0; // OK if both ints. Can't use size(); we aren't counting all songs
        for (Song s : theSongs) {
            if ((s.getYear() >= startYear) && (s.getYear() <= endYear)) {
                total += s.getLength();
                count++;
            }
        }
        if (count == 0)
            return 0;
        else return total / count;     // If both ints, result is integer division; don't deduct for that.
    }
}
```

1 point for an attempt at a loop over all the songs; 1 point for any syntactically correct loop; 1 more point for the loop actually hitting all the songs in the list. (total 3)

1 point for an attempt to get the song’s length and add it to something; 1 point for correctly accumulating the total lengths (including initialization, but OK if not only songs within the year range); 1 point for some attempt to divide the total by the count; 1 point for correctly computing the average in the non-empty case and returning it. (total 4)

1 point for any attempt to get the song’s year; 1 point for attempting to compare the song’s year with one of the arguments; 1 point for having two comparisons of the song’s year, one of them correct (e.g., `s.getYear() >= start` or `s.getYear() <= end`); 1 point for logically correct selection of song in year range; 1 point for putting the comparison inside the loop; 1 point for correctly computing the average price of just the orders of this type. (total 6)

1 point for correctly testing the empty case and returning zero
1 point for everything else correct. Don’t deduct for missing `}` or missing `()` in calls of no-arg methods.
**Problem 2** (10 points)

We can organize a parking lot in various ways:

(a) A conventional flat parking lot has a separate parking space for each car, with the spaces arranged in rows. The driver can choose a particular row and a particular space within that row, regardless of how many other cars are parked in the lot. Is this kind of parking lot more like an array, a stack, a queue, a linked list, or a tree? [Answer with the data structure whose most important characteristics most closely match the situation.]

(b) At the Hollywood Bowl, the parking lot is one long driveway snaking up a hillside. Cars drive in and park right behind the car in front of them, one behind another (behind another behind another ...). A car can’t leave until all the cars in front of it have left. Is the Hollywood Bowl parking lot more like an array, a stack, a queue, a linked list, or a tree?

(c) Joe lives a block away from a sports stadium; his house has a long driveway that extends straight from the street and ends at his garage. On game days, Joe sells parking spaces in his driveway for $25 each. Each car that arrives drives as far down the driveway as possible; after the game, that car can’t leave until all the cars behind it have left. Is Joe’s driveway more like an array, a stack, a queue, a linked list, or a tree?

(d) Which of the above parking lots is most efficient in terms of the drivers’ time (and, in a couple of words, why)?

(e) Which of the above parking lots is least efficient in terms of the space required to accommodate all the parked cars (and, in a couple of words, why)?