

THIRD 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)

(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 method calls. Showing your work will help you get partial credit.

```
System.out.println("Now the Star-bellied Sneetches had bellies with stars.");
System.out.println("The Plain-bellied Sneetches had none upon thars.");
System.out.println("The stars weren't so big; they were really quite small.");
System.out.println("You would think such a thing wouldn't matter at all.");

for (i=0; i<n; i=i+10)
{
    theSneetches(i);
    System.out.println("But because they had stars, all the Star-bellied Sneetches");
    System.out.println("Would brag, 'We're the best kind of Sneetch on the beaches.'");

    for (j=n; j>=0; j=j-2)
    {
        System.out.println("With their snoots in the air,");
        System.out.println("they would sniff and they'd snort,");
        drSeuss(j);
        System.out.println("'We'll have nothing to do with the plain-bellied sort.'");
    }

    System.out.println("And whenever they met some, when they were out walking,");
    System.out.println("They'd hike right on past them without even talking.");
}

System.out.println("When the Star-bellied children went out to play ball,");
System.out.println("Could the Plain-bellies join in their game? Not at all!");
```

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

(b) (2 points) Give the O -notation, as explained in class, of each of the following polynomials. Read them carefully. Choose each answer from this list: $O(1)$, $O(\log n)$, $O(n)$, $O(n \log n)$, $O(n^2)$, $O(n^3)$, $O(n^4)$, $O(e^n)$.

(b.1) $31 n \log n + 41n + 59 \log n$

(b.2) $26535 + 8979n + 323n^2 + 84n^3 + 6n^4$

(b.3) $n + 264338$

(b.4) 3279502

Problem 2 (16 points)

Attached is a copy of the ArrayList version of the restaurants program. We are going to modify the code to accept an additional command (“d”), which will ask the user for the name of a dish and a price, and return the number of restaurants in the collection that serve that dish for the specified price or less.

(a) (2 points) In the Q3RPArrayList class on the first page (the “controller” class containing the main method), five lines of code have been added to accept and process this command. On the page of code itself, circle those five lines.

(b) (12 points) Complete the body of the numRrantsServingDishBelow method according to the specifications shown in the code. You may write on the page of code itself, but don’t forget to put your name on that page (especially if you detach it).

```
// Return number of Rrants serving specified dish at or below specified price  
public int numRrantsServingDishBelow (String dishName, double maxPrice) {
```

```
}
```

(c) (2 points) Suppose we wanted to return list of all the restaurants serving a given dish at or below a given price (rather than just a count, as above). What’s the best class name to fill the blank in this sentence? “I would change the name from numRrantsServingDishBelow to listRrantsServingDishBelow; it would create a new _____, to which I would add each qualifying Rrant identified in the method.”