CS3460: Data Structures Spring 2018
Assignment 01: Fun with Algorithm Analysis
Due Date: Monday, January 29; 23:00 pm
Total Points: 10

Practice with Empirical Testing (10 points): In this assignment, we will deduce the asymptotic behavior of algorithms by conducting an empirical performance analysis on them. You are given five pre-compiled (Java class files that are generated after compiling respective programs) Java programs named `Prog1.class` ... `Prog5.class`. Each of these programs accept a non-negative number as argument. For example, to run `Prog1.class`, we can type the following command in a Unix/ Linux terminal.

```
$ time java Prog1 <n>
```

where `java` refers to the Java virtual environment, `n` refers to the program input size[1] and `time` is a Unix utility that outputs the total time spent by the program. The output will look something like:

```
0.291u 0.066s 0:00.29 120.6% 0+0k 0+64io 0pf+0w
```

The first number (with a 'u') indicates user time, and the second number (with a 's') indicates system time. These are the amount of time it takes for the program to run in the user and system (or kernel) modes respectively. The time that follows (0.29s) is the "real" time. Please use the real time to measure and complete the table below. You may leave entries blank if it takes more than 2 minutes to run.

Input Size	Prog1	Prog2	Prog3	Prog4	Prog5
100					
1000					
10000					
100000					
1000000					

Looking at the measured times, please deduce the asymptotic behavior of each of the programs. It may be required to measure running times for input sizes beyond the ones that are provided in the table.

Submission: Please submit your table and the deduced asymptotic run times for each of the programs as a neatly typeset pdf document. Please name your document `hw01.pdf`.

[1]Note that the < and > symbols indicate that the variable `n` is a user input, and the '$' indicates the Unix shell. These should not be included in the actual command.