University of Nevada, Las Vegas Computer Science 302 Spring 2017

Assignment 1: Due January 25, 2017

Name:_____

You are permitted to work in groups, get help from others, read books, and use the internet. But the handwriting on this document must be your own. You may attach extra sheets, using a stapler.

1. Fill in the following table. All entries must be integers. In case the value is not an integer, write an approximation. (For example, for $\sqrt{8}$, you could write either 2 or 3.) For logarithms, assume base 2. **Do not fill in entries where the answer exceeds one million.**

n	$\log\log n$	$\log n$	$\log^2 n$	$\sqrt{n}$	$n\log n$	$n^{\frac{3}{2}}$	n^2	n^3
1								
2								
4								
8								
16								
32								
64								
128								
256								
512								
1024								
2048								
4096								
8192								

2. Write each of the code fragments into a program, estimating the time complexity using the method shown in class. Run each fragment for several choices of **n**, and then estimate its asymptotic time complexity. In each case, the answer will be $O(\log n)$, $O(n)$, $O(n \log n)$, or $O(n^2)$.

   Do not hand in your code.

(a)
```
int kount = 0;
for (int i = 1; i < n; i=2*i)
  kount ++;
cout << kount << endl;
```

(b)
```
int kount = 0;
for (int i = n; i > 2; i=i/2)
  kount ++;
cout << kount << endl;
```

(c)
```
int kount = 0;
for (int i = 0; i < n; i++)
  kount ++;
cout << kount << endl;
```

(d)
```
int kount = 0;
for (int i = 0; i < n; i++)
  for (int j = 0; j < n; j++)
    kount ++;
cout << kount << endl;
```

(e)
```
int kount = 0;
for (int i = 0; i < n; i++)
  for (int j = n; j > 1; j=j/2)
    kount ++;
cout << kount << endl;
```

(f)
```
int kount = 0;
for (int i = 1; i < n; i++)
  for (int j = i; j < n; j=2*j)
    kount ++;
cout << kount << endl;
```

(g)
```
int kount = 0;
for (i = 1; i < n; i=2*i)
  for (j = 1; j < i; j++);
cout << kount << endl;
```