

University of Nevada, Las Vegas Computer Science 302 Fall 2018

Homework 2: September 17, 2018

Name: _____

For each problem, the answer is one of the following: $\Theta(\log^* n)$, $\Theta(\log \log n)$, $\Theta(\log n)$, $\Theta(\sqrt{n})$, $\Theta(n)$, $\Theta(n \log n)$, $\Theta(n^2)$, $\Theta(n^2 \log n)$, $\Theta(n^3)$, $\Theta(2^n)$,

1. Give asymptotic time complexity, in terms of **n**, of these C++ code fragments.

- (a)

```
for(int i = 0; i < n; i++)
    for(int j = 0; j < i; j++)
        cout << "Hello" << endl;
```
- (b)

```
for(int i = 0; i < n; i++)
    for(int j = n; j > i+5; j=j-2)
        cout << "Hello" << endl;
```
- (c)

```
int m = n;
while(m > 1)
{
    m = m/2;
    cout << "Hello" << endl;
}
```
- (d)

```
for(int i = 1; i < n; i++)
    for(int j = i; j < n; j = 2*j)
        cout << "Hello" << endl;
```
- (e)

```
for(int i = 1; i < n; i++)
    for(int j = 1; j < i; j = 2*j)
        cout << "Hello" << endl;
```
- (f)

```
for(int i = 1; i < n; i++)
    for(int j = 1; j < i*i; j++);
    if(j % n == 0)
        for(int k = 1; k < j; k++);
        cout << "Hello" << endl;
```
- (g)

```
for(int i = n; i > 1; i = floor(sqrt(i)))
    cout << "Hello" << endl;
```
- (h)

```
for(int i = n; i > 0; i = floor(log(i)))
    cout << "Hello" << endl;
```

2. Give the asymptotic time complexity, in terms of the parameter **n**, of each of these C++ functions.

```
(i) void f(int n)
    {
        cout << "Hello" << endl;
        if (n > 1)
            f(n-1);
    }
```

```
(j) void g(int n)
    {
        cout << "Hello" << endl;
        if (n > 1)
        {
            g(n-1);
            g(n-1);
        }
    }
```

```
(k) void h(int n)
    {
        cout << "Hello" << endl;
        if (n > 1)
            h(n/2);
    }
```