University of Nevada, Las Vegas Computer Science 477/677 Fall 2019

Assignment 1: Due Wednesday August 28, 2019

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. Print out the document, staple, and fill in the answers. You may attach extra sheets. Turn in the pages to the graduate assistant at the beginning of class, August 14.

1. Problem 0.1 on page 8 of the textbook. In each of the following situations, write O, Ω. Θ in the blank.

   (a) $n - 100 =$ _____ $(n - 200)$

   (b) $n^{1/2} =$ _____ $(n^{2/3})$

   (c) $100n + \log n =$ _____ $(n + \log^2 n)$

   (d) $n \log n =$ _____ $(10n + \log(10n))$

   (e) $\log(2n) =$ _____ $(\log(3n))$

   (f) $10 \log n =$ _____ $(\log(n^2))$

   (g) $n^{1.01} =$ _____ $(n \log^2 n)$

   (h) $n^2 / \log n =$ _____ $(n \log^2 n)$

   (i) $n^{0.1} =$ _____ $(\log^2 n)$

   (j) $(logn)^{\log n} =$ _____ $(n / \log n)$

   (k) $\sqrt{n} =$ _____ $(\log^3 n)$

   (l) $n^{1/2} =$ _____ $(5^{log_2 n})$

   (m) $n2^n =$ _____ (3^n)

   (n) $2^n =$ _____ (2^{n+1})

   (o) $n! =$ _____ (2^n)

   (p) $\log n^{\log n} =$ _____ $(2^{(\log_2 n)^2}$

   (q) $\sum_{i=1}^{n} i^k =$ _____ (n^{k+1})

2. Work problem 0.3(c) on page 9 of the textbook.

3. Consider the following C++ program.

```
void process(int n)
 {
  cout << n << " " << n%2 << endl;
  if(n > 1) process(n/2);
 }

int main{)
 {
  int n;
  cin >> n;
  process(n);
 }
```

For example, if you enter the value 37, the output will look like this:

```
37 1
18 0
 9 1
 4 0
 2 0
 1 1
```

For any positive integer input, say n, the second column is a string of bits. What does that bitstring represent?