1. Problem 0.1 on page 8 of the textbook. In each of the following situations, write $O$, $\Omega$, $\Theta$ 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) $(\log n)^{\log n} = \_\_\_\_\_\_\_\_ (n / \log n)$

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

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

(m) $2^n = \_\_\_\_\_\_\_\_ (3^n)$

(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.

```cpp
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?