

CSCI 362 Homework assignment 2

Total 100 pints

1. (30) Use big O notation to indicate **the least upper bound** of the following functions of n

- a. $100 * n \log n$
- b. $0.3n^2 - 10000n - 10000$
- c. $n^3 + 10n + 5$
- d. 2^{15}
- e. $1000 \log n$
- f. $0.001n - 1000$
- g. 2^n
- h. $n^{10000} - n^{9999}$
- i. $n^2 \log n - 500 \log n$
- j. $5n^2 - 10n - 10$

2. (40) Compare the following pairs of functions and use “<”, “>” or “=” to tell which function is growing faster asymptotically. (Hint: $n = 1000n$, $n^2 < n^3$)

- | | |
|---------------------|-------------|
| 1. $100 * n \log n$ | n^2 |
| 2. n^3 | $3000n^2$ |
| 3. 2^{15} | 1 |
| 4. $1000 \log n$ | $0.001n$ |
| 5. 2^n | n^{10000} |

3. (30) Find $T(N)$, the number of comparisons ($A[i] < A[j]$) the following segment performs. Then express $T(N)$ using Big-O notation.

```
for(int i=2; i<N; i++) {  
    for(int j=N; j> N-10; j--) {  
        if(A[i] < A[j]) {  
            .....  
        }  
    }  
}
```