

HW#1.

* Exercise

* Sec. 1.1 – 5 Write an algorithm that finds the greatest common divisor of two integers.

* Sec. 1.4 – 15 Show directly that $f(n) = n^2 + 3n^3 \in \Theta(n^3)$. That is, use the definitions of O and Ω to show that $f(n)$ is both $O(n^3)$ and $\Omega(n^3)$

* Additional exercise

26. Derive the proof of Theorem 1.3.

27. Show the correctness of the following statements.

(a) $\lg n \in O(n)$

(b) $n \in O(n \lg n)$

(c) $n \lg n \in O(n^2)$

(d) $2^n \in \Omega(5^{\lg n})$

(e) $\lg^3 n \in o(n^{0.5})$

30. Consider the following algorithm:

```
j = 1;
while ( j <= n/2 ) {
    i = 1;
    while ( j <= i ) {
        cout << j << i;
        i++;
    }
    j++;
}
```

(a) What is the output when $n = 6$, $n = 8$, and $n = 10$?

(b) What is the time complexity $T(n)$? You may assume that the input n is divisible by 2.

Due Date : 2020. 3. 28