Assignments 1 + 2

Fei Li[1]

[1]Department of Computer Science, George Mason University, Fairfax, VA 22030. Email: fli4@gmu.edu

Problem

For each of the following statement, indicate TRUE or FALSE. Provide a counter-example if the statement is false. Provide a brief proof if the statement is true.

1. *Let $f(n)$ be a polynomial running-time function of n and g be an exponential running-time function of n. Then $f(n) = O(g(n))$.*
2. *For every $b > 1$ and every constant $x > 0$, $\log_b n = O(n^x)$.*
3. *For every $r > 1$ and every constant $d > 0$, $n^d = \Omega(r^n)$.*
4. $n^2 \log n = \Theta(n^2 \log n \log n)$.
5. $n^{1.01} = O(n \log^2 n)$.
6. $n! = \Theta(n^n)$.
7. $2^n = \Theta(4^n)$.
8. $\sum_{i=1}^{n} i^k = O(n^{k+1})$, *where k is a constant.*