Algorithm

assignment #1

March 14, 2024

Please answer the following questions.

1. **(30%)** Let $T(n) = \Theta(g(n))$. Derive $g(n)$in the simplest form for $T(n) = \sum_{i=0}^{k} 2^i \times (k-i)$ where $n = 2^k$.
2. **(30%)** Let $T(n) = \Theta(g(n))$. Derive $g(n)$in the simplest form for $T(n) = \sum_{i=0}^{n} i^2 lg(i)$.
3. **(40%)** Determine if $(loglog(n))^{log(n)}$ is polynomially-bounded. A function $T(n)$ is polynomially-bounded if and only if there exist a polynomial function $f(n)$ so that $T(n) \leq cf(n)$ when $n \geq n_0$ for some positive c and n_0.