Context from Theorem 7.1:

> *Suppose that $\{a_k\}_{k=1}^{\infty}$ is a sequence of monotonically decreasing nonnegative numbers.*

Problem 7.12(b):

> *Let s_n be the n-th partial sum of $\sum a_k$ and t_m be the m-th partial sum of $\sum 2^\ell a_{2^\ell}$. Use the inequality above to prove that $s_{2^{m+1}-1} \le t_m$ for all $m \in \mathbb{N}$.*

Counter-example: Let $\{a_k\}_{k=1}^{\infty}$ be such that

$$\begin{aligned} a_1 &= 3\,, \\ a_2 &= 2\,, \\ a_3 &= 1\,, \end{aligned}$$

and $a_k = 0$ for all $k > 3$. Clearly, $\{a_k\}_{k=1}^{\infty}$ is monotonically decreasing, and all its terms are nonnegative. Let $m = 1 \in \mathbb{N}$. Then,

$$\begin{aligned} s_{2^{m+1}-1} = s_{2^2-1} = s_3 = a_1 + a_2 + a_3 &= 3 + 2 + 1 = 6\,, \\ t_m = t_1 = 2^1 a_{2^1} &= 2a_2 = 4\,, \end{aligned}$$

so $s_{2^{m+1}-1} > t_m$ in this case. □

Proposition: Perhaps the statement should read:

> *Let s_n be the n-th partial sum of $\sum a_k$ and t_m be the m-th partial sum of $\sum_{\ell=0}^{\infty} 2^\ell a_{2^\ell}$. Use the inequality above to prove that $s_{2^{m+1}-1} \le t_m$ for all $m \in \mathbb{N}$.*

Maybe this was the original intention, but it seems odd for the one series to start at 1 and the other to start at 0.