$$\sum_{i=0}^{n}(n-i)2^i \to n\sum_{i=0}^{n}2^i - \sum_{i=0}^{n} i2^i \quad \text{I}$$

Resolvendo $\sum_{i=0}^{n} i2^i = 0 + 2 + 2\cdot 2^2 + 3\cdot 2^3 + \dots + n\cdot 2^n + (n+1)2^{n+1}$

↳ Perturbação

$$\left[\sum_{i=0}^{n} i2^i\right] + (n+1)2^{n+1} = \sum_{i=0}^{n}(i+1)2^{i+1}$$

$$\cancel{\left[\sum_{i=0}^{n} i2^i\right]}\; n\cdot 2^{n+1} + 2^{n+1} = 2\sum_{i=0}^{n} i\cdot 2^i + 2\sum_{i=0}^{n} 2^i \to (2^{n+1}-1)$$

$$n\cdot 2^{n+1} + 2^{n+1} - (2^{n+2}-2) = \sum_{i=0}^{n} i2^i$$

$$n\cdot 2^{n+1} + 2^{n+1} - 2^{n+2} + 2 = ''$$

$$n\cdot 2^{n+1} - 2^{n+1} + 2 \;//$$

Voltando para equação I

$$\sum_{i=0}^{n}(n-i)2^i = \cancel{n2^{n+1}} - n \cancel{- n\cdot 2^{n+1}} + 2^{n+1} - 2$$

$$= 2^{n+1} - 2 - n$$

$$= 2^{\log n + 1} - \log n - 2 \;//$$