CLRS 15.1-3

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$$\sum_{i=1}^{2}\sum_{j=1}^{n} r_i(j) = 2^{n+1} - 2 \tag{1}$$

$$\sum_{j=1}^{n} 2^{n-j} = 2^n - 1 \qquad \text{by (15.8)} \tag{2}$$

$$\sum_{j=1}^{n} 2^{n-j} = \sum_{j=0}^{n-1} j \tag{3}$$

$$= \frac{2^n - 1}{2 - 1} \qquad \text{geometric series} \tag{4}$$

$$= 2^n - 1 \tag{5}$$