Algorithm Design

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Solution of Exercise R-8.9

Let $X = \{x_1, x_2, \ldots, x_n\}$ and $Y = \{y_1, y_2, \ldots, y_n\}$. We can count all possible matchings inductively. There are n ways to match x_1 with vertices in Y. Given this match, there are still $n-1$ ways to match x_2 with vertices in Y. Given the previous matches, there are still $n-2$ ways to match x_3 with vertices in Y, and so on. Ultimately, given previous matches, there will be $n-(n-1) = 1$ way to match x_n. Thus, there are $n!$ possible matches.