Using MathCAD's iterated product to calculate Lagrange-like terms

$$x := \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix} \qquad n := 4 \qquad \prod_{j=0}^{n-1} x_j = 24$$

$$L(i) := \prod_{j=0}^{i-1} x_j \cdot \prod_{j=i+1}^{n-1} x_j$$

$L(0) =$ $\qquad L(1) = 12 \qquad L(2) = 8 \qquad L(3) =$

use "trace error" to see cause

$$L(i) := \begin{cases} \prod_{j=1}^{n-1} x_j & \text{if } i = 0 \\ \prod_{j=0}^{i-1} x_j & \text{if } i = n-1 \\ \left(\prod_{j=0}^{i-1} x_j \cdot \prod_{j=i+1}^{n-1} x_j \right) & \text{otherwise} \end{cases}$$

$L(0) = 24 \qquad L(1) = 12 \qquad L(2) = 8 \qquad L(3) = 6$

Alternative:

$$L(i) := \left| \begin{array}{l} L \leftarrow \prod_{j=1}^{n-1} x_j \quad \text{if } i = 0 \\ \text{otherwise} \\ \quad \left| \begin{array}{l} L \leftarrow \prod_{j=0}^{i-1} x_j \quad \text{if } i = n-1 \\ L \leftarrow \prod_{j=0}^{i-1} x_j \cdot \prod_{j=i+1}^{n-1} x_j \quad \text{otherwise} \end{array} \right. \\ \text{return } L \end{array} \right.$$

$L(0) = 24$ $L(1) = 12$ $L(2) = 8$ $L(3) = 6$