7.1 coordinates to index:
$$index = x_1 \cdot L_1 + x_2$$

index to coordinates:
$$x_1 = \cancel{index} \; index \bmod L_1$$
$$x_2 = floor(index / L_1)$$

7.2 coordinates to index:
$$index = \sum_{n=2}^{d}\left(\prod_{i=1}^{n-1} L_i \cdot x_n\right) + x_1$$

index to coordinates:
$$x_d = floor\left(index / \prod_{i=1}^{d-1} L_i\right)$$
$$x_{d-1} = \overset{floor}{\left(index - x_d \cdot \prod_{i=1}^{d-1} L_i\right)} / \prod_{i=1}^{d-2} L_i$$
$$x_{d-2} = \overset{floor}{\left(index - x_d \cdot \prod_{i=1}^{d-1} L_i - x_{d-1} \cdot \prod_{i=1}^{d-2} L_i\right)} / \prod_{i=1}^{d-3} L_i$$
$$\vdots$$