

## Linear index to 3D index conversion:

We are given that the array's dimensions are  $4 \times 4 \times 8$ , with the equation for converting a linear index to 3D format being:

$W \times (N \times O) + X \times O + Y = \text{Linear Index}$ , Where W, X, and Y represent the 3D indexes, and:

- $N=4$ ,  $O=8$
- The total size is  $M \times N \times O = 4 \times 4 \times 8 = 128$

With the value of N and O, the formula of the **linear index is**  $= W \times (4 \times 8) + X \times 8 + Y$

### 1. For Linear Index = 96:

Linear Index 96:

$$W = 96 // (4 * 8) = 96 // 32 = 3$$

$$\text{Remainder} = 96 \% (4 * 8) = 96 \% 32 = 0$$

$$X = 0 // 8 = 0$$

$$\text{Remainder} = 0 \% 8 = 0$$

$Y = \text{Remainder from previous step} = 0$

3D Index for Linear Index 96:  $[3][0][0]$

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### 2. Linear Index 107:

$$W = 107 // (4 * 8) = 107 // 32 = 3$$

$$\text{Remainder} = 107 \% (4 * 8) = 107 \% 32 = 11$$

$$X = 11 // 8 = 1$$

$$\text{Remainder} = 11 \% 8 = 3$$

$$Y = 3$$

3D Index for Linear Index 107:  $[3][1][3]$

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### 3. Linear Index 60:

$$W = 60 // (4 * 8) = 60 // 32 = 1$$

$$\text{Remainder} = 60 \% (4 * 8) = 60 \% 32 = 28$$

$$X = 28 // 8 = 3$$

$$\text{Remainder} = 28 \% 8 = 4$$

$$Y = 4$$

3D Index for Linear Index 60:  $[1][3][4]$