

A good way to see **how the left K-map is formed** is to walk down the truth table's **Y0 column** (or whichever output you want to map) and place a 1 or 0 into the corresponding cell in the K-map for each $(X2, X1, X0)$ row:

1. **Label the K-map axes**

- Since there are 3 inputs $(X2, X1, X0)$, you have an 8-cell map. One axis might be $X2$ (0 on the top row, 1 on the bottom row), while the columns use a Gray code for $(X1, X0)$: 00, 01, 11, 10.

2. **Scan the truth table**

- For each row $(X2, X1, X0)$, look at the **Y0** value.
- If $Y0 = 1$, put a 1 in the K-map cell where $(X2, X1, X0)$ match that row. If $Y0 = 0$, put a 0.

3. **Fill all eight cells**

- You'll end up with a pattern of 1s and 0s in the K-map that matches exactly the truth table's Y0 column—but reorganized so adjacent cells differ by only one input bit.

Once you have that **K-map of 1s and 0s**, you can then group adjacent 1-cells to simplify the Boolean expression for Y0 (or whichever output you're working on). That is essentially how your instructor “goes down from Y0” in the truth table and builds up the left-hand chart.