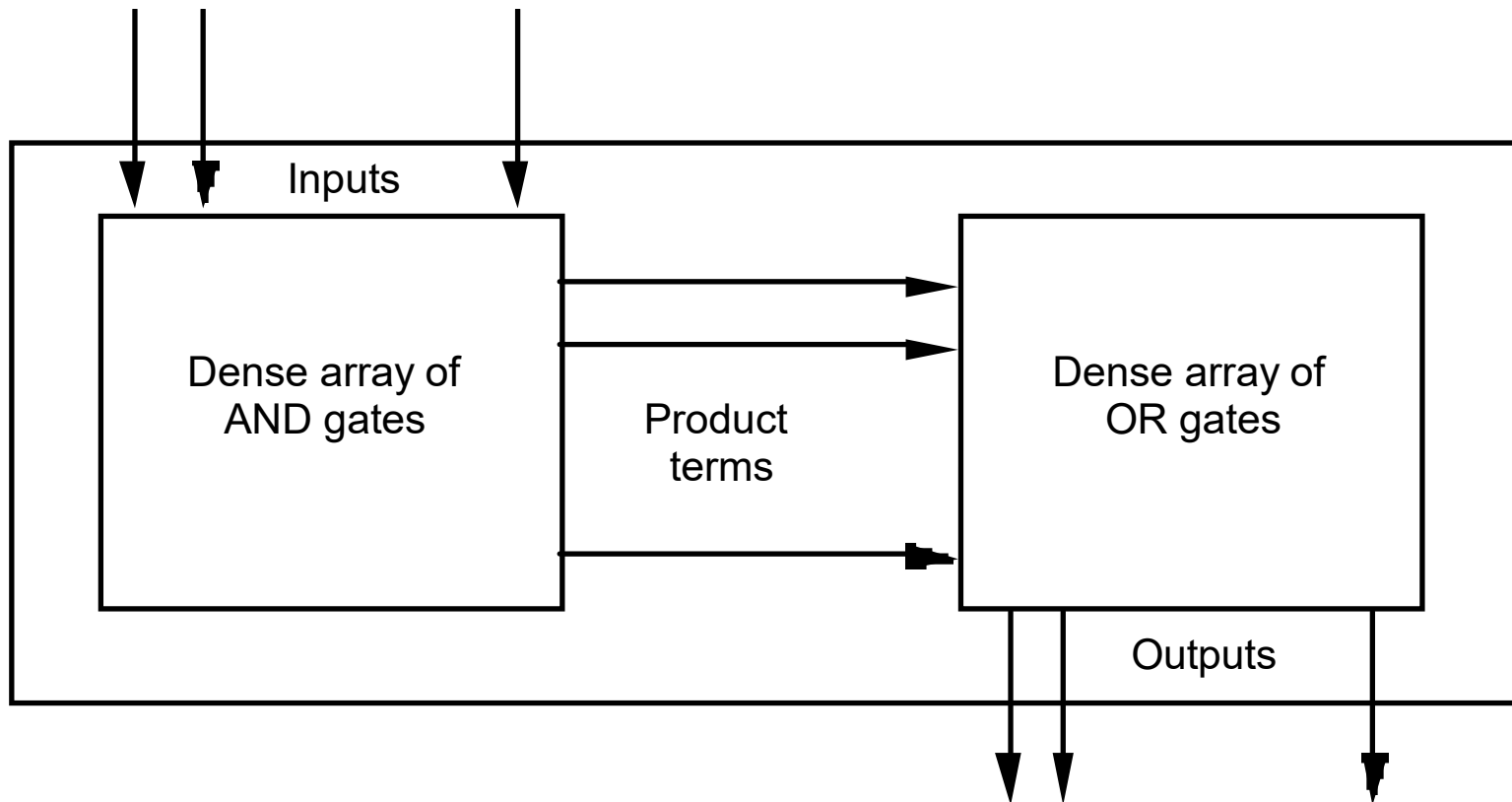# Programmable Logic

PAL, PLA
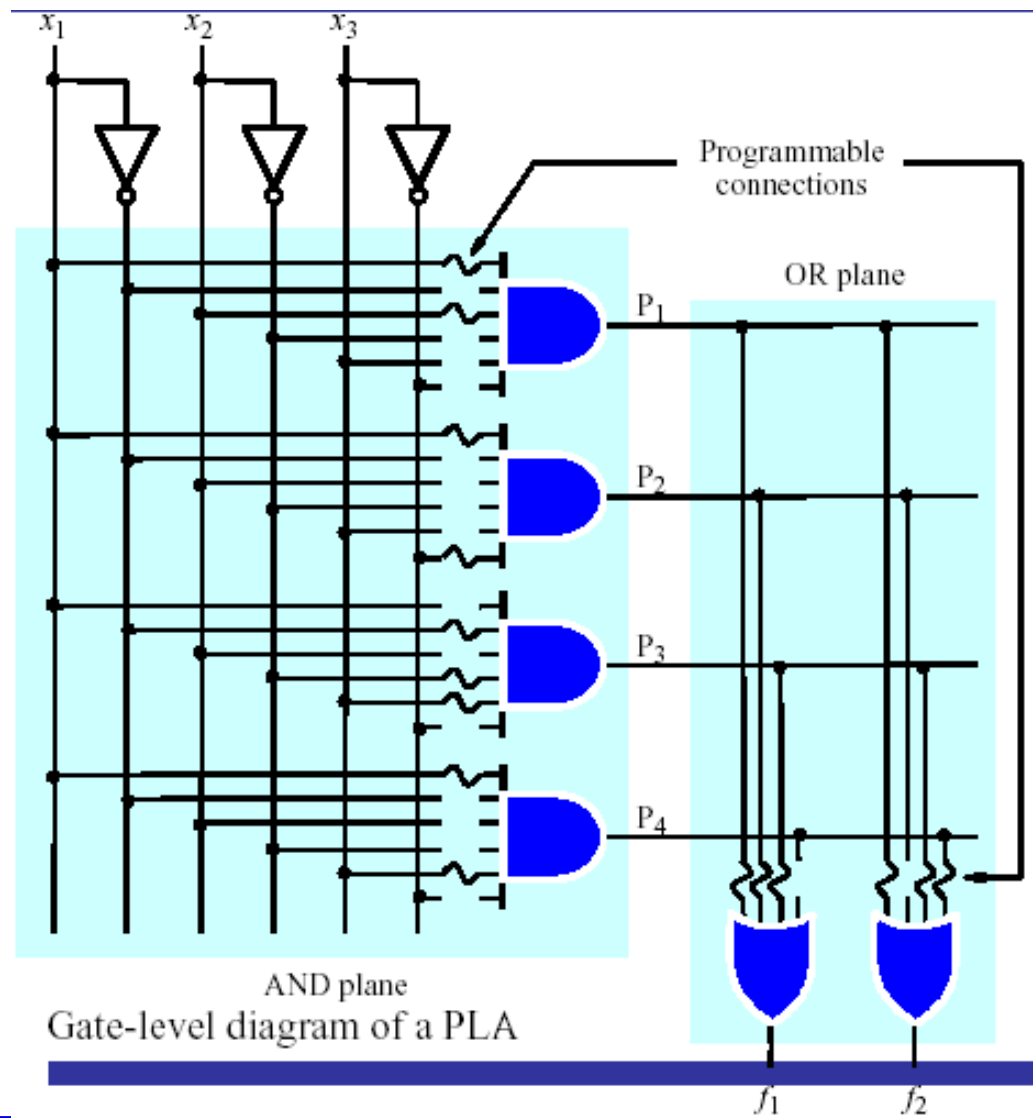
PLAs

Programmable Logic Array

- ◅ Pre-fabricated building block of many AND/OR gates (or NOR, NAND)
- ◅ General purpose logic building blocks
- ◅ "Personalized" or "customized" by making/breaking connections among the gates
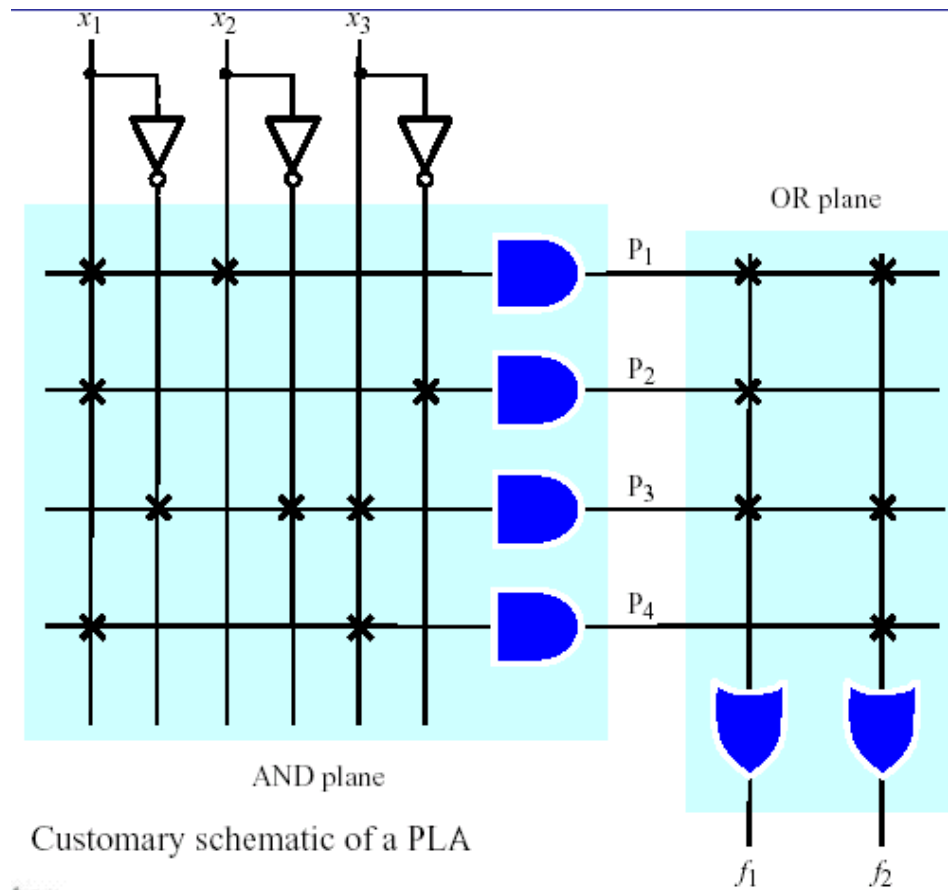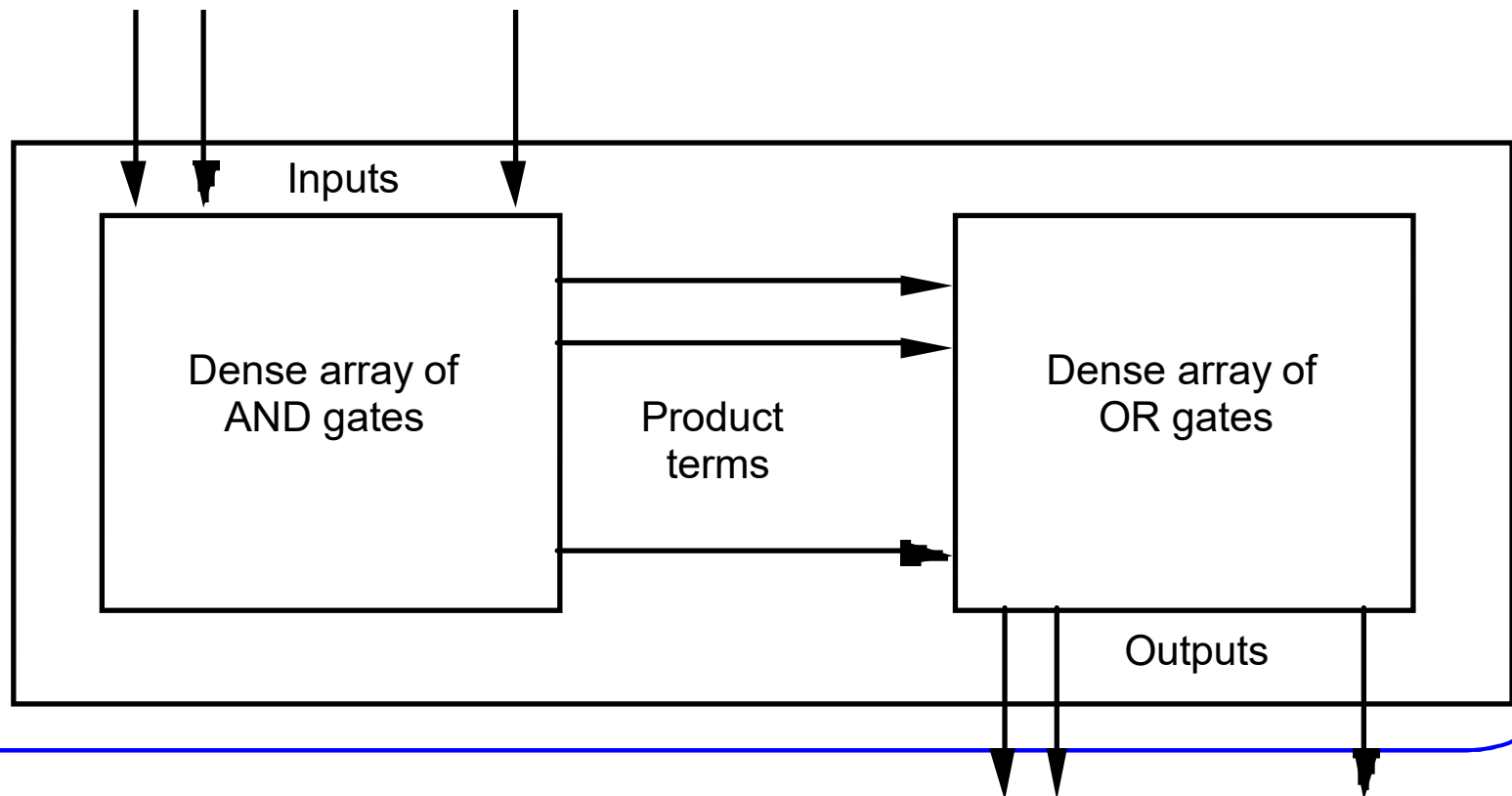- ◅ This process is called "programming"

PLA

- **Realizes Sums of Products**

Inputs

Dense array of
AND gates

Product
terms

Dense array of
OR gates

Outputs

PLA

Gate-level diagram of a PLA

PLA

Customary schematic of a PLA

- A 3×2 PLA with 4 product terms.

PALs

- **Programmable Array Logic**
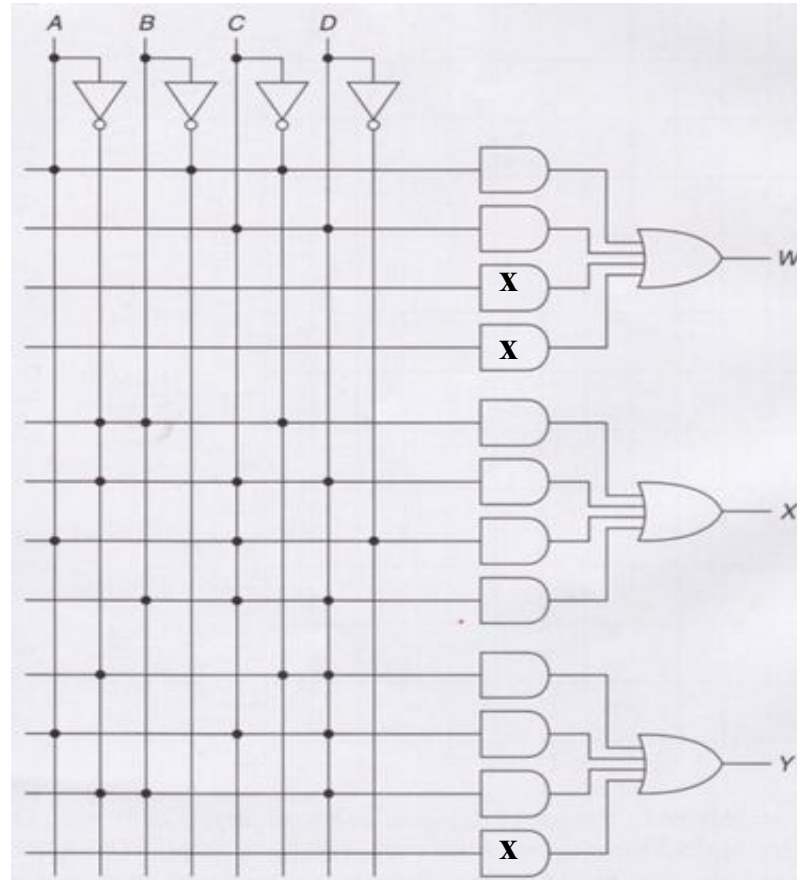 - ◄ Realizes Sums of Products but with a *fixed* OR array

Inputs

Dense array of AND gates

Product terms

Dense array of OR gates

Outputs

PAL

Figure 4.15 A PAL.

inputs

1st output section

2nd output section

3rd output section

4th output section
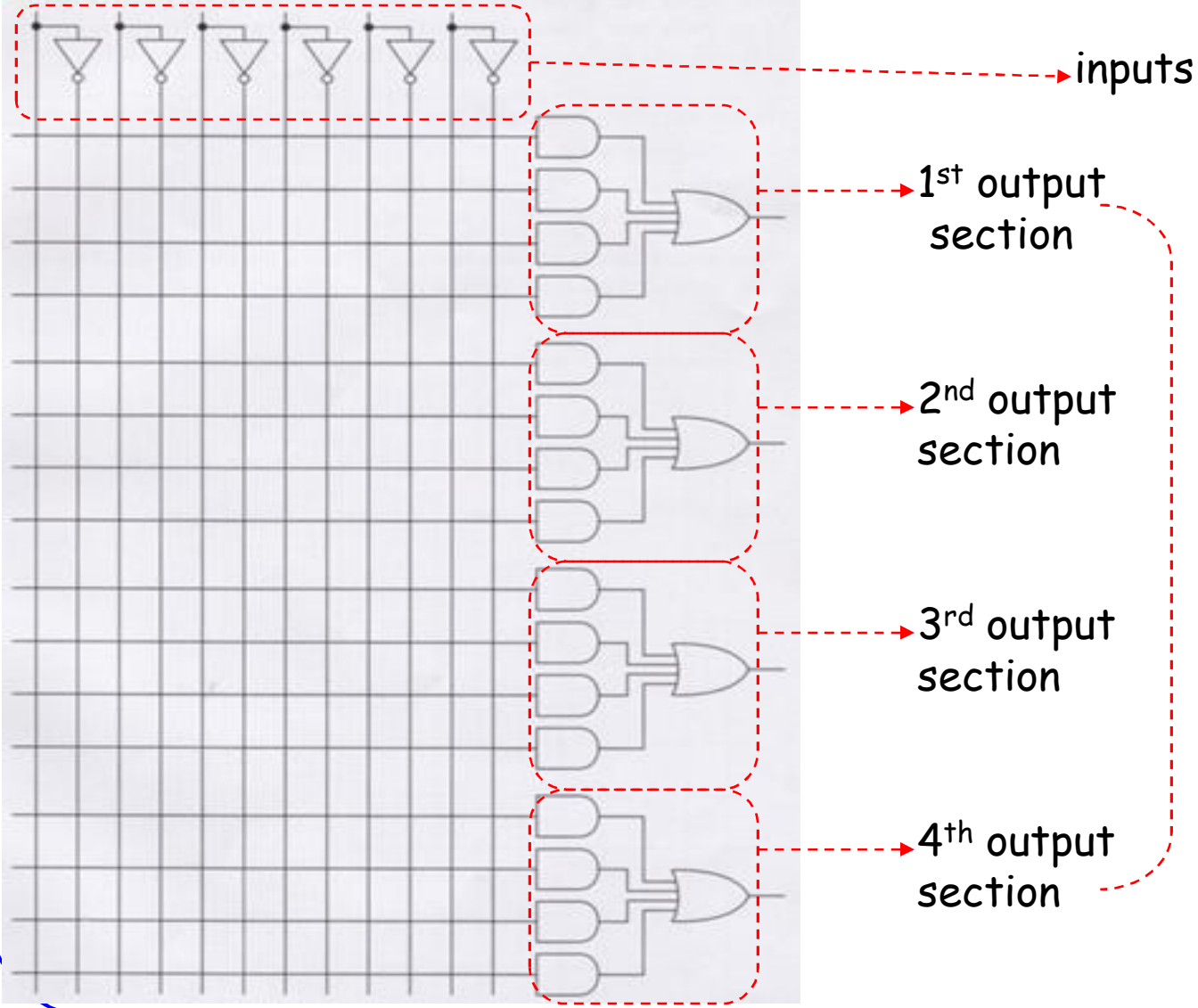
Only functions with at most four products can be implemented

13

PAL

$W = AB'C' + CD$

$X = A'BC' + A'CD + ACD' + BCD$

$Y = A'C'D + ACD + A'BD$