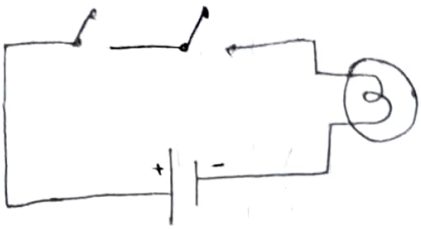
# Programmable Logic Control —

Logic Gates

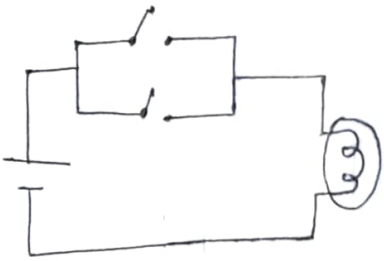
1. AND Gate —



Circuit Diagram

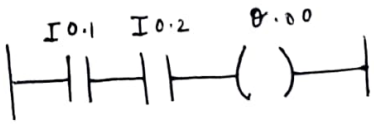

| A | B | output |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

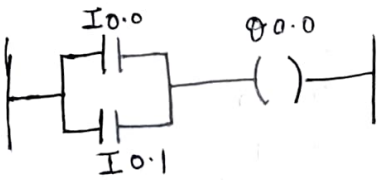
2. OR Gate —



| A | B | A+B |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

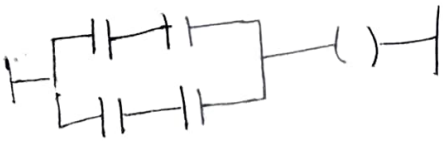
AND IN PLC Logic —



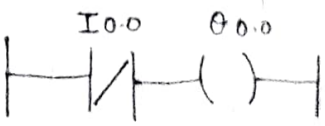

OR GATE

0.1 → AB + CD = Y



0.2 →

| A | Y = $\bar{A}$ |
|---|---|
| 0 | 1 |
| 1 | 0 |




Circuit Diagram

## Universal Gates

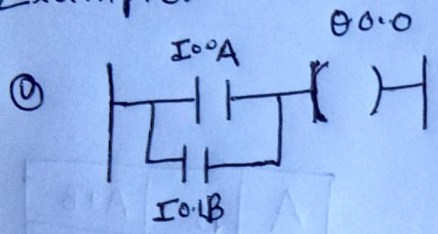
⊙ NAND
⊙ NOR

⊙ NAND ⇒ I/P = A, B
O/P = Y
$Y = \overline{A \cdot B} = \bar{A} + \bar{B}$ (By Demogans theorem)

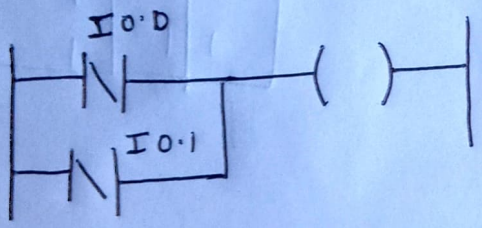
A → —| |—
$\bar{A}$ → —|/|—
+ → Parallel
• → series

⊙ NOR ⇒ $Y = \overline{A + B} = \bar{A} \cdot \bar{B}$

Examples —

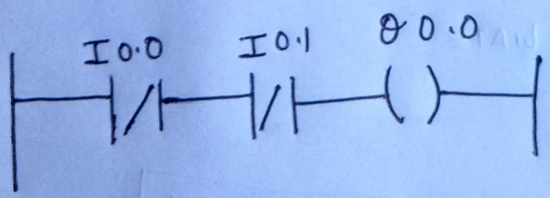
① 


⑪ NAND $\overline{A \cdot B} = Y$
$\bar{A} + \bar{B} = Y$




| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

⑪ NOR $Y = \overline{A + B} = \bar{A} \cdot \bar{B}$



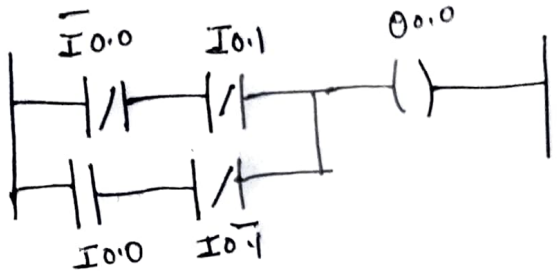

| A | B | Y |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

⇒ XOR & XNOR ——

XOR → $\bar{A}B + A\bar{B}$

XNOR → $AB + \bar{A} \cdot \bar{B}$

XOR → $\bar{A}B + A\bar{B}$




XNOR