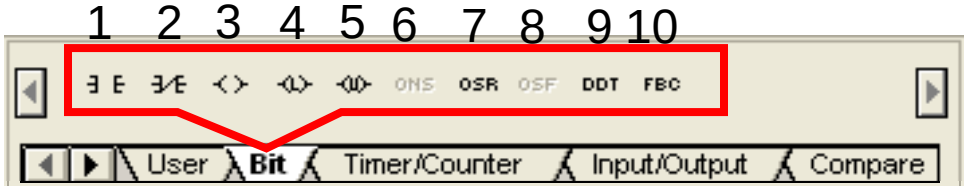
Pertemuan ke-10

# Bit Instruction

# Objektif

- Memahami Bit Instruction dan aplikasinya
- Memahami logika boolean
- Memahami Instruksi Conversion dan aplikasinya
- Menahami Instruksi Comparison dan aplikasinya

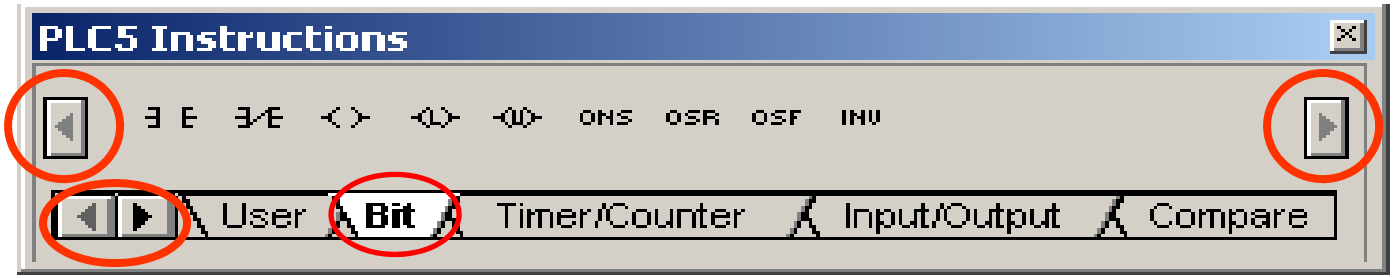
# Bit Instruction Set(1)




| | |
|---|---|
| **Normally Open** | 1 |
| **Normally Closed** | 2 |
| **Output Coil** | 3 |
| **Latch Output Coil** | 4 |
| **Unlatch Output Coil** | 5 |
| **One Shot** | 6 |
| **One Shot Rising** | 7 |
| **One Shot Falling** | 8 |
| **Diagnostics Detect Instruction** | 9 |
| **File Bit Comparison** | 10 |

# Bit Instruction Set(2)

- Instruction Toolbar, digunakan untuk membuat/menyusun instruksi yang digunakan dalam program ladder



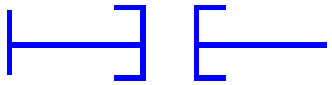

- Sub-window: Bit
  - Gunakanlah relay-type instructions untuk memonitor dan mengontrol data status bit dalam tabel data seperti input bits atau timer control-word bit
  - Dengan instruksi ini, pengalamatan bit di semua bagian penyimpanan data

# Terminologi: Relay-type Instructions

- Examine If Closed (XIC)
- Examine If Open (XIO)
- Output Energized (OTE)
- Output Latch (OTL)
- Output Unlatch (OTU)

# Examine If Closed (XIC)

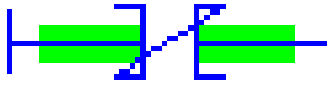
- The examine-on instruction adalah instruksi yang akan dibaca ON atau  OFF tergantung dari kondisi dari addressed bit



| If the Bit Is: | Then the Instruction Is: | Bit Logic State: |
|---|---|---|
| on | true | 1 |
| off | false | 0 |

# Examine If Open (XIO)

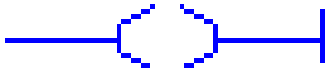
- The examine-off instruction adalah instruksi yang akan dibaca ON atau  OFF tergantung dari kondisi sebaliknya dari addressed bit



| If the Bit Is: | Then the Instruction Is: | Bit Logic State: |
|---|---|---|
| off | true | 0 |
| on | false | 1 |

# Output Energize (OTE)

- Instruksi OTE memberi tahu processor untuk mengontrol output bit berdasarkan kondisi rung



| If the Rung Is: | Then the Processor Turns the Bit: | Bit Logic State: |
|---|---|---|
| true | on | 1 |
| false | off | 0 |

# Output Latch (OTL)

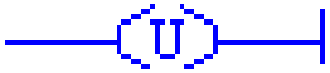
- Instruksi OTL adalah perintah sekali output, jika bit address tersebut sudah diinstruksikan menyala, maka jika ada perubahan instruksi OTL tidak akan berubah




| If the Rung Is: | Then the Processor Turns the Bit: |
|---|---|
| true | on |
| false | no change |

# Output Unlatch (OTU)

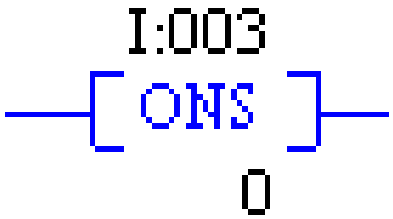
- Instruksi OTU berlawanan dari OTE, jika OUT diinstruksikan ON, maka OTU akan Off dan tidak akan berubah jika ada perubahan instruksi




| If the Rung Is: | Then the Processor Turns the Bit: |
|---|---|
| true | off |
| false | no change |

# One Shot (ONS)

- ONS adalah input satu kesempatan, bisa menjalankan program pada satu kali scanning, sering juga dipakai untuk transisi dari keadaan false ke true



# Karakteristik Devices



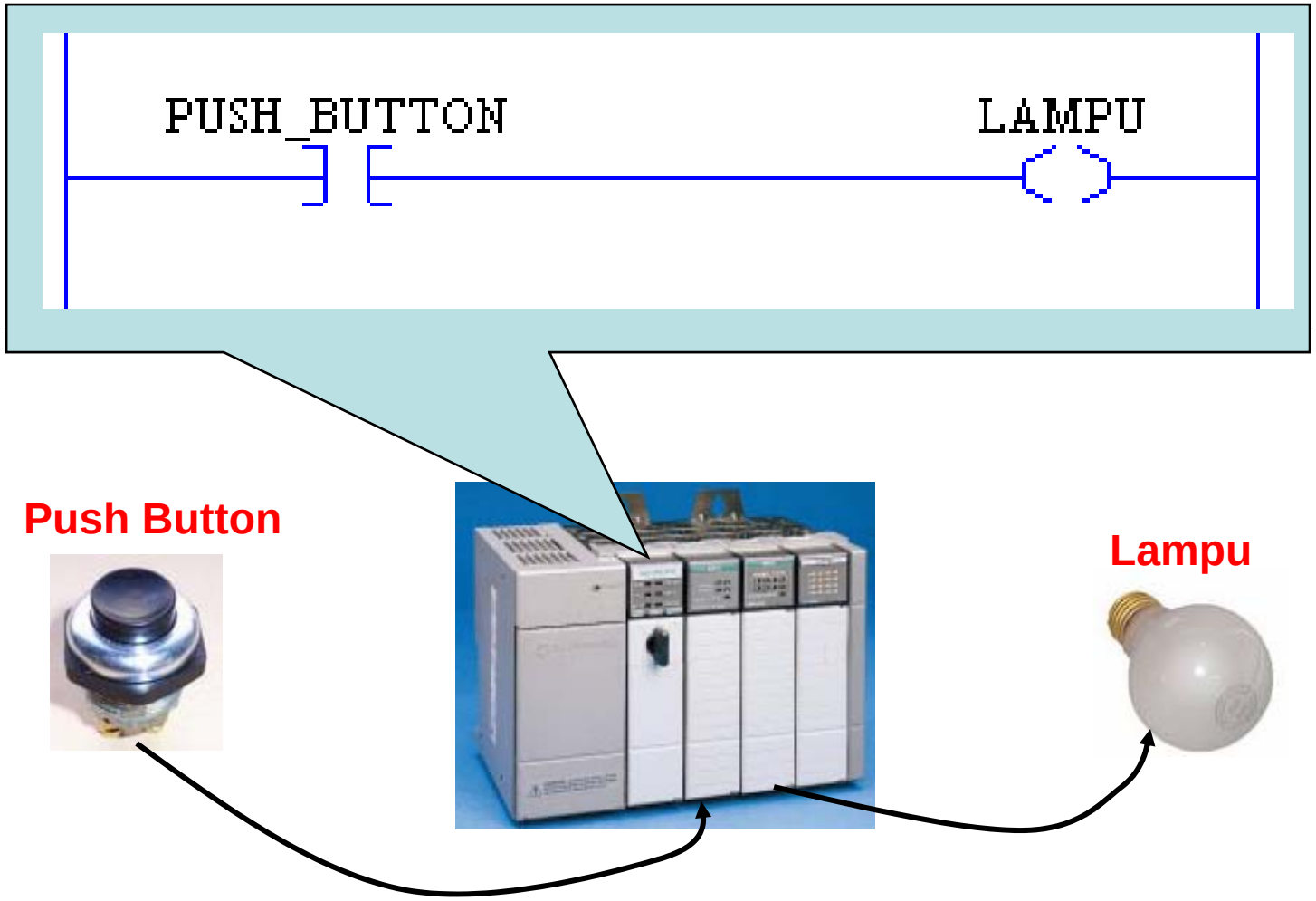




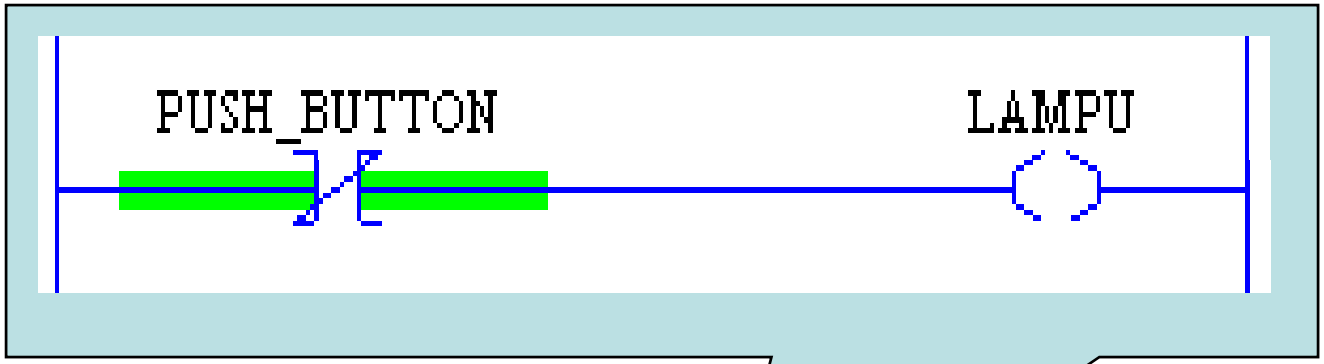
**Real External Input Devices**

- **Normally Open**
- **Normally Closed**

# Exercise 1: NO dan OTE



# Exercise 2: NC & OTE




**Push Button**

**NO**

**NC**

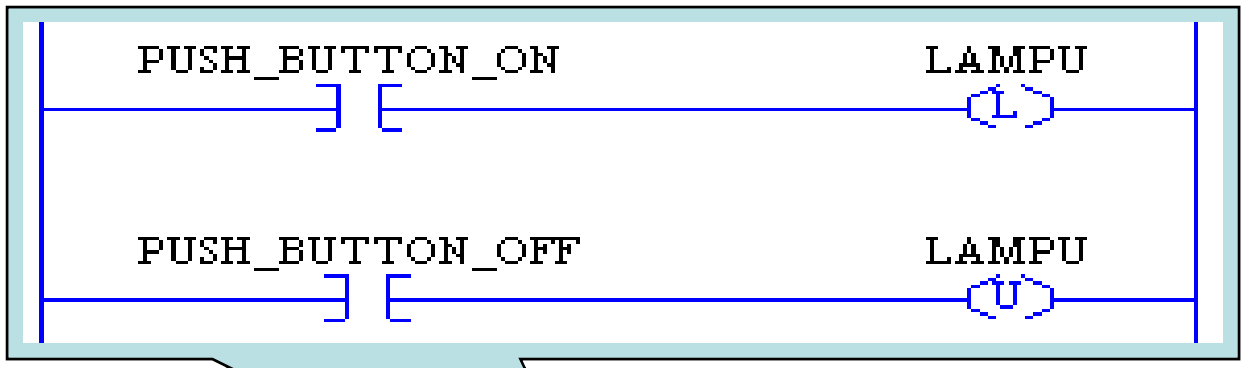




**Lampu**



# Exercise 3: NO, OTL & OTU




**Push Button ON**

**NO**

**NC**





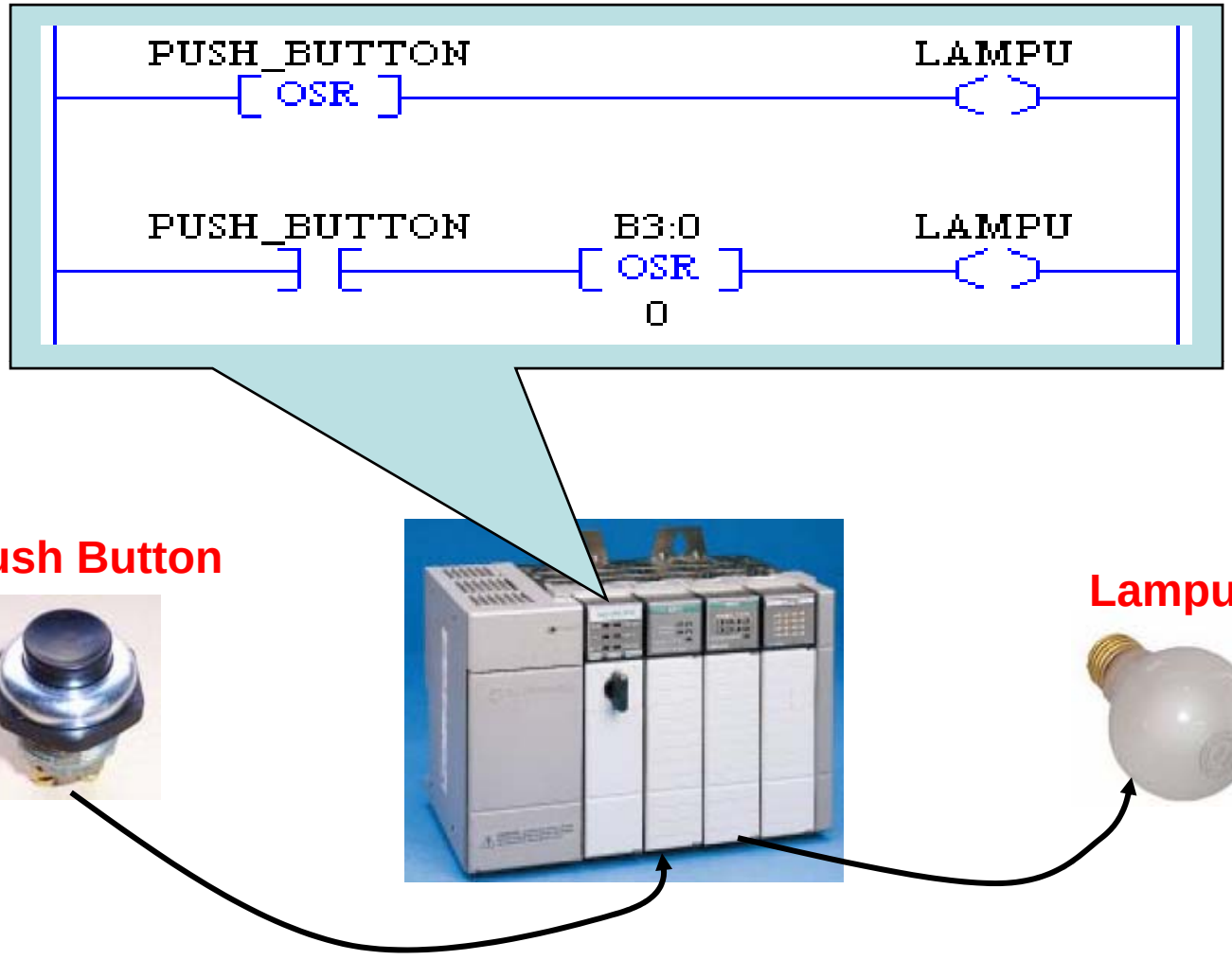
**Lampu**





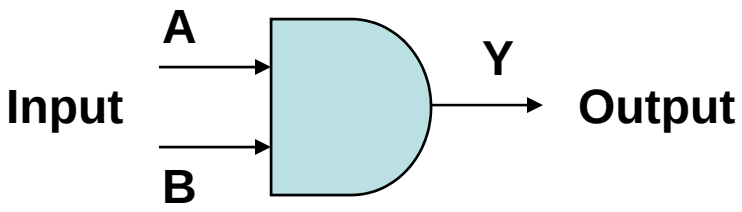
**Push Button OFF**

# Exercise 4: OSR

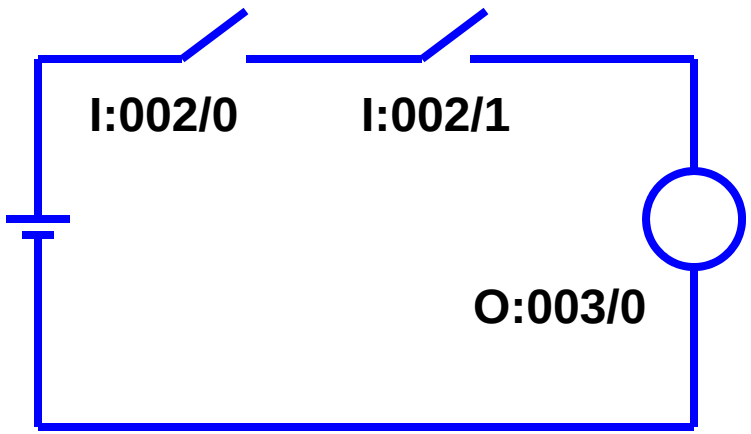


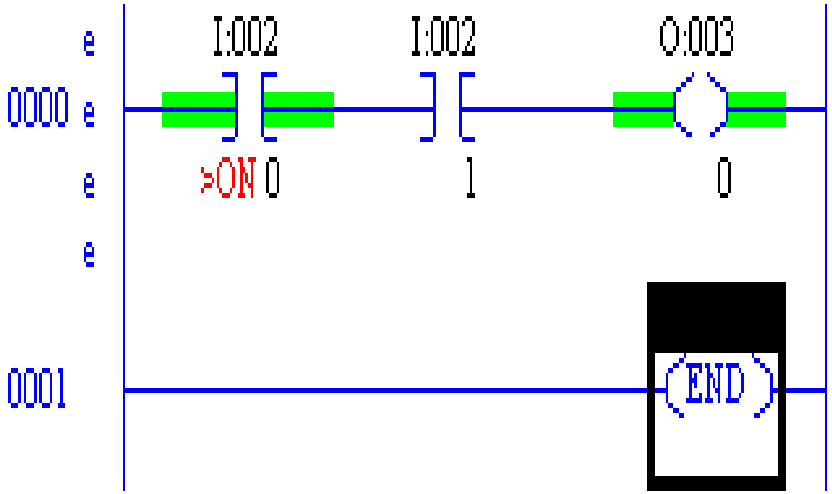
# Operasi AND di Bit – Level

| Source A | Source B | Result |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 1 | 1 |



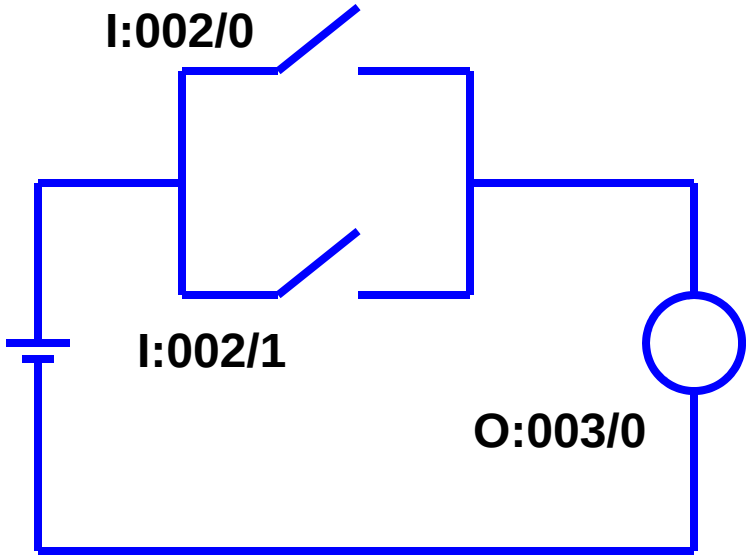

Simbol AND Gate

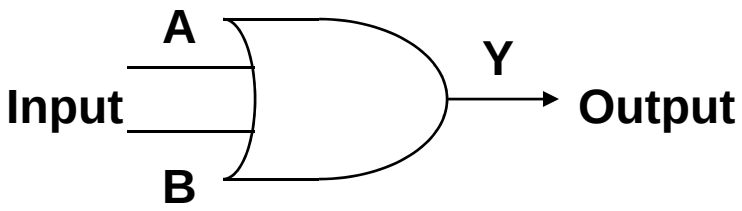


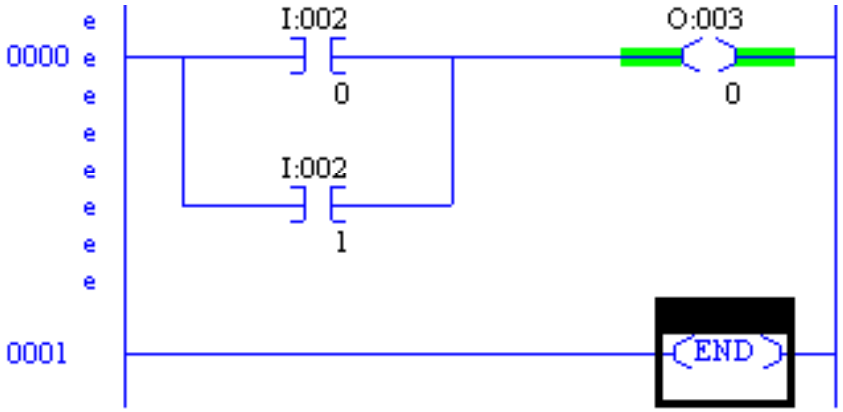
# Operasi OR di Bit – Level

| Source A | Source B | Result |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 1 | 1 |



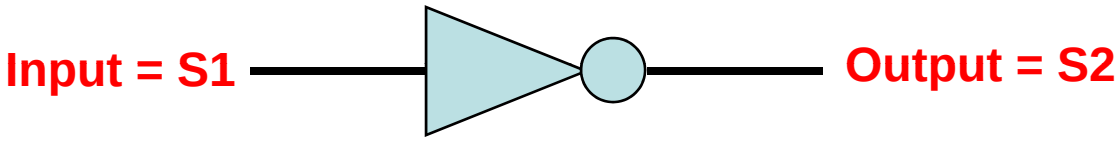



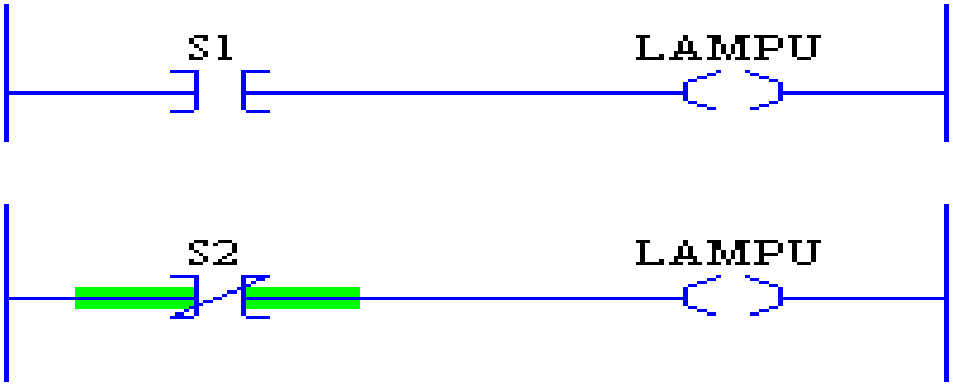

Simbol OR Gate



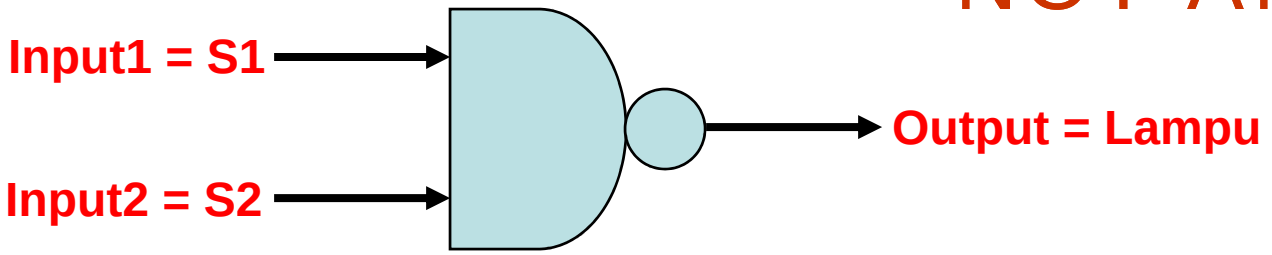
# NOT

| S1 | S2 = NOT S1 | LAMPU |
|---|---|---|
| 0 | 1 | 0 |
| 1 | 0 | 1 |

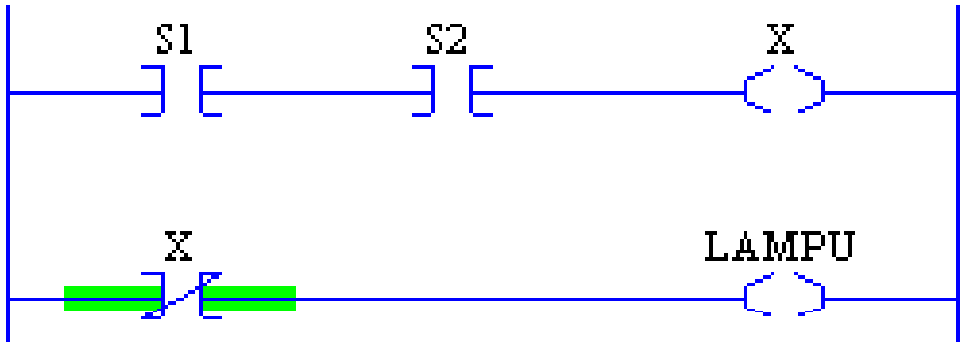


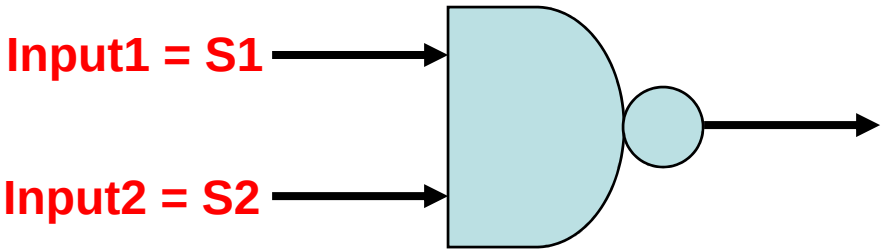
# NOT AND(1)



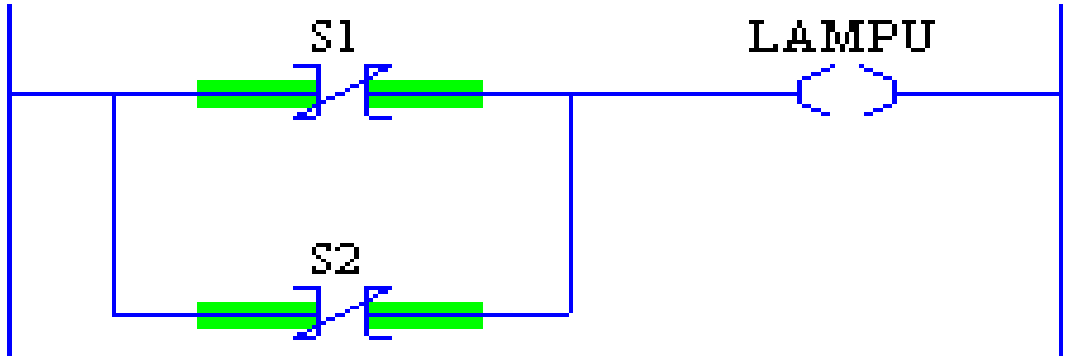

| S1 | S2 | Lampu |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |



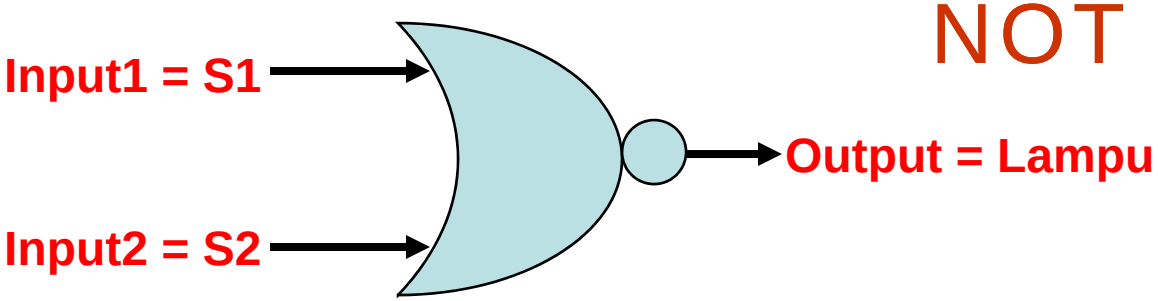
# NOT AND(2)



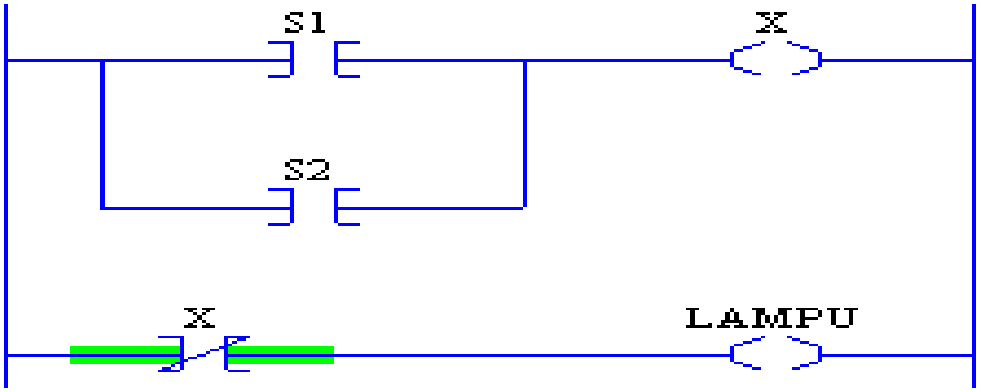

| S1 | S2 | Lampu |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |



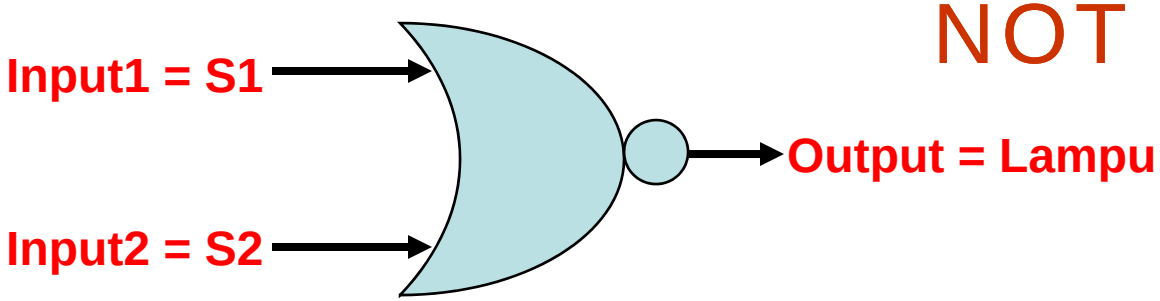
# NOT OR(1)



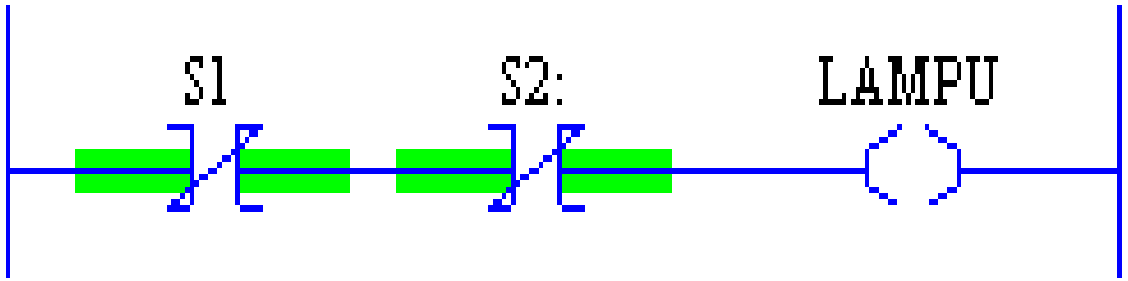

| S1 | S2 | Lampu |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |



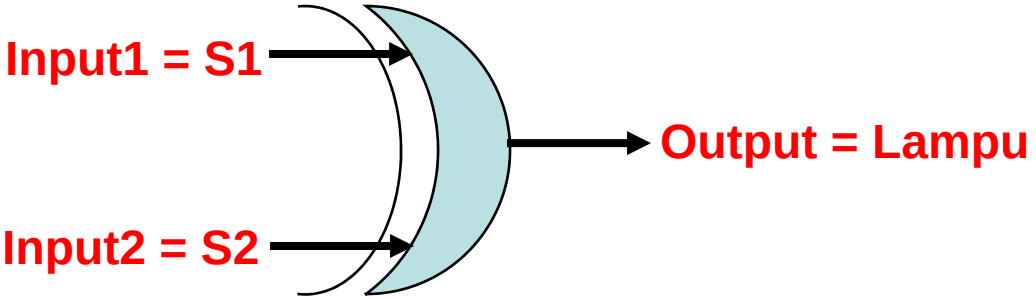
# NOT OR(2)

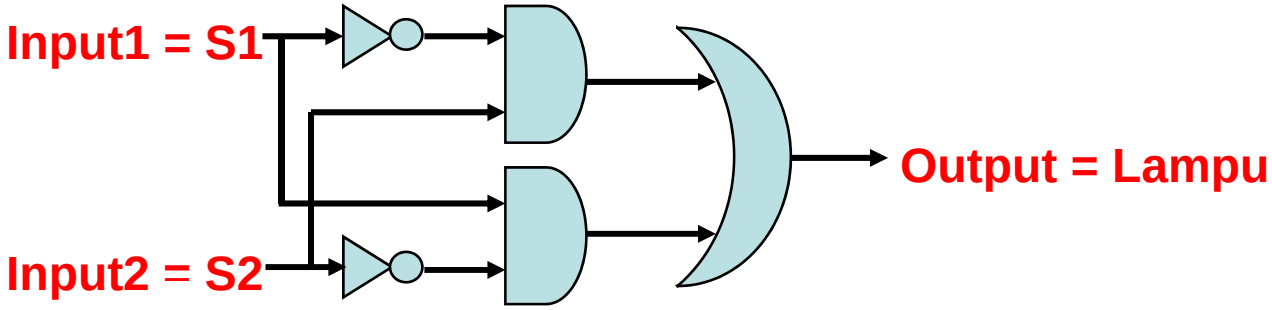



| S1 | S2 | Lampu |
|---|---|---|
| 0 | 0 | 1 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 0 |

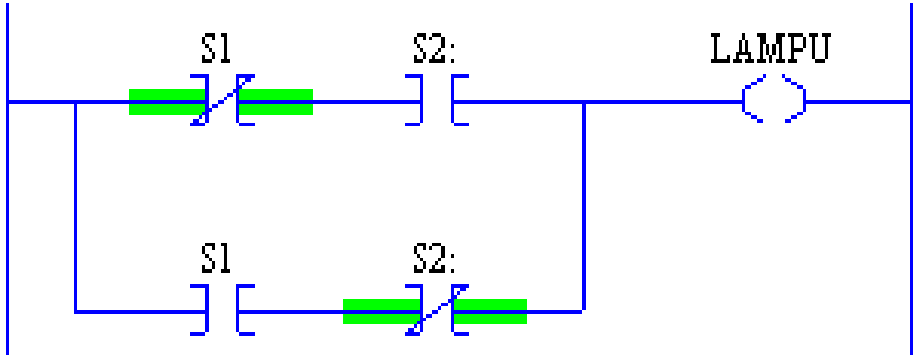


# Exclusive OR(XOR)

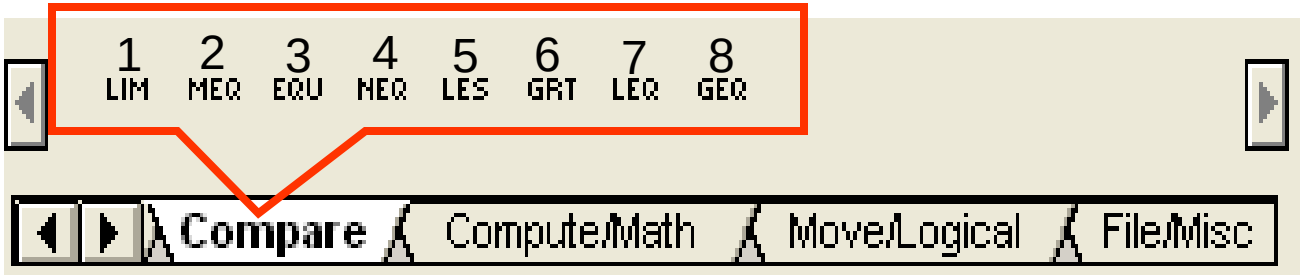



| S1 | S2 | Lampu |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

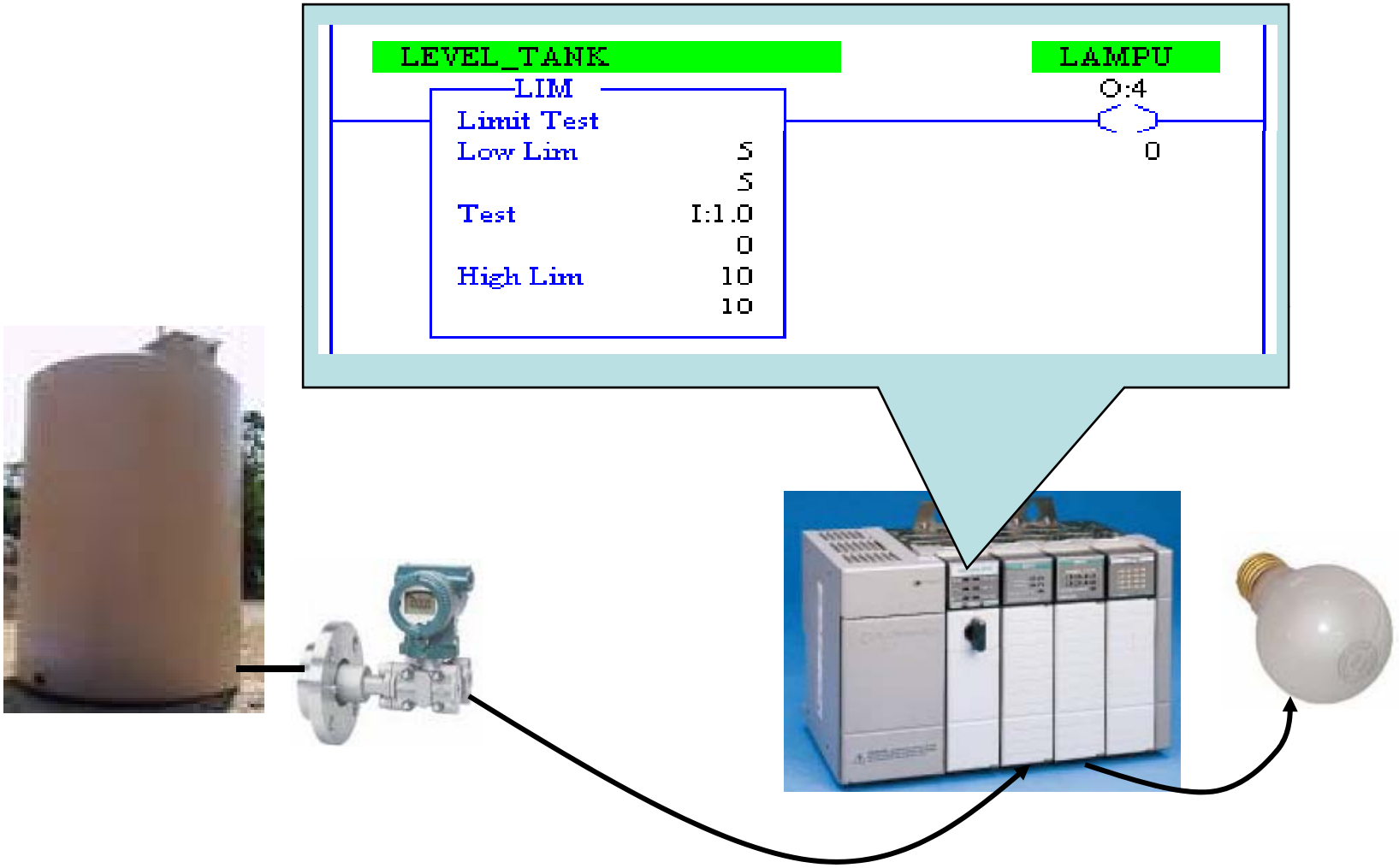


# Compare Instruction

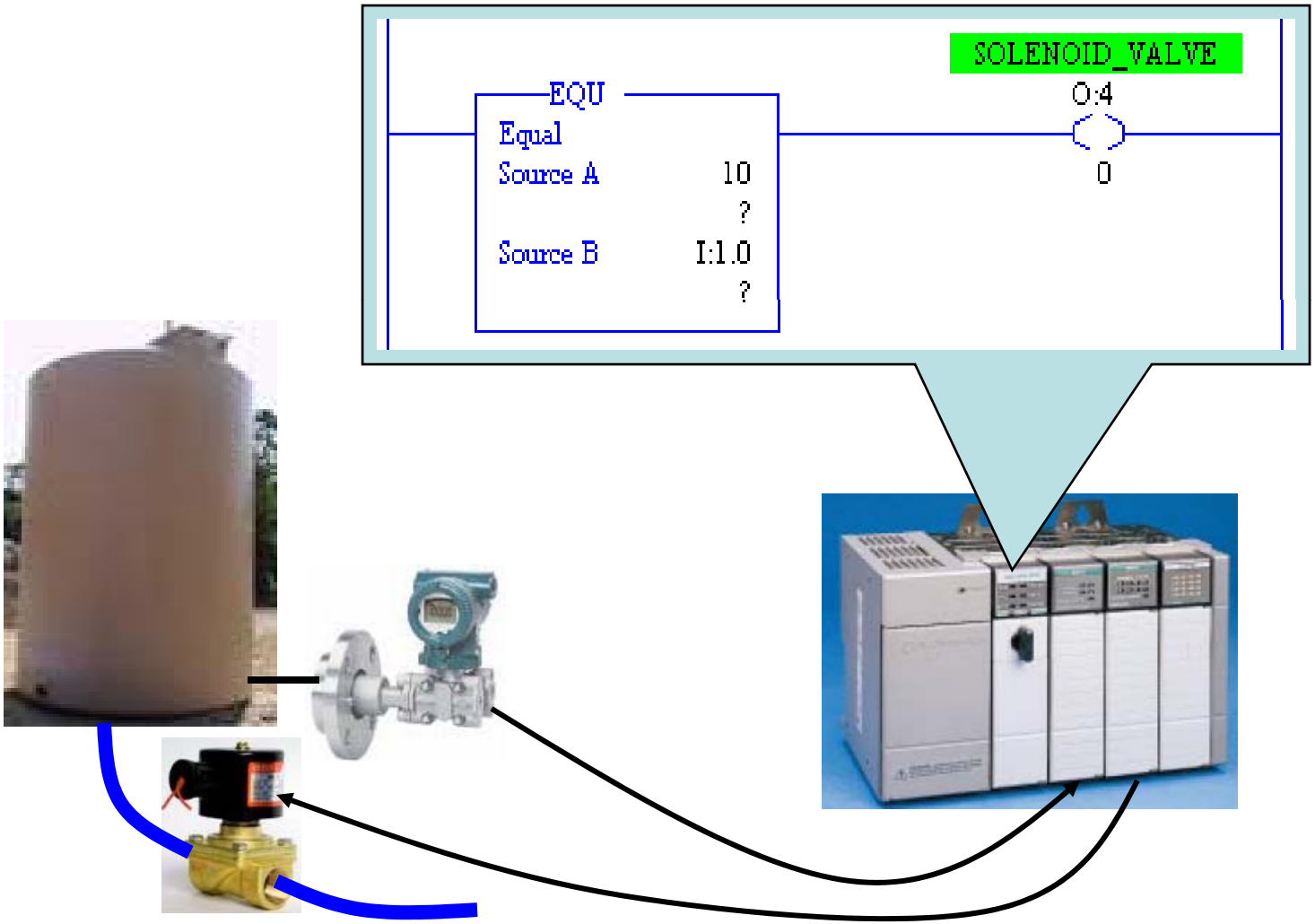



| | |
|---|---|
| **LIMIT** | 1 |
| **Masked Equal** | 2 |
| **Equal** | 3 |
| **Not Equal** | 4 |
| **Less Than** | 5 |
| **Greater Than** | 6 |
| **Less Than Or Equal To** | 7 |
| **Greater Than Or Equal To** | 8 |

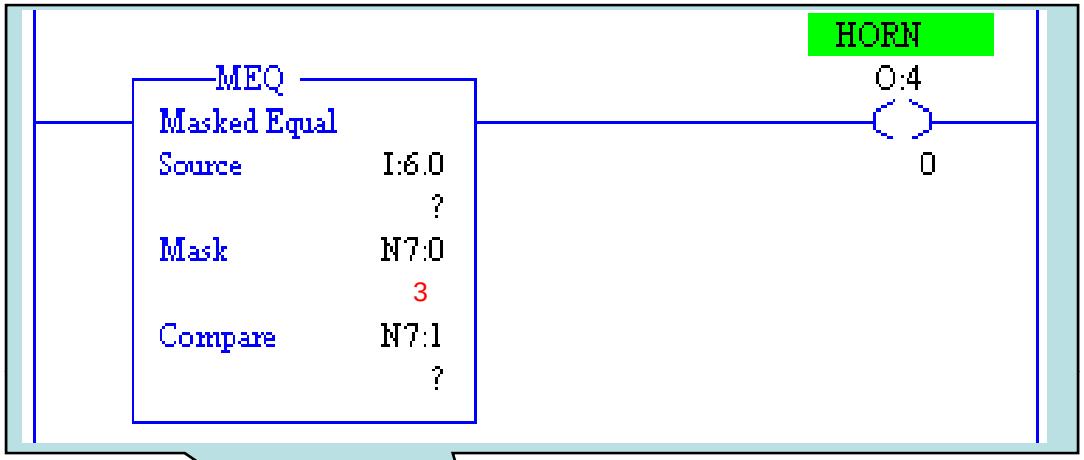
# Exercise 5: LIMIT TEST



# Exercise 6: Equal



# Exercise 7: Masked Equal








Pressure Switch



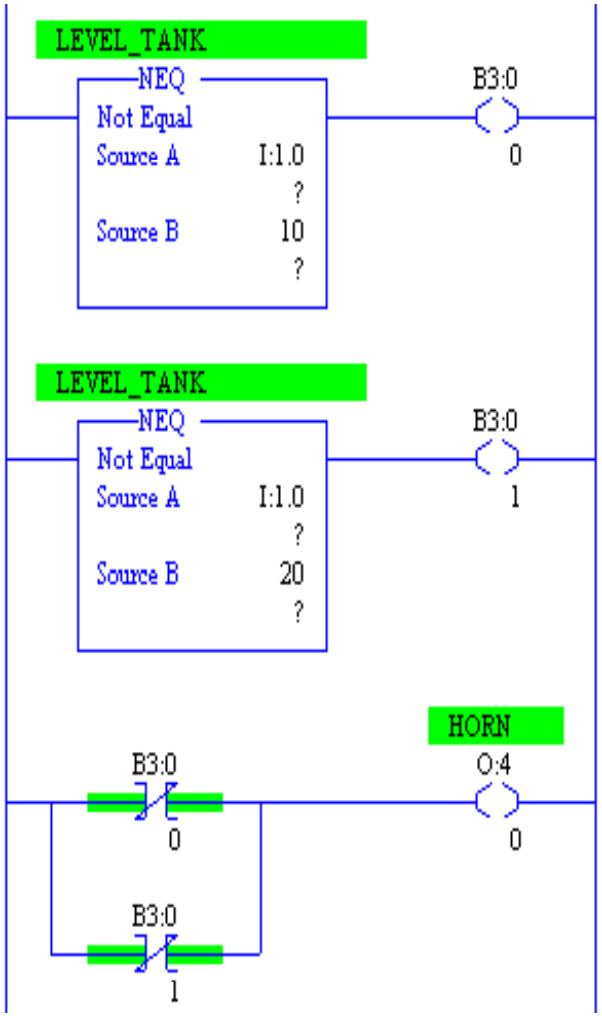
Horn

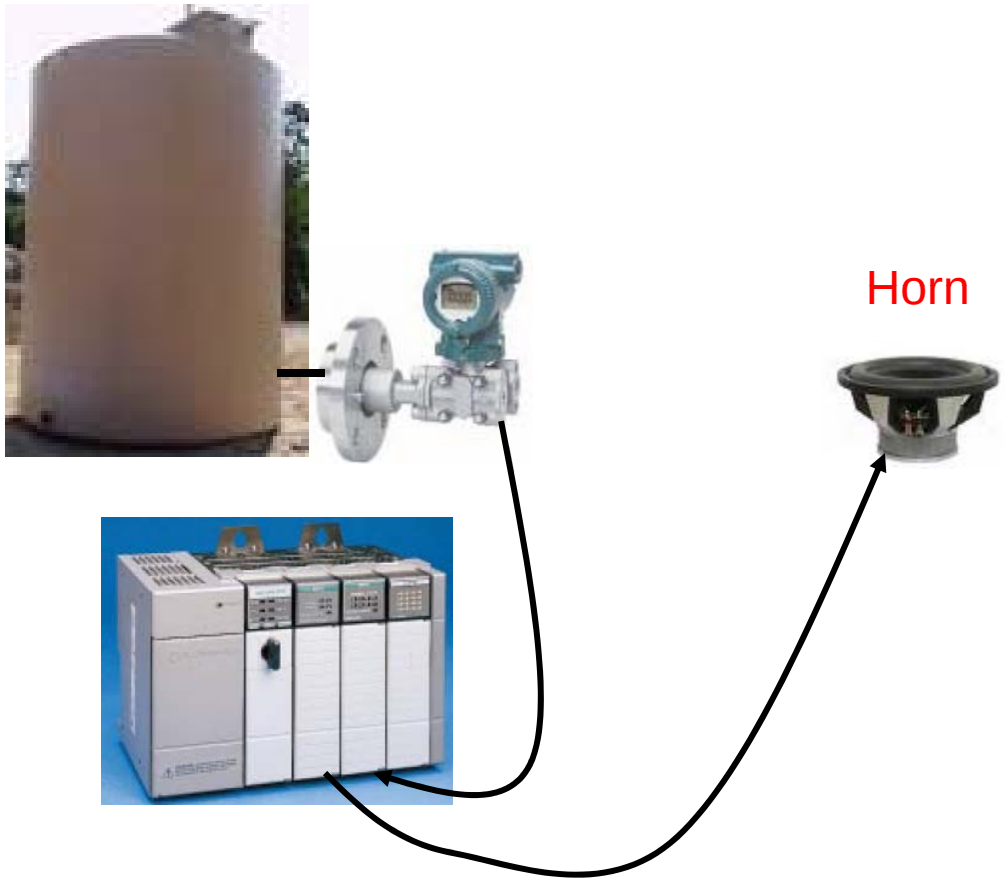




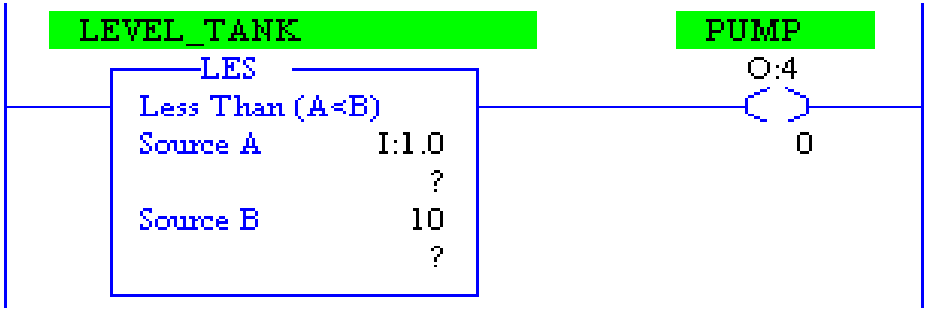
Temperature Switch

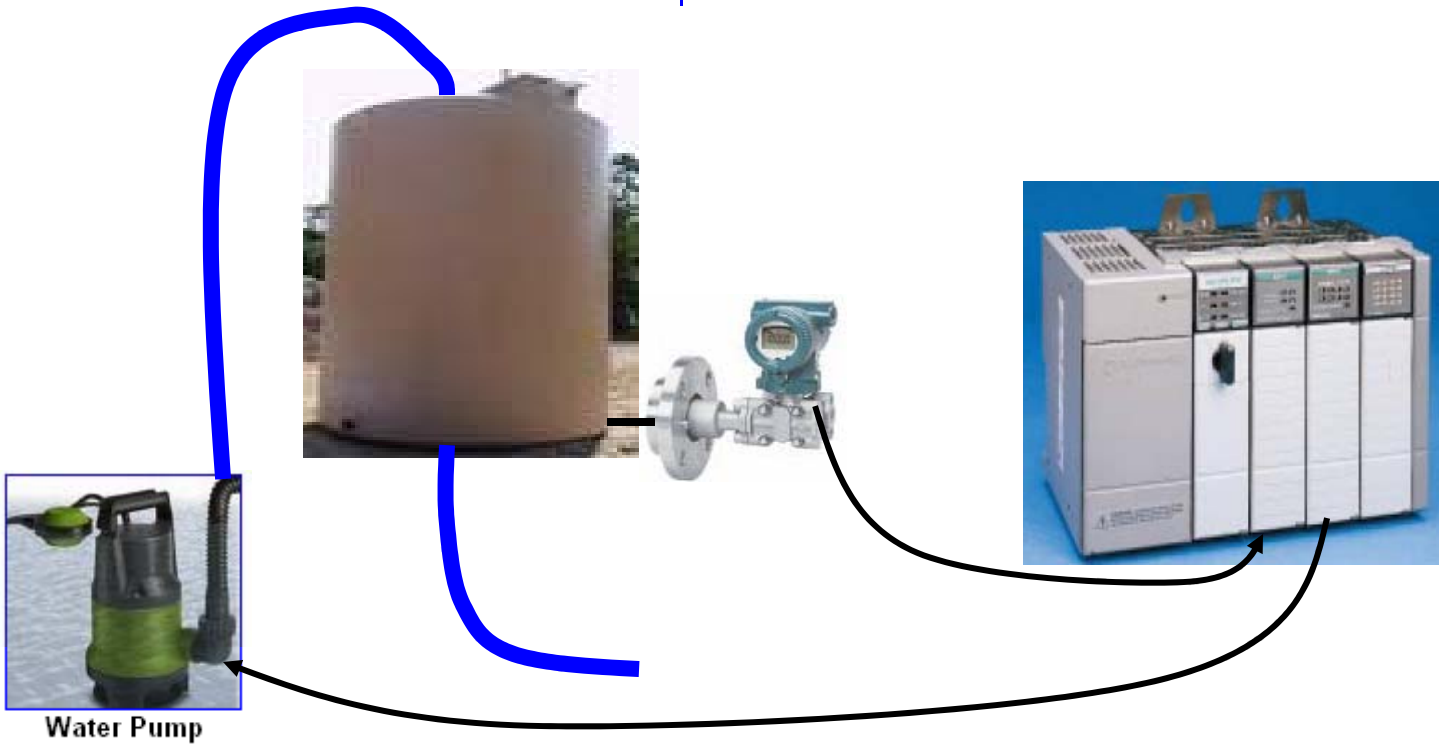
# Exercise 7: Not Equal



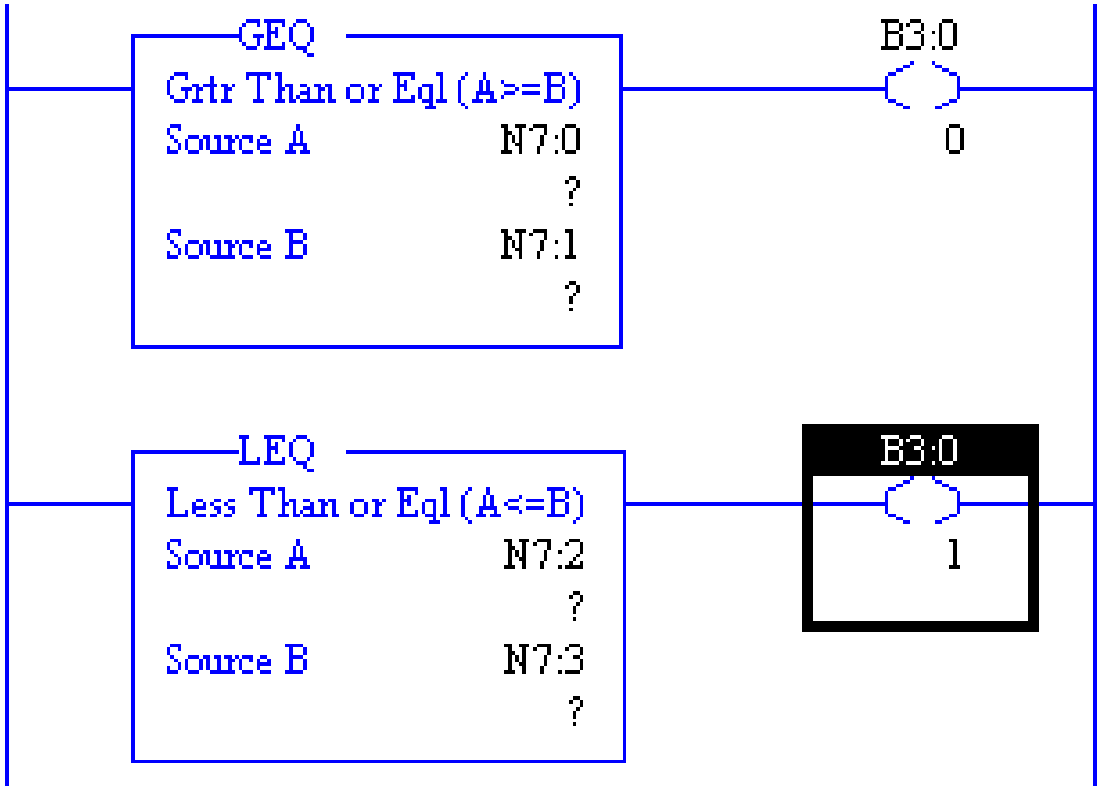



# Exercise 8: Less Than

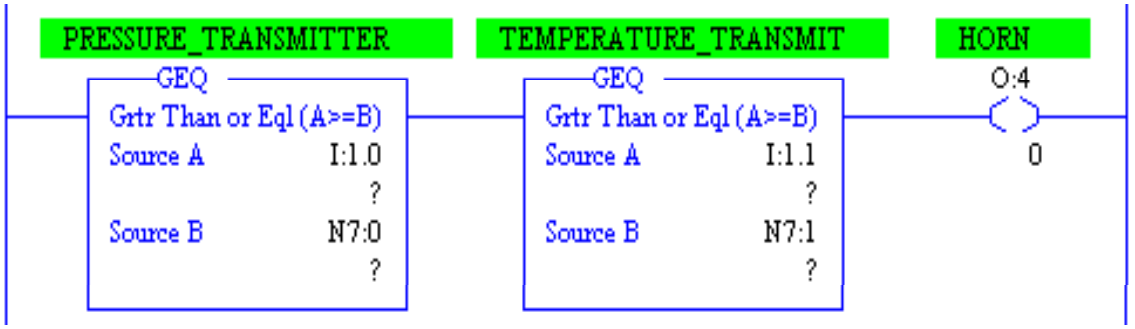


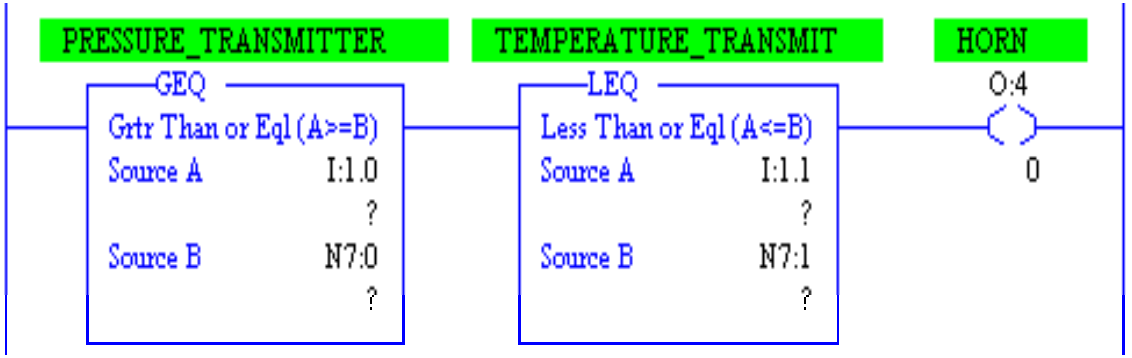



# Exercise 9: Greater(Less) Than Or Equal To



# Exercise 10: Kombinasi Instruksi



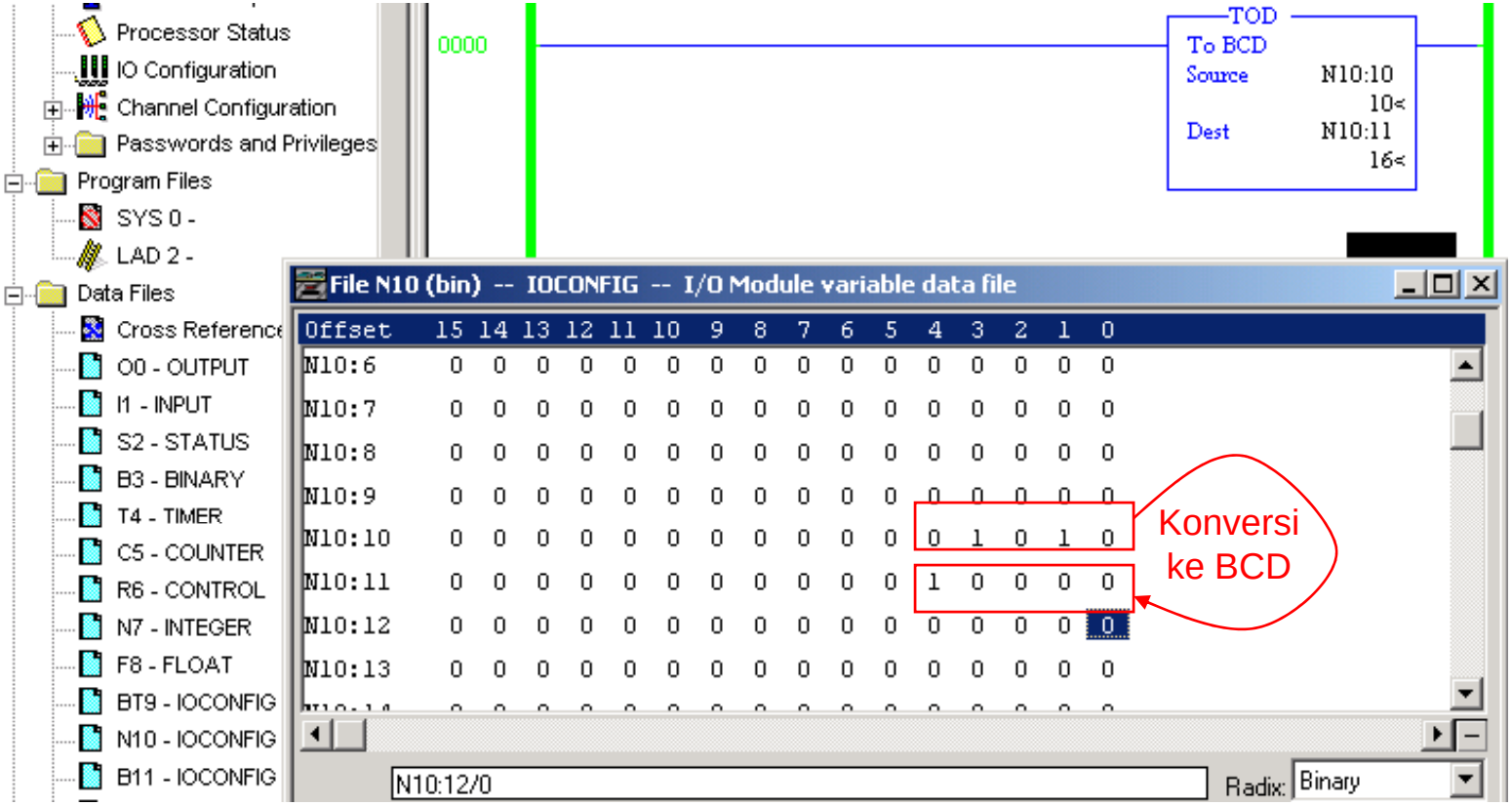



# Instruksi Konversi

- Instruksi konversi di RSLogix 5 berguna untuk mengubah satu sistem bilangan ke sistem bilangan yang lain.
- Bisa juga mengkonversi dari bentuk derajat (degree) ke bentuk radian (rad)

# TOD – Convert to BCD

- TOD – Convert to BCD, digunakan untuk mengubah bilangan ke bilangan BCD
- Contoh Pemrograman TOD :



# FRD – Convert from BCD

- FRD – Convert from BCD, digunakan untuk mengubah bilangan dari BCD
- Contoh Pemrograman FRD :

