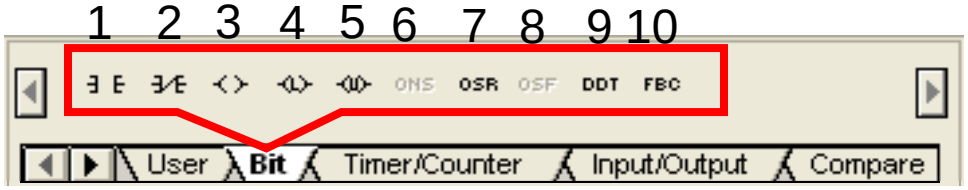
Pertemuan ke-9

Logika Boolean dalam pemrograman

Objektif

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

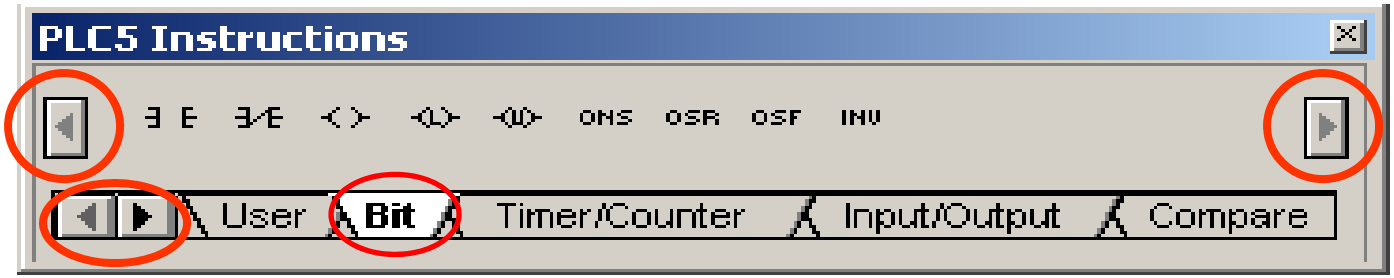
Bit Instruction Set(1)



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



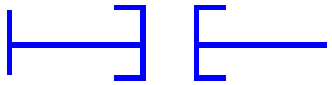
- Sub-window: Bit
  - Gunakanlah relay-type instructions untuk memonitor dan mengontrol data status bit dalam tabel data seperti input bits atau timer control-word bit
  - Dengan instruksi ini, pengalamatan bit di semua bagian penyimpanan data

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)

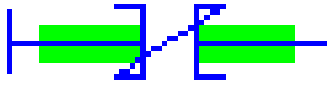
- The examine-on instruction adalah instruksi yang akan dibaca ON atau OFF tergantung dari kondisi dari addressed bit



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

Examine If Open (XIO)

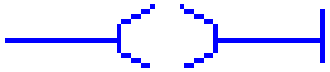
- The examine-off instruction adalah instruksi yang akan dibaca ON atau OFF tergantung dari kondisi sebaliknya dari addressed bit



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)

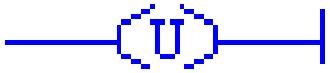
- Instruksi OTL adalah perintah sekali output, jika bit address tersebut sudah diinstruksikan menyala, maka jika ada perubahan instruksi OTL tidak akan berubah



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

Output Unlatch (OTU)

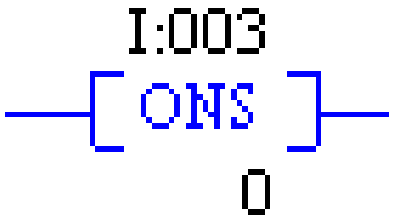
- Instruksi OTU berlawanan dari OTE, jika OUT diinstruksikan ON, maka OTU akan Off dan tidak akan berubah jika ada perubahan instruksi



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



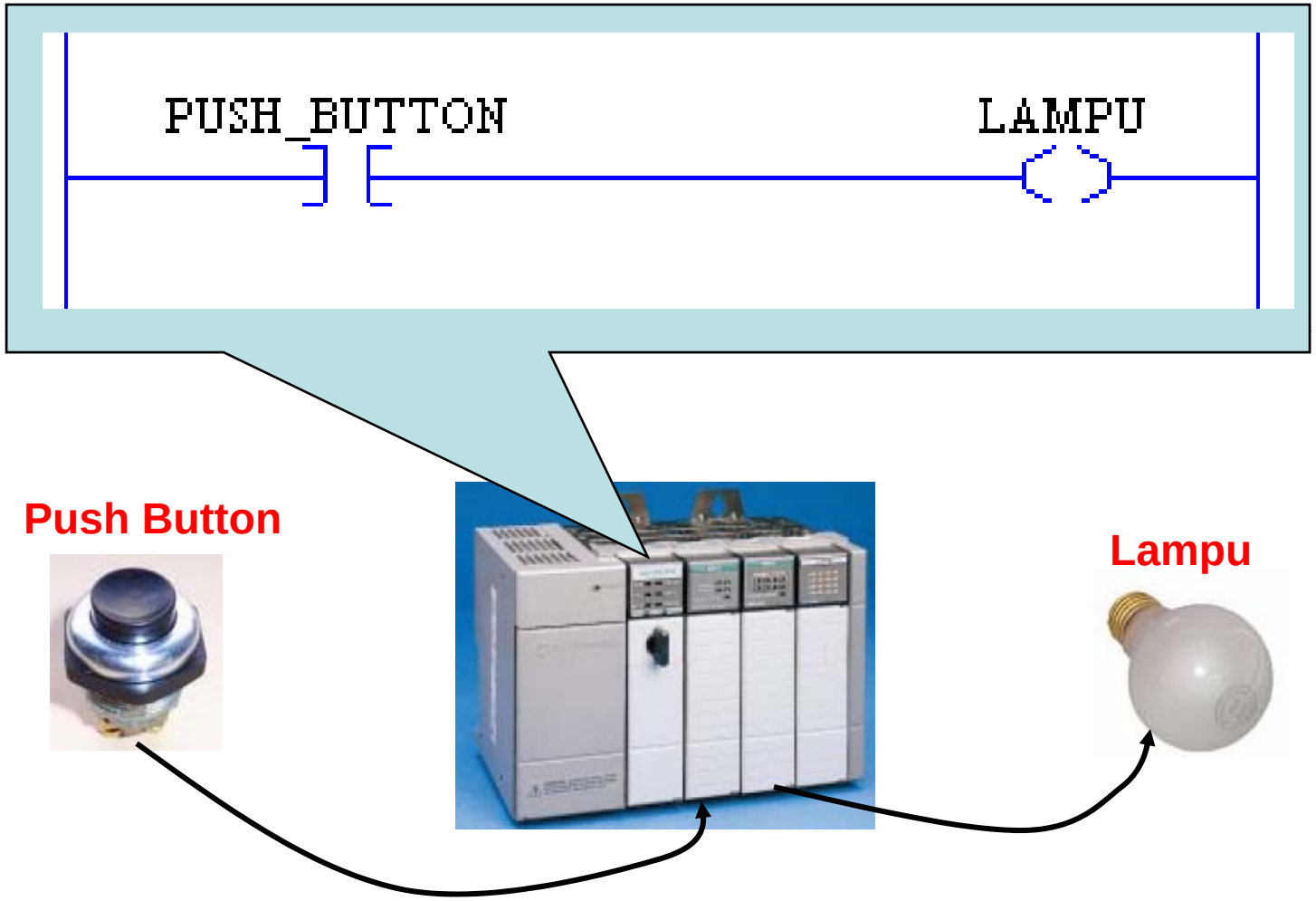




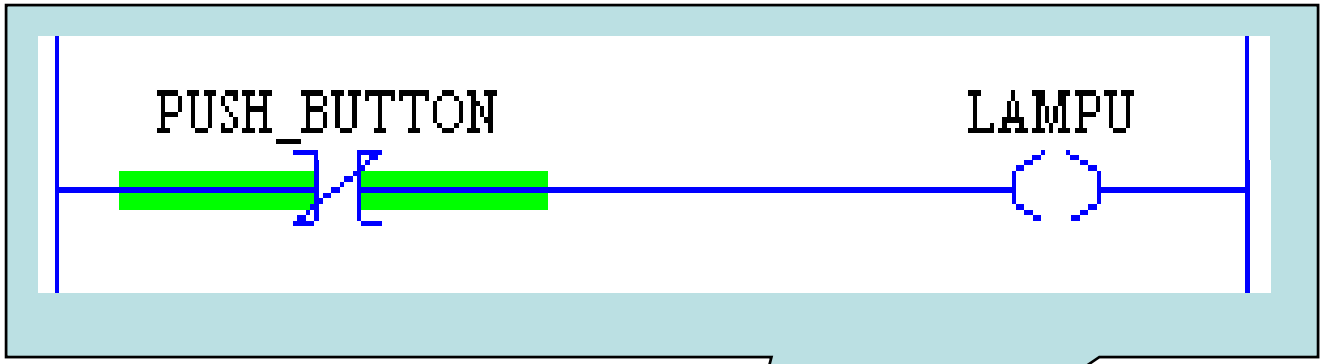
Real External Input Devices

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

Exercise 1: NO dan OTE



Exercise 2: NC & OTE



Push Button

NO

NC

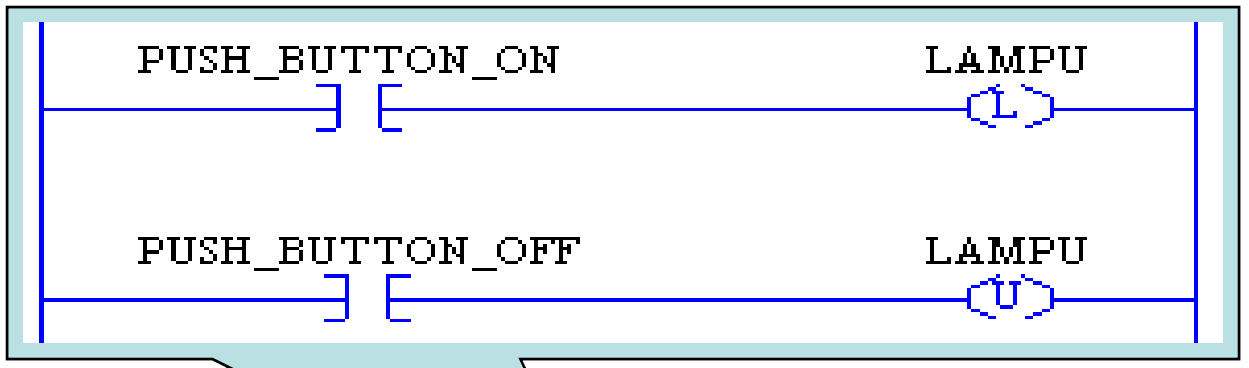




Lampu



Exercise 3: NO, OTL & OTU



Push Button ON

NO

NC





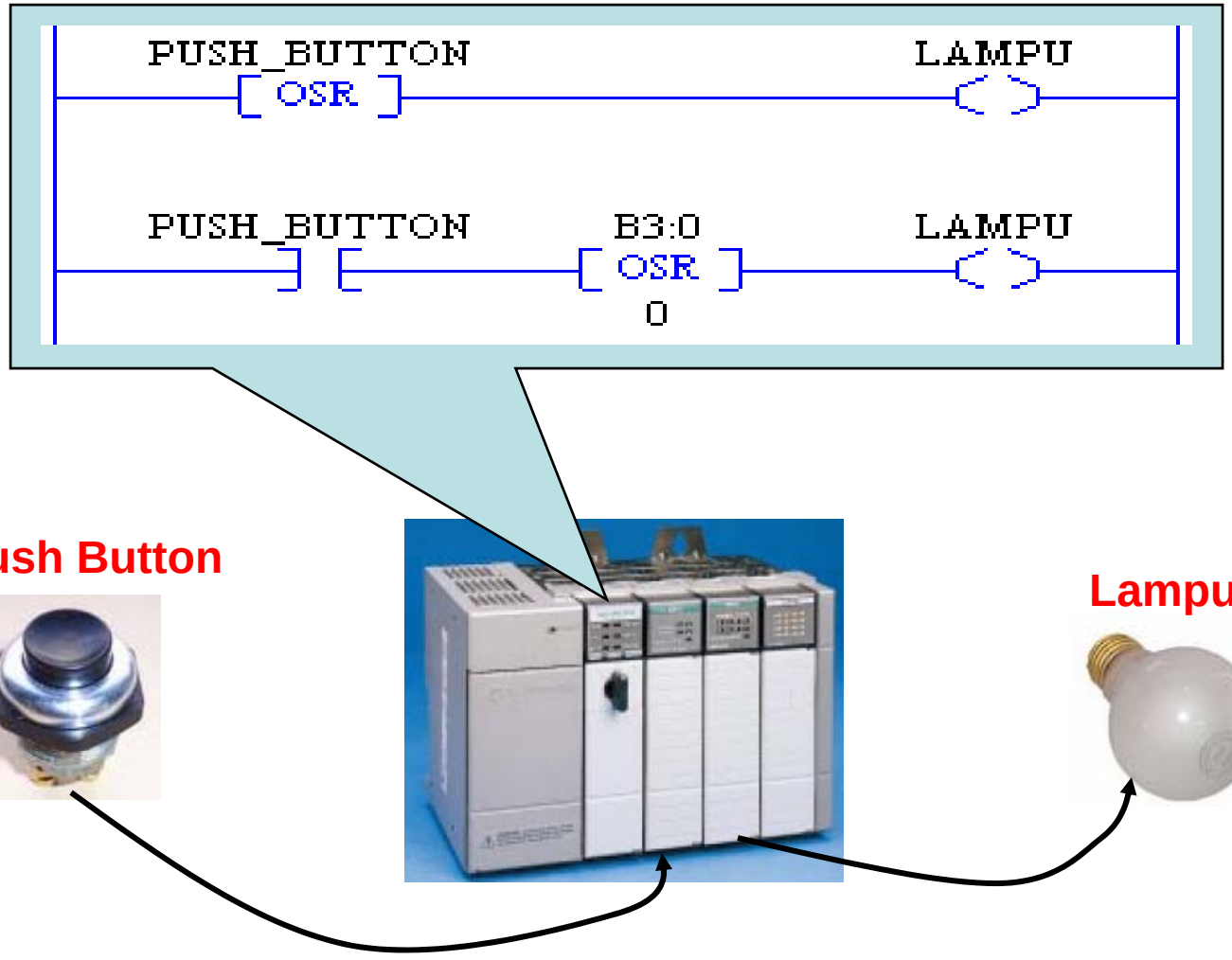
Lampu





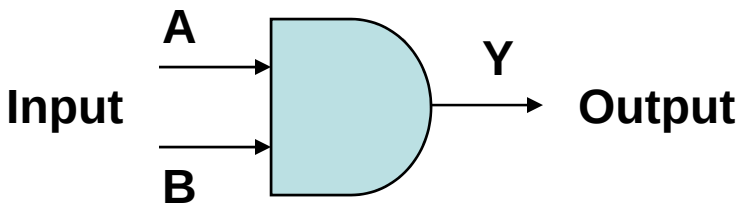
Push Button OFF

Exercise 4: OSR

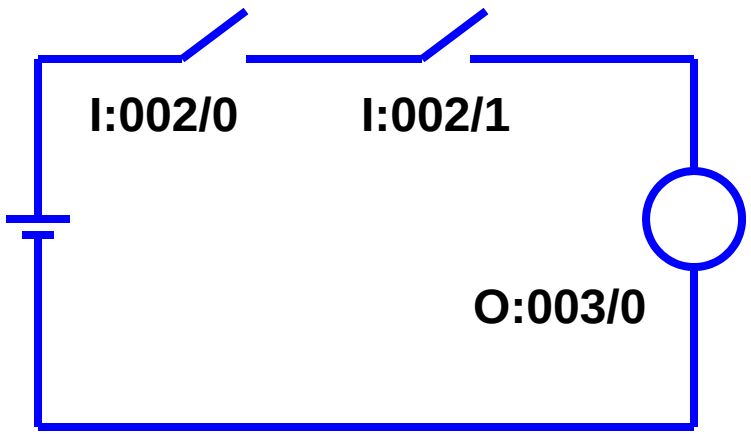


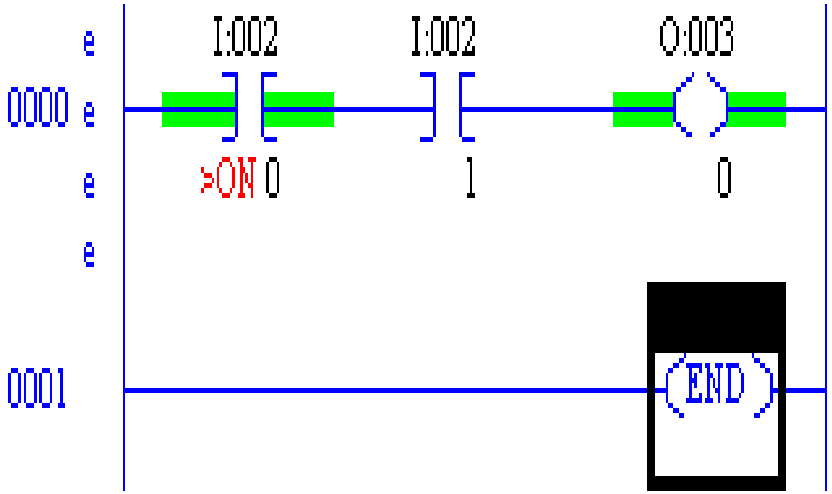
Operasi AND di Bit – Level

Source A	Source B	Result
0	0	0
1	0	0
0	1	0
1	1	1



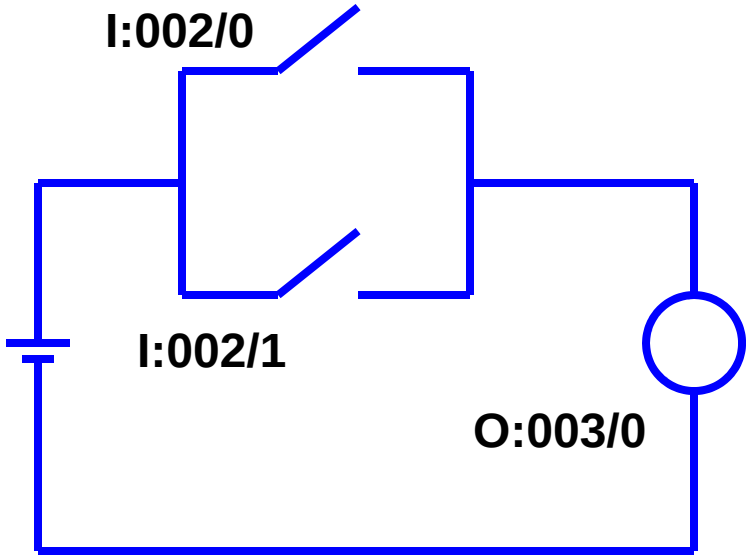
Simbol AND Gate

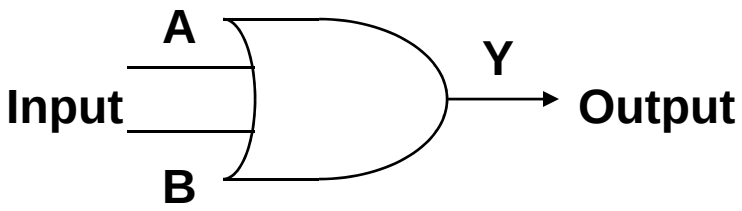




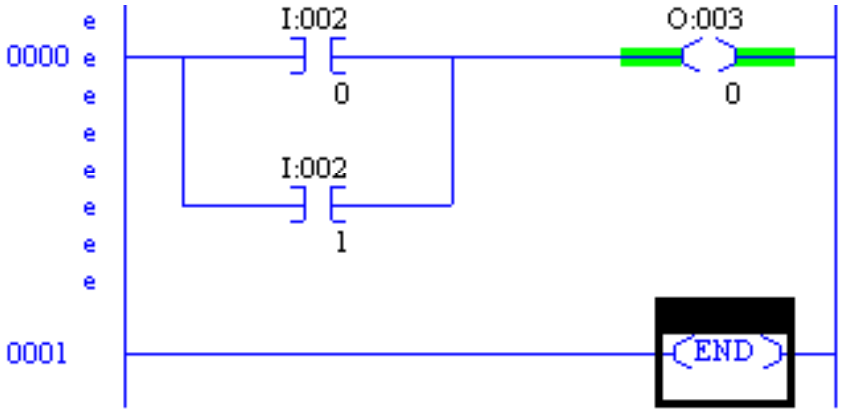
Operasi OR di Bit – Level

Source A	Source B	Result
0	0	0
1	0	1
0	1	1
1	1	1



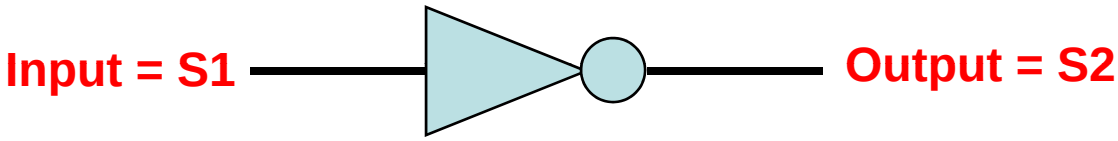


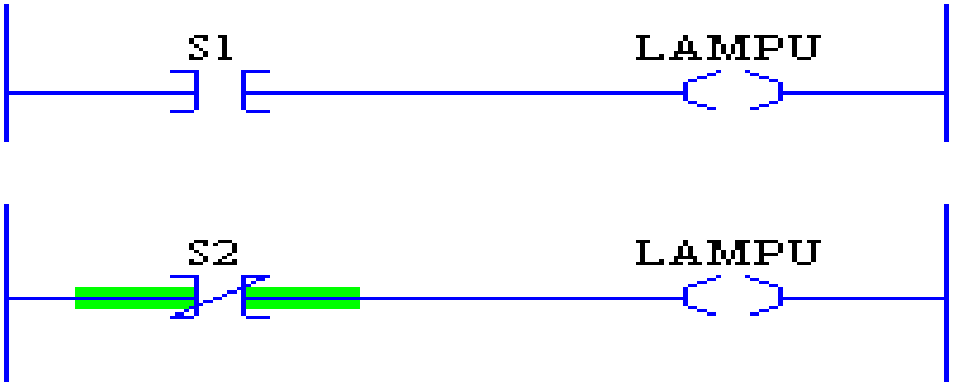
Simbol OR Gate



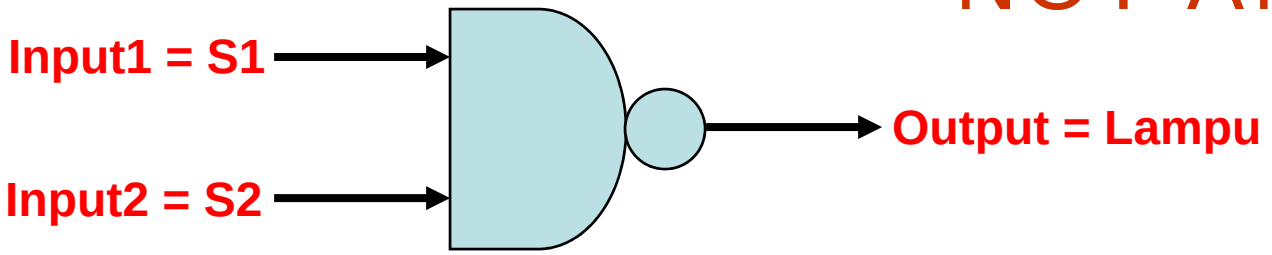
NOT

S1	S2 = NOT S1	LAMPU
0	1	0
1	0	1

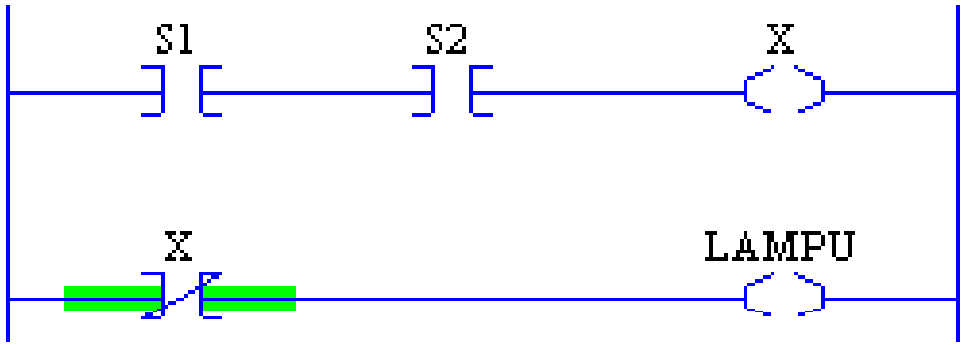




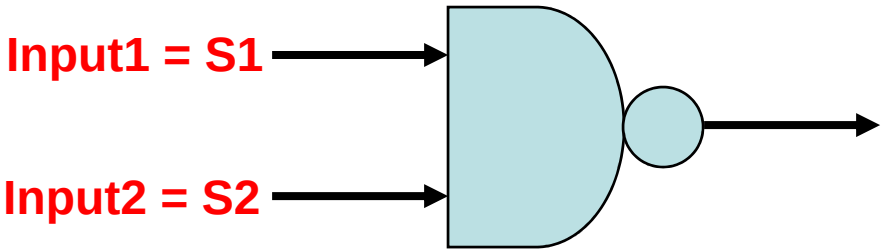
NOT AND(1)



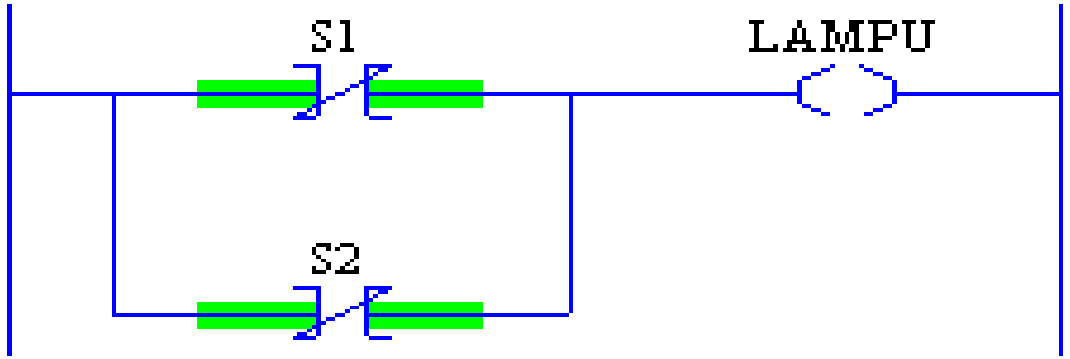
S1	S2	Lampu
0	0	1
0	1	1
1	0	1
1	1	0



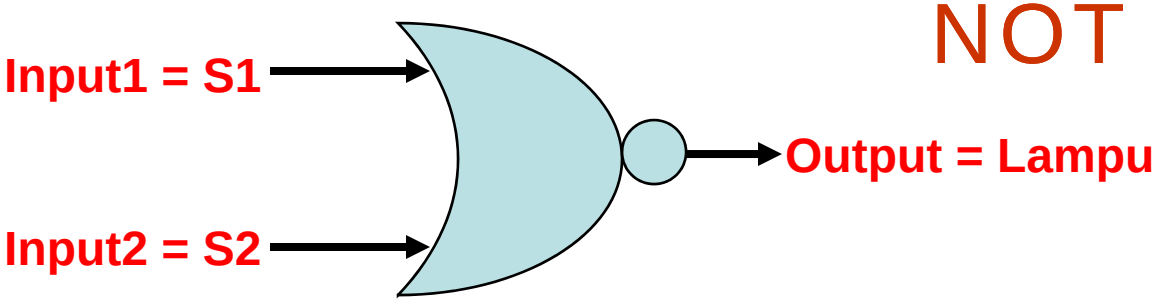
NOT AND(2)



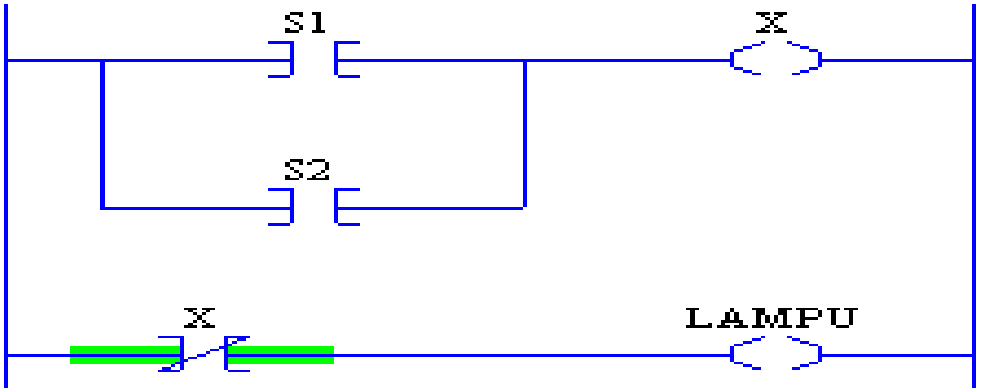
S1	S2	Lampu
0	0	1
0	1	1
1	0	1
1	1	0



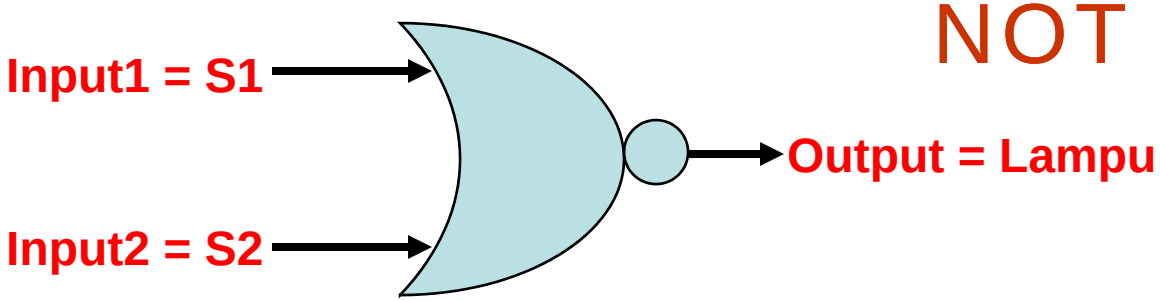
NOT OR(1)



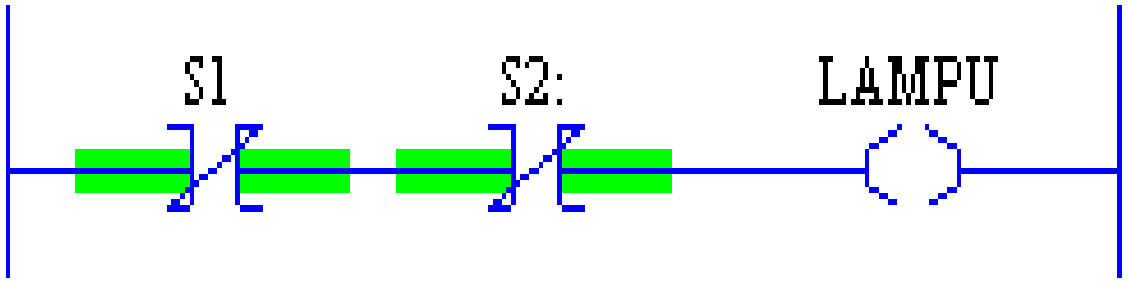
S1	S2	Lampu
0	0	1
0	1	0
1	0	0
1	1	0



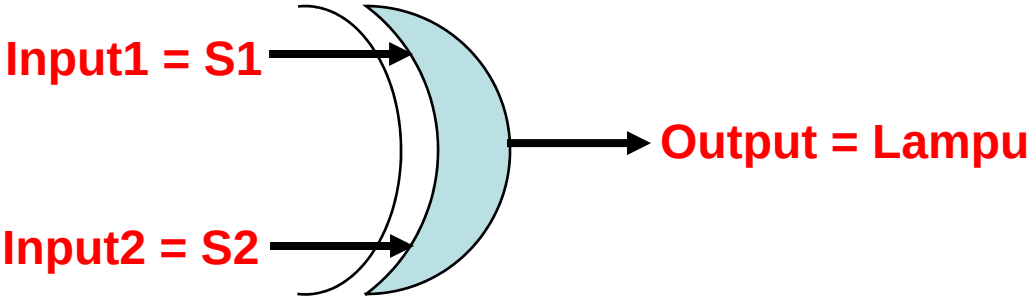
NOT OR(2)

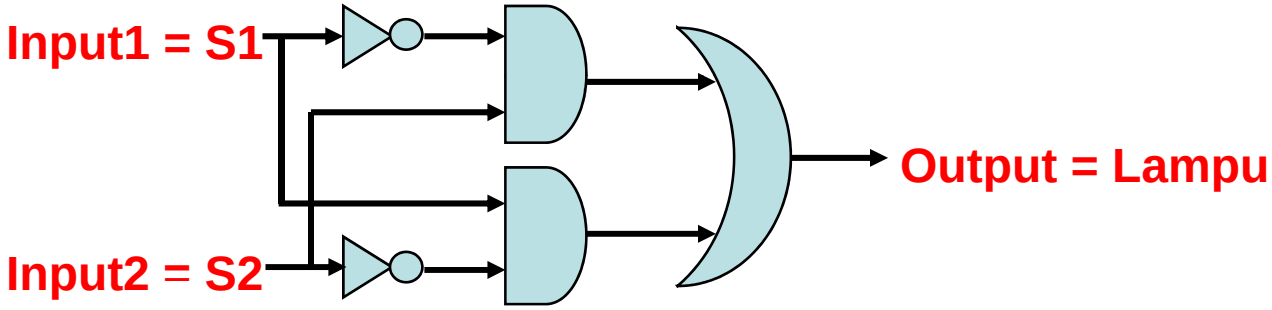


S1	S2	Lampu
0	0	1
0	1	0
1	0	0
1	1	0

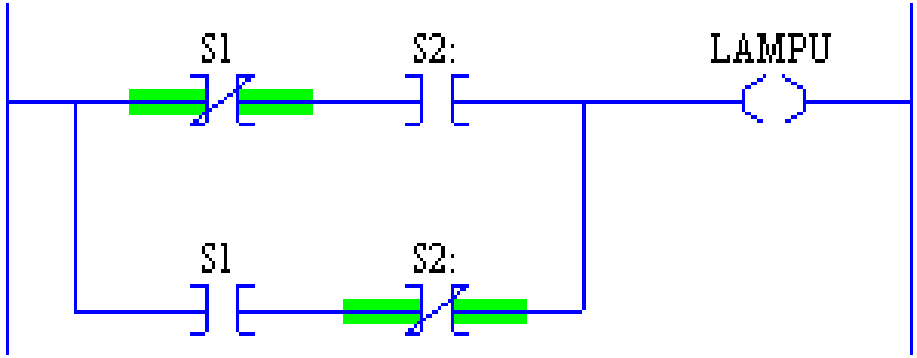


Exclusive OR(XOR)

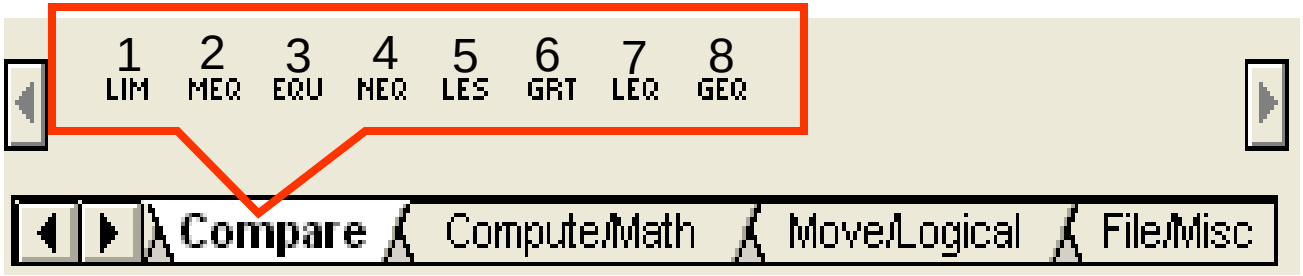




S1	S2	Lampu
0	0	0
0	1	1
1	0	1
1	1	0

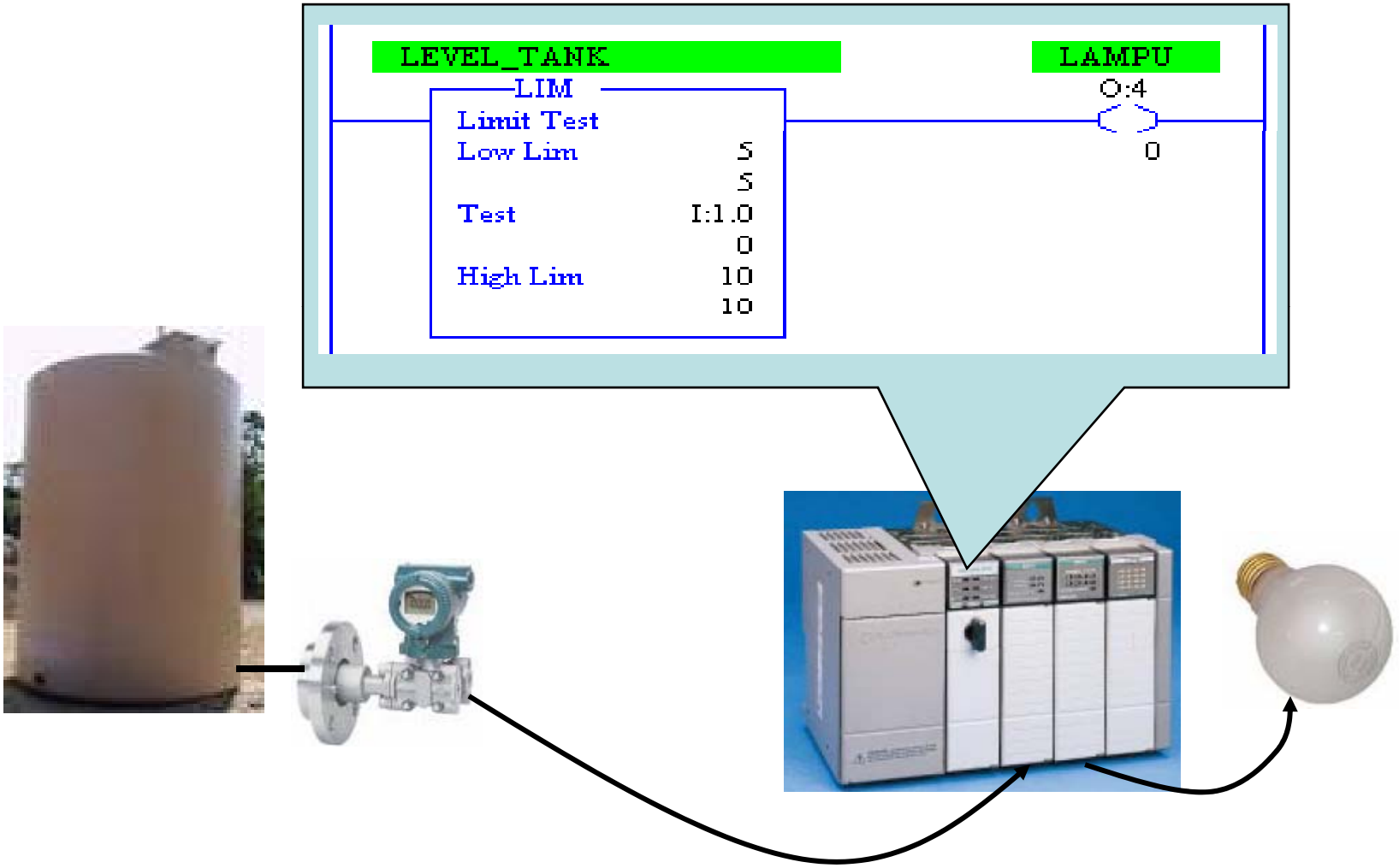


Compare Instruction

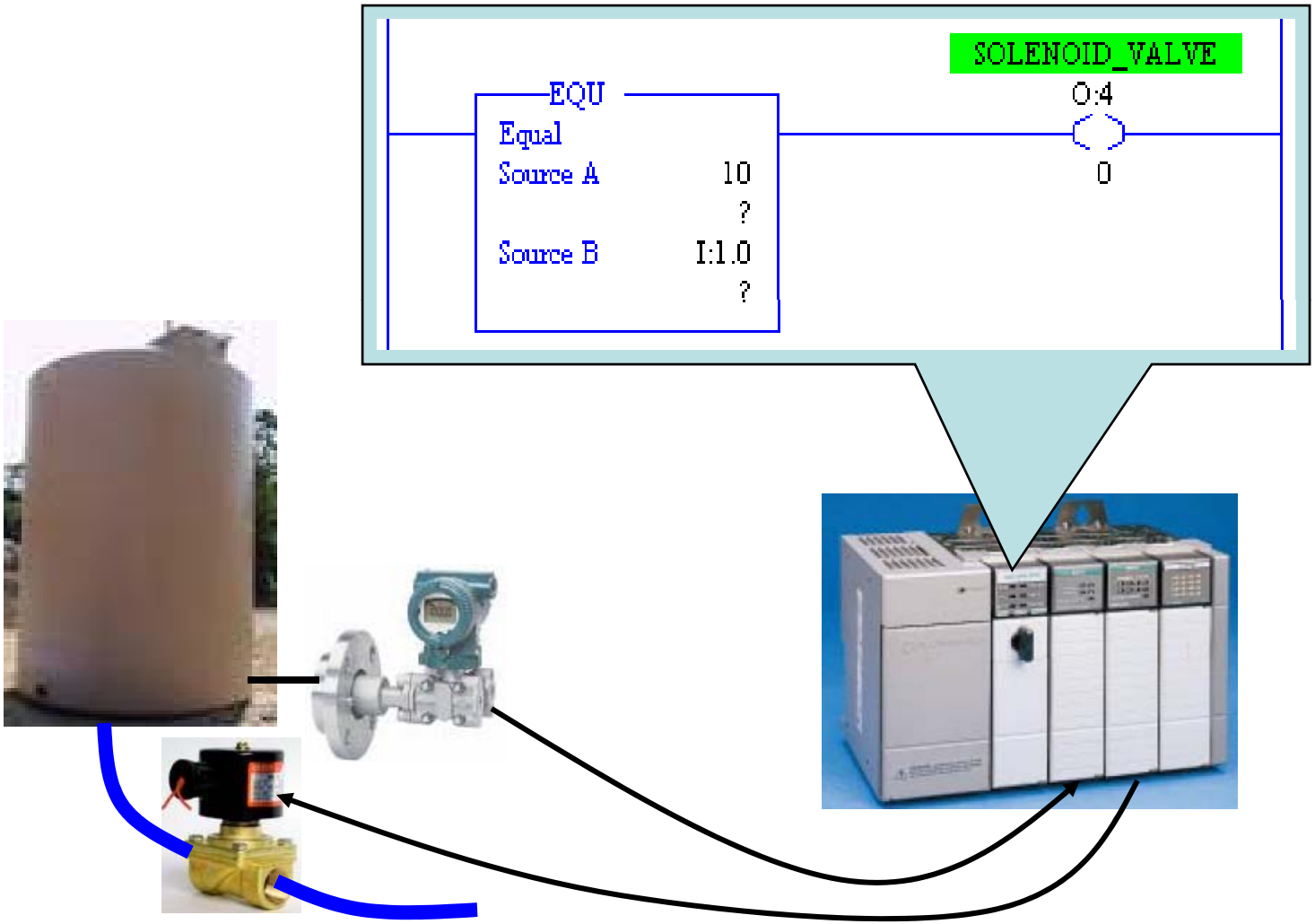


LIMIT	1
Masked Equal	2
Equal	3
Not Equal	4
Less Than	5
Greater Than	6
Less Than Or Equal To	7
Greater Than Or Equal To	8

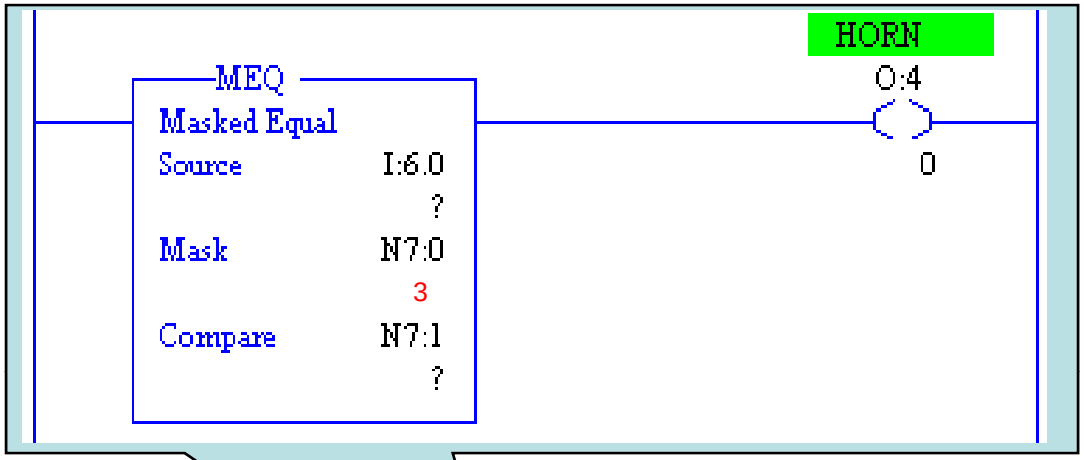
Exercise 5: LIMIT TEST



Exercise 6: Equal



Exercise 7: Masked Equal







Pressure Switch



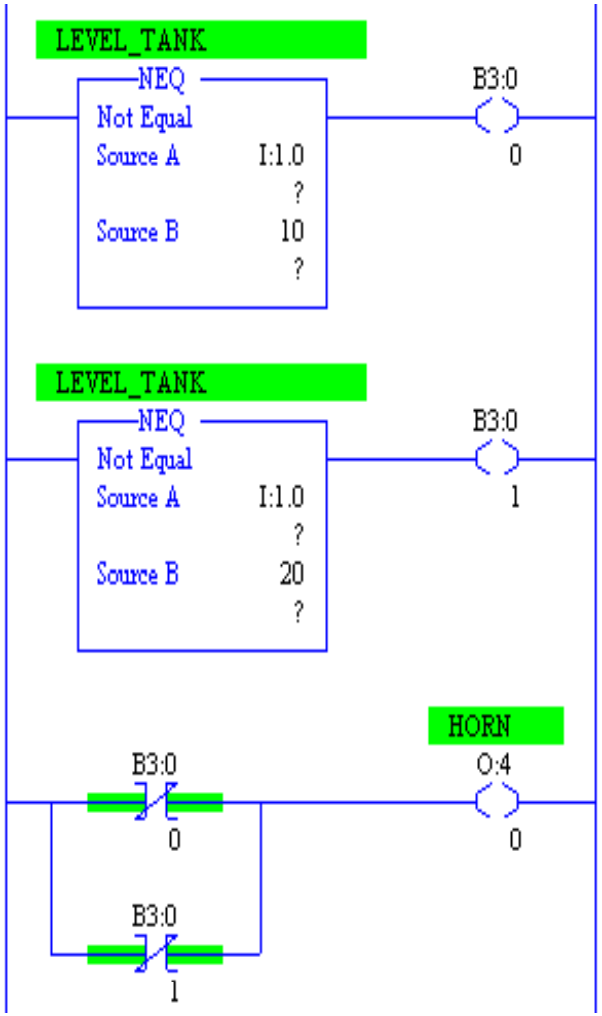
Horn

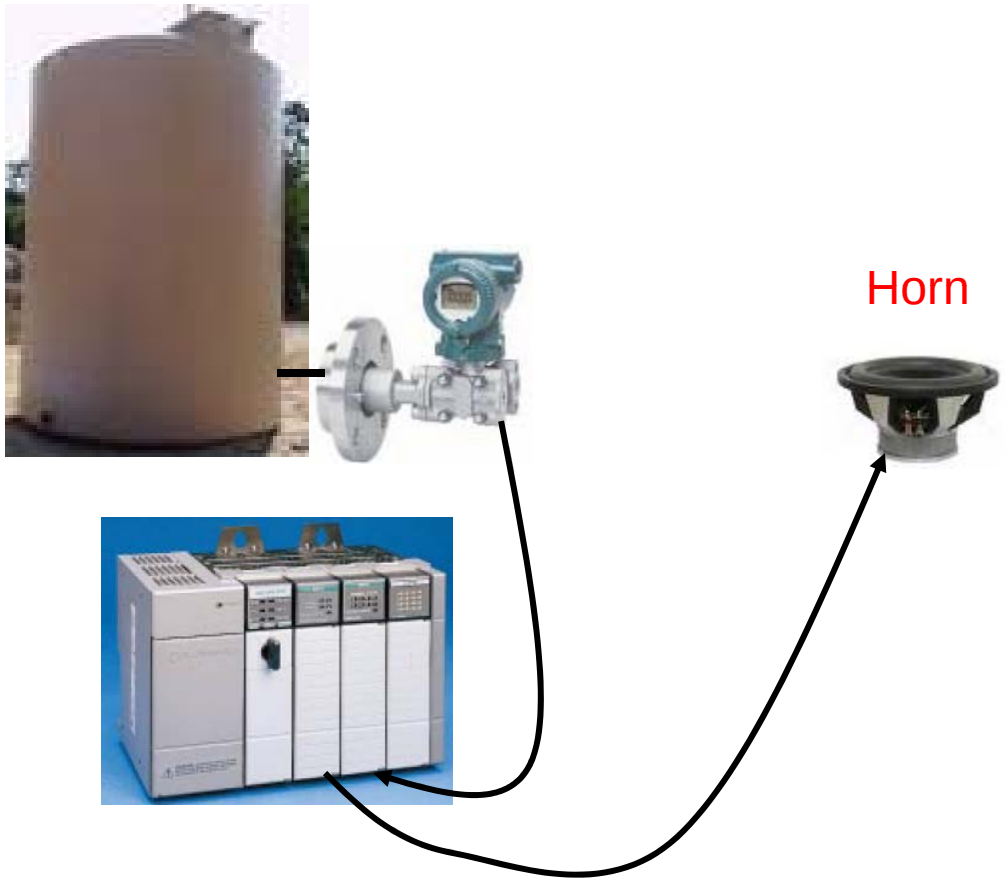




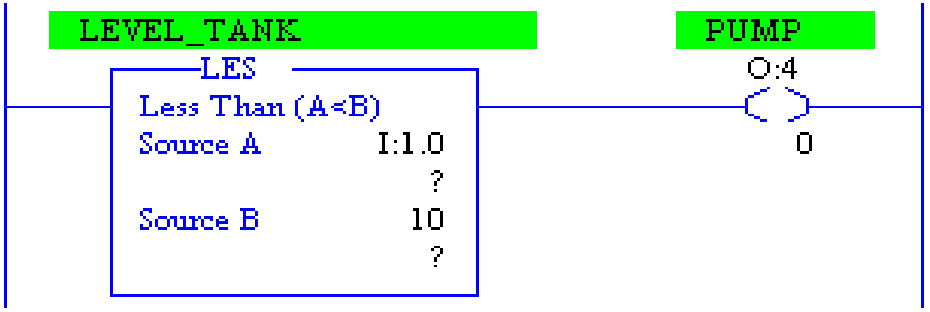
Temperature Switch

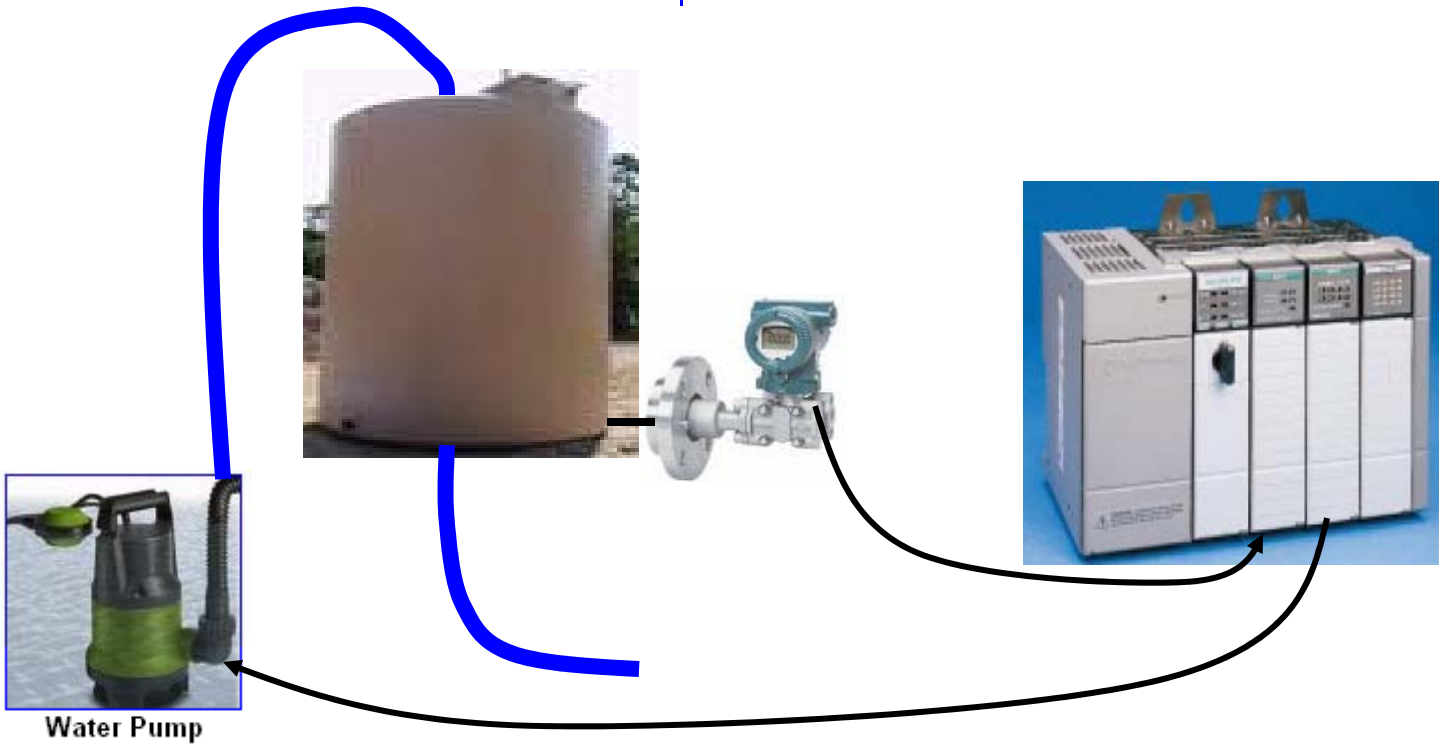
Exercise 7: Not Equal



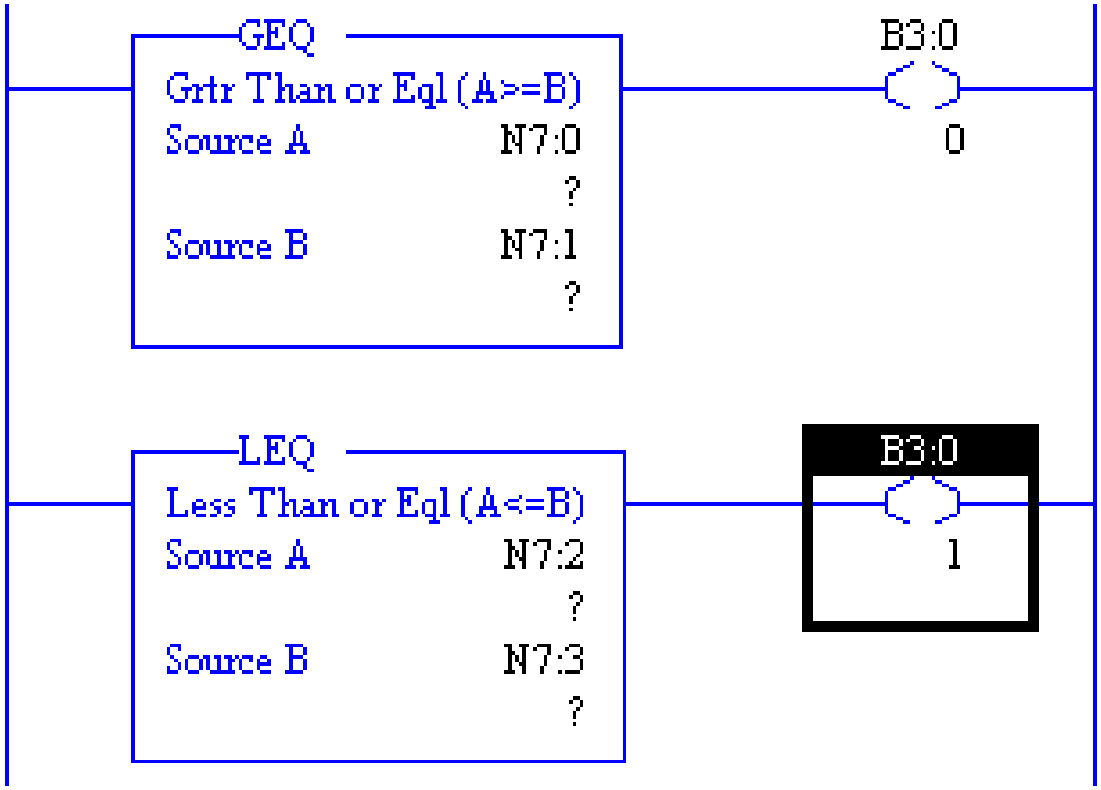


Exercise 8: Less Than

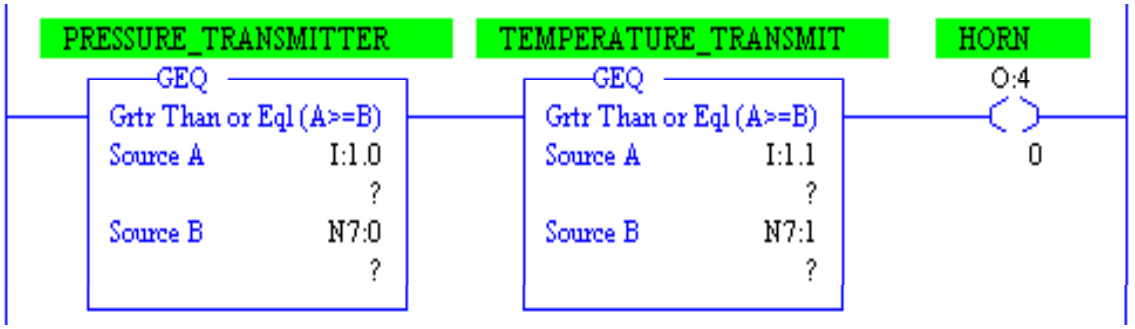


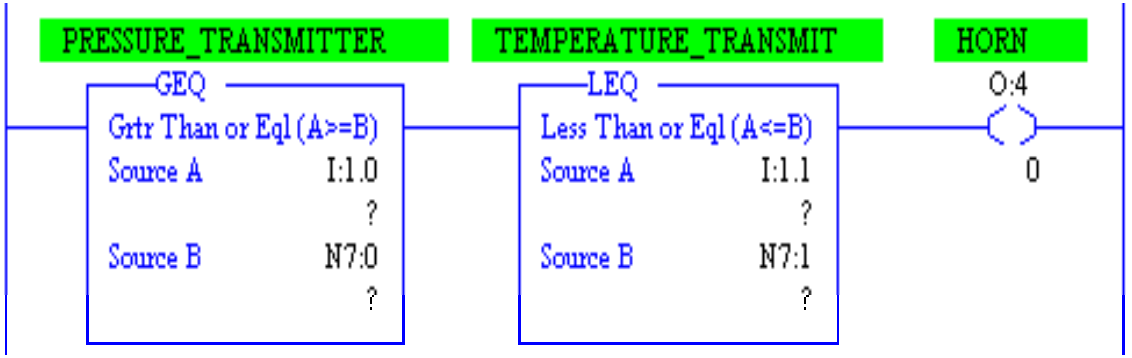


Exercise 9: Greater(Less) Than Or Equal To



Exercise 10: Kombinasi Instruksi



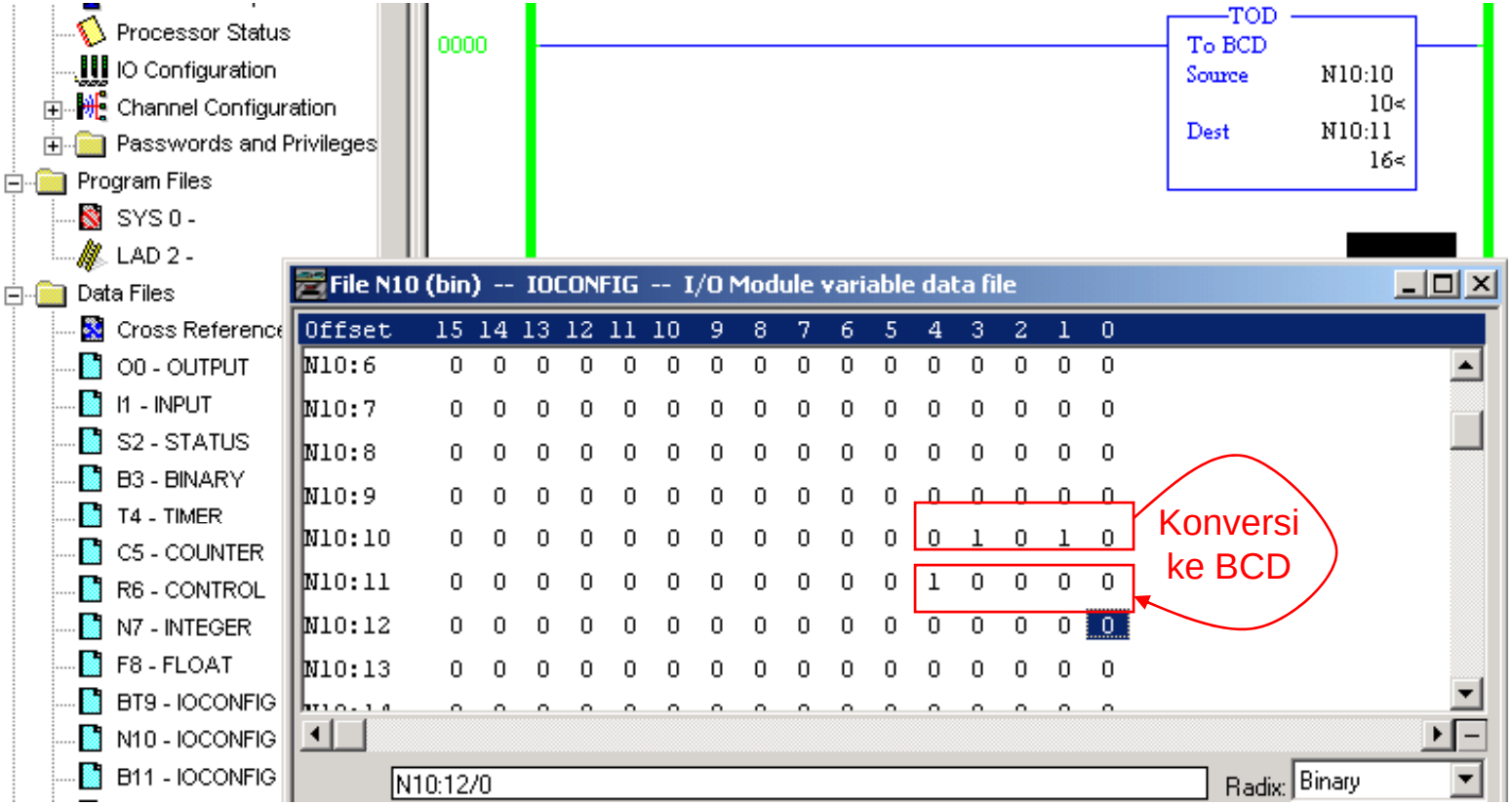


Instruksi Konversi

- 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 :

