Lógica de Controle

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CLPs

Vantagens do uso de Controladores Lógicos Programáveis

- Ocupam menor espaço;
- Requerem menor potência elétrica;
- Podem ser reutilizados;
- São programáveis, permitindo alterar os parâmetros de controle;
- Apresentam maior confiabilidade;
- Manutenção mais fácil e rápida;
- Oferecem maior flexibilidade;
- Apresentam interface de comunicação com outros CLP's e computadores de controle;
- Permitem maior rapidez na elaboração do projeto do sistema.

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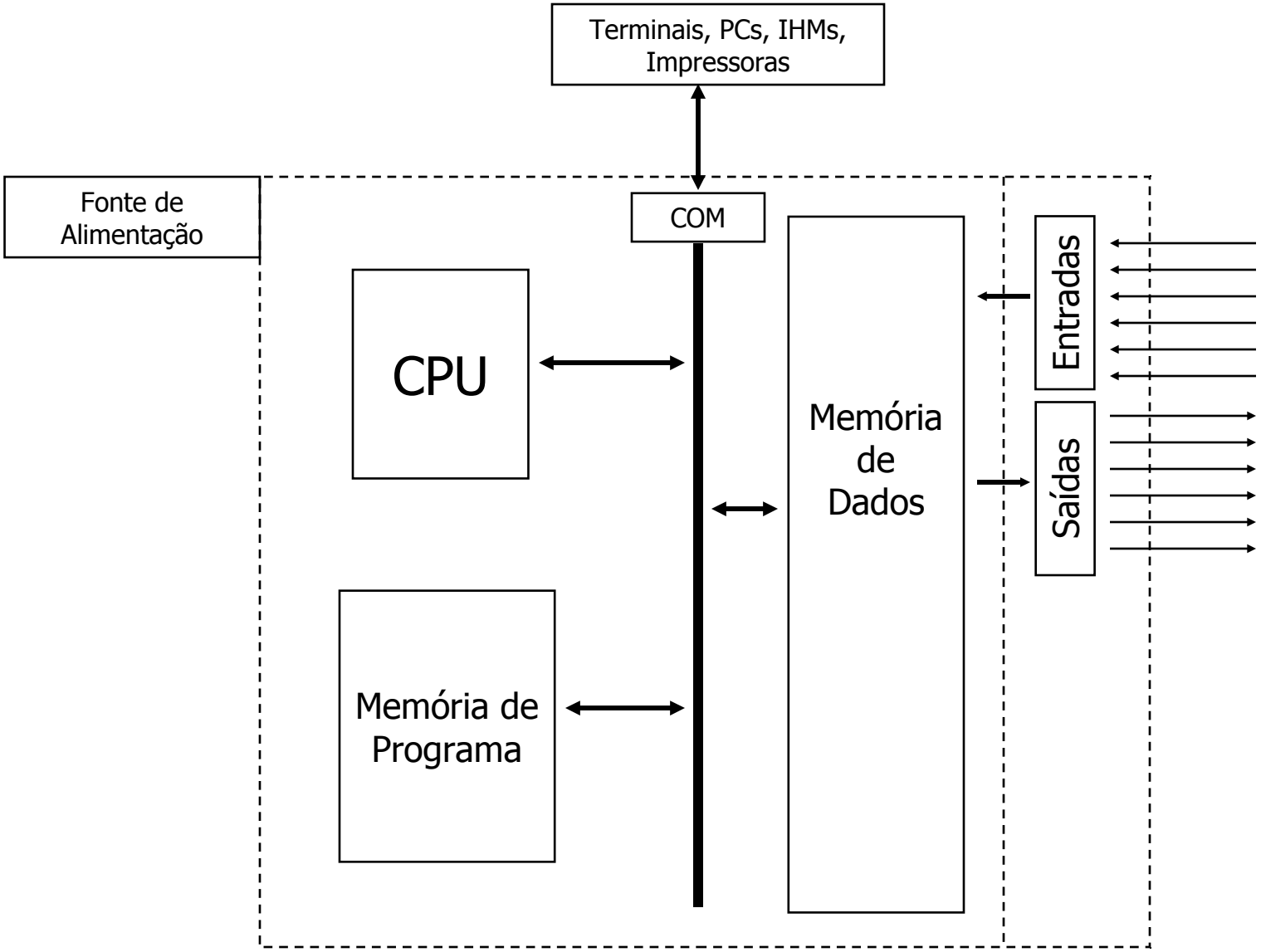
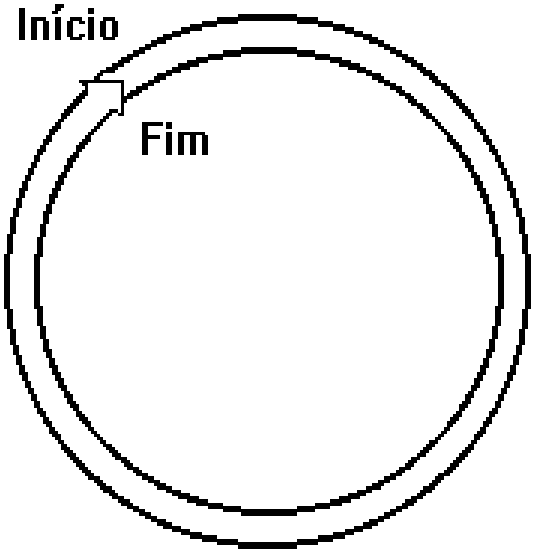
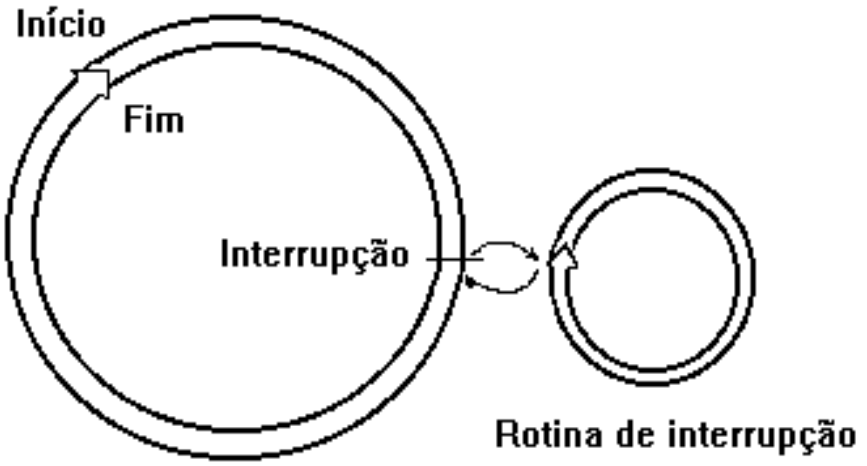
Arquitetura do CLP



CPU





Ciclo normal de programa

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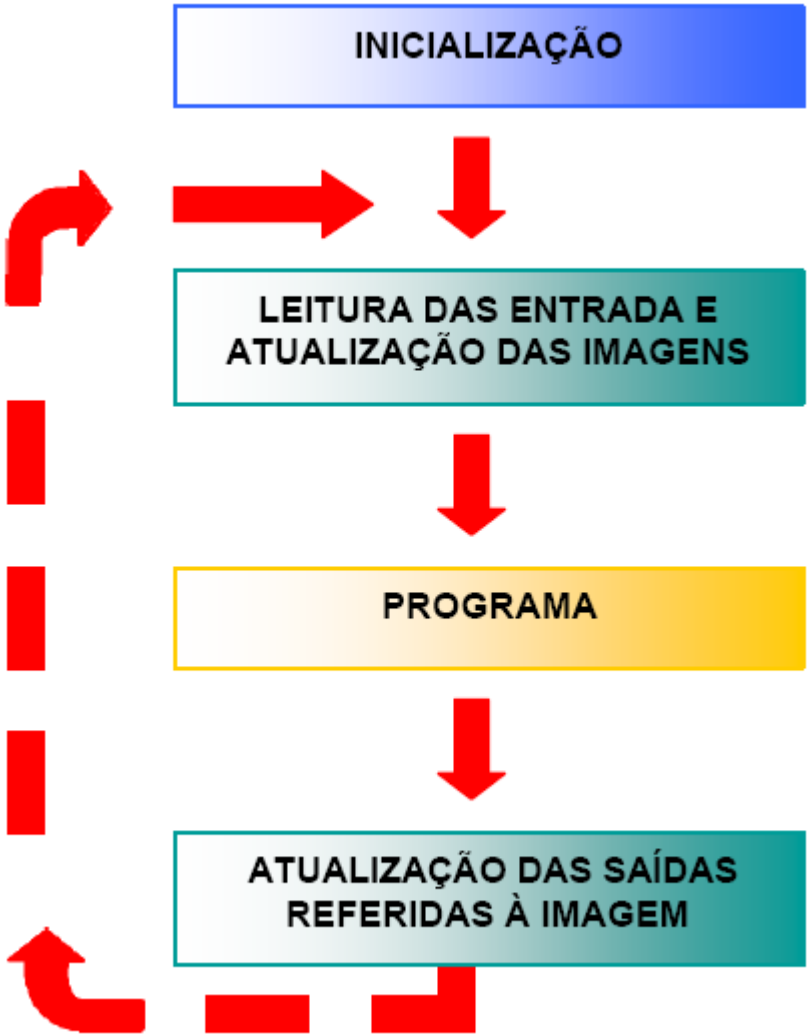
CPU



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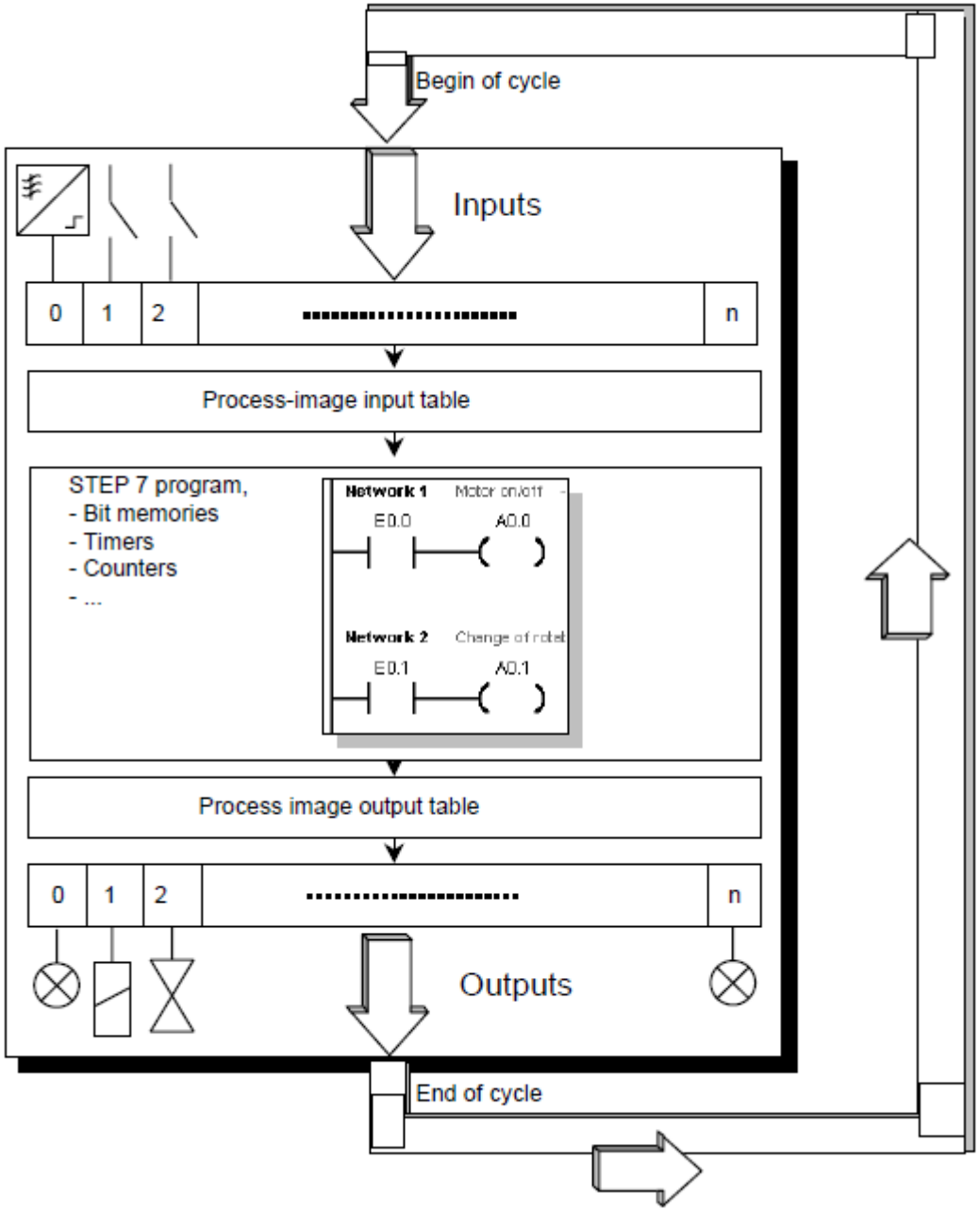
CPU

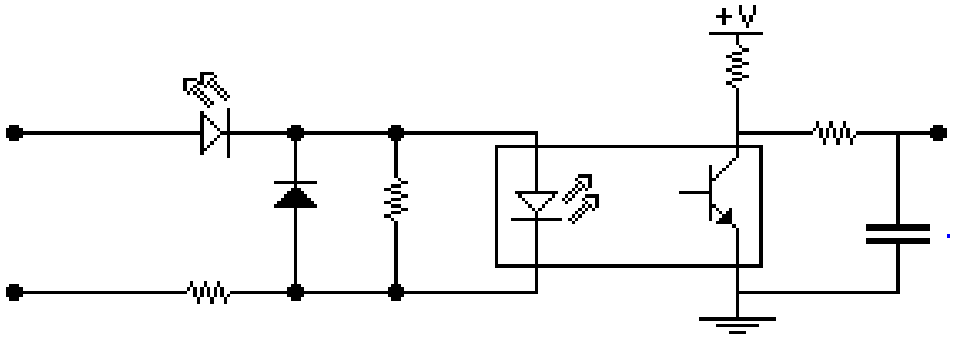

Begin of cycle
Inputs
0
1
2
n
Process-image input table
STEP 7 program,
- Bit memories
- Timers
- Counters
- ...
Network 1
Motor on/off
E0.0
A0.0
Network 2
Change of rotat
E0.1
A0.1
Process image output table
0
1
2
n
Outputs
End of cycle

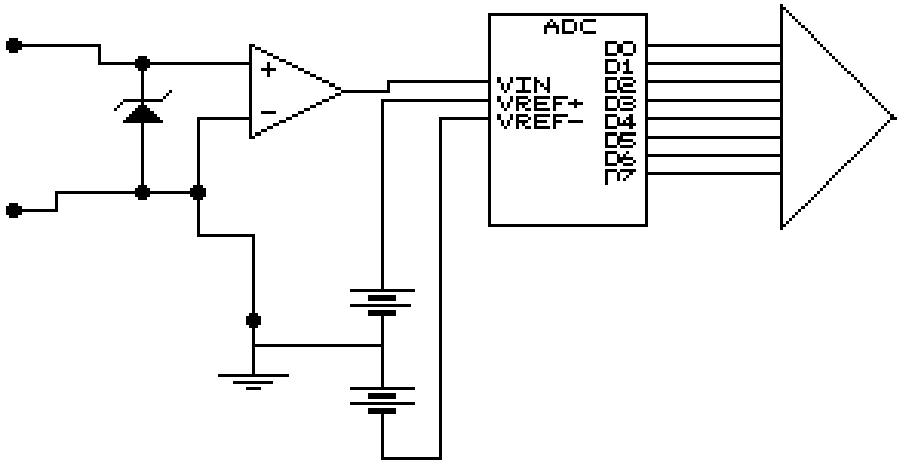
Memória

Tipo de Memória	*Descrição*	*Observação*
RAM DINÂMICA	Memória de acesso aleatório	- Volátil - Gravada pelo usuário - Lenta - Ocupa pouco espaço - Menor custo
RAM	Memória de acesso aleatório	- Volátil - Gravada pelo usuário - Rápida - Ocupa mais espaço - Maior custo
ROM MÁSCARA	Memória somente de leitura	- Não Volátil - Não permite apagamento - Gravada pelo fabricante
PROM	Memória programável somente de leitura	- Não volátil - Não permite apagamento - Gravada pelo usuário
EPROM	Memória programável/ apagável somente de leitura	- Não Volátil - Apagamento por ultravioleta - Gravada pelo usuário
EPROM **EEPROM** **FLASH EPROM**	Memória programável/ apagável somente de leitura	- Não Volátil - Apagável eletricamente - Gravada pelo usuário

Entradas

Entrada Digital

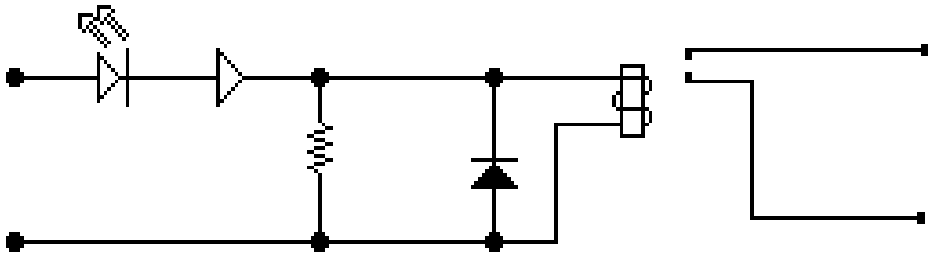


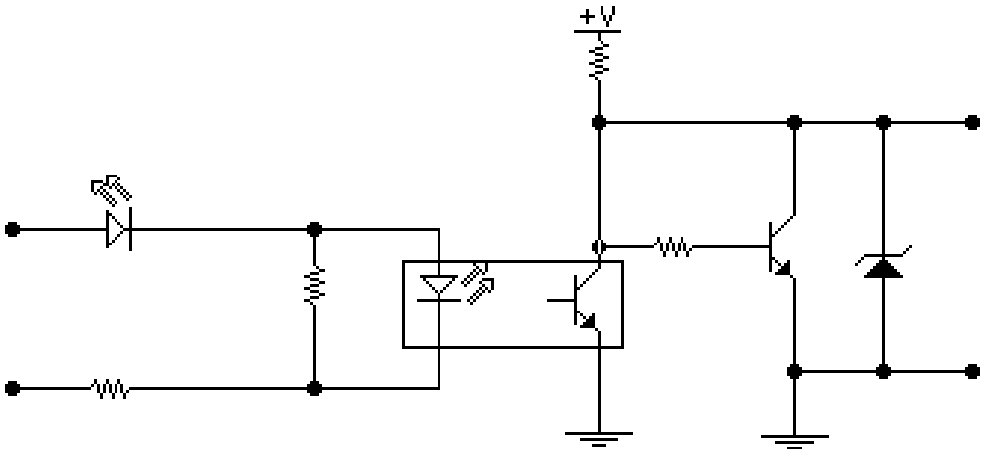


Entrada Analógica

Saídas

Saída Digital
à Relê





Saída Digital
à Transistor

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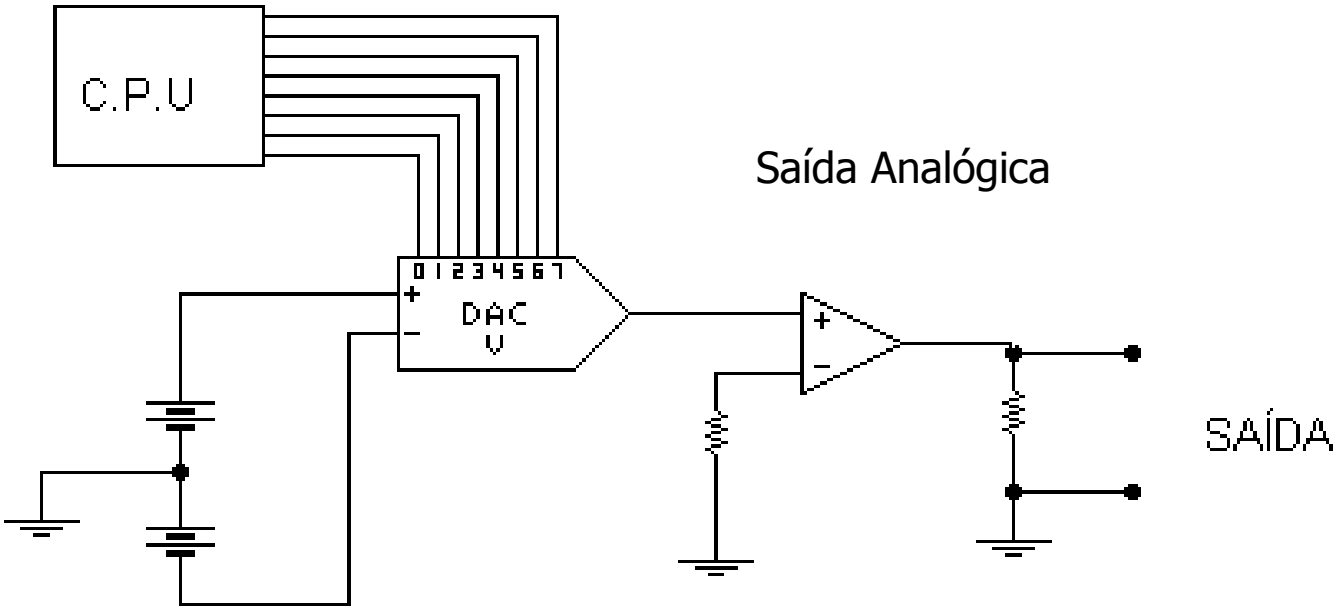
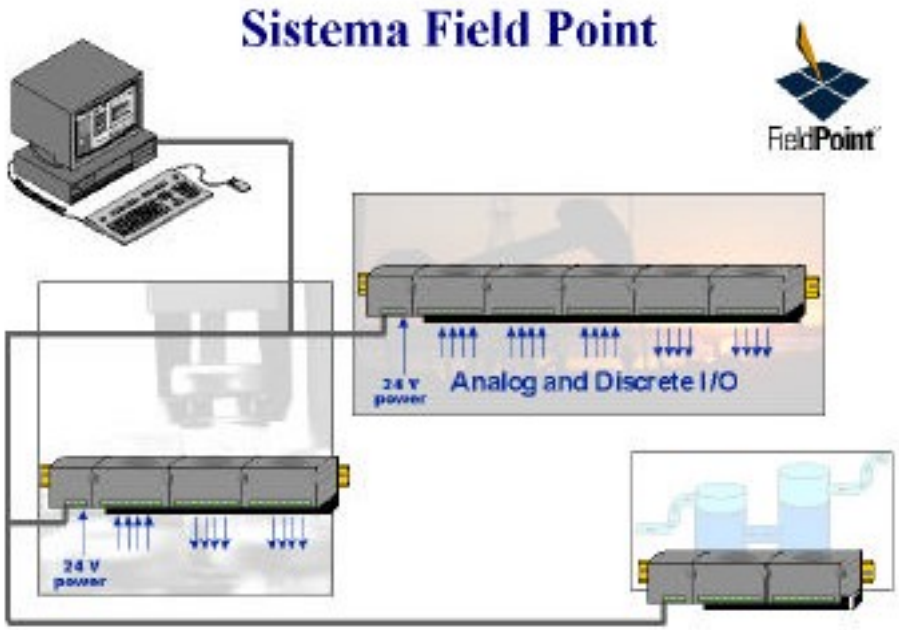
Saídas

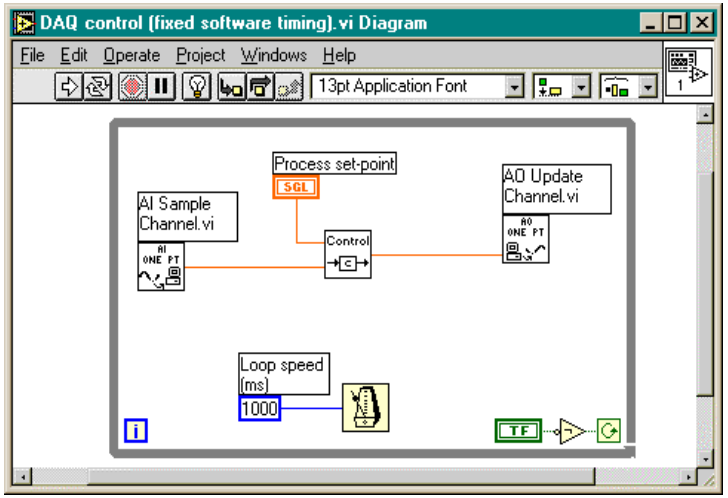


Tecnologias Industriais

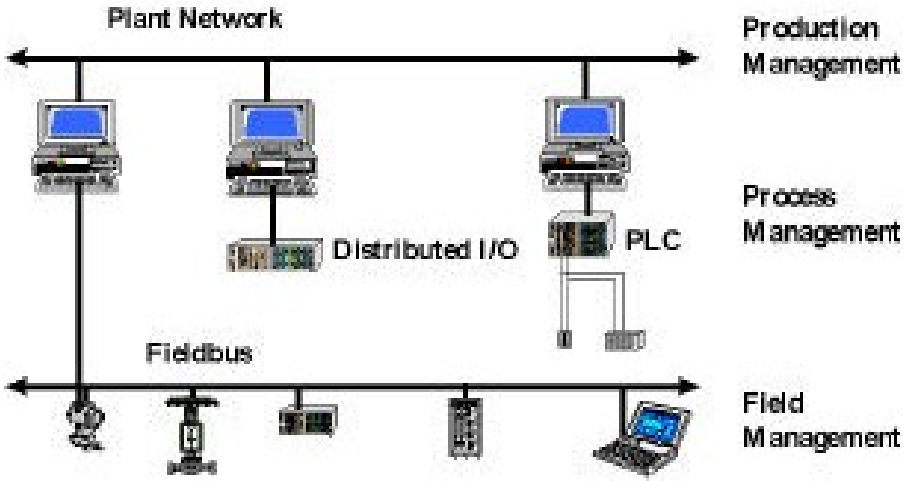
Fieldbus™
Foudation



Tecnologias Industriais

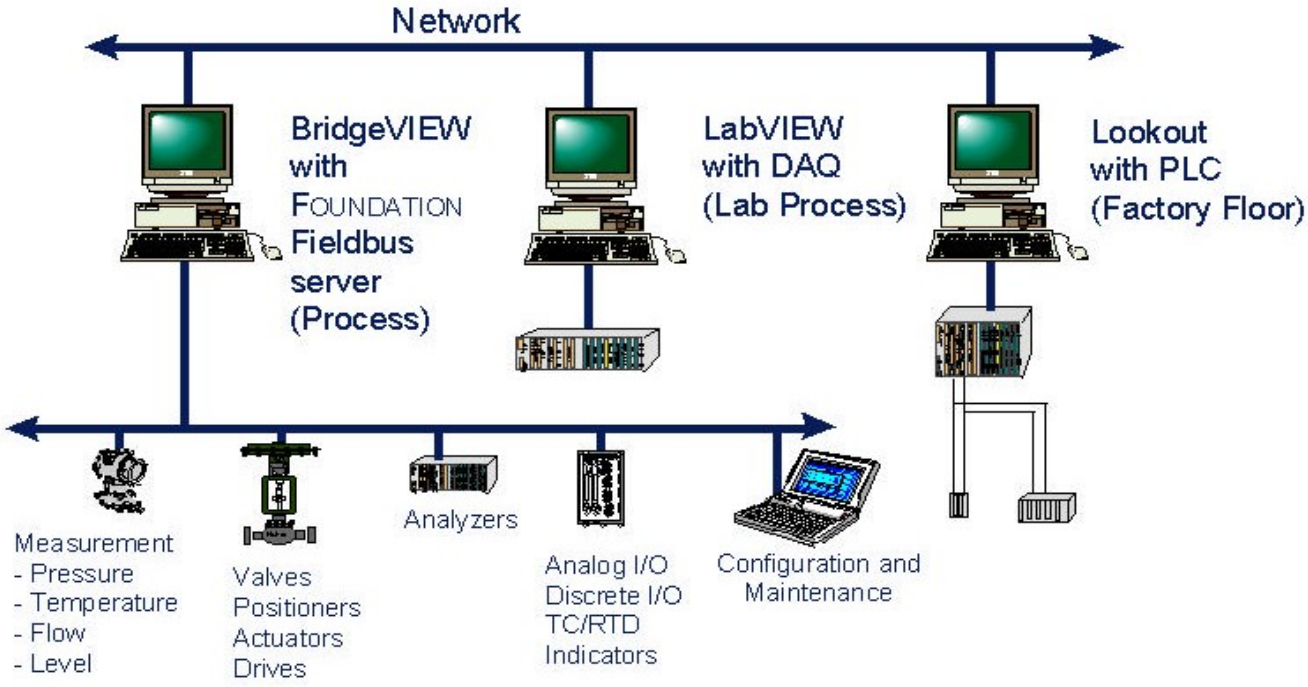


Arquitetura BridgeVIEW

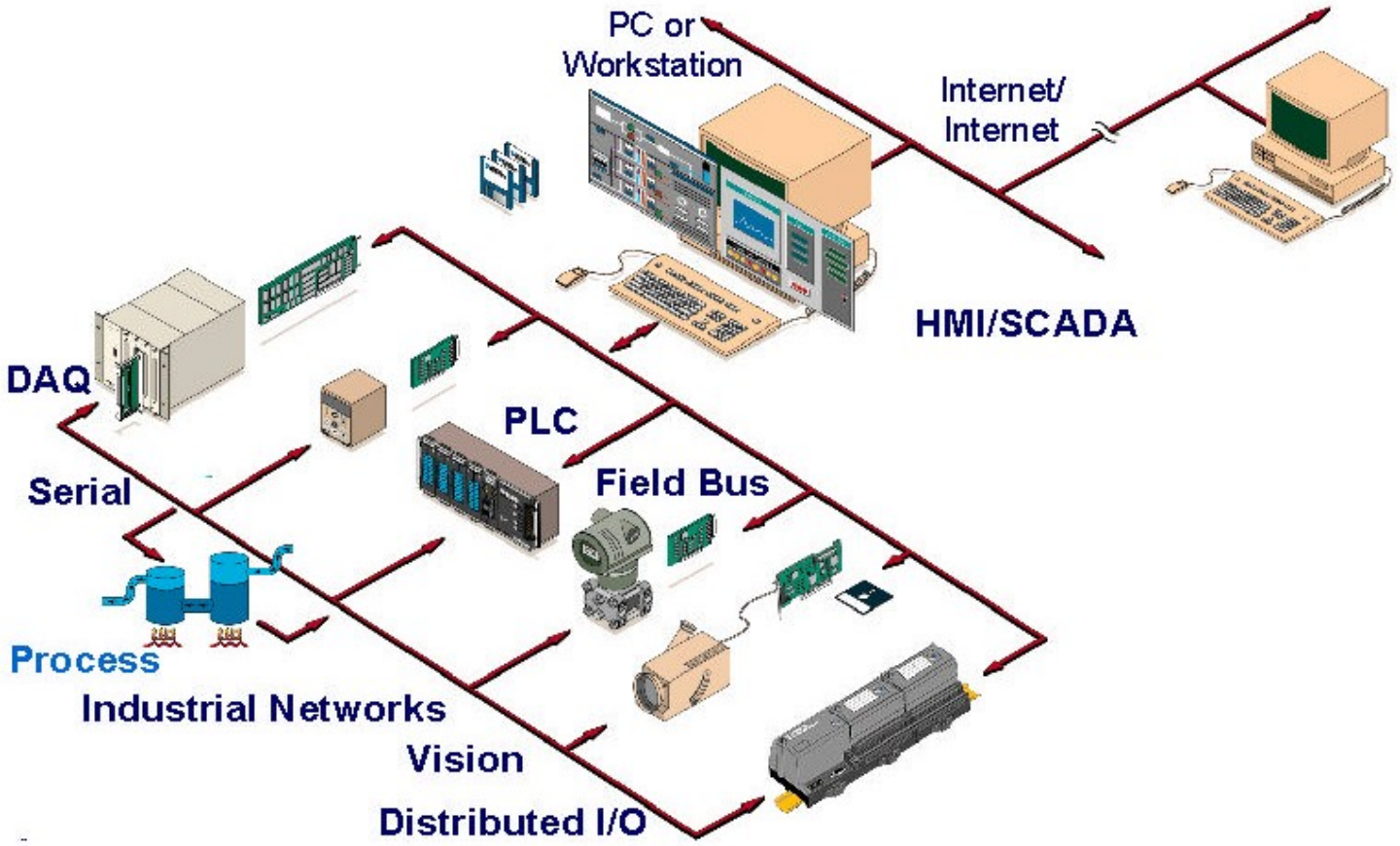


Tecnologias Industriais

Aplicações de Automação



Tecnologias Industriais



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CLPs Comerciais

Pequeno Porte (Micro CLP)
Até 320 E/S

CLP de Médio Porte
Até 2500 E/S

CLP de Grande Porte
Até 5000 E/S

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CLPs Comerciais

FANUC

OMRON

Rockwell Automation

SIEMENS

Allen-Bradley

Rexroth Bosch Group

Schneider Electric

weg

altus

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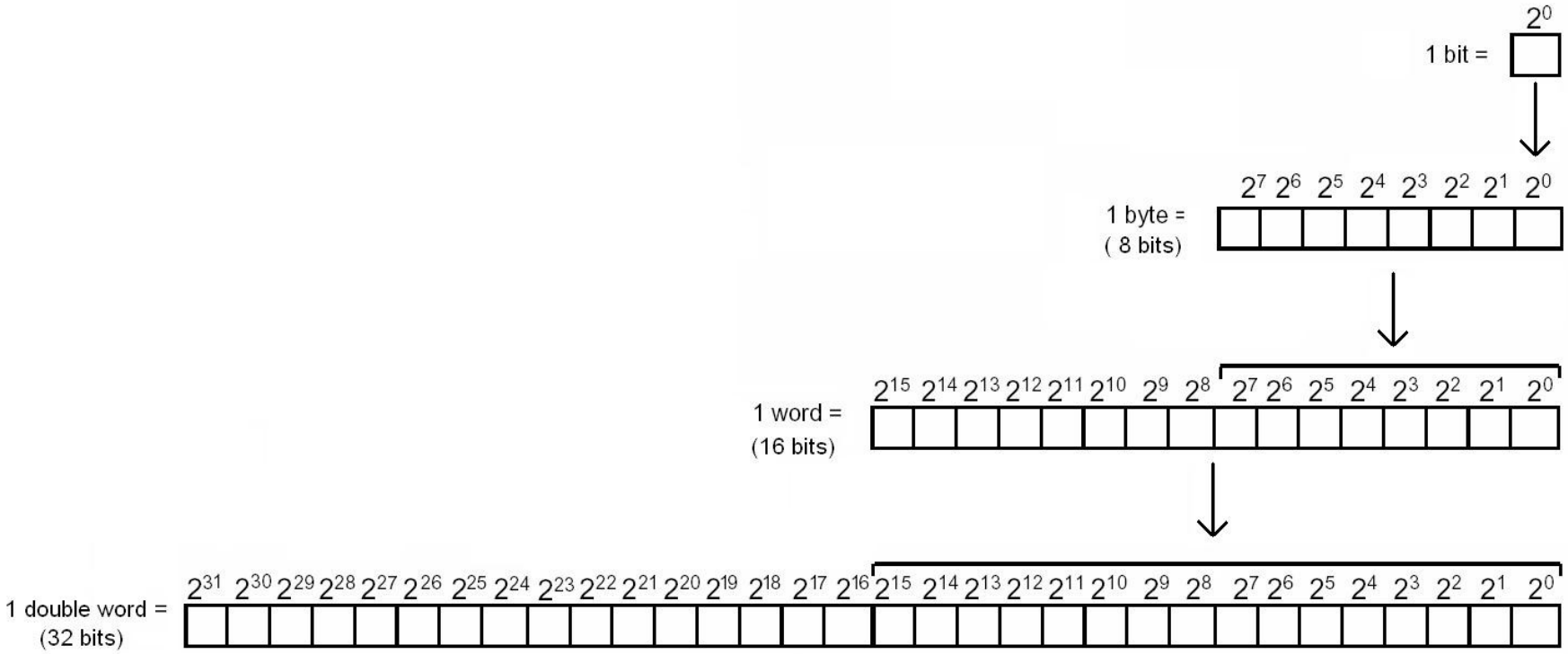
Estrutura de Dados



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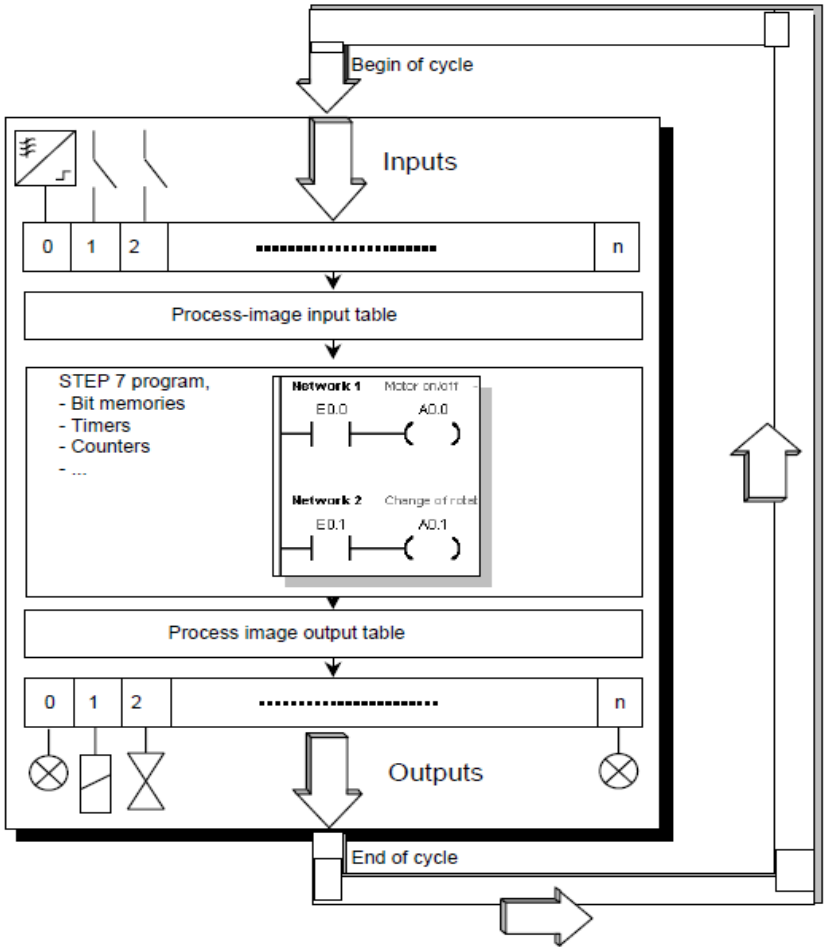
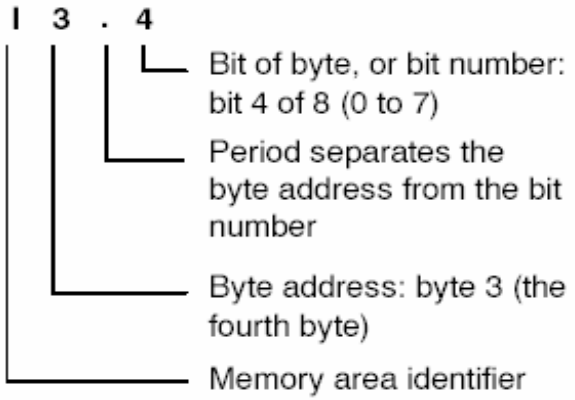
Estrutura de Dados

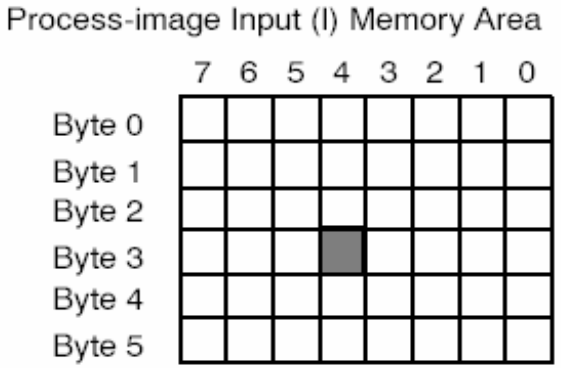


Estrutura de Dados

Representation	Byte (B)	Word (W)	Double Word (D)
Unsigned Integer	0 to 255 0 to FF	0 to 65,535 0 to FFFF	0 to 4,294,967,295 0 to FFFF FFFF
Signed Integer	-128 to +127 80 to 7F	-32,768 to +32,767 8000 to 7FFF	-2,147,483,648 to +2,147,483,647 8000 0000 to 7FFF FFFF
Real IEEE 32-bit Floating Point	*Not applicable*	*Not applicable*	+1.175495E-38 to +3.402823E+38 (positive) -1.175495E-38 to -3.402823E+38 (negative)

To access a bit in a memory area, you specify the address, which includes the memory area identifier, the byte address, and the bit number. Figure 4-3 shows an example of accessing a bit (which is also called "byte.bit" addressing). In this example, the memory area and byte address (I = input, and 3 = byte 3) are followed by a period (".") to separate the bit address (bit 4).





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Estrutura de Dados

- **TIPOS DE ENDEREÇOS**

– **I** = DIGITAL INPUT
– **Q** = DIGITAL OUTPUT (QUIT)
– **AIW** = ANALOG INPUT
– **AQW** = ANALOG OUTPUT (QUIT)
– **V** = VARIABLE (FLAG)
– **M** = MEMORY
– **C** = COUNTER
– **T** = TIMER

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Estrutura de Dados

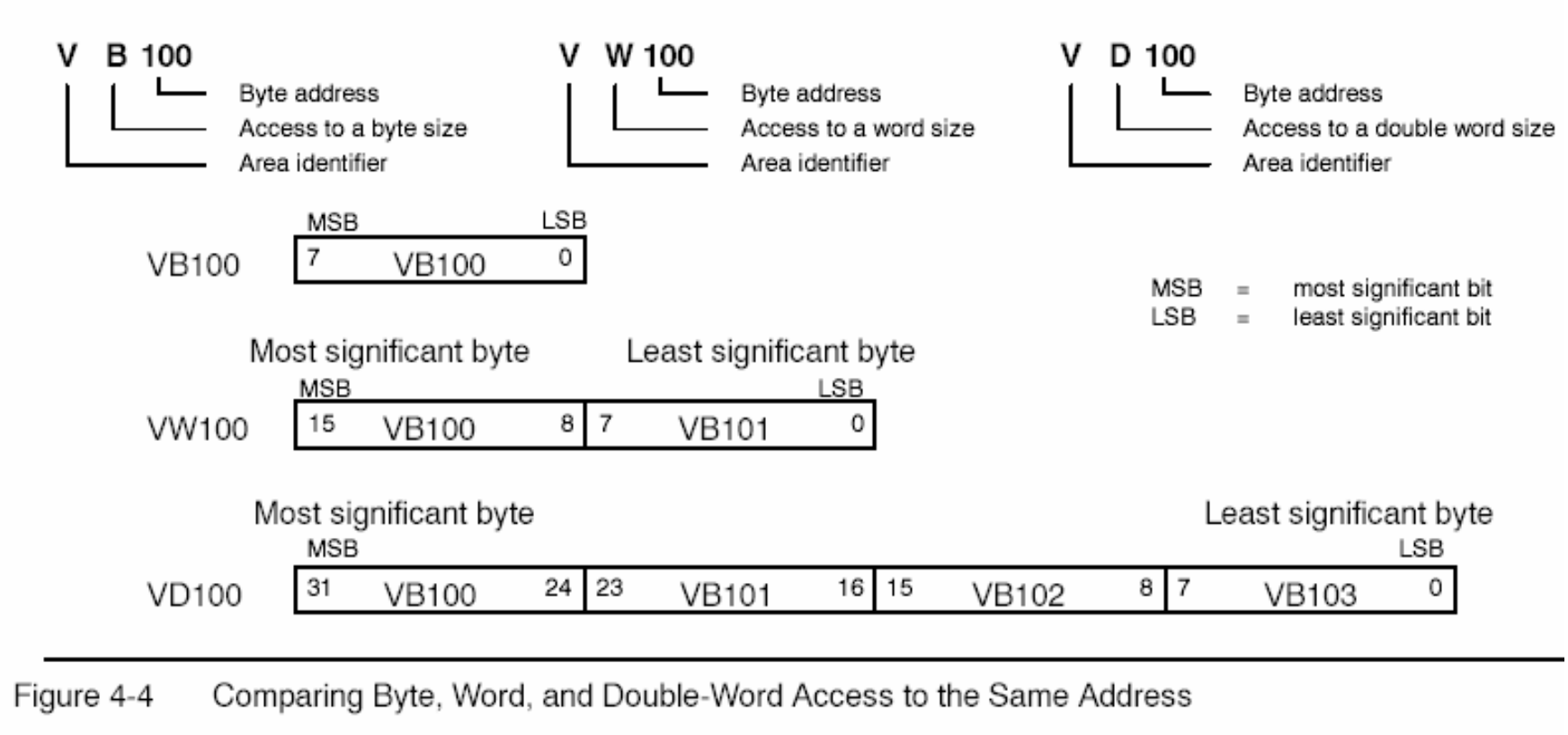


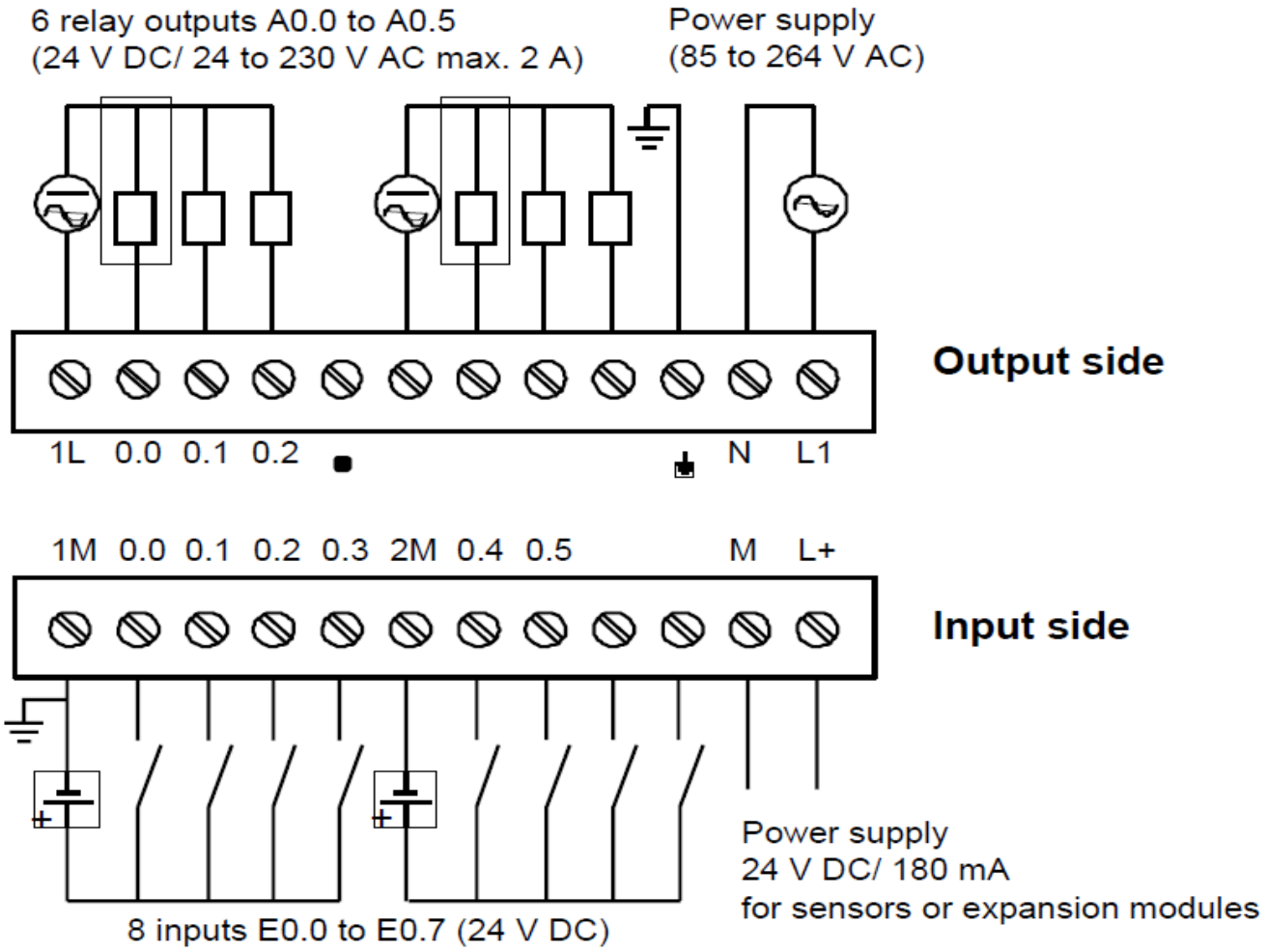
Figure 4-4 Comparing Byte, Word, and Double-Word Access to the Same Address

Estrutura de Dados

Endereços

Saídas:
Q0.0 a Q0.5

Entrada:
I0.0 a I0.7



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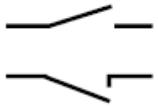
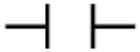
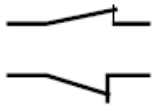
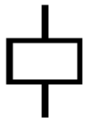
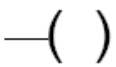
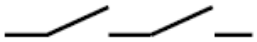
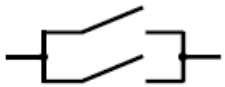
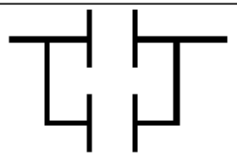
Linguagem Ladder

Contactor		Instruction on the PLC/ corresponding function
	Scan: Is current flowing ? If yes, then the result of the scan is true. (Result is "1")	
	Scan: Is no current flowing ? If yes (no current), then the result of the scan is true. (Result is "0")	
	Coil: If the value "true" (current) is passed to a coil it is activated (The coil starts up).	
	Series circuit: (AND logic). The first switch AND the second switch must be closed in order to pass current.	
	Parallel circuit (OR logic). The first switch OR the second switch must be closed in order to pass current.	

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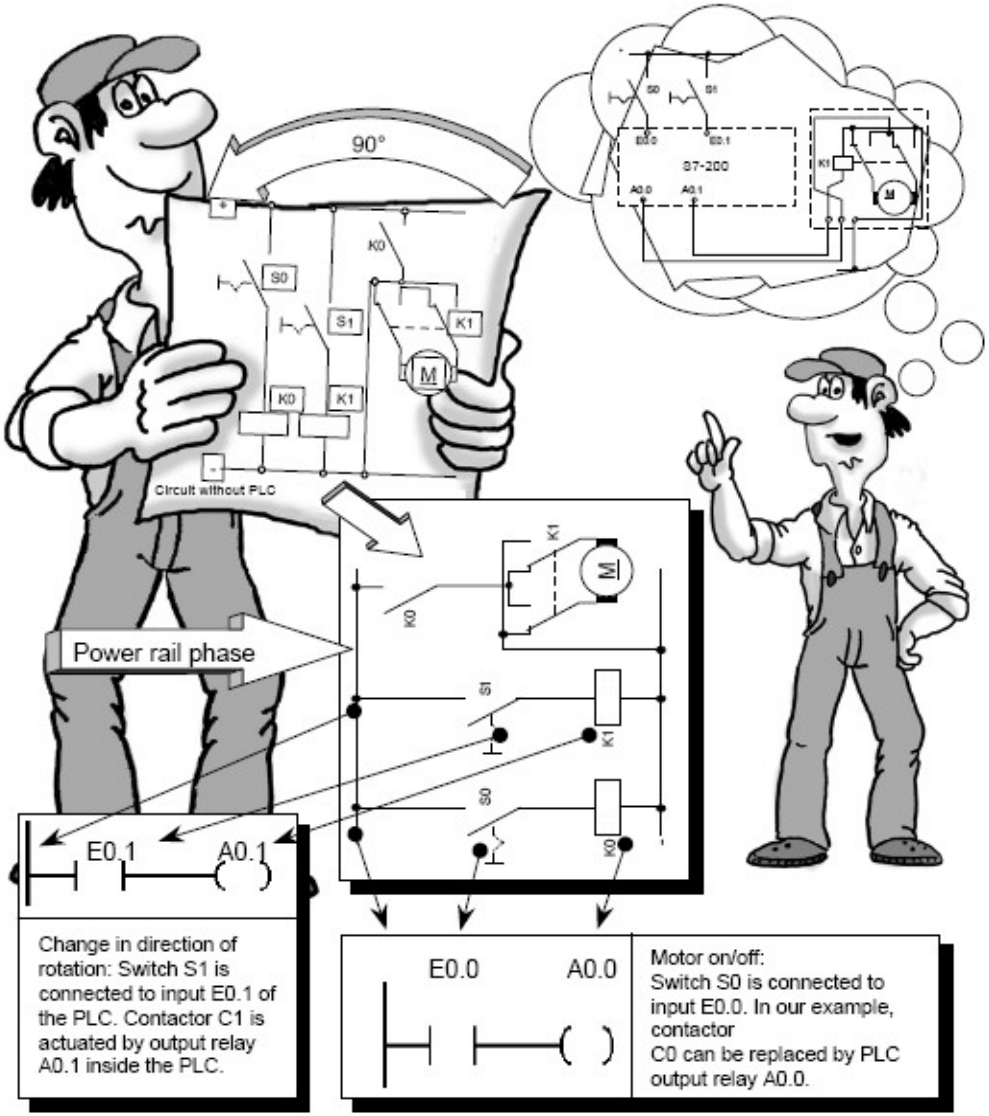
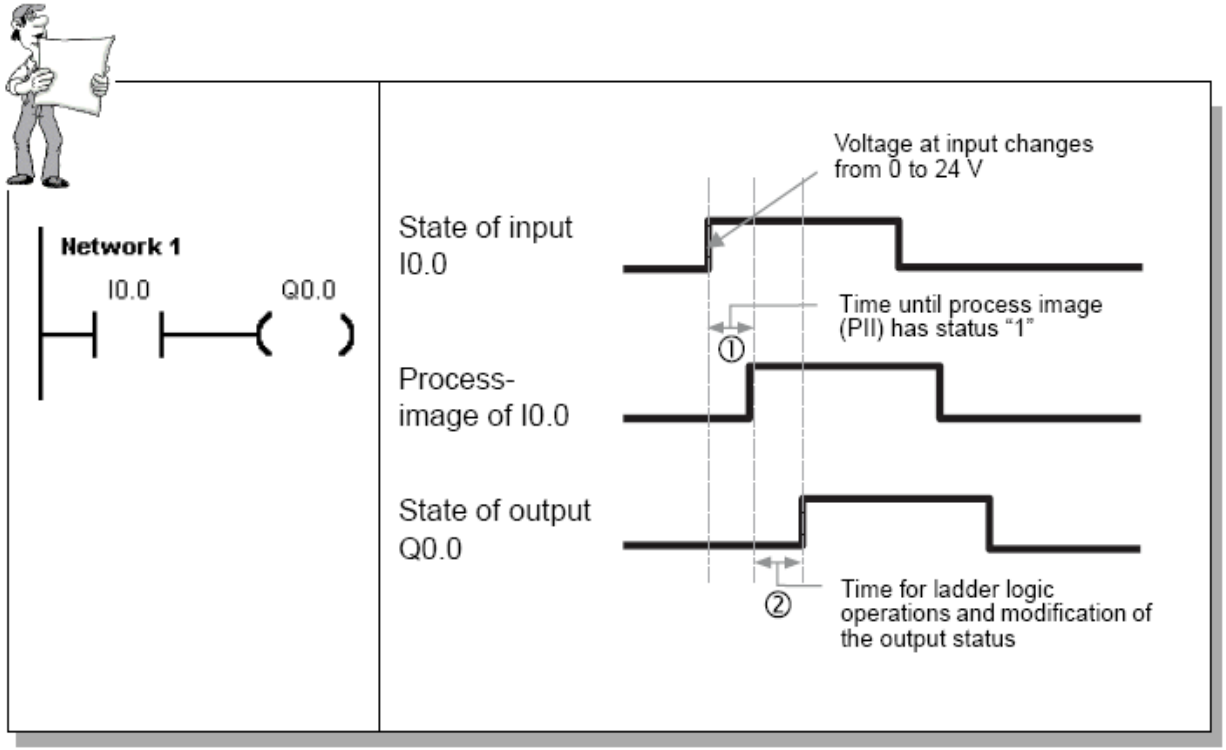
Linguagem Ladder



Linguagem Ladder



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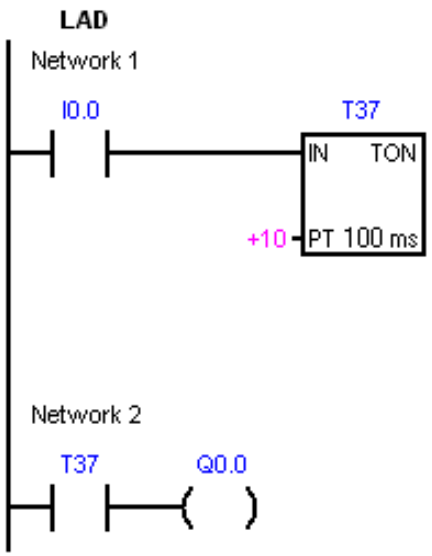
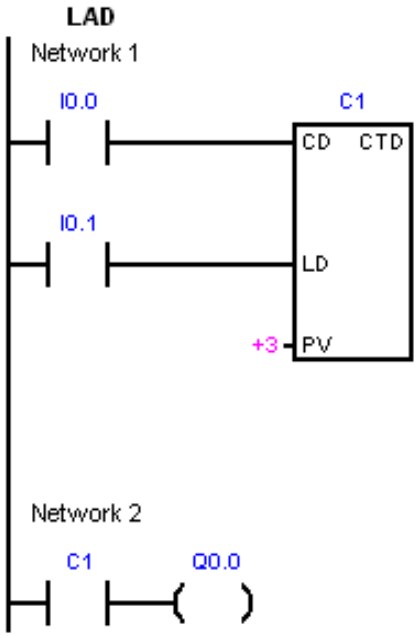
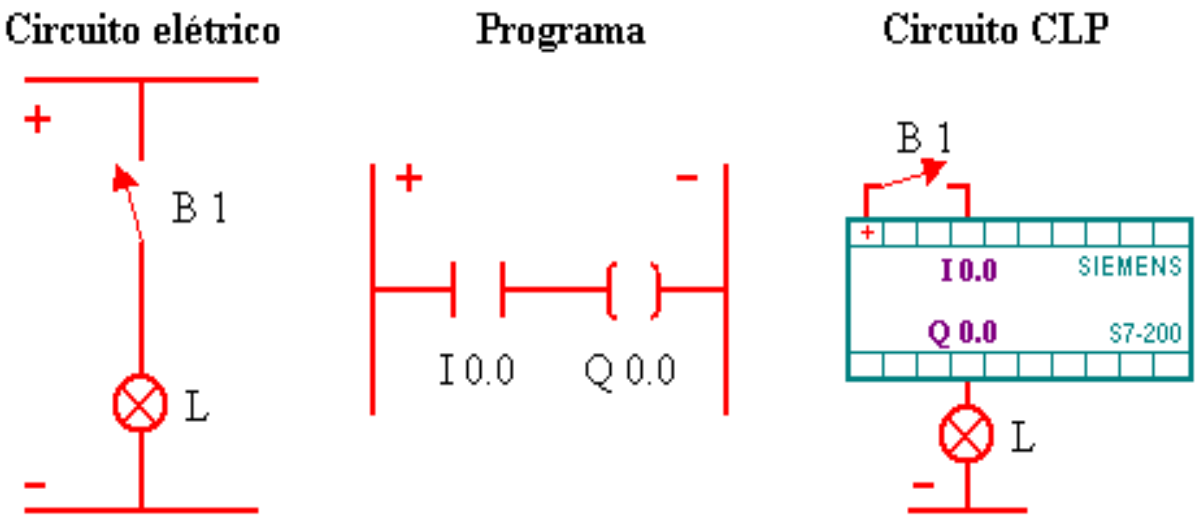
Linguagem Ladder



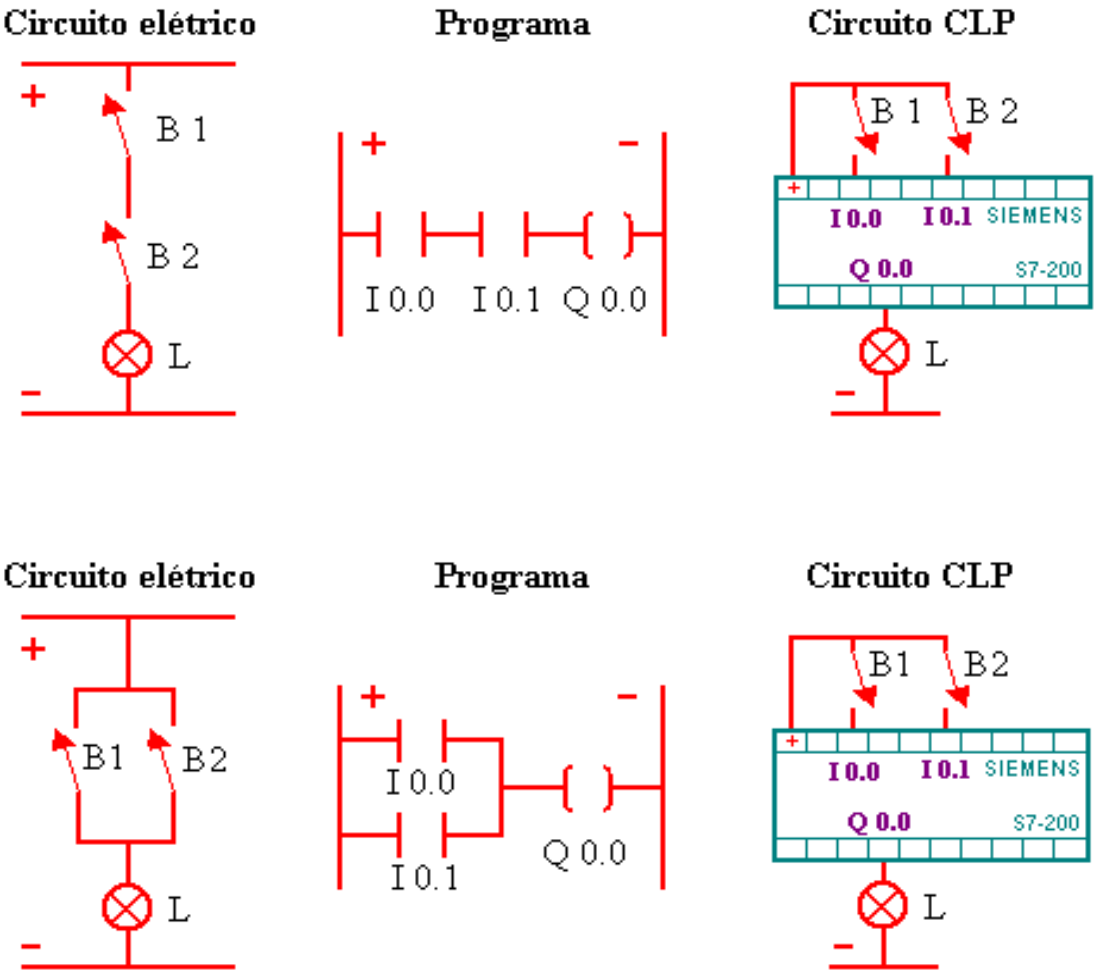


Linguagem Ladder

- *definição da função lógica a ser programada*
- *transformação desta função em programa assimilável pelo CLP*
- *implementação física do controlador e de suas interfaces com o processo*



Linguagem Ladder



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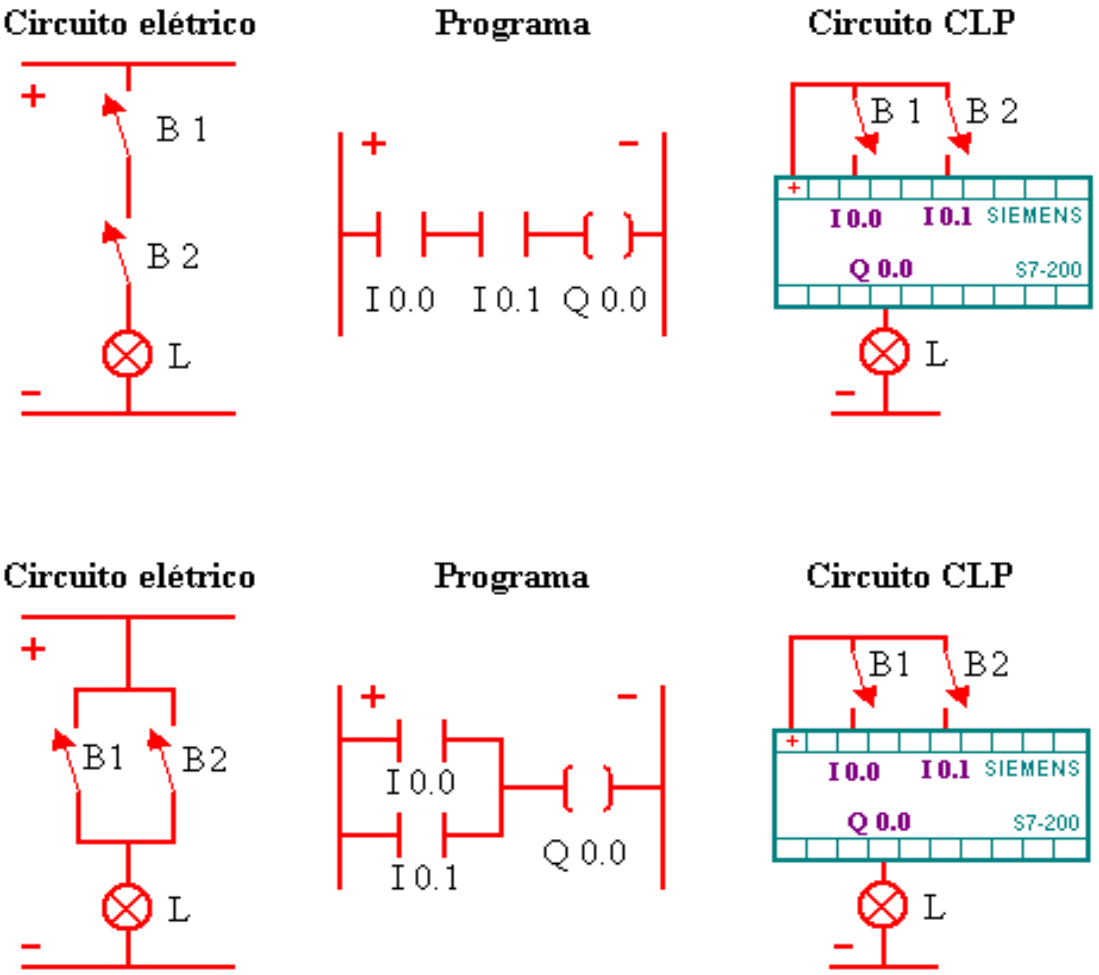
Linguagem Ladder



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