Aula 3
Instrumentação II

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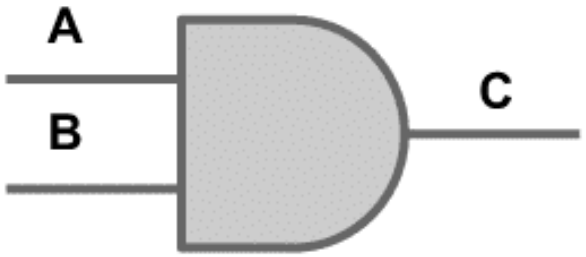
2019

Objetivo da Aula

1. Revisar portas lógicas;
2. Estudar as estruturas de repetição **FOR**, **WHILE**;
3. Apresentar **Sistema de Temporização**;
4. Blocos de **Comparação e Seleção**;
5. Exercício com problemas práticos com o conteúdo abordado.

Porta **E** (**AND**)

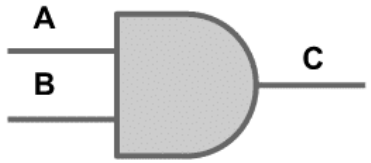


Valor de Saída = 1, Se somente se A e B forem = 1

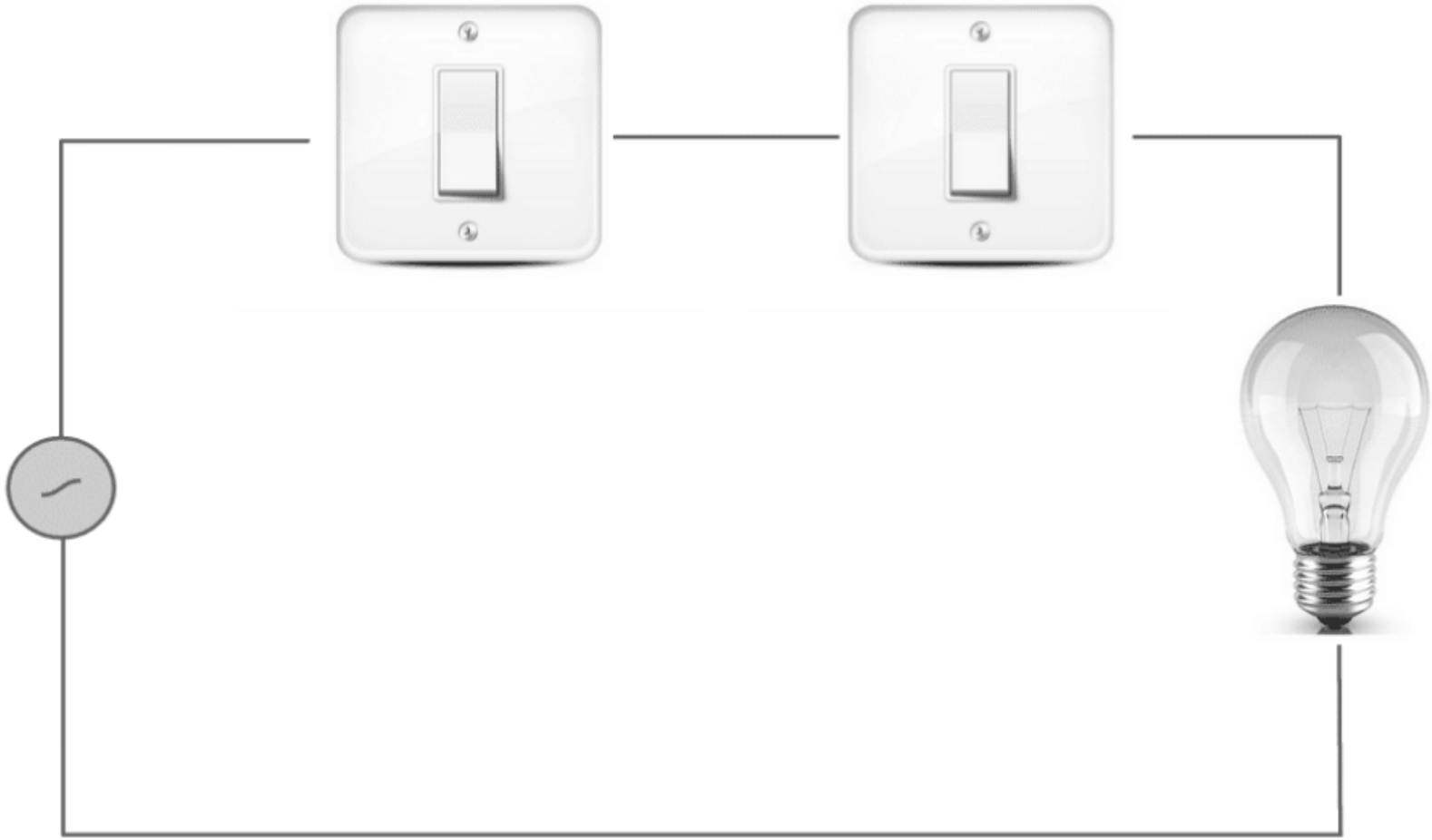
A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

Valor de Saída = 0, Se pelo menos A ou B forem = 0

Porta **E** (**AND**)

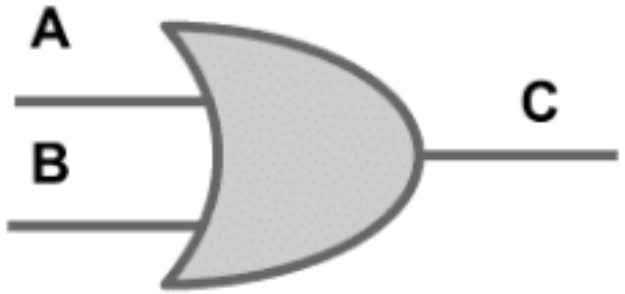


A	B	X
0	0	0
0	1	0
1	0	0
1	1	1



Analogia com a porta lógica AND

Porta **OU (OR)**

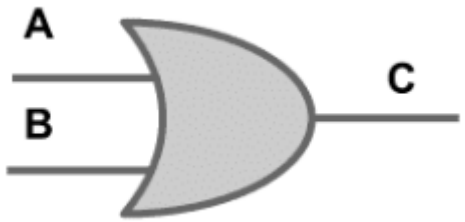


Valor de Saída = 0, Se somente se A e B forem = 0

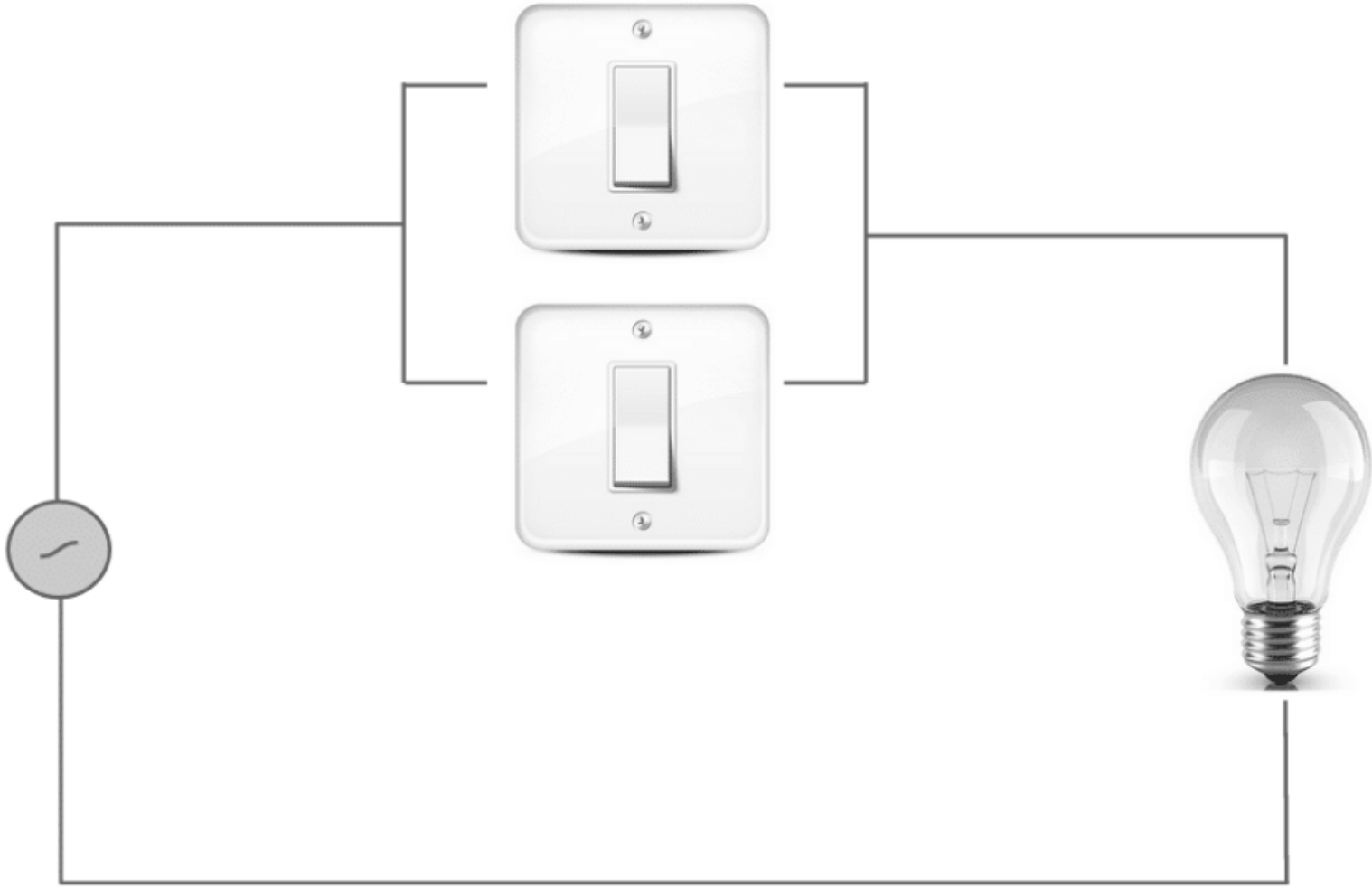
A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

Valor de Saída = 1, Se pelo menos A ou B forem = 1

Porta **OU (OR)**

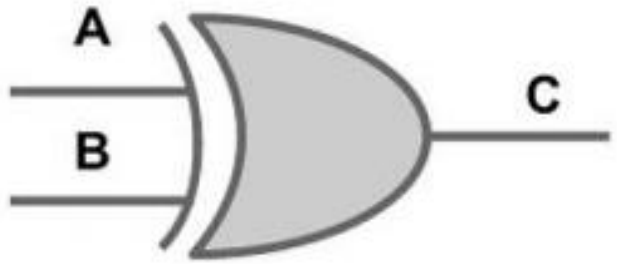


A	B	X
0	0	0
0	1	1
1	0	1
1	1	1



Analogia com a porta lógica OR

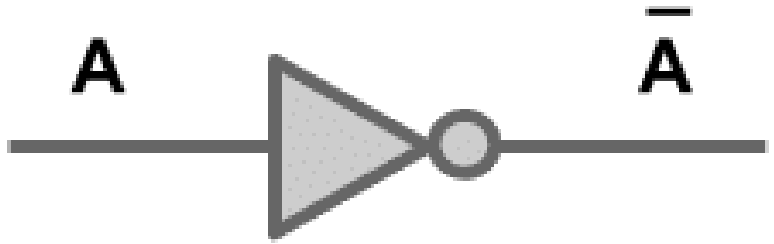
Porta **OU Exclusiva (XOR)**



A	B	XOR
0	0	0
0	1	1
1	0	1
1	1	0

Valores iguais = 0 / Valores diferentes = 1

Porta **Não (NOT)**



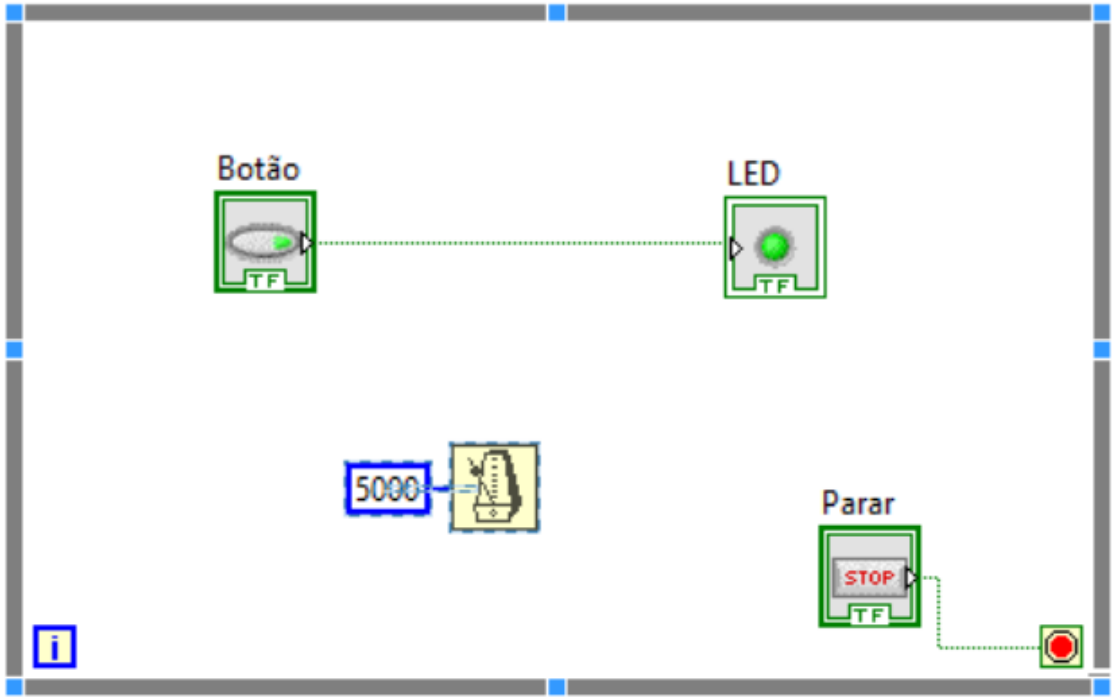
A	$\overline{A}$
0	1
1	0

Inverte valor da entrada!

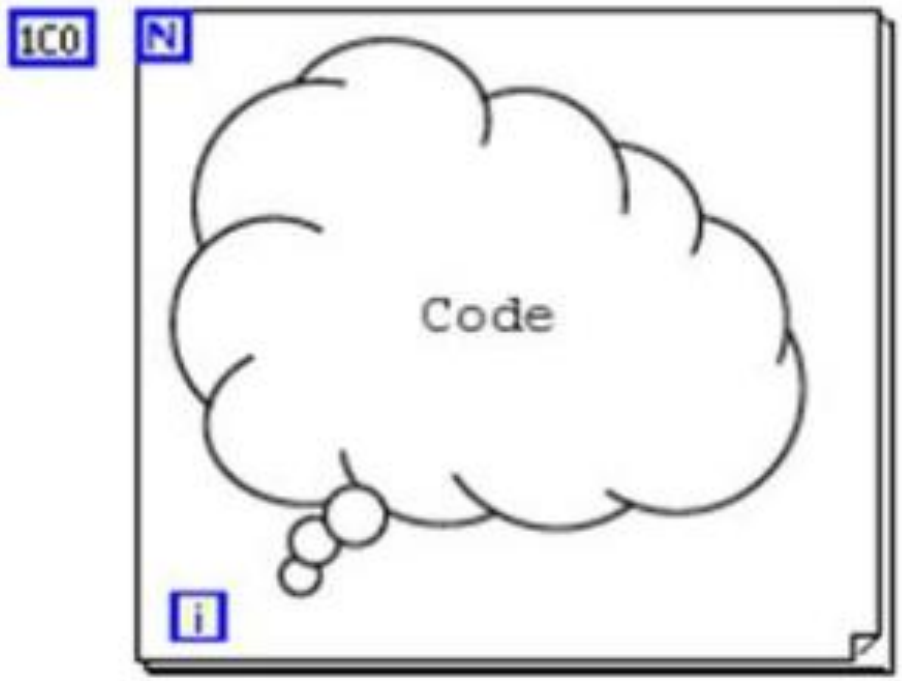
Estrutura Loop

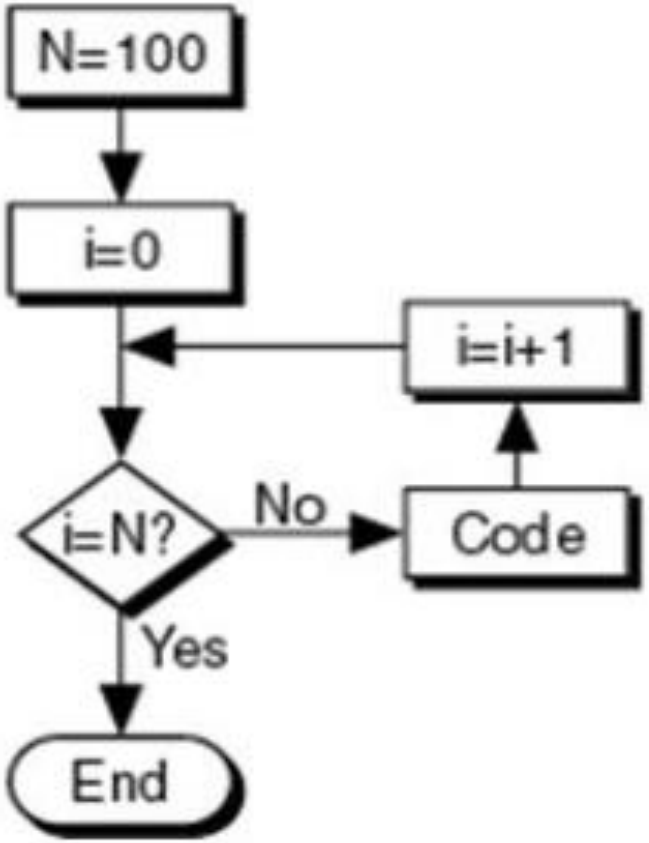
Definição: Estrutura lógica programável para repetição de tarefas. Principalmente composto por uma atividade que se deseja repetir.

1. Botão de parada; 2. Tempo definido de execução; 3. Valor das inteirações.

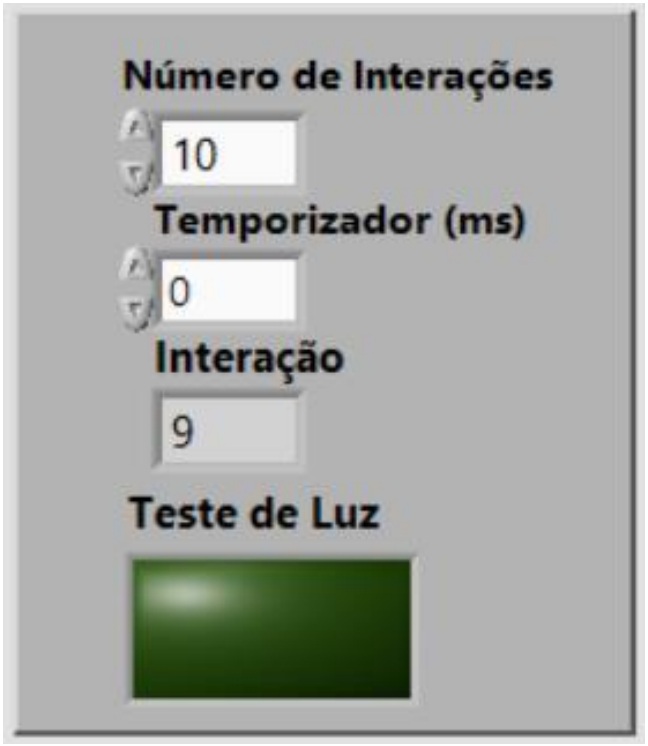


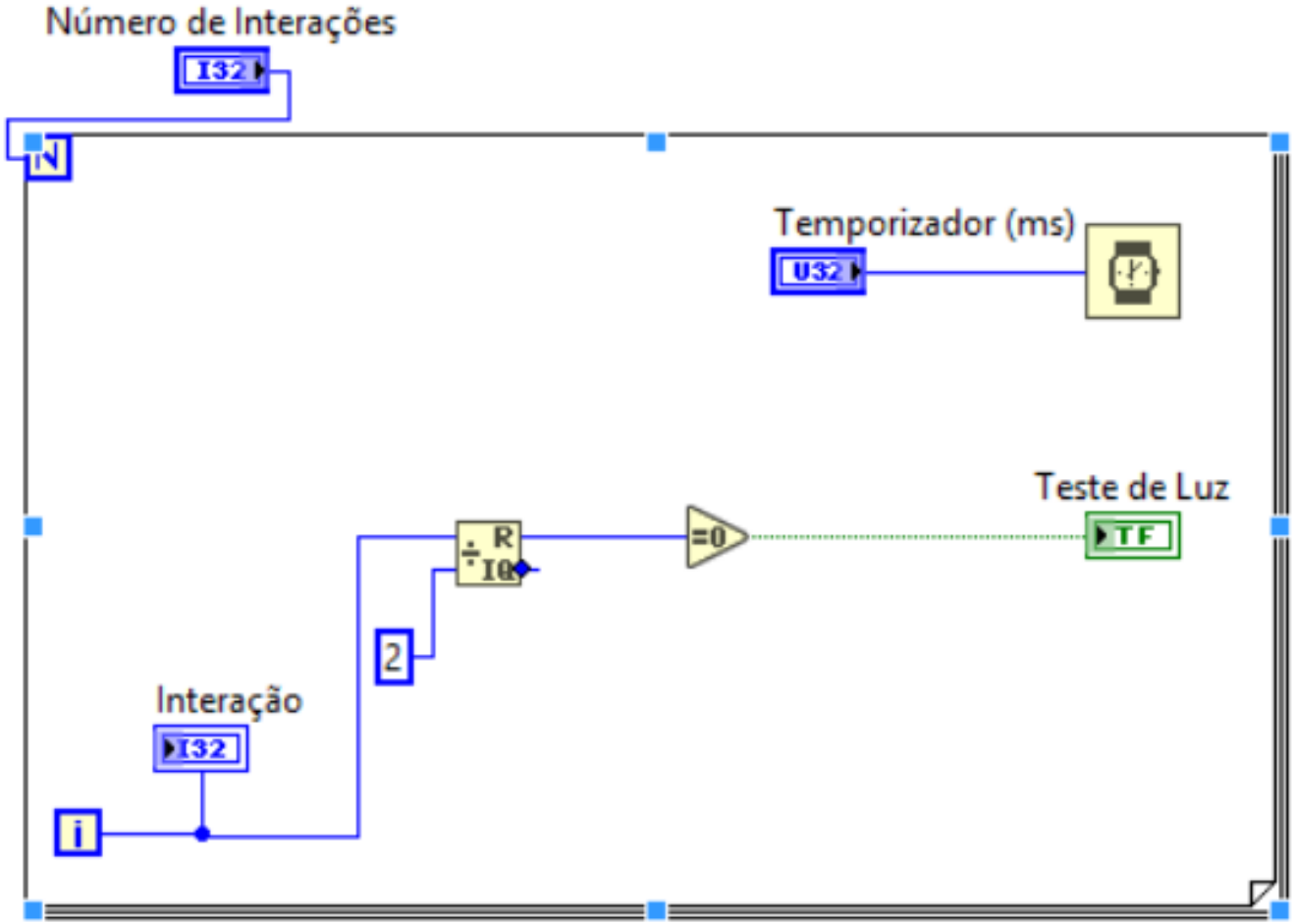
For loop



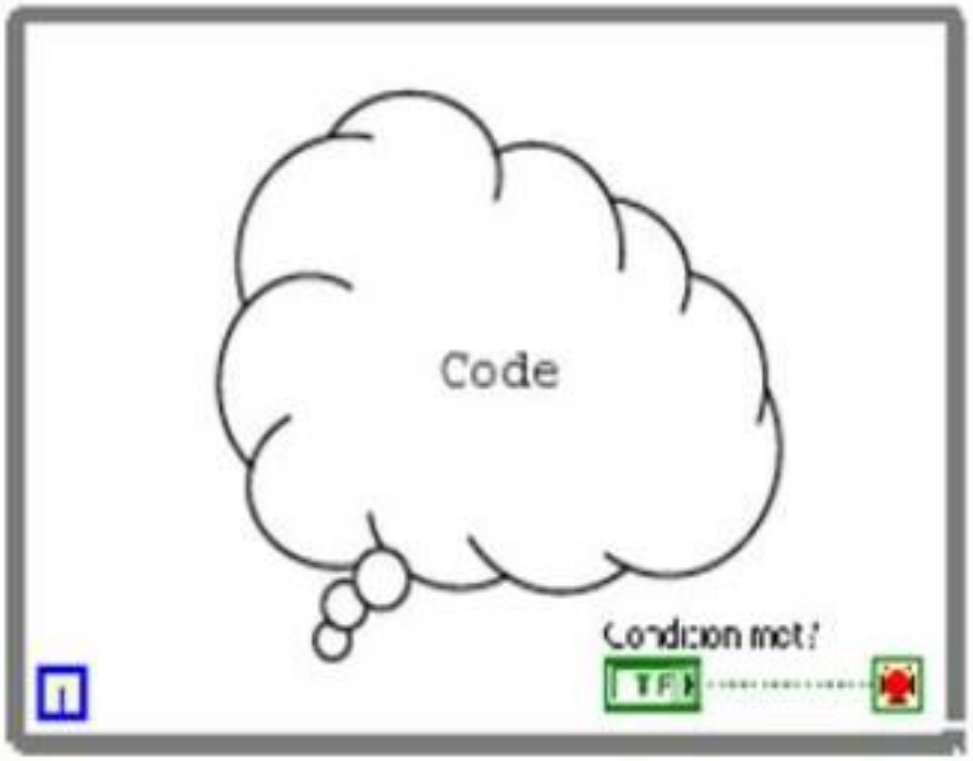


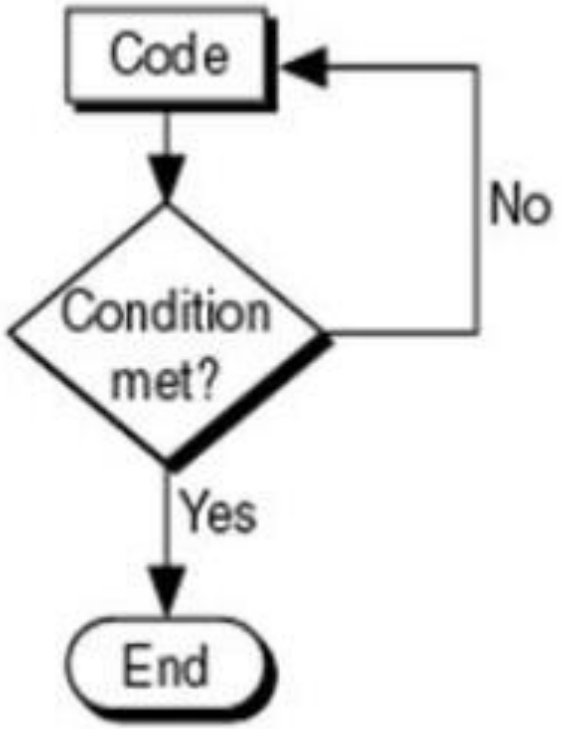
For loop


Número de Interações
10
Temporizador (ms)
0
Interação
9
Teste de Luz


Número de Interações
I32
N
Temporizador (ms)
U32
Teste de Luz
TF
=0
R
÷
I0
2
Interação
I32
i

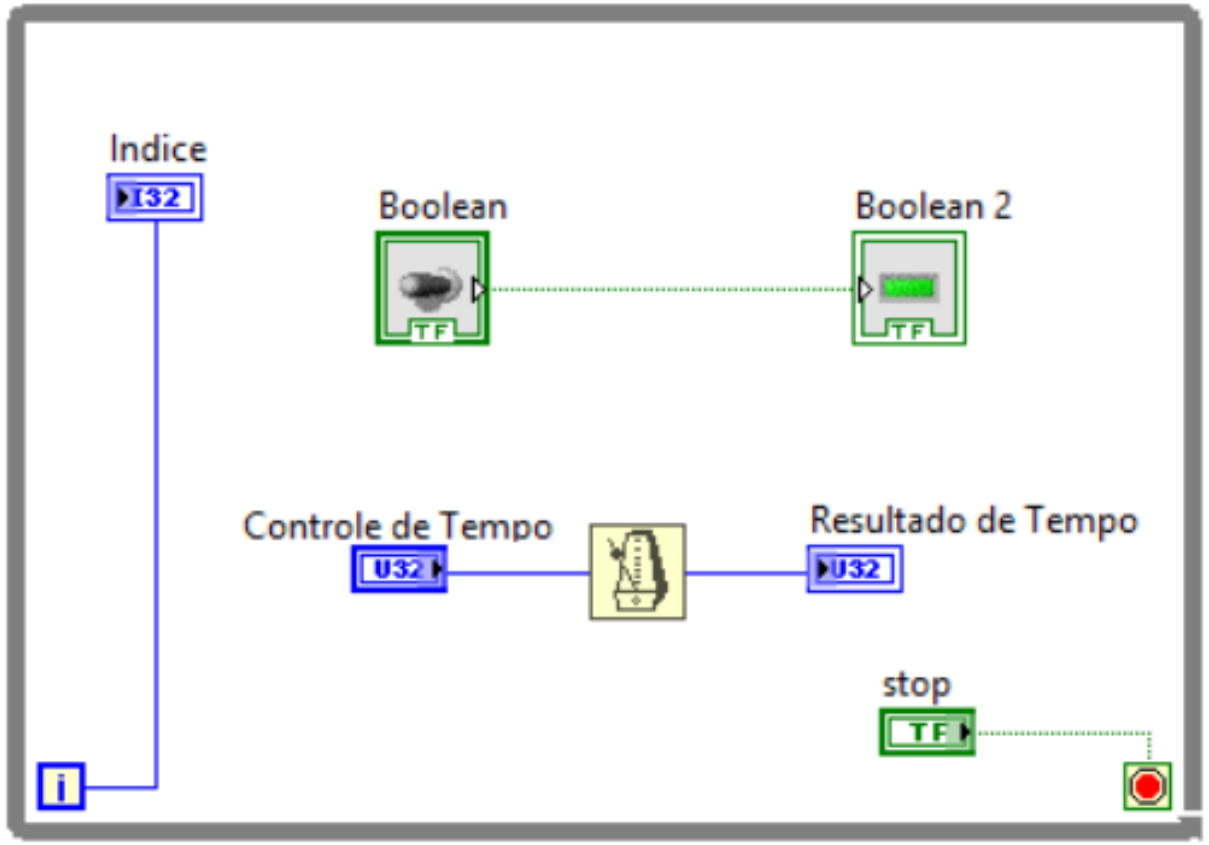
While loop





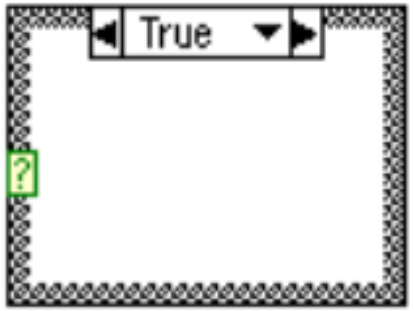
While loop


Boolean
Boolean 2
stop
STOP
Controle de Tempo
2000
Indice
2
Resultado de Tempo
2742001


Indice
I32
Boolean
TF
Boolean 2
TF
Controle de Tempo
U32
Resultado de Tempo
U32
stop
TF
i

Resumo

Case Structure



Tomada de Escolha

For Loop

Início, meio e fim bem definidos

While Loop

Loop Infinito até que escolha parar

Bloco de Comparação

Igual

Equal?

Returns TRUE if **x** is equal to **y**. Otherwise, this function returns FALSE. You can change the comparison mode of this function.

Detailed help

Diferente

Not Equal?

Returns TRUE if **x** is not equal to **y**. Otherwise, this function returns FALSE. You can change the comparison mode of this function.

Detailed help

Maior

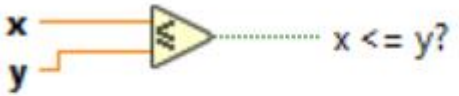
Greater Or Equal?

Returns TRUE if **x** is greater than or equal to **y**. Otherwise, this function returns FALSE. You can change the comparison mode of this function.

Detailed help

Menor

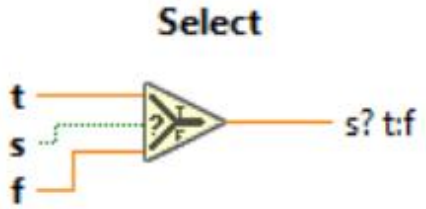
Less Or Equal?



Returns TRUE if **x** is less than or equal to **y**. Otherwise, this function returns FALSE. You can change the comparison mode of this function.

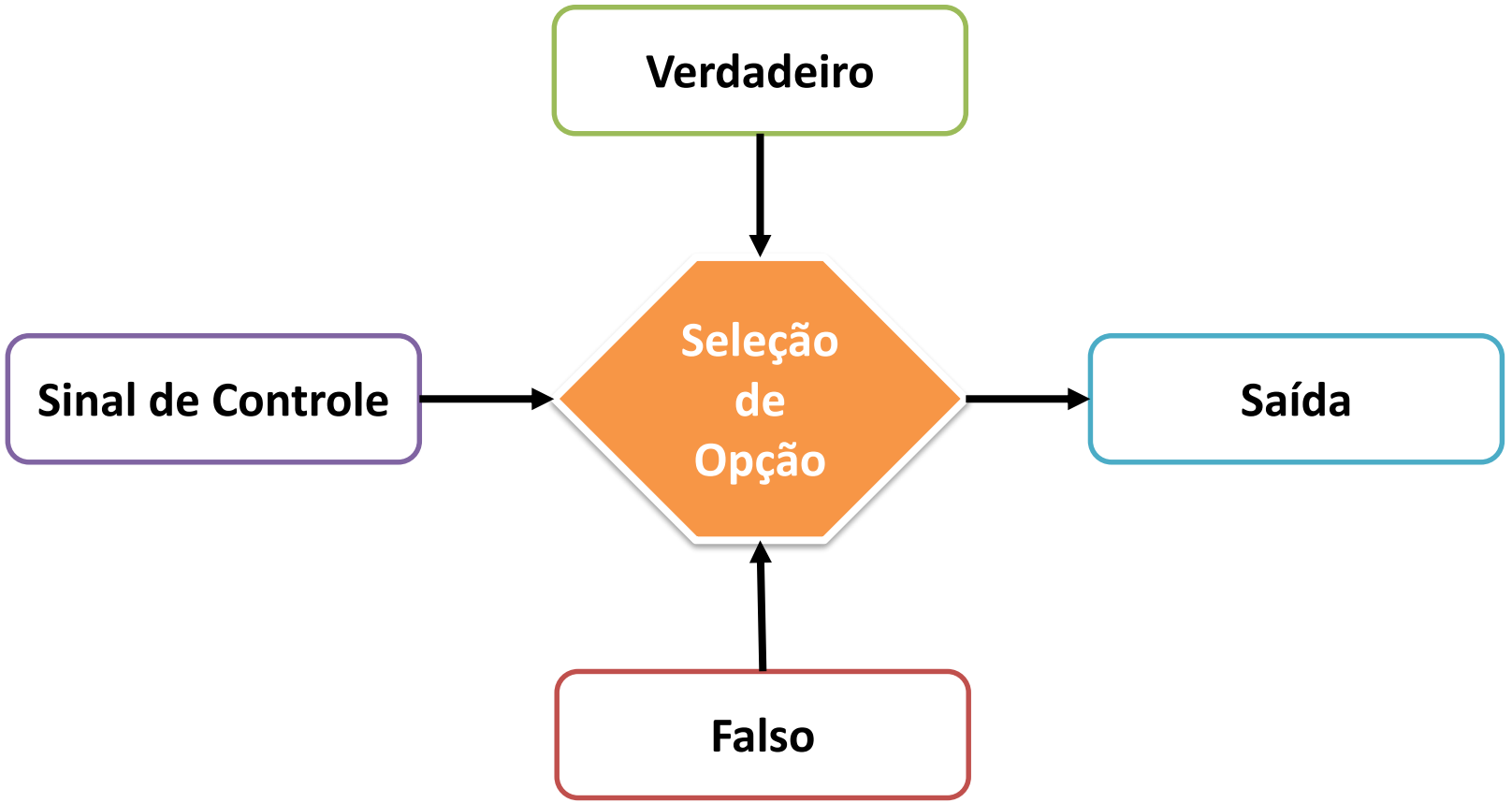
Detailed help

Bloco de Seleção

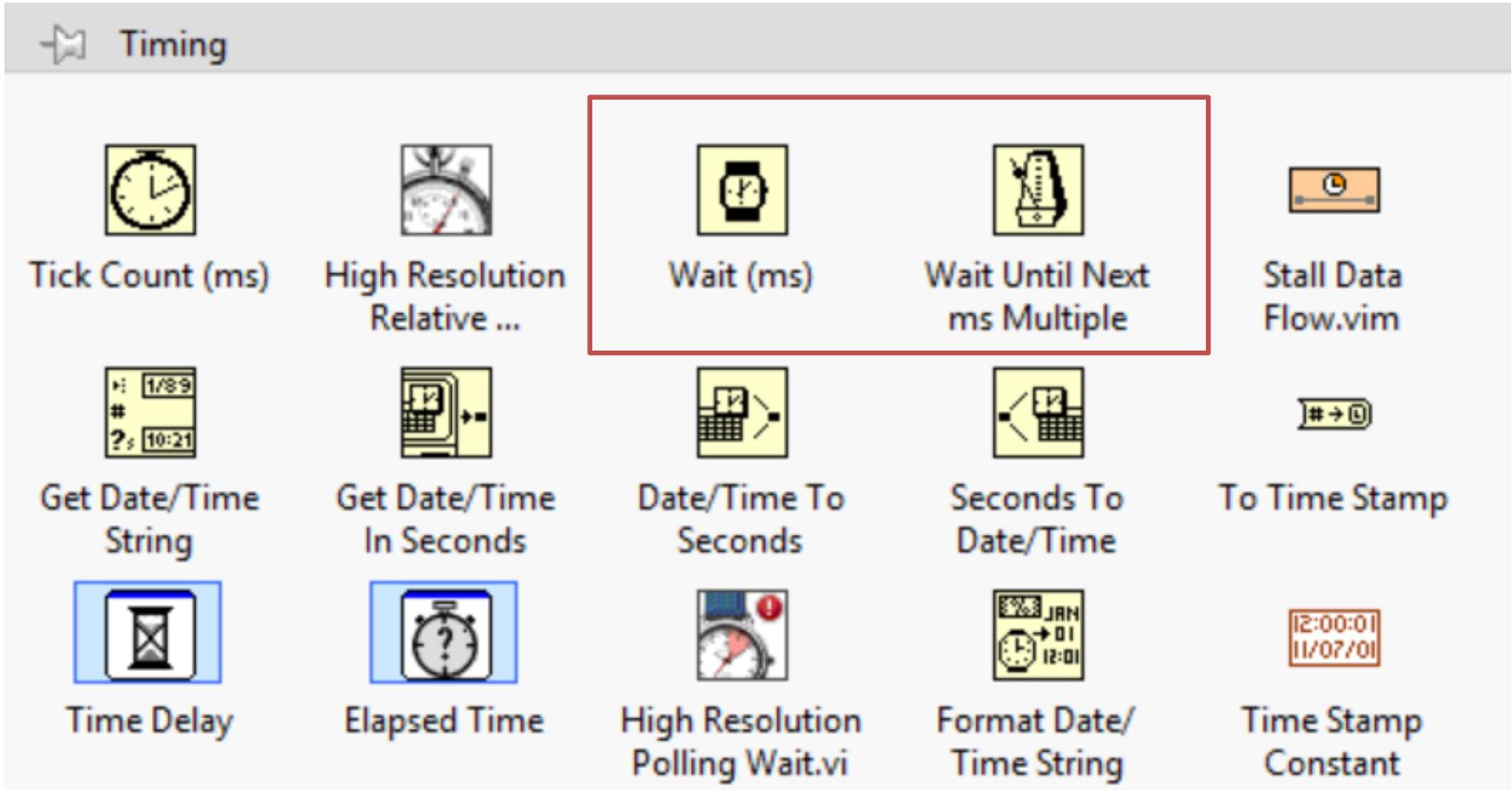


Returns the value wired to the **t** input or **f** input, depending on the value of **s**. If **s** is TRUE, this function returns the value wired to **t**. If **s** is FALSE, this function returns the value wired to **f**.

Detailed help

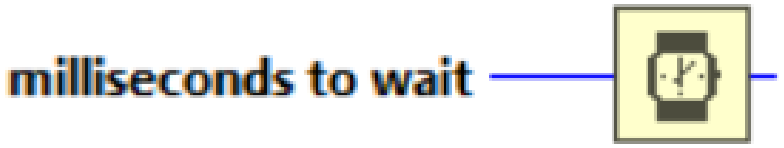


Temporizadores



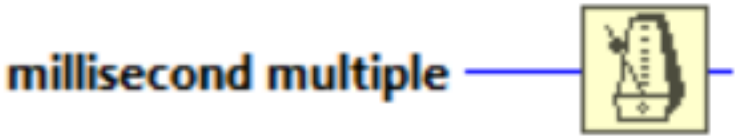
Temporizadores

Wait (ms)



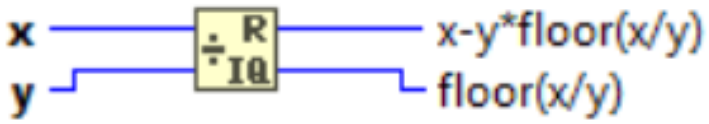
*A função **Wait (ms)** força o loop a aguardar uma quantidade de tempo especificada pelo usuário, em milissegundos, antes de executar a próxima iteração. **(esperar)***

Wait Until Next ms Multiple



*A função **Múltipla** assiste ao contador de milissegundos e espera que ele atinja um múltiplo do tempo especificado pelo usuário, em milissegundos. **(sincronizar)***

Quotient & Remainder



Função para retornar o Resto ou Quociente

Exercício I

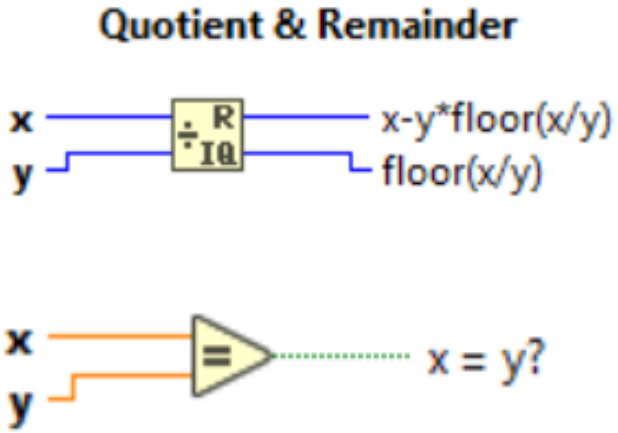
Enunciado: Fazer um programa em *LabVIEW* que conte os números pares de 1 até 50. Em seguida, um outro programa que conte os números ímpares de 1 até 50.

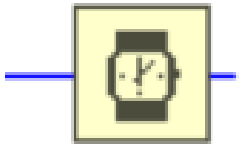
Somatória dos Números Pares – Acender LED

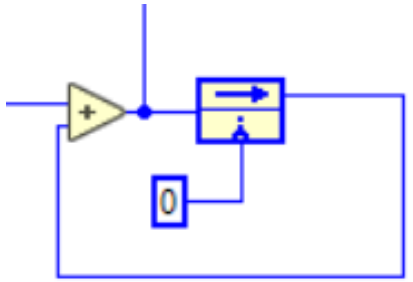
Somatória dos Números Ímpares - Apagar LED

Recursos

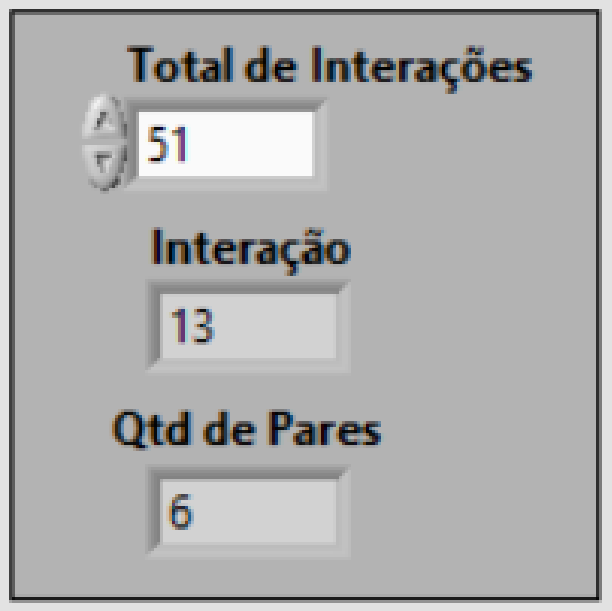
- ✓ Variáveis de Manipulação de Dados
- ✓ Estrutura FOR
- ✓ Blocos de Comparação e Resto
- ✓ Bloco de Seleção
- ✓ Contador e Temporizador

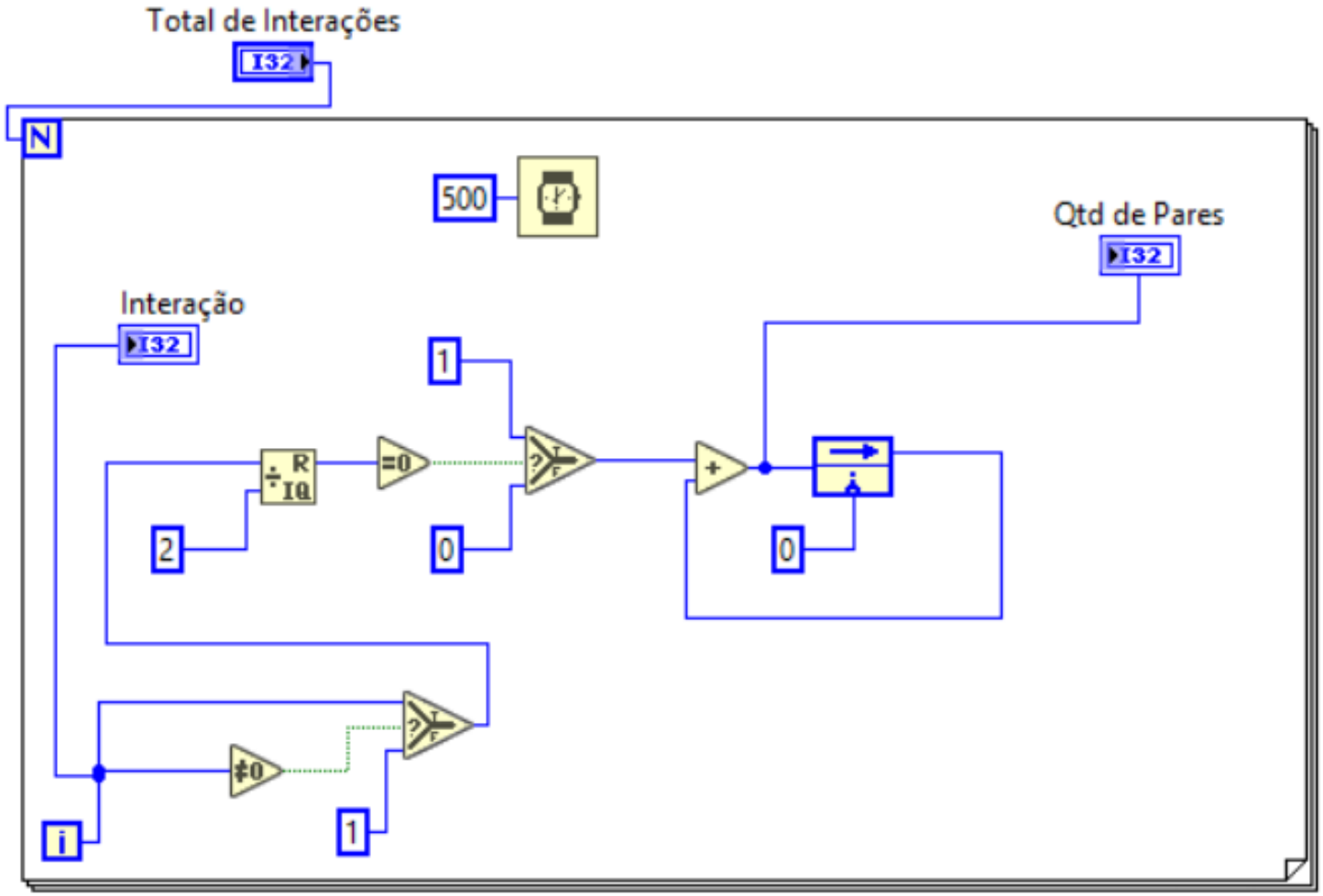






Resultados


Total de Interações
51
Interação
13
Qtd de Pares
6


Total de Interações
I32
N
500
Qtd de Pares
I32
Interação
I32
1
R
IQ
=0
2
0
+
0
≠0
1
i

Exercício II

Enunciado: Fazer um programa em *LabVIEW* que pisque um LED vermelho de 2 em 2 segundo; um LED amarelo de 4 em 4 segundos; um LED verde de 8 em 8 segundos.

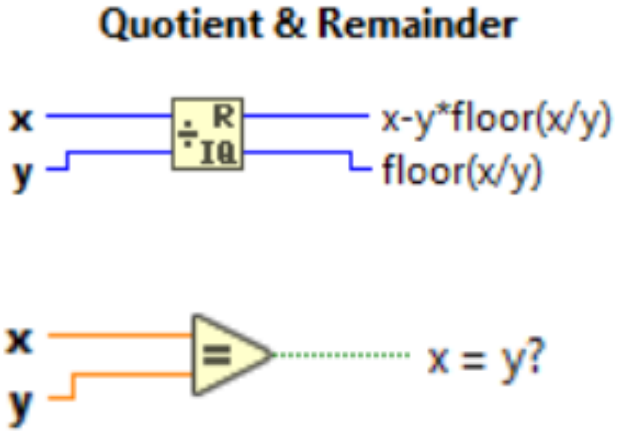
Acender LED Vermelho a cada 2 segundos

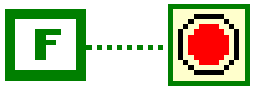
Acender LED Amarelo a cada 4 segundos

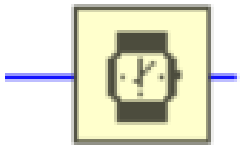
Acender LED Verde a cada 8 segundos

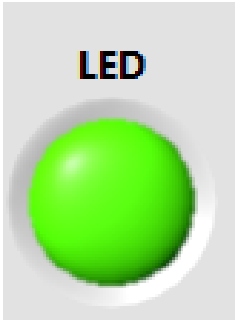
Recursos

- ✓ Variáveis de Manipulação de Dados
- ✓ Estrutura WHILE
- ✓ Blocos de Comparação e Resto
- ✓ Sistema de Parada e Temporizador
- ✓ LEDs



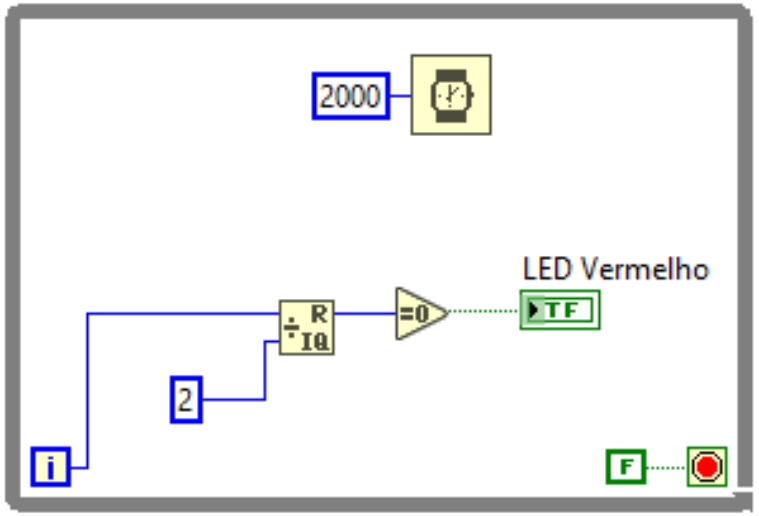


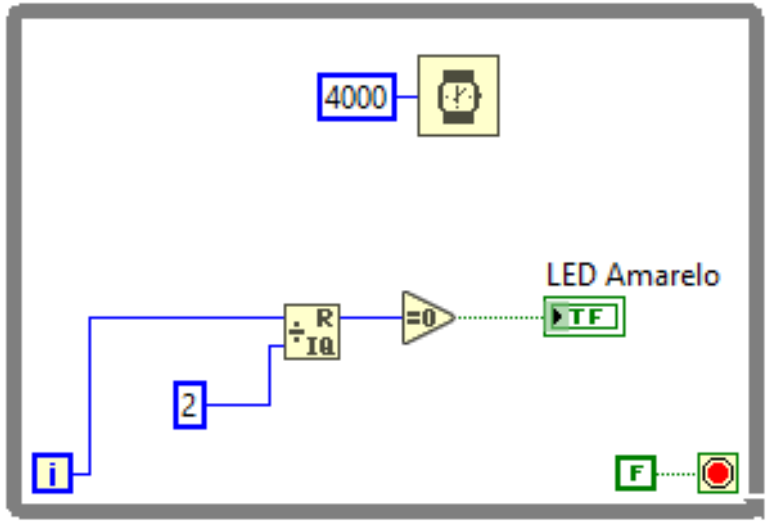


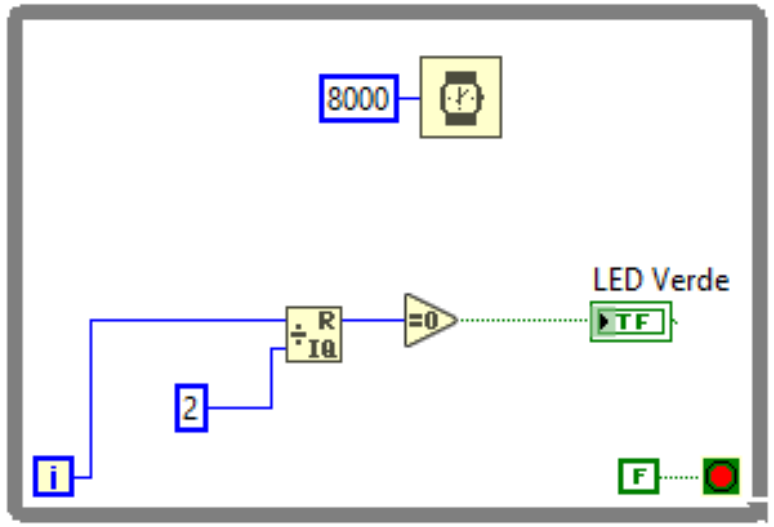


Resultados


LED Vermelho
LED Amarelo
LED Verde


2000
LED Vermelho
TF
R
IQ
=0
2
i
F


4000
LED Amarelo
TF
R
IQ
=0
2
i
F


8000
LED Verde
TF
R
IQ
=0
2
i
F

M. Sc. Alan Tavares
E-mail: alan.am.tavares@gmail.com
GitHub: https://github.com/alanprodam
https://github.com/alanprodam/Aulas-LabVIEW.git

E-mail: alan@fem.unicamp.br
Linkedin : https://www.linkedin.com/in/alantavares-sp-br/