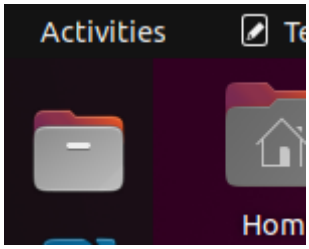
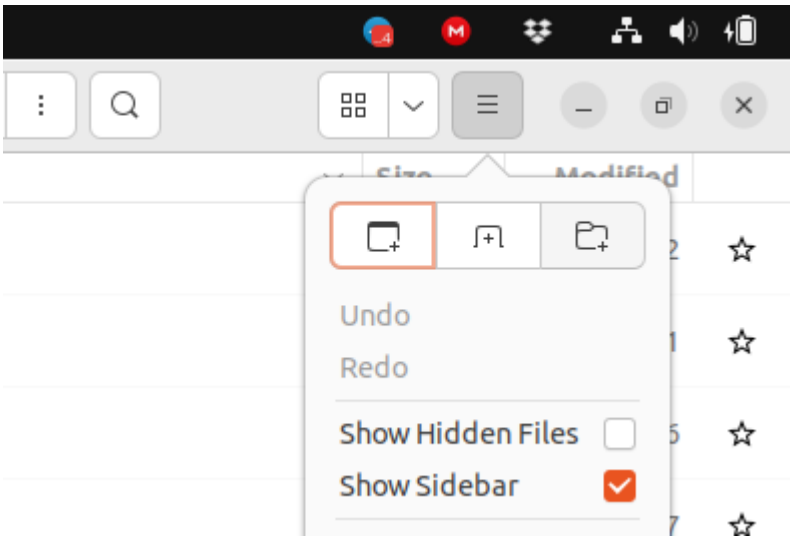
Exercícios de Simulação de Circuitos usando o software Logisim

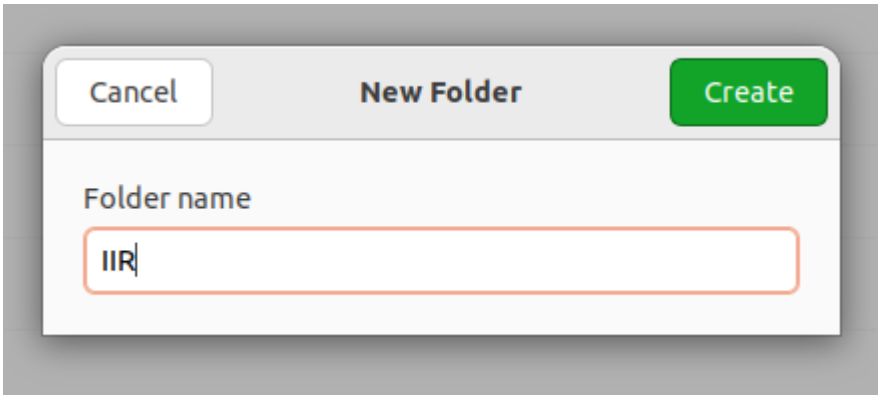
Para este laboratório será utilizado o Simulador de Circuitos Lógicos - Logisim, o qual permite o projeto e a simulação de circuitos lógicos através de uma interface gráfica.

O *download* do **Logisim** pode ser obtido no endereço: http://sourceforge.net/projects/circuit/

1. Criar uma pasta com o nome de IIR

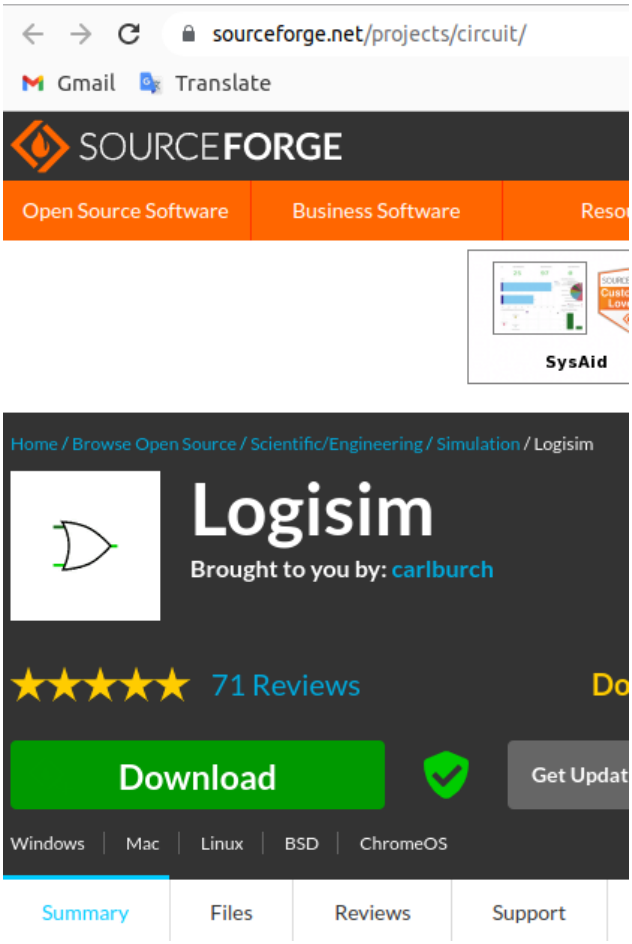






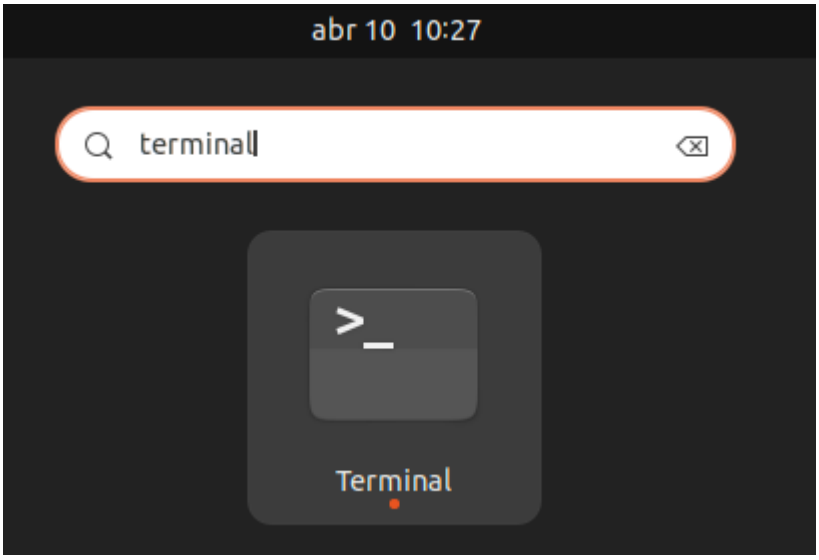
2. Copiar o endereço http://sourceforge.net/projects/circuit/ para a barra do navegador

3. Clicar no botão Download para baixar o arquivo logisim-generic-2.7.1.jar na pasta criada IIR

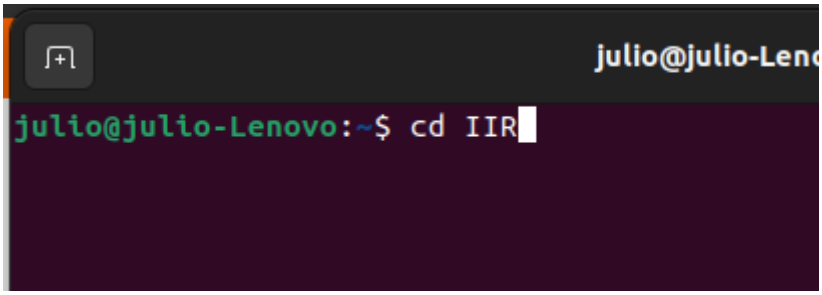


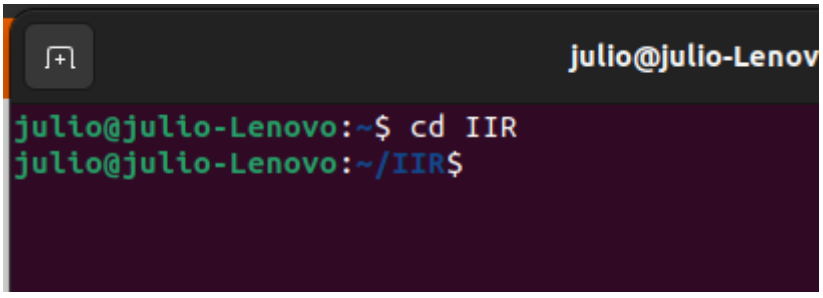
Selecionar a pasta criada e clicar em Salvar (ou Save)

4. Abrir um terminal

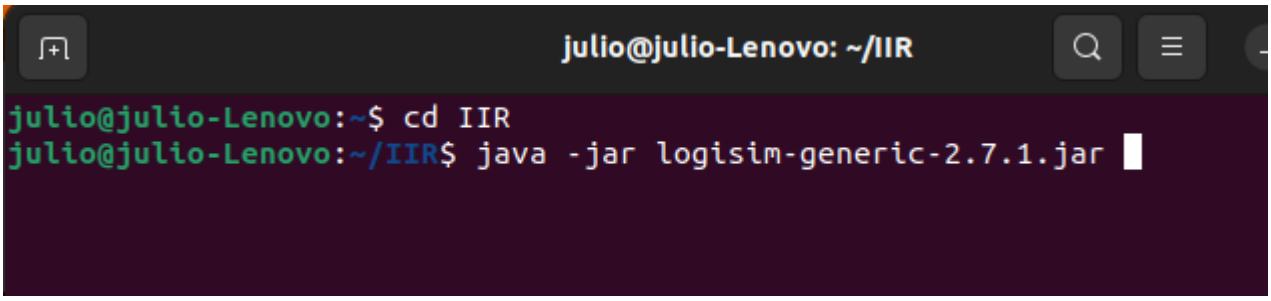


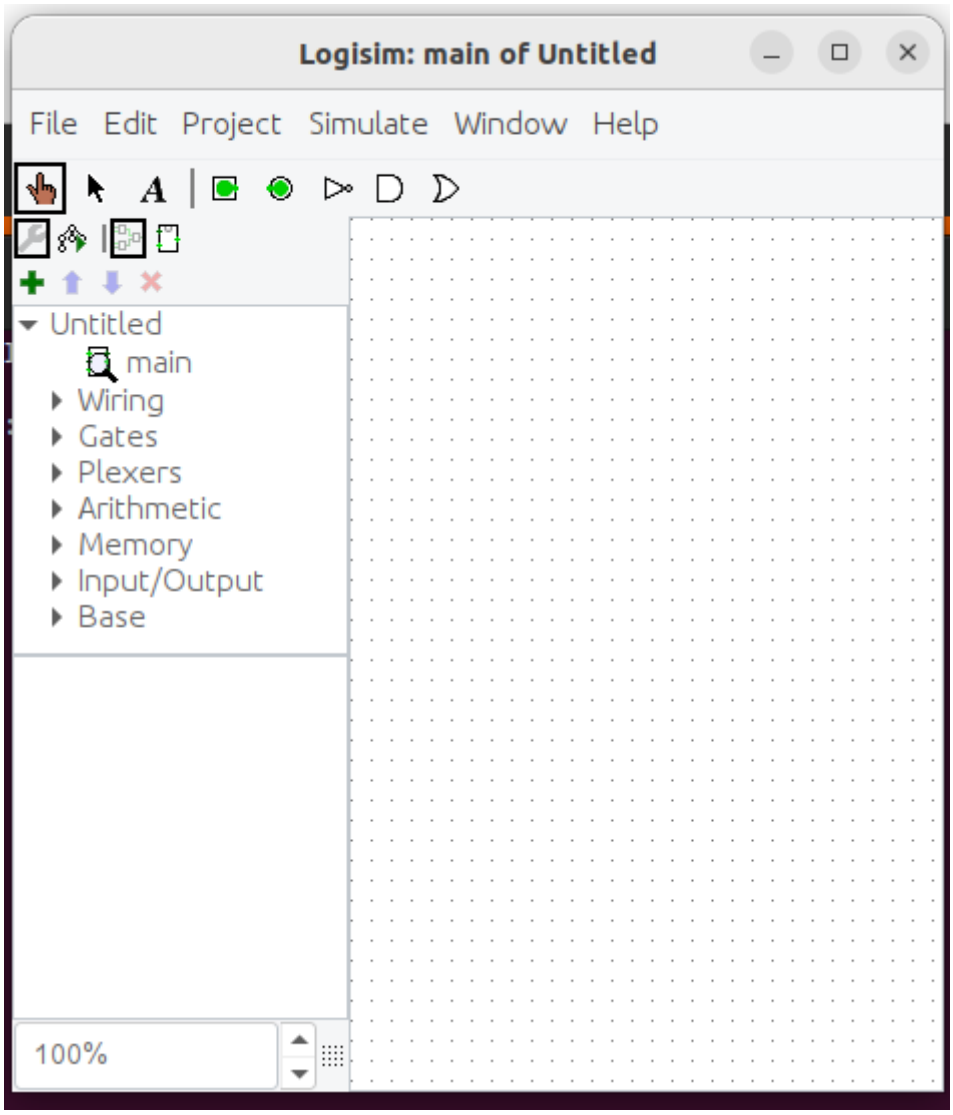
5. Se posicionar na pasta criada IIR, usando o comando cd IIR





6. Abrir o logisim, com o comando java -jar logisim-generic-2.7.1.jar

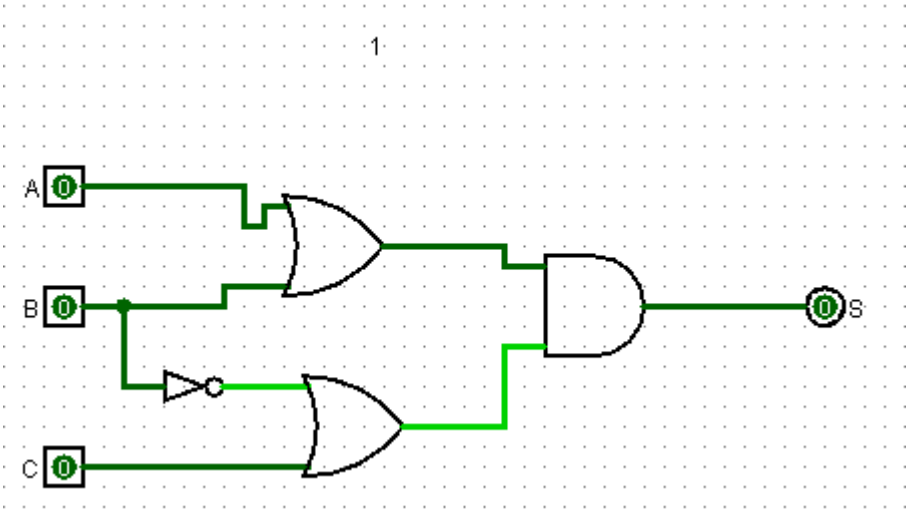




7. Para entender como criar os circuitos usando o logisim, assista ao vídeo https://www.youtube.com/watch?v=TdDCWG2inoY

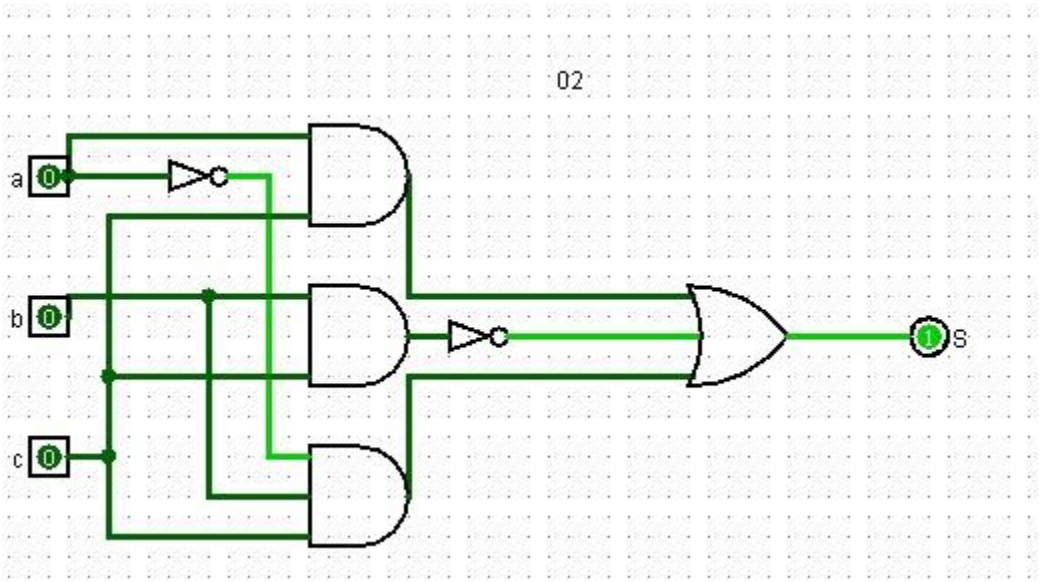
8. Exercícios: Construir, simular e determinar a **tabela verdade** dos circuitos representados pelas **expressões lógicas** abaixo:

1. S = (A + B).(~B + C)



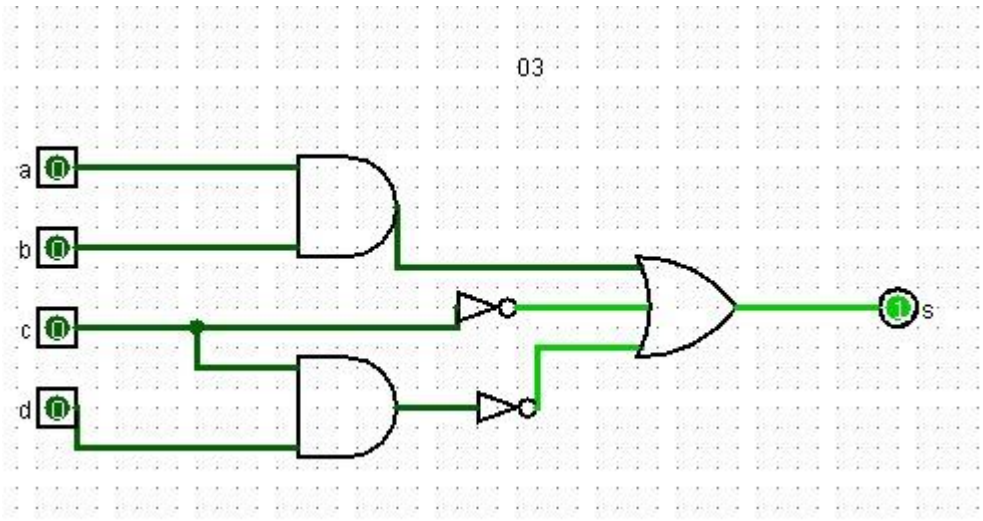
A	B	C	A+B	~B	~B+C	S
0	0	0	0	1	1	0
0	0	1	0	1	1	0
0	1	0	1	0	0	0
0	1	1	1	0	1	1
1	0	0	1	1	1	1
1	0	1	1	1	1	1
1	1	0	1	0	0	0
1	1	1	1	0	1	1

2. S = A.C + ~(B.C) + ~A.B.C



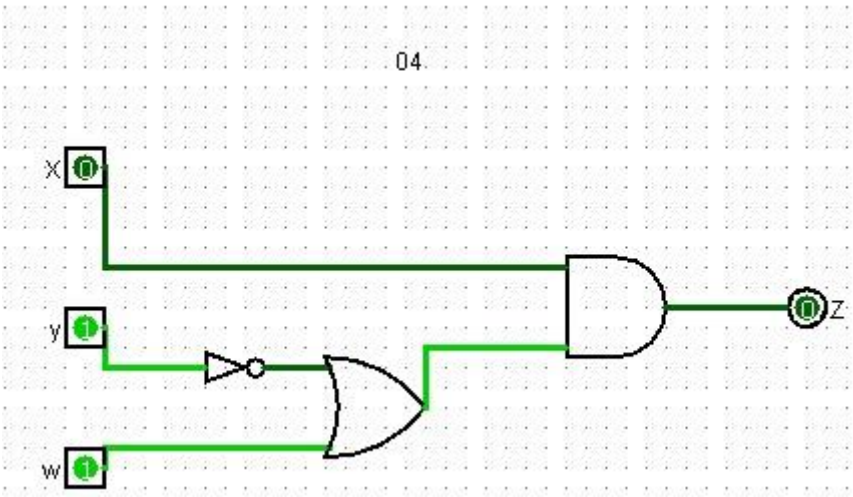
A	B	C	A·C	B·C	~(B·C)	~A	~A·B·C	S
0	0	0	0	0	1	1	0	1
0	0	1	0	0	1	1	0	1
0	1	0	0	0	1	1	0	1
0	1	1	0	1	0	1	1	1
1	0	0	0	0	1	0	0	1
1	0	1	1	0	1	0	0	1
1	1	0	0	0	1	0	0	1
1	1	1	1	1	0	0	0	1

3. S = A.B + ~C + ~(C.D)



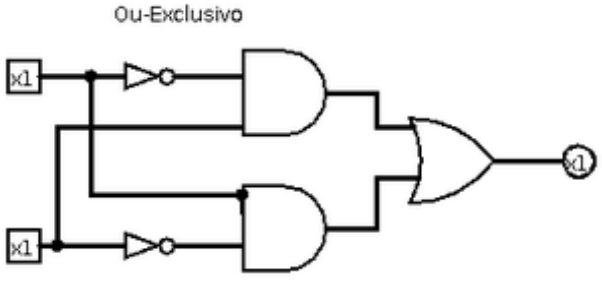
A	B	C	D	A·B	~C	C·D	~(C·D)	S
0	0	0	0	0	1	0	1	1
0	0	0	1	0	1	0	1	1
0	0	1	0	0	0	0	1	1
0	0	1	1	0	0	1	0	0
0	1	0	0	0	1	0	1	1
0	1	0	1	0	1	0	1	1
0	1	1	0	0	0	0	1	1
0	1	1	1	0	0	1	0	0
1	0	0	0	0	1	0	1	1
1	0	0	1	0	1	0	1	1
1	0	1	0	0	0	0	1	1
1	0	1	1	0	0	1	0	0
1	1	0	0	1	1	0	1	1
1	1	0	1	1	1	0	1	1
1	1	1	0	1	0	0	1	1
1	1	1	1	1	0	1	0	1

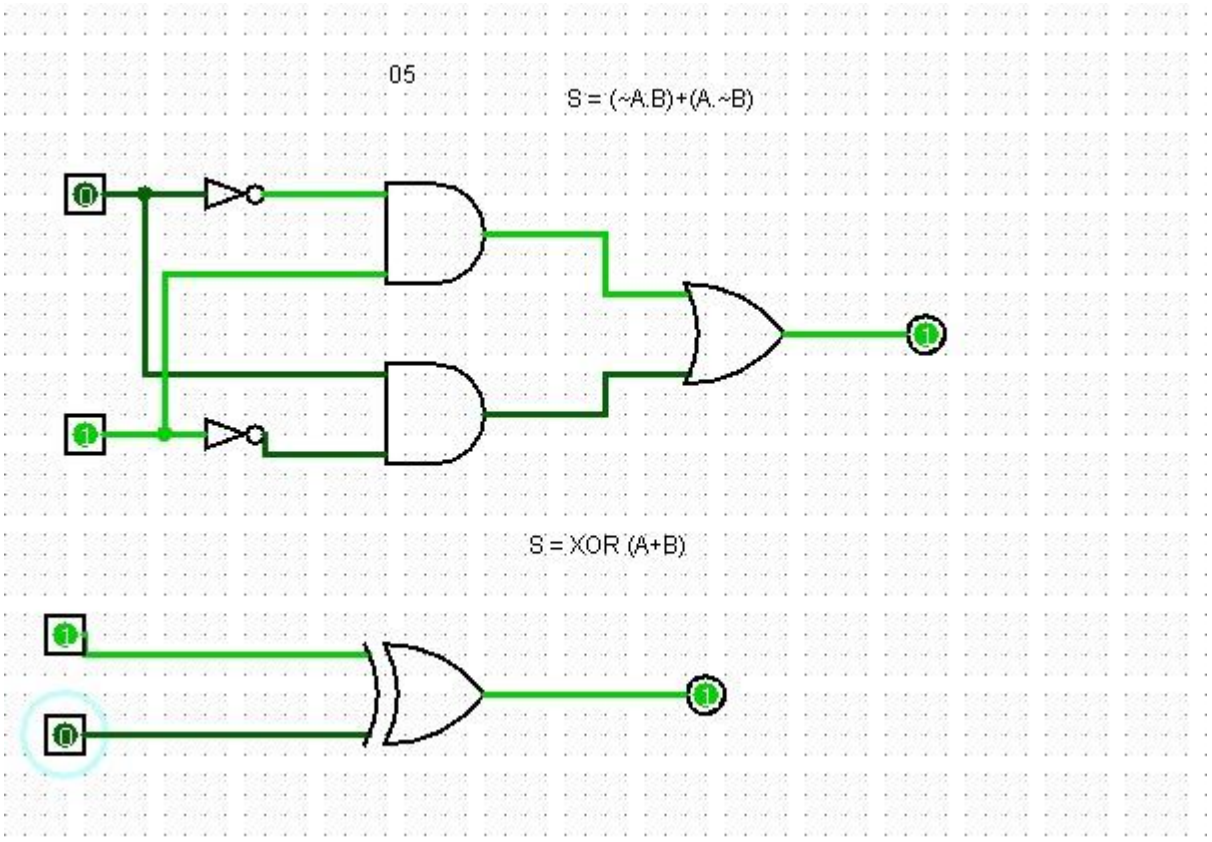
4. Z = X.(~Y + W)



X	**Y**	**W**	**~Y**	**~Y + W**	**Z**
0	0	0	1	1	0
0	0	1	1	1	0
0	1	0	0	0	0
0	1	1	0	1	0
1	0	0	1	1	1
1	0	1	1	1	1
1	1	0	0	0	0
1	1	1	0	1	1

5. Construir e simular o circuito da figura abaixo e comparar seu funcionamento com a porta **Ou-Exclusivo**:





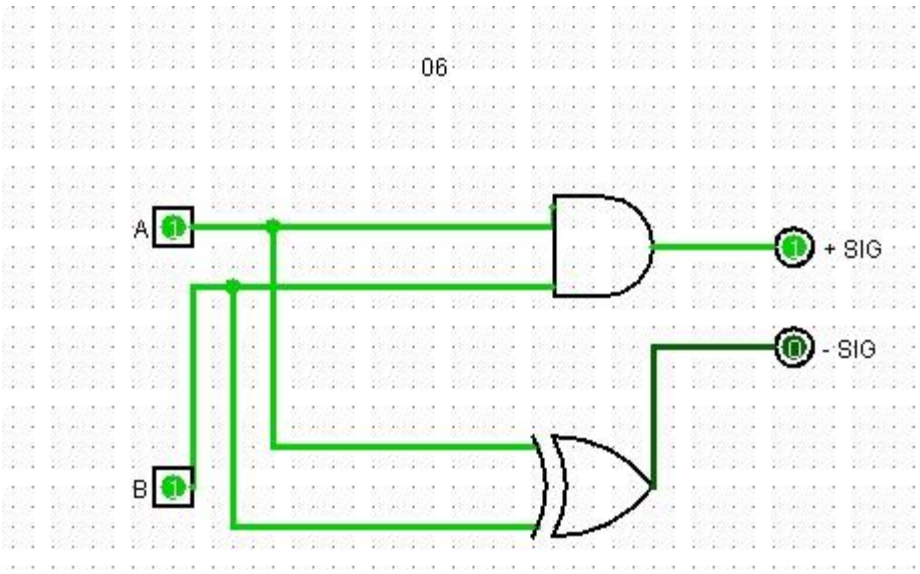
S=(~A·B)+(A·~B)

A	B	~A	~B	(~A·B)	(A·~B)	S
0	0	1	1	0	0	0
0	1	1	0	1	0	1
1	0	0	1	0	1	1
1	1	0	0	0	0	0

S=A⊕B

A	B	S = A⊕B
0	0	0
0	1	1
1	0	1
1	1	0

6. Construir e simular o circuito da soma de dois bits. Observe que nesse caso são necessárias duas entradas e duas saídas. Uma saída para o bit menos significativo e outra para o bit mais significativo (segunda casa).



A	B	Soma (S = A⊕B)	Carry (C = A·B)
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1