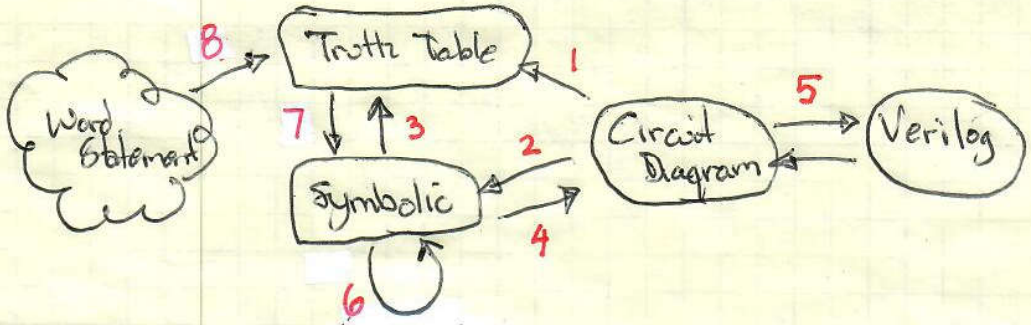
5 representations of logical functions



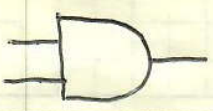
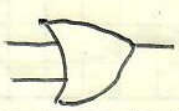
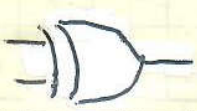
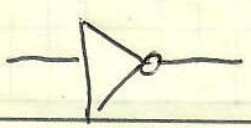
Word Statement ≡ Describes I/O & behavior using words

Truth Table ≡ Enumeration of every input & associated output

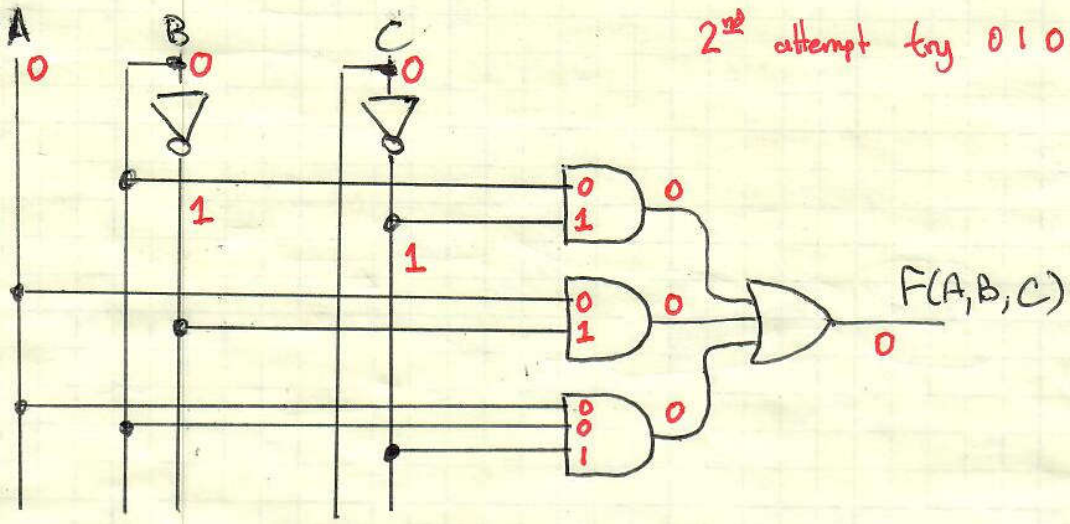
Symbolic ≡ Description of operations and operands to convert input to output

Circuit Diagram ≡ Picture of circuit elements & interconnections to transform input to output

Elementary Logic Functions

Function	AND	OR	XOR	Not
Word Statement	N-inputs 1 output that equals 1 when All inputs equal 1 else 0	N-inputs 1 output that equals 1 when ANY input equals 1, else 0	2 inputs 1 output that equals 1 when inputs are different, else 0	1 input 1 output that does not equal the input
Symbolic	A * B	A + B	A ⊕ B	A'
Truth Table	A B | A*B 0 0 0 1 1 0 1 1	A B | A+B 0 0 0 1 1 0 1 1	A B | A⊕B 0 0 0 1 1 0 1 1	A | A' 0 1
Circuit Diagram				

① Circuit Diagram → Truth Table



2nd attempt try 0 1 0

Observations

1. Gates may have different # of inputs
2. lines represent wire
3. Logic levels propagate instantly on wire
4. Black dots indicate connection btw wires
5. Crossing wires with no dot are not connected
6. Outputs are not connected together
7. Inputs must be tied to a signal source
8. An output can drive the input of many gates

Step 1
Identify inputs & outputs

A, B, C

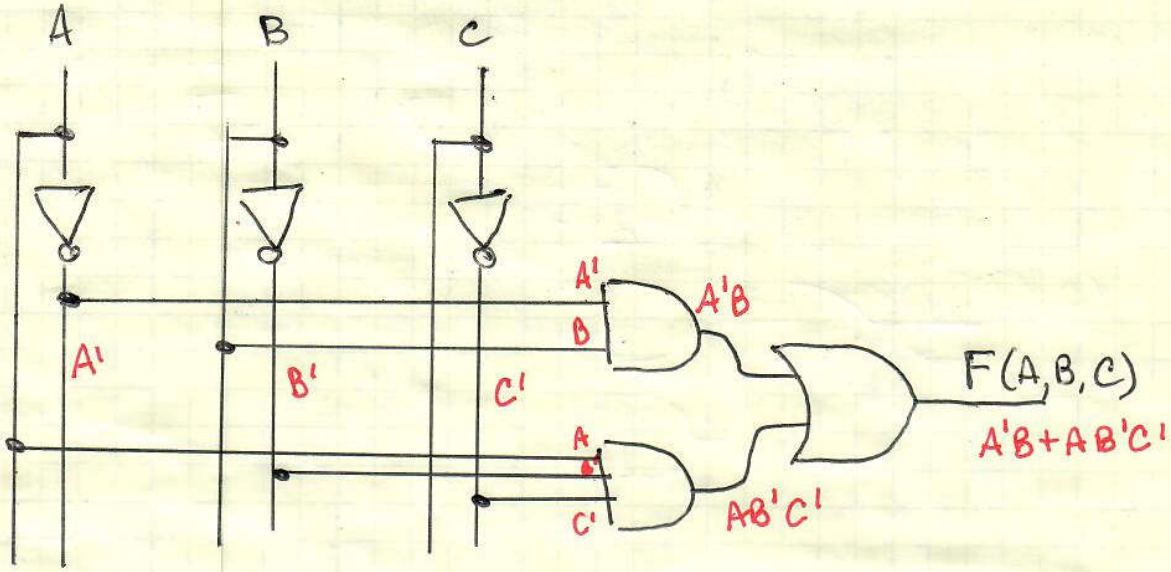
F

Step 2
Build shell of truth table

A	B	C	F(A,B,C)
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

Step 3
Evaluate
- apply input
- compute output for each gate until you reach output

② Circuit Diagram to Symbolic



- Flow inputs to output
- Gate output is computed when all inputs have values