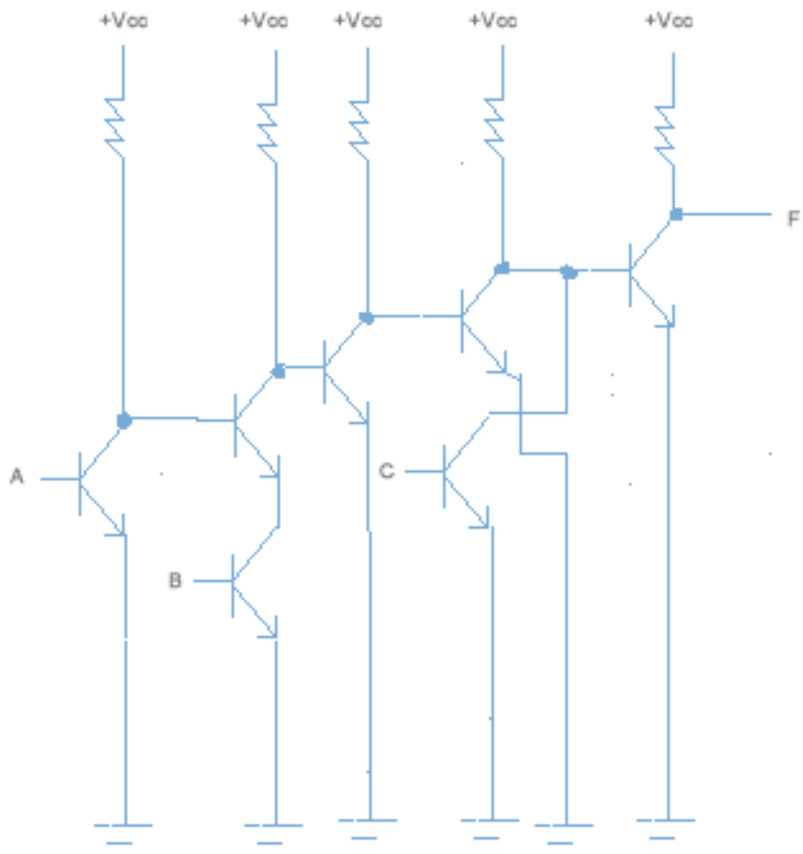
Computer Science 240
Assignment for Lab 6

1. Write a Boolean function for F:

A B C	F
0 0 0	1
0 0 1	0
0 1 0	1
0 1 1	1
1 0 0	0
1 0 1	1
1 1 0	1
1 1 1	0

F = A'B'C' + A'BC' + A'BC + AB'C + ABC'

2. Draw a transistor circuit (use transistors, not logc gate symbols) to implement F = A'B + C

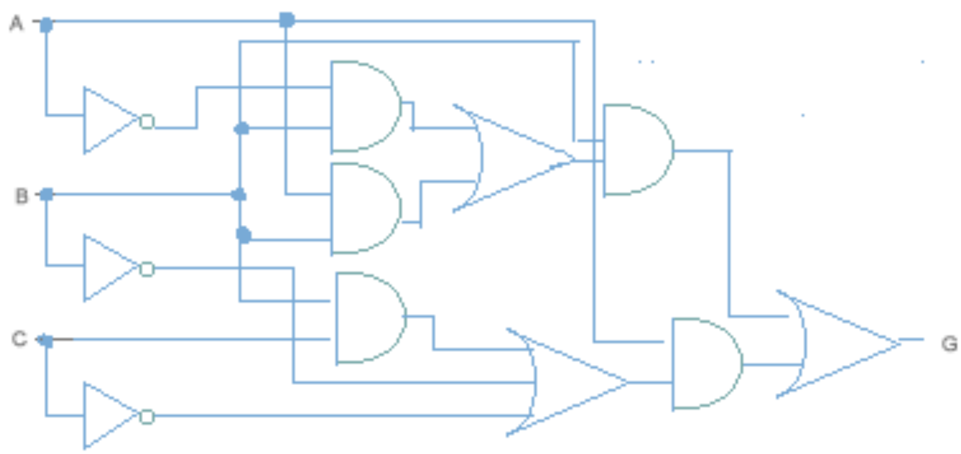


2. Draw a circuit which implements the following function G, using logic gates for AND, OR, and NOT .

Do not simplify G before drawing the circuit.

You may use 1, 2, or 3-input gates of type AND, OR, and NOT.

$$G = A(BC + B' + C') + B(AB + A'B)$$



3. Give the truth table for G. In the truth table, include the outputs of each of the gates in your circuit. For example:

A	B	C	BC	(BC+B'+C')	A(BC+B'+C')	AB	A'B	B(AB+A'B)	A(BC+B'+C')+B(AB+A'B)
0	0	0	0	1	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0
0	1	0	0	1	0	0	1	1	1
0	1	1	1	1	0	0	1	1	1
1	0	0	0	1	1	0	0	0	1
1	0	1	0	1	1	0	0	0	1
1	1	0	0	1	1	1	0	1	1
1	1	1	1	1	1	1	0	1	1

4. Use the identities of Boolean algebra to show that G is equivalent to F = A + B. Show all your work, and list the identity used for each step.

G = A(BC + B' + C') + B(AB + A'B)   F = A + B

A(BC + (BC)')		DeMorgan's
A(1)		Inverse
A		Identity
A	+ B((A + A')B)	Distributive
A	+ B((1)B))	Inverse
A	+ BB	Identity
A	+ B	Idempotent