Practice Problems 6 Solutions

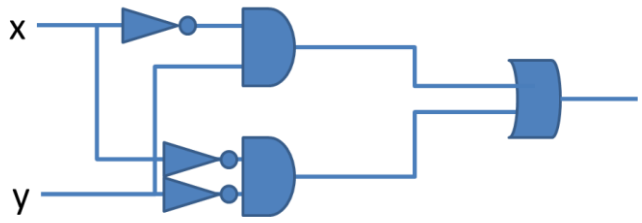
Be sure to provide an answer for each question. You may work with other students, as well as use your notes, the book, and the internet. Do make sure you understand how to solve the problems and answer the questions, as similar ones may appear on the exams.

For each Boolean expression, construct the appropriate input/output table, list the terms and minterms/maxterms, state whether the expression is in DNF, CDNF, CND, CCNF, or none of these and construct a circuit representing the expression. You may not change the presented form of the Boolean expression.

1. $\bar{x}y + \bar{x}\bar{y}$

x	y	$\bar{x}y$	$\bar{x}\bar{y}$	$\bar{x}y + \bar{x}\bar{y}$
1	1	0	0	0
1	0	0	0	0
0	1	1	0	1
0	0	0	1	1

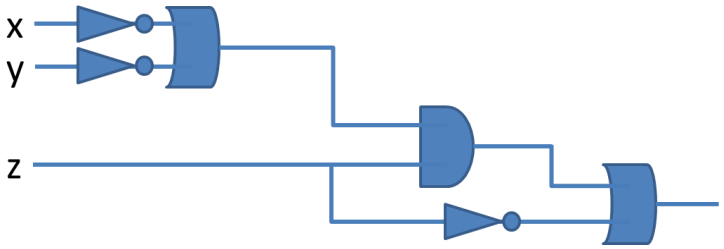
Terms: $\bar{x}y$, $\bar{x}\bar{y}$, $\bar{x}y + \bar{x}\bar{y}$
Minterms: $\bar{x}y$, $\bar{x}\bar{y}$
Maxterms: None
CDNF



2. $(\bar{x} + \bar{y})z + \bar{z}$

x	y	z	$(\bar{x} + \bar{y})z$	$\bar{z}$	$(\bar{x} + \bar{y})z + \bar{z}$
1	1	1	0	0	0
1	1	0	0	1	1
1	0	1	1	0	1
1	0	0	0	1	1
0	1	1	1	0	1
0	1	0	0	1	1
0	0	1	1	0	1
0	0	0	0	1	1

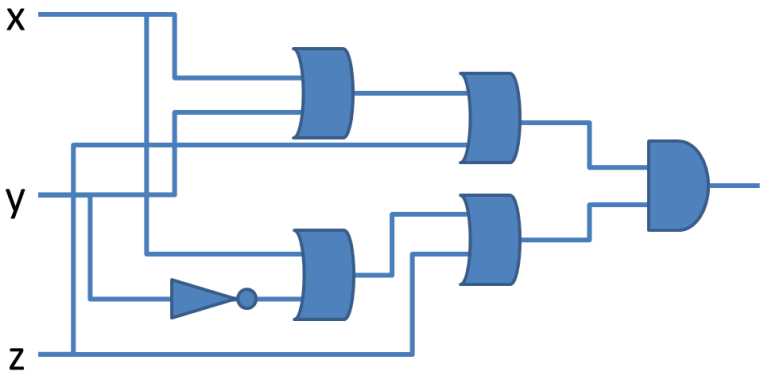
Terms: $(\bar{x}+\bar{y})z, \bar{z}, (\bar{x}+\bar{y})z+\bar{z}$
Minterms: none
Maxterms: none
None of these



3. $(x+y+z)\,(x+\bar{y}+z)$

x	y	z	$(x+y+z)$	$(x+\bar{y}+z)$	$(x+y+z)\,(x+\bar{y}+z)$
1	1	1	1	1	1
1	1	0	1	1	1
1	0	1	1	1	1
1	0	0	1	1	1
0	1	1	1	1	1
0	1	0	1	0	0
0	0	1	1	1	1
0	0	0	0	1	0

Terms: $(x+y+z)$, $(x+\bar{y}+z)$, $(x+y+z)\,(x+\bar{y}+z)$
Minterms: none
Maxterms: $(x+y+z)$, $(x+\bar{y}+z)$
CCNF



Construct an algebraic equation equivalent to the function f() based on the input/output table for that function, and a circuit based on that equation.

1.

x	y	z	f(x,y,z)
1	1	1	0
1	1	0	1
1	0	1	1
1	0	0	0
0	1	1	0
0	1	0	0
0	0	1	0
0	0	0	0

$f(x,y,z) = xy\bar{z}+x\bar{y}z$