CISC 203 Problem Set 4

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a)

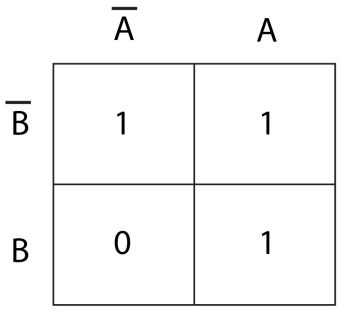
1. The Boolean expression is :

   $y = \bar{A}\bar{B} + A\bar{B} + AB$

2. Sigma notation is:

   $Y = \Sigma(0, 2, 3)$

3. The Karnaugh map can be represented as:



   The simplified expression is:
   $y = \bar{B} + A$

b)

1. The Boolean expression is :

   $y = \bar{A}\bar{B}\bar{C} + ABC$

2. Sigma notation is:

   $Y = \Sigma(0, 7)$

3. The Karnaugh map can be represented as:

	$\overline{A}\,\overline{B}$	$\overline{A}\,B$	$A\,B$	$A\,\overline{B}$
$\overline{C}$	1	0	0	0
C	0	0	1	0

The simplified expression is :
$y = \bar{A}\bar{B}\bar{C} + ABC$

c)

1. The Boolean expression is :

   $y = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + ABC + A\bar{B}C$

2. Sigma notation is:

   $Y = \Sigma(0, 2, 4, 5, 7)$

3. The Karnaugh map can be represented as:

	$\overline{A}\,\overline{B}$	$\overline{A}\,B$	$A\,B$	$A\,\overline{B}$
$\overline{C}$	1	1	0	1
C	0	0	1	1

The simplified expression is:
$y = \bar{A}\bar{C} + AC + A\bar{B}$

d)

1. The Boolean expression is :

$y = \bar{A}\bar{B}\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + \bar{A}\bar{B}C\bar{D} + ABC\bar{D} + A\bar{B}C\bar{D}$

2. Sigma notation is:

   $Y = \Sigma(0, 1, 2, 3, 8, 10, 14)$

3. The Karnaugh map can be represented as:

	$\overline{A}\,\overline{B}$	$\overline{A}\,B$	$A\,B$	$A\,\overline{B}$
$\overline{C}\,\overline{D}$	1	0	0	1
$\overline{C}\,D$	1	0	0	0
$C\,D$	1	0	0	0
$C\,\overline{D}$	1	0	1	1

   The simplified expression is:
   $y = \bar{A}\bar{B} + A\bar{C}\bar{D} + AC$

e)

1. The Boolean expression is :

   $y = \bar{A}\bar{B}\bar{C}\bar{D} + AB\bar{C}\bar{D} + \bar{A}B\bar{C}D + A\bar{B}\bar{C}D\bar{A}\bar{B}CD + ABCD + \bar{A}BC\bar{D} + A\bar{B}C\bar{D}$

2. Sigma notation is:

   $Y = \Sigma(0, 3, 5, 6, 9, 10, 12, 15)$

3. The Karnaugh map can be represented as:

	$\overline{A}\,\overline{B}$	$\overline{A}\,B$	$A\,B$	$A\,\overline{B}$
$\overline{C}\,\overline{D}$	1	0	1	0
$\overline{C}\,D$	0	1	0	1
$C\,D$	1	0	1	0
$C\,\overline{D}$	0	1	0	1

The simplified expression is:

$y = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + AB\bar{C}\bar{D} + ABCD + A\bar{B}\bar{C}D + A\bar{B}C\bar{D}$