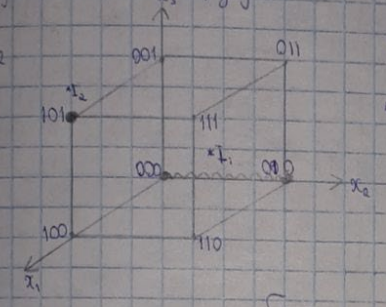
Булев куб §1.1

$F = 10100100_2$

x_1	x_2	x_3	F
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	0
1	1	1	0



§3

$I_1 \begin{cases} 000 \\ 010 \end{cases} = 0\,0 \Rightarrow \bar{x}_1 \bar{x}_3$

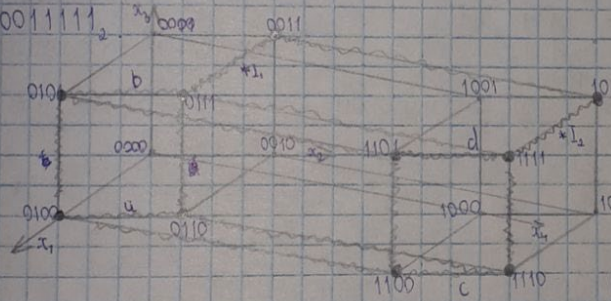
$I_2 = 101 \Rightarrow x_1 \bar{x}_2 x_3$

МДНФ: $\bar{x}_1 \bar{x}_3 \vee x_1 \bar{x}_2 x_3$

§1.2

$F = 0001111100011111_2$

x_1	x_2	x_3	x_4	F
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1



$I_1 \begin{cases} 0111 \\ 0011 \end{cases} = 0-11 \Rightarrow \bar{x}_1 x_3 x_4$

$I_2 \begin{cases} 1111 \\ 1011 \end{cases} = 1-11 \Rightarrow x_1 x_3 x_4$ } $x_3 x_4$

$a = \begin{cases} 0100 \\ 0110 \end{cases} = 01-0 \Rightarrow \bar{x}_1 x_2 \bar{x}_4$

$b = \begin{cases} 0101 \\ 0111 \end{cases} = 01-1 \Rightarrow \bar{x}_1 x_2 x_4$ } $\bar{x}_1 x_2$

$c = \begin{cases} 1100 \\ 1110 \end{cases} = 11-0 \Rightarrow x_1 x_2 \bar{x}_4$

$d = \begin{cases} 1101 \\ 1111 \end{cases} = 11-1 \Rightarrow x_1 x_2 x_4$ } $x_1 x_2$

x_2

МДНФ: $x_2 \vee x_3 x_4$.

§2.1.

Карта Карно.

В Карта Карно нужно искать как максимально большие интервалы, но интервалов в карте должно быть как можно меньше.

$F = 10100100_2$

x_1 \ x_2x_3	00	01	11	10
0	(1)	0	0	(1)
1	0	(1)	0	0

МДНФ: $x_1\bar{x}_2x_3 \vee \bar{x}_1\bar{x}_3$.

№2.2. $F = 0001111100011111_2$

МДНФ: $x_2 \vee x_3x_4$.

x_1x_2 \ x_3x_4	00	01	11	10
00	0	0	(1)	0
01	(1	1	1	1)
11	1	1	1	1
10	0	0	(1)	0

№3.1

Метод Квайна Мак-Класки

$F = 10100100_2$

1)

0к	0	0	0
1к	0	1	0
2к	1	0	1

2) $0 - 0 - \Pi_1$

МДНФ: $\bar{x}_1\bar{x}_3 \vee x_1\bar{x}_2x_3$

	000	010	101
Π_1 0-0-0	+	+	

Склеивать элементы пока возможно

№3.2.

$F = 0001111100011111_2$

Π_1	0	0	1	1	0к	0 1 0 0
Π_2	0	1	0	0		0 0 1 1
Π_3	0	1	0	1	1к	0 1 0 1
Π_4	0	1	1	0		0 1 1 0
Π_5	0	1	1	1		1 1 0 0
Π_6	1	0	1	1		0 1 1 1
Π_7	1	1	0	0		1 0 1 1
Π_8	1	1	0	1	2к	1 1 0 1
Π_9	1	1	1	0		1 1 1 0
Π_{10}	1	1	1	1	3к	1 1 1 1

0 1 0 -	0 1 0 -	- 1 0 -	- 1 0 -
0 1 - 0	1 1 0 -	1 1 - -	- 1 - -
0 - 1 1	1 1 1 -	0 1 - -	- - 1 1
- 0 1 1	0 1 - 0	- 1 - 0	
0 1 - 1	0 1 - 1	- 1 - 1	
- 1 0 1	1 1 - 0	- - 1 1	
- 1 1 0	1 1 - 1	- - 1 1	
1 1 0 -	0 - 1 1	- 1 - 1	
1 1 - 0	1 - 1 1		
- 1 1 1	- 0 1 1		
1 - 1 1	- 1 0 1		
1 1 - 1	- 1 1 0		
1 1 1 -	- 1 1 1		

МДНФ: $x_3x_4 \vee x_2$

Строим таблицу

	0011	0100	0101	0110	0111	1011	1100	1101	1110	1111
-10-		+	+				+	+		
-1--	(+)	+	+	+	+		+	+	+	+
x_3x_4 11	+					+				+

Диаграммы Вейча №4.1.

$F = 10100100_2$

x_1	x_2	x_3	F	
0	0	0	1	I
0	0	1	0	
0	1	0	1	II
0	1	1	0	
1	0	0	0	III
1	0	1	1	
1	1	0	0	IV
1	1	1	0	

	x_2	$\bar{x}_2$
x_1	0 0	(1) 0
$\bar{x}_1$	(1) 0	0 (1)
	$\bar{x}_3$ x_3	$\bar{x}_3$

МДНФ: $\bar{x}_1\bar{x}_3 \vee x_1\bar{x}_2x_3$.

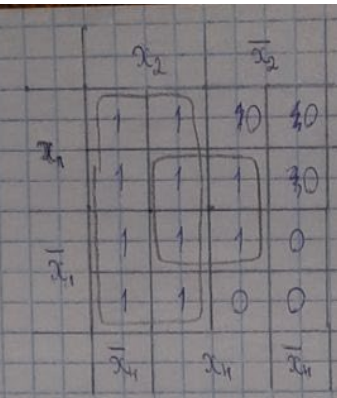
1) Разбиваем ф-ию на 4 блока
2) Подставляем каждый блок в наши карты (диаграммы), учитывая, что это тор.

№4.2.

$F = 0001111100011111_2$.

x_1	x_2	x_3	x_4	F	
0	0	0	0	0	I
0	0	0	1	0	
0	0	1	0	0	
0	0	1	1	1	
0	1	0	0	1	II
0	1	0	1	1	
0	1	1	0	1	
0	1	1	1	1	
1	0	0	0	0	III
1	0	0	1	0	
1	0	1	0	0	
1	0	1	1	1	
1	1	0	0	1	IV
1	1	0	1	1	
1	1	1	0	1	
1	1	1	1	1	

	x_2		$\bar{x}_2$		
x_1	1	1	0	0	$\bar{x}_3$
	1	1	1	0	x_3
$\bar{x}_1$	1	1	1	0	
	1	1	0	0	$\bar{x}_3$
	$\bar{x}_4$	x_4		$\bar{x}_4$	



Тороидальная форма (как и у карт Карно)

МДНФ: $x_2 \vee x_3 x_4$

(Ищем наибольший единичный "кратный 2^n" интервал)

№5.1.

Метод неопределённых коэффициентов:

$F = 10100100_2$

x_1	x_2	x_3	x_1x_2	x_1x_3	x_2x_3	$x_1x_2x_3$	F
~~0~~	~~0~~	~~0~~	~~00~~	00	~~00~~	~~000~~	1
0	0	1	00	01	01	001	0
~~0~~	~~1~~	~~0~~	~~01~~	00	~~10~~	~~010~~	1
0	1	1	01	01	11	011	0
1	0	0	10	10	00	100	0
~~1~~	~~0~~	~~1~~	~~10~~	~~11~~	~~01~~	101	1
1	1	0	11	10	10	110	0
1	1	1	11	11	11	111	0

1) Вычеркиваем нули ф-ии.
2) Вычеркиваем в столбцах уже выч-ые значения.
3) Вычеркиваем поглощённые конъюнкты.
4) Ядро фун-ии:

МДНФ: $\bar{x}_1\bar{x}_3 \vee x_1\bar{x}_2x_3$.

№5.2.

$F = 0001111100011111_2$

x_1	x_2	x_3	x_4	x_1x_2	x_1x_3	x_1x_4	x_2x_3	x_2x_4	x_3x_4	$x_1x_2x_3$	$x_1x_2x_4$	$x_1x_3x_4$	$x_2x_3x_4$	$x_1x_2x_3x_4$	F
~~0~~	~~0~~	~~0~~	~~0~~	~~00~~	~~00~~	~~00~~	~~00~~	~~00~~	~~00~~	~~000~~	~~000~~	~~000~~	~~000~~	~~0000~~	0
~~0~~	~~0~~	~~0~~	~~1~~	~~00~~	~~00~~	~~01~~	~~00~~	~~01~~	~~01~~	~~000~~	~~001~~	~~001~~	~~001~~	~~0001~~	0
~~0~~	~~0~~	~~1~~	~~0~~	~~00~~	~~01~~	~~00~~	~~01~~	~~00~~	~~10~~	~~001~~	~~000~~	~~010~~	~~010~~	~~0010~~	0
~~0~~	~~0~~	~~1~~	~~1~~	~~00~~	~~01~~	~~01~~	~~01~~	~~01~~	~~11~~	~~001~~	~~001~~	~~011~~	~~011~~	~~0011~~	1
~~0~~	~~1~~	~~0~~	~~0~~	~~01~~	~~00~~	~~00~~	~~10~~	~~10~~	~~00~~	~~010~~	~~010~~	~~000~~	~~100~~	~~0100~~	1
~~0~~	~~1~~	~~0~~	~~1~~	~~01~~	~~00~~	~~01~~	~~10~~	~~11~~	~~01~~	~~010~~	~~011~~	~~001~~	~~101~~	~~0101~~	1
~~0~~	~~1~~	~~1~~	~~0~~	~~01~~	~~01~~	~~00~~	~~11~~	~~10~~	~~10~~	~~011~~	~~010~~	~~010~~	~~110~~	~~0110~~	1
~~0~~	~~1~~	~~1~~	~~1~~	~~01~~	~~01~~	~~01~~	~~11~~	~~11~~	~~11~~	~~011~~	~~011~~	~~011~~	~~111~~	~~0111~~	1
~~1~~	~~0~~	~~0~~	~~0~~	~~10~~	~~10~~	~~10~~	~~00~~	~~00~~	~~00~~	~~100~~	~~100~~	~~100~~	~~000~~	~~1000~~	0
~~1~~	~~0~~	~~0~~	~~1~~	~~10~~	~~10~~	~~11~~	~~00~~	~~01~~	~~01~~	~~100~~	~~101~~	~~101~~	~~001~~	~~1001~~	0
~~1~~	~~0~~	~~1~~	~~0~~	~~10~~	~~11~~	~~10~~	~~01~~	~~00~~	~~10~~	~~101~~	~~100~~	~~110~~	~~010~~	~~1010~~	0
~~1~~	~~0~~	~~1~~	~~1~~	~~10~~	~~11~~	~~11~~	~~01~~	~~01~~	~~11~~	~~101~~	~~101~~	~~111~~	~~011~~	~~1011~~	1
~~1~~	~~1~~	~~0~~	~~0~~	~~11~~	~~10~~	~~10~~	~~10~~	~~10~~	~~00~~	~~110~~	~~110~~	~~100~~	~~100~~	~~1100~~	1
~~1~~	~~1~~	~~0~~	~~1~~	~~11~~	~~10~~	~~11~~	~~10~~	~~11~~	~~01~~	~~110~~	~~111~~	~~101~~	~~101~~	~~1101~~	1
~~1~~	~~1~~	~~1~~	~~0~~	~~11~~	~~11~~	~~10~~	~~11~~	~~10~~	~~10~~	~~111~~	~~110~~	~~110~~	~~110~~	~~1110~~	1
~~1~~	~~1~~	~~1~~	~~1~~	~~11~~	~~11~~	~~11~~	~~11~~	~~11~~	~~11~~	~~111~~	~~111~~	~~111~~	~~111~~	~~1111~~	1

Используя законы склеивания и поглощения:

МДНФ: $x_2 \vee x_3 x_4$.