Theory of Logic Circuits					
Academic year	Term	Makrokierunek	Exercise Supervisor	Group	Section
2018/2019	Thursday 15:15-16:45		KP	1,2	1

Report from exercise number 1

Exercise performed on: 2019-03-21

Subject of the exercise:

Combinational switching circuits

Section consists of:

Mikołaj Dobosz group 1
Wojciech Bieniek group 2

Task 1

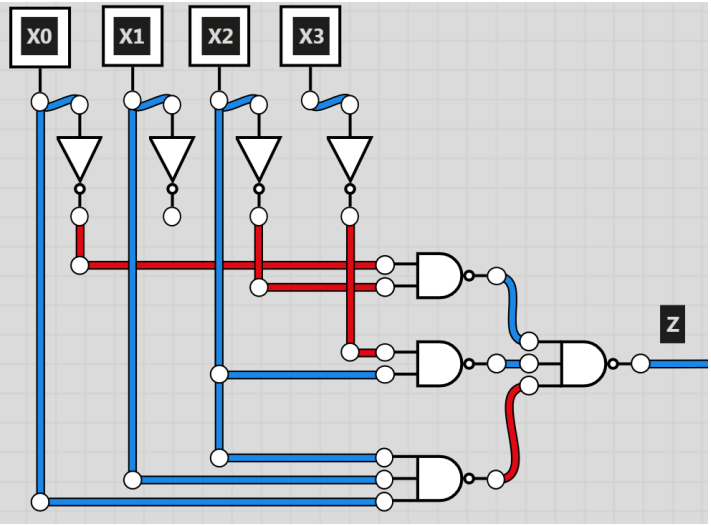
Design a switching circuit from given function $Z=\Sigma(0,2,4,5,6,7,8,10,15)_{x_3x_2x_1x_0}$.

x_3x_2 \ x_1x_0	00	01	11	10
00	1			1
01	1	1	1	1
11			1	
10	1			1

$$Z=\overline{x}_0\overline{x}_2+\overline{x}_3x_2+x_2x_1x_0$$

$$Z=\overline{\overline{x}_0\overline{x}_2+\overline{x}_3x_2+x_2x_1x_0}$$

$$Z=\overline{\overline{\overline{x}_0\overline{x}_2}*\overline{\overline{x}_3x_2}*\overline{x_2x_1x_0}}$$



Task 2

Design a translator from the Gray code into the binary code.

Gray			Binary		
X_2	X_1	X_0	Z_2	Z_1	Z_0
0	0	0	0	0	0
0	0	1	0	0	1
0	1	1	0	1	0
0	1	0	0	1	1
1	1	0	1	0	0
1	1	1	1	0	1
1	0	1	1	1	0
1	0	0	1	1	1

x_2x_1 \ x_0	0	1
00	0	0
01	0	0
11	1	1
10	1	1

x_2x_1 \ x_0	0	1
00	0	0
01	1	1
11	0	0
10	1	1

x_2x_1 \ x_0	0	1
00	0	1
01	1	0
11	0	1
10	1	0

$$Z_0 = x_0\overline{x}_2\overline{x}_1 + \overline{x}_0\overline{x}_2x_1 + x_0x_1x_2 + \overline{x}_0x_2x_1$$

$$Z_0 = x_0 \oplus \overline{(x_1 \oplus x_2)}$$

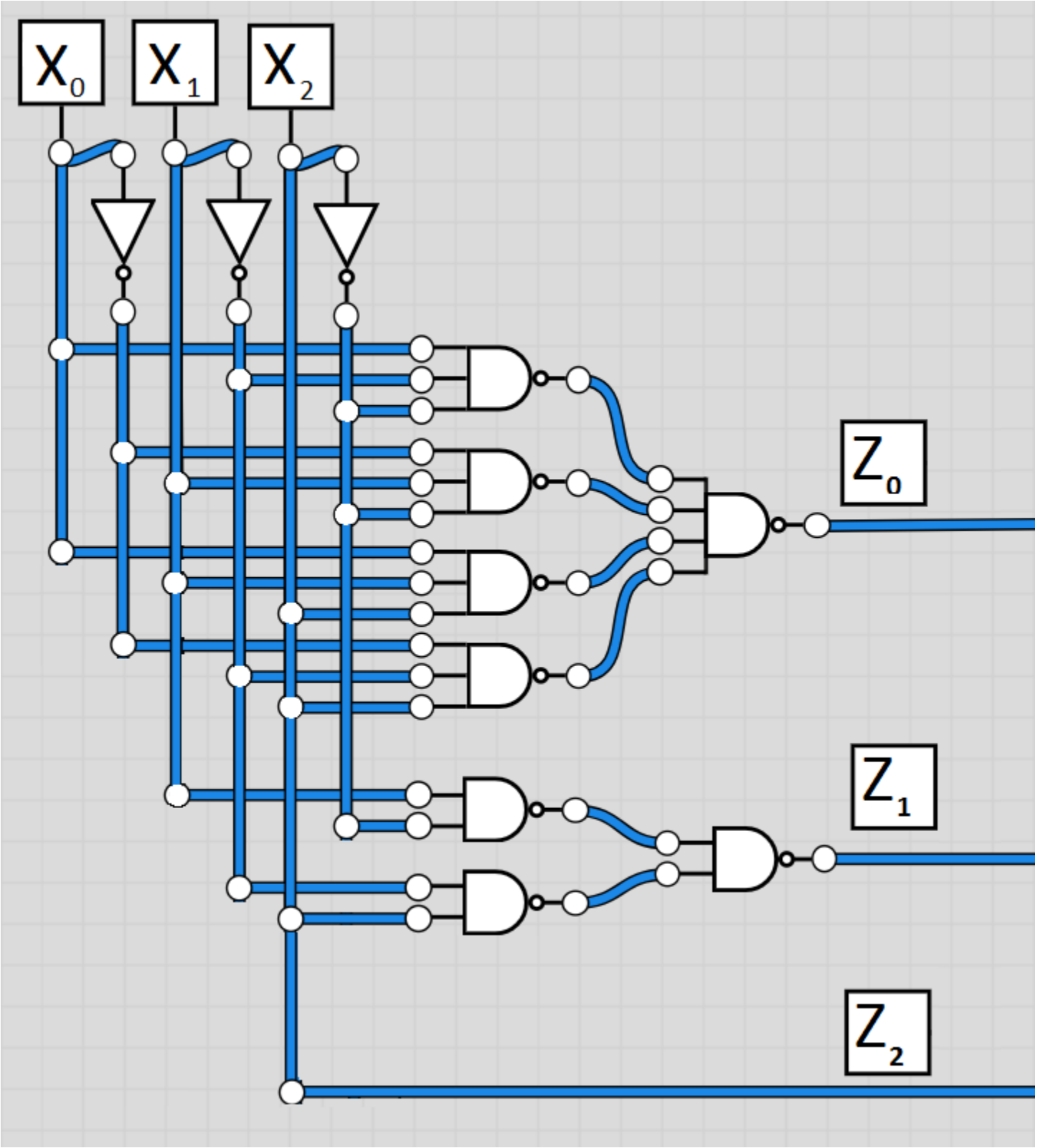
$$Z_0 = \overline{\overline{x_0\overline{x}_1\overline{x}_2} * \overline{\overline{x}_0x_1\overline{x}_2} * \overline{x_0x_1x_2} * \overline{\overline{x}_0\overline{x}_1x_2}}$$

$$Z_1 = \overline{x}_2x_1 + x_2\overline{x}_1$$

$$Z_1 = x_1 \oplus x_2$$

$$Z_1 = \overline{\overline{x_1\overline{x}_2} * \overline{\overline{x}_1x_2}}$$

$$Z_2 = x_2$$


X0
X1
X2
Z0
Z1
Z2