

## Контрольное домашнее задание 2

**В КДЗ 2 следует выполнить следующие задания**

1. Записать булевы выражения А, В и С в стандартных обозначениях
2. Проверить, эквивалентны ли А и В
3. Привести В и С к КНФ и ДНФ
4. Написать двойственное к С выражение в виде многочлена Жегалкина
5. Указать, при каких значениях переменных В истинно
6. Проверить А на линейность и монотонность
7. Проверить, не являются ли А, В и С тавтологиями

1

$$A = \&\text{and}(\&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(c, b, \&\text{not}(a))), \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$B = \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c))$$

$$C = c b + b + a b + 1 + a$$

2

$$A = \&\text{and}(\&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = c b + a c b + b + a b + 1 + a$$

3

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = c b + a c$$

4

$$A = \&\text{or}(a, c, \&\text{not}(b))$$

$$B = \&\text{or}(\&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$C = c + 1 + a c$$

5

$$A = \&\text{or}(c, b, \&\text{not}(a))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b)))$$

$$C = b + 1 + a$$

6

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \\ \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)), \\ \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{and}(a, c, b) \&\text{or} \&\text{and}(b, \&\text{not}(a), \&\text{not}(c))$$

$$C = b + a b + a c$$

7

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(a, c, \&\text{not}(b)), \\ \&\text{or}(c, b, \&\text{not}(a)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)) \&\text{or} \&\text{and}(b, \&\text{not}(a), \&\text{not}(c))$$

$$C = c + b + 1 + a$$

8

$$A = \&\text{and}(\&\text{or}(c, b, \&\text{not}(a)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \\ \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \\ \&\text{and}(c, b, \&\text{not}(a)))$$

$$C = c b + 1 + a$$

9

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(c, b, \&\text{not}(a)), \\ \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$C = c b + a c$$

10

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$B = \&\text{or}(\&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a)), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = c b + c + a b + 1$$

11

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(c, b, \&\text{not}(a))), \\ \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(c, b, \&\text{not}(a))), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$C = c + a b + 1 + a c$$

12

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c))), \\ \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = a c b + c + 1 + a c$$

13

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(c, b, \&\text{not}(a))), \\ \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$B = \textit{false}$$

$$C = a c b + b + 1 + a c + a$$

14

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(c, b, \&\text{not}(a)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b))), \\ \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c))), \\ \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$C = a c b + c + b + a b + 1 + a c + a$$

15

$$A = \&\text{and}(\&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b))), \\ \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b))), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = c b + c + 1 + a c$$

16

$$A = \&\text{or}(a, b, \&\text{not}(c)) \&\text{and} \&\text{or}(a, c, \&\text{not}(b))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a))), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(b, \&\text{not}(a), \&\text{not}(c)), \\ \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$C = b + a b$$

17

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(c, b, \&\text{not}(a)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \\ \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a)))$$

$$C = c + a b + 1 + a c$$

18

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(c, b, \&\text{not}(a)), \\ \&\text{or}(b, \&\text{not}(a), \&\text{not}(c)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a)), \\ \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$C = c b + a c b + c + b + a$$

19

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \\ \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(c, b, \&\text{not}(a)), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = c b + a c b + c + b$$

20

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, b), \&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(c, b, \&\text{not}(a)), \\ \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$B = \&\text{or}(\&\text{and}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{and}(c, b, \&\text{not}(a)), \\ \&\text{and}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$C = c b + a c b + b + a b + a c + a$$

21

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(c, b, \&\text{not}(a)))$$

$$B = \&\text{and}(a, b, \&\text{not}(c)) \&\text{or} \&\text{and}(a, c, \&\text{not}(b))$$

$$C = a c b + c + a b + a$$

22

$$A = \&\text{and}(\&\text{or}(a, c, b), \&\text{or}(a, \&\text{not}(b), \&\text{not}(c)), \&\text{or}(a, c, \&\text{not}(b)), \\ \&\text{or}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{or}(\&\text{not}(a), \&\text{not}(b), \&\text{not}(c)))$$

$$B = \&\text{or}(\&\text{and}(a, b, \&\text{not}(c)), \&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, b, \&\text{not}(a)), \\ \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$C = cb + acb + c + b + ab + 1 + a$$

23

$$A = \&\text{or}(a, \&\text{not}(b), \&\text{not}(c))$$

$$B = \&\text{or}(\&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)))$$

$$C = cb + acb + ac$$

24

$$A = \&\text{and}(\&\text{or}(a, b, \&\text{not}(c)), \&\text{or}(a, c, \&\text{not}(b)), \&\text{or}(c, b, \&\text{not}(a)))$$

$$B = \&\text{or}(\&\text{and}(a, c, b), \&\text{and}(a, c, \&\text{not}(b)), \&\text{and}(c, \&\text{not}(a), \&\text{not}(b)), \&\text{and}(b, \&\text{not}(a), \&\text{not}(c)))$$

$$C = c + 1$$