

### Лабораторная работа 3

1. Вычислить длину формулы. Выполнить преобразования формул, используя законы булевой алгебры. Вычислить длину формулы после преобразования.

$$\bar{a}\bar{b}\bar{c} + abc + \bar{a}b\bar{c} + a\bar{b}c$$

$$a\bar{b}c + \bar{a}bc + ab\bar{c} + abc$$

$$a\bar{b}\bar{c} + abc + \bar{a}b\bar{c} + ab\bar{c} + \bar{a}bc$$

$$ab + a^- b^- + abc^-$$

$$(a + b + c)(a + b + \bar{c})(a + \bar{b} + \bar{c})(\bar{a} + b + \bar{c})$$

$$(\bar{a} + \bar{b} + \bar{c})(a + b + \bar{c})(\bar{a} + b + \bar{c})(a + \bar{b} + \bar{c})(\bar{a} + b + \bar{c})$$

$$\overline{a + b} + \bar{a}c + \bar{b} + ac$$

$$\overline{\overline{\bar{a}\bar{b}} + \overline{\bar{c}\bar{d}} + \bar{a}b + c\bar{d}}$$

$$\overline{ab + \bar{c}\bar{d}} * \overline{\bar{a}\bar{c} + \bar{b}\bar{d}}$$

$$(a + b)\bar{a}\bar{b} + ac(b\bar{c}d + a\bar{b})$$

$$d + (a + \bar{d})(\bar{a} + \bar{d}) + \overline{(\bar{a}\bar{c} + \bar{b}\bar{d} + \bar{a}\bar{b}c\bar{d})}$$

$$\overline{a + \bar{a}\bar{c}} * \overline{\bar{b} + \bar{d}} + \overline{ab\bar{c}\bar{d}} * \overline{(c + d)(\bar{c} + d)}$$

2. Булевы функции заданы таблицей истинности. Записать эти БФ в форматах СДНФ и СКНФ. Номер задания – это F с вашим номером в списке группы (взять у старосты).

| № | abc | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | F12 | F13 | F14 | F15 |
|---|-----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|
| 0 | 000 | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 1   | 0   | 0   | 1   | 0   | 1   |
| 1 | 001 | 0  | 1  | 1  | 1  | 1  | 0  | 0  | 1  | 0  | 1   | 1   | 1   | 0   | 1   | 0   |
| 2 | 010 | 1  | 0  | 1  | 0  | 1  | 1  | 0  | 1  | 0  | 0   | 1   | 1   | 1   | 0   | 1   |
| 3 | 011 | 0  | 1  | 1  | 1  | 1  | 1  | 0  | 0  | 1  | 0   | 1   | 0   | 1   | 0   | 0   |
| 4 | 100 | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 1   | 1   | 0   | 1   | 1   | 0   |
| 5 | 101 | 0  | 0  | 0  | 1  | 0  | 1  | 1  | 1  | 1  | 1   | 0   | 1   | 1   | 0   | 1   |
| 6 | 110 | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 1   | 1   | 0   | 1   | 0   | 0   |
| 7 | 111 | 0  | 1  | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0   | 0   | 0   | 1   | 1   | 1   |

| № | abc | F16 | F17 | F18 | F19 | F20 | F21 | F22 | F23 | F24 | F25 | F26 | F27 | F28 | F29 | F30 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 000 | 1   | 1   | 1   | 0   | 1   | 0   | 0   | 0   | 0   | 1   | 0   | 1   | 1   | 0   | 1   |
| 1 | 001 | 1   | 0   | 1   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 1   | 0   |
| 2 | 010 | 0   | 1   | 0   | 1   | 1   | 0   | 1   | 1   | 0   | 0   | 1   | 0   | 0   | 1   | 0   |
| 3 | 011 | 0   | 1   | 0   | 1   | 0   | 1   | 1   | 1   | 0   | 1   | 1   | 0   | 0   | 0   | 0   |
| 4 | 100 | 0   | 0   | 1   | 0   | 0   | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 0   | 0   | 1   |
| 5 | 101 | 0   | 0   | 1   | 0   | 1   | 1   | 1   | 0   | 1   | 1   | 0   | 1   | 0   | 1   | 1   |
| 6 | 110 | 1   | 1   | 1   | 1   | 0   | 1   | 0   | 0   | 0   | 1   | 0   | 0   | 0   | 0   | 1   |
| 7 | 111 | 0   | 0   | 1   | 0   | 0   | 0   | 1   | 0   | 1   | 0   | 1   | 0   | 1   | 1   | 0   |