

Vježbe III

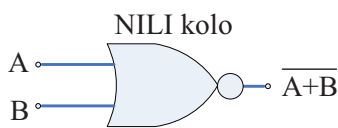
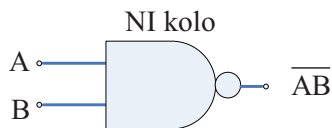
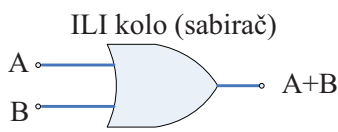
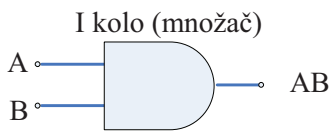
Bulova algebra

$$\begin{aligned}
 A + 0 &= A & A \times 0 &= 0 \\
 A + 1 &= 1 & A \times 1 &= A \\
 A + A &= A & A \times A &= A \\
 A + \bar{A} &= 1 & A \times \bar{A} &= 0 \\
 \bar{\bar{A}} &= A
 \end{aligned}$$

De Morganova teorema

$$\begin{aligned}
 \overline{A+B} &= \bar{A} \times \bar{B} \\
 \overline{A \times B} &= \bar{A} + \bar{B}
 \end{aligned}$$

Logički elementi



INVERTOR



ili



napomena

Oznake za inverter su ekvivalentne i mogu se ravnopravno koristiti

1. Koristeći pravila Bulove algebre uprostiti izraze:

a) $AB + \bar{A}B$ b) $A+B+\bar{A}\bar{B}$ c) $\overline{AC} \times \overline{ABC}$ d) $\overline{ABC} + \overline{A\bar{B}C} + \overline{AB\bar{C}} + \overline{ABC}$

a) $AB + \bar{A}B = B(A + \bar{A}) = B$

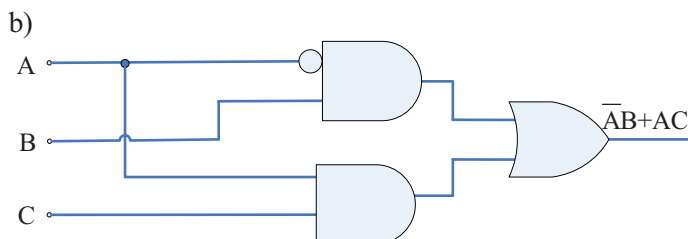
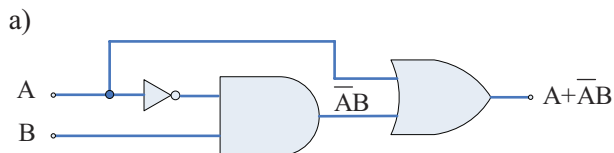
b) $A+B+\bar{A}\bar{B} = A+B+\overline{A+B} = 1$

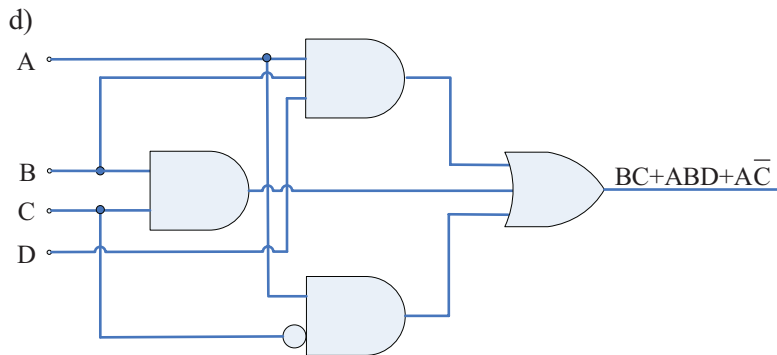
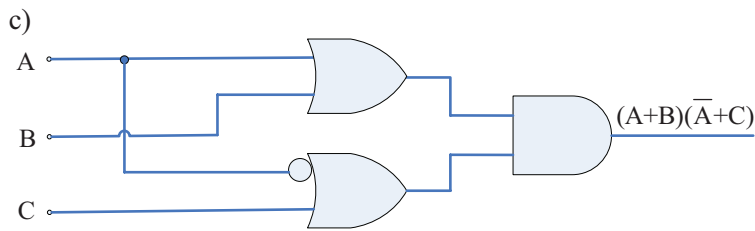
c) $\overline{AC} \times \overline{ABC} = (\bar{A} + \bar{C}) \times (A + \bar{B} + \bar{C}) = \bar{A}A + \bar{A}\bar{B} + \bar{A}\bar{C} + \bar{C}A + \bar{C}\bar{B} + \bar{C}\bar{C} = \bar{A}\bar{B} + \bar{A}\bar{C} + \bar{C}A + \bar{C}\bar{B} + \bar{C} = \bar{A}\bar{B} + \bar{C}(A + \bar{A} + \bar{B} + 1) = \bar{A}\bar{B} + \bar{C}$

d) $\overline{ABC} + \overline{A\bar{B}C} + \overline{AB\bar{C}} + \overline{ABC} = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} = \bar{A}\bar{B}(\bar{C} + \bar{C}) + \bar{A}B\bar{C} + A\bar{B}\bar{C} = \bar{A}\bar{B} + \bar{A}B\bar{C} + A\bar{B}\bar{C} = \bar{A}(\bar{B} + B)\bar{C} = \bar{A}\bar{C}$

2. Nacrtati šeme realizacije izraza:

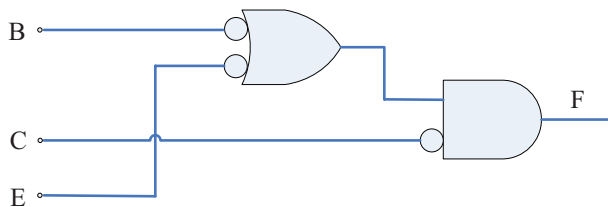
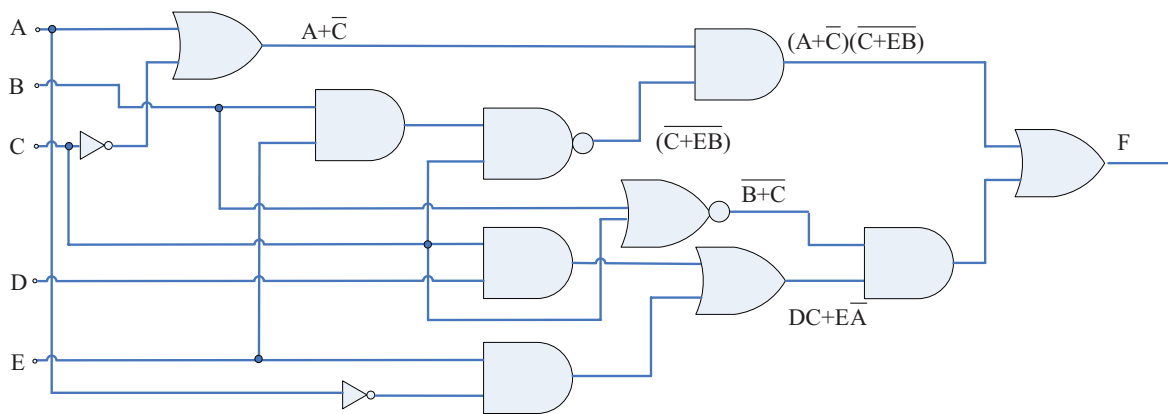
a) $A + \bar{A}B$ b) $\bar{A}B + AC$ c) $(A+B)(\bar{A}+C)$ d) $BC + ABD + \bar{A}C$





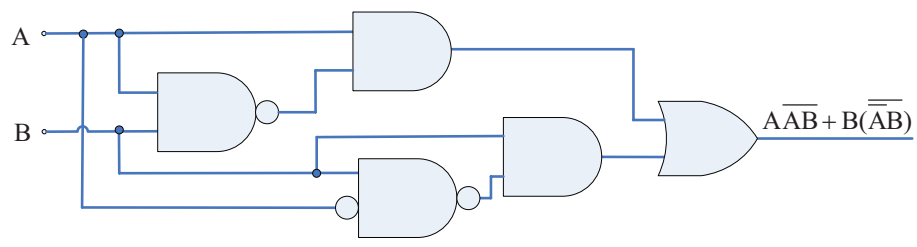
3. Uprostiti, a zatim realizovati originalnu i uprošćenu funkciju.

$$\begin{aligned}
 F &= (A+\bar{C})(\overline{C+EB})+(DC+E\bar{A})(\overline{B+C})=(A+\bar{C})\bar{C}\bar{E}\bar{B}+(DC+E\bar{A})\bar{B}\bar{C} = \\
 &= (A+\bar{C})\bar{C}(\bar{E}+\bar{B})+\bar{B}\bar{C}DC+\bar{B}\bar{C}E\bar{A} = (A\bar{C}+\bar{C}\bar{C})(\bar{E}+\bar{B})+\bar{B}\bar{C}E\bar{A} = \\
 &= \bar{C}(A+1)(\bar{E}+\bar{B})+\bar{B}\bar{C}E\bar{A} = \bar{C}(\bar{E}+\bar{B})+\bar{B}\bar{C}E\bar{A} = \bar{C}\bar{E}+\bar{C}\bar{B}+\bar{B}\bar{C}E\bar{A} = \\
 &= \bar{C}\bar{E}+\bar{B}\bar{C}(1+E\bar{A}) = \bar{C}\bar{E}+\bar{B}\bar{C} = \bar{C}(\bar{E}+\bar{B})
 \end{aligned}$$



4. Koristeći pravila Bulove algebre dokazati identitet $A \times \overline{AB} + B(\overline{A \times B}) = A$ i nacrtati obje šeme realizacije.

$$A \times \overline{AB} + B(\overline{A \times B}) = A \times (\bar{A} + \bar{B}) + B(\bar{A} + \bar{B}) = A\bar{A} + A\bar{B} + B\bar{A} + B\bar{B} = A(\bar{B} + B) = A$$



A —