

AUDITORNE

③ $F = a+b$, $G = ac$, $H = b+d$

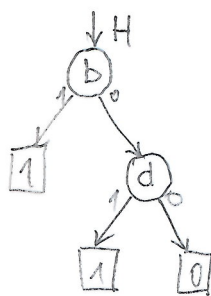
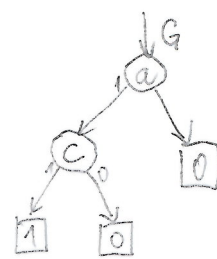
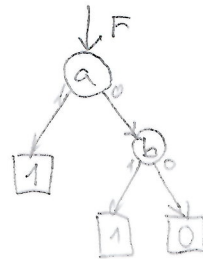
a) ite, BDD za svaku fjin

b) ite(F,G,H), BDD bez komplementarnih lukova uz preduke (a,b,c,d)

a) $F = a+b$, ite(a,1,b)

$G = ac$, ite(a,c,0)

$H = b+d$, ite(b,1,d)



b) $ite(F,G,H) = ite(a+b, ac, b+d) = / ite(f,g,h) = fg + f'h /$

$= (a+b)(ac) + \overline{(a+b)}(b+d) = / \overline{a+b} \stackrel{DeM.}{=} \bar{a} \cdot \bar{b} /$

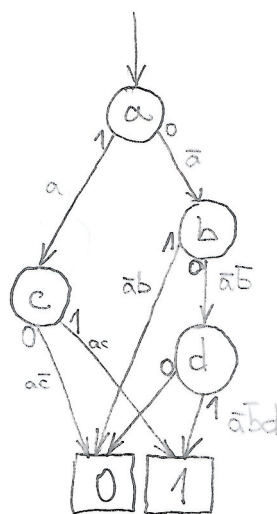
$= \cancel{aac} + \cancel{abc} + \bar{a}\bar{b}b + \bar{a}\bar{b}d = / \cancel{aac} = ac, \bar{b}b = 0 /$

$= ac + \bar{a}\bar{b}d$

$= ac(1+b) + \bar{a}\bar{b}d = / 1+b=1 /$

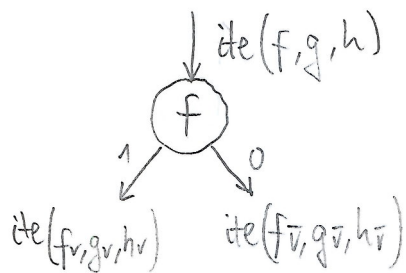
$= ac + \bar{a}\bar{b}d$

$fa = c$
 $f\bar{a} = \bar{b}d$



(A₁) Razvoj $\text{ite}(f, g, h)$ relazivno!

$$\begin{aligned}
 \text{ite}(f, g, h) &= fg + \bar{f}h \\
 &= v(fg + \bar{f}h)_v + \bar{v}(fg + \bar{f}h)_{\bar{v}} \\
 &= v(f_v g_v + \bar{f}_v h_v) + \bar{v}(f_{\bar{v}} g_{\bar{v}} + \bar{f}_{\bar{v}} h_{\bar{v}}) \\
 &= \text{ite}(v, \text{ite}(f_v, g_v, h_v), \text{ite}(f_{\bar{v}}, g_{\bar{v}}, h_{\bar{v}}))
 \end{aligned}$$



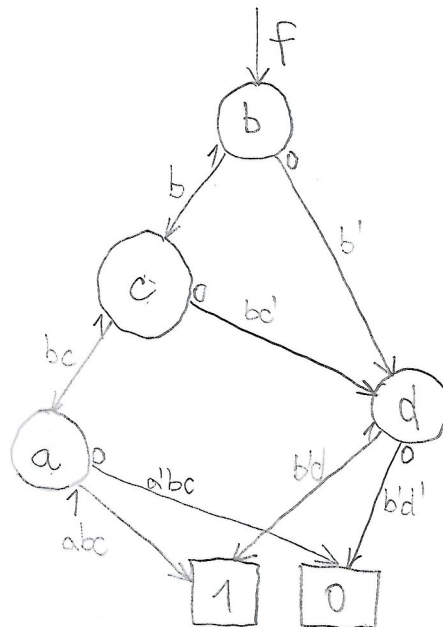
(A₂) Nacrtaj ROBDD za funkciju $f = abc + b'd + c'd$ uz uredenost varijabli (b, c, d, a)

$$f_b = ac + c'd$$

$$f_{b'} = d + c'd$$

$$f_{bc} = a \quad f_{b'c} = d$$

$$f_{bcd} = d \quad f_{b'cd} = d$$



11. Nacrtaj ROBDD za funkciju: $f = abd' + ab'd + a'c + a'c'd$
 uz uređenost varijabli ($a < b < c < d$)
- bez komplementarnih lukova
 - s komplementarnim lukovima

$$f_a = bd' + b'd$$

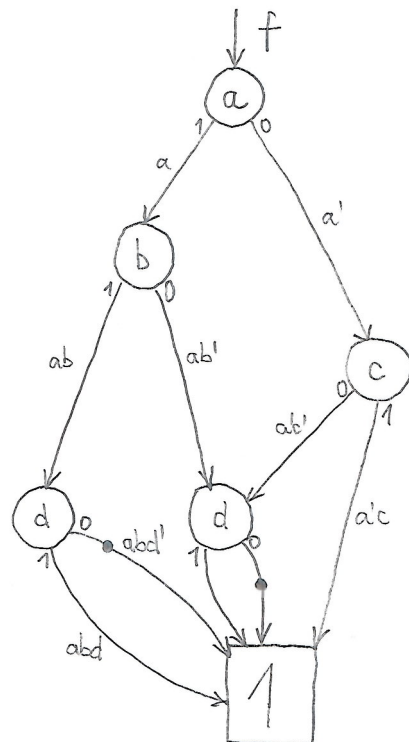
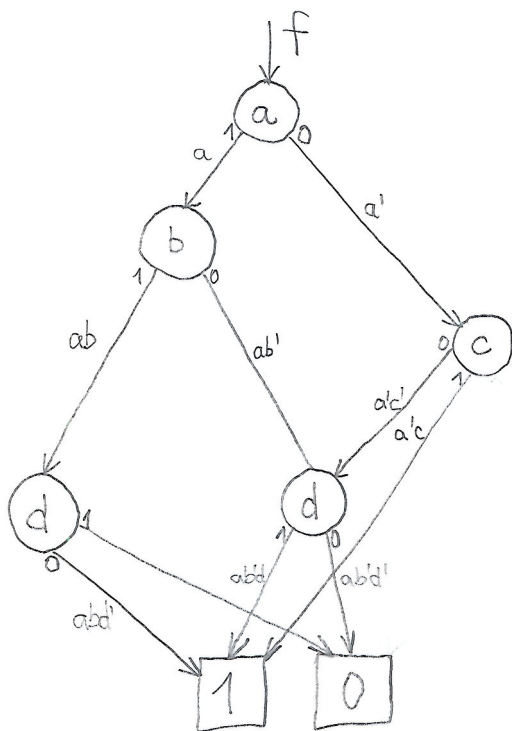
$$f_{a'} = c + c'd$$

$$f_{ab} = d' \quad f_{a'b} = c + c'd$$

$$f_{ab'} = d \quad f_{a'b'} = c + c'd$$

$$f_{a'bc} = c$$

$$f_{a'bc'} = d$$



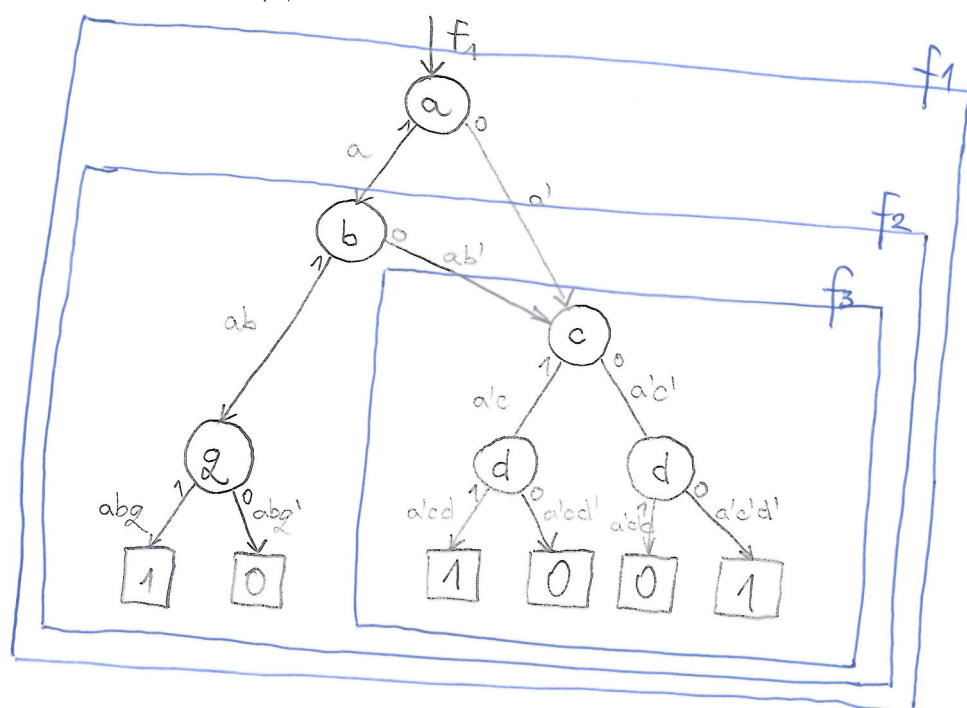
14.) Neka je rezultat izračunavanja

$$\text{ite}(F, G, H) = (a, (b, g, (c, d, d')), (c, d, d'))$$

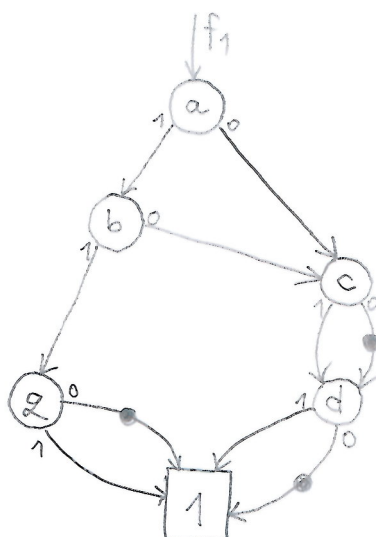
a) Nacrtaj odgovarajući BDD.

b) Pojednostavi BDD uz pretpostavku da se lukovima mogu dodati obilježja komplementa.

a) $\text{ite}(a, \underbrace{\text{ite}(b, g, \underbrace{\text{ite}(c, d, d'))}_{f_3})}_{f_2}, \underbrace{\text{ite}(c, d, d'))}_{f_3})$
 f_1



b) $f_3 = \text{ite}(c, d, d')$ EKVIVALENCIJA ($\text{ite}(f, g, g') \equiv f \Leftrightarrow g$)



komplementarni lukovi

30. Nacrtaj ROBDD za funkciju: $f = (a \Leftrightarrow c) \wedge (b \Leftrightarrow d) \Rightarrow \text{and}(\text{ite}(a, c, \bar{c}), \text{ite}(b, d, \bar{d}))$
 uz uređaje $u_1(a < b < c < d)$ i $u_2(a < c < b < d) \Rightarrow \text{ite}(\text{ite}(a, c, \bar{c}), \text{ite}(b, d, \bar{d}), 0)$
 Koji je uređaj bolji?

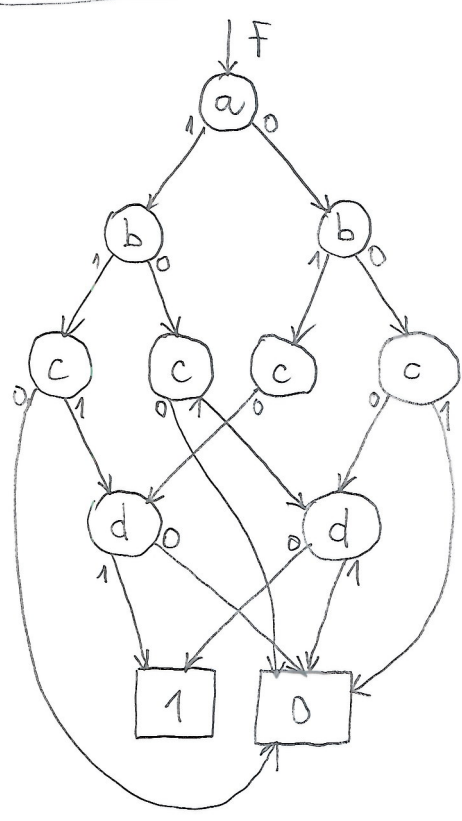
EKVIVALENCIJA: $\text{ite}(f, g, \bar{g})$ / AND: $\text{ite}(f, g, 0)$

Funkcija f je zadovoljena kada su $(a \Leftrightarrow c)$ i $(b \Leftrightarrow d)$:

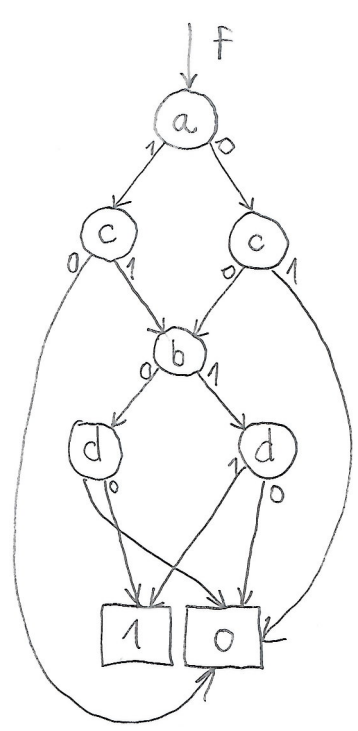
a	c	b	d
0	0	0	0
0	0	1	1
1	1	0	0
1	1	1	1

4 slučaja

$u_1(a < b < c < d)$



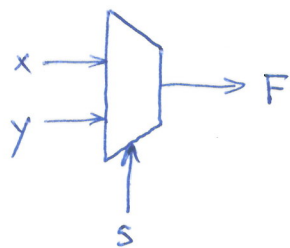
$u_2(a < c < b < d)$



Uređaj u_2 je bolji jer ROBDD sadrži manje čvorova (6 naspram 9) — zato što poredak varijabli koincidira s izrazima ekvivalencij

42. a) Napiši logičku fju za digitalni multipleksor na slici:

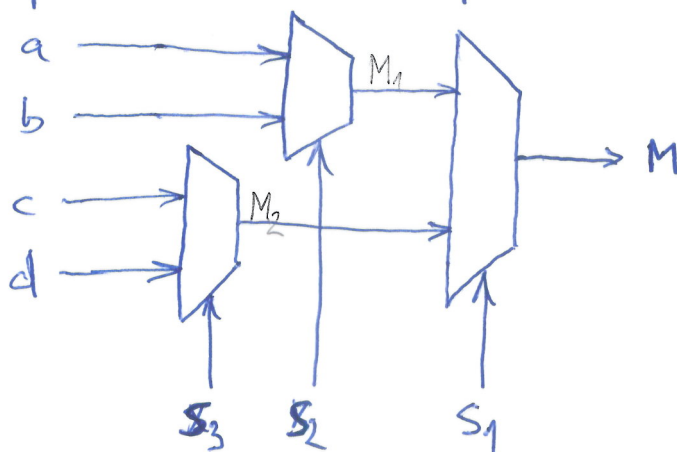
(41)



$$F = \bar{s}x + sy$$

b) Napiši logičku fju izlaza M i nacrtaj ROBDD za sklop 3 muxa na slici uz redoslijed varijabli: $s_1, s_2, a, b, c, s_3, d$

Nije potrebno koristiti komplementarne ulove.



$$M_1 = \bar{s}_2 a + s_2 b$$

$$M_2 = \bar{s}_3 c + s_3 d$$

$$M = \bar{s}_1 M_1 + s_1 M_2 = \bar{s}_1 (\bar{s}_2 a + s_2 b) + s_1 (\bar{s}_3 c + s_3 d)$$

$$M = \bar{s}_1 \bar{s}_2 a + \bar{s}_1 s_2 b + s_1 \bar{s}_3 c + s_1 s_3 d$$

Slijed: $s_1, s_2, a, b, c, s_3, d$

$$M_{s_1} = \bar{s}_3 c + s_3 d$$

$$M_{\bar{s}_1} = \bar{s}_2 a + s_2 b$$

$$M_{s_1 s_2} = \bar{s}_3 c + s_3 d = M_{s_1} \bar{s}_2$$

$$M_{\bar{s}_1 s_2} = b \quad M_{\bar{s}_1 \bar{s}_2} = a$$

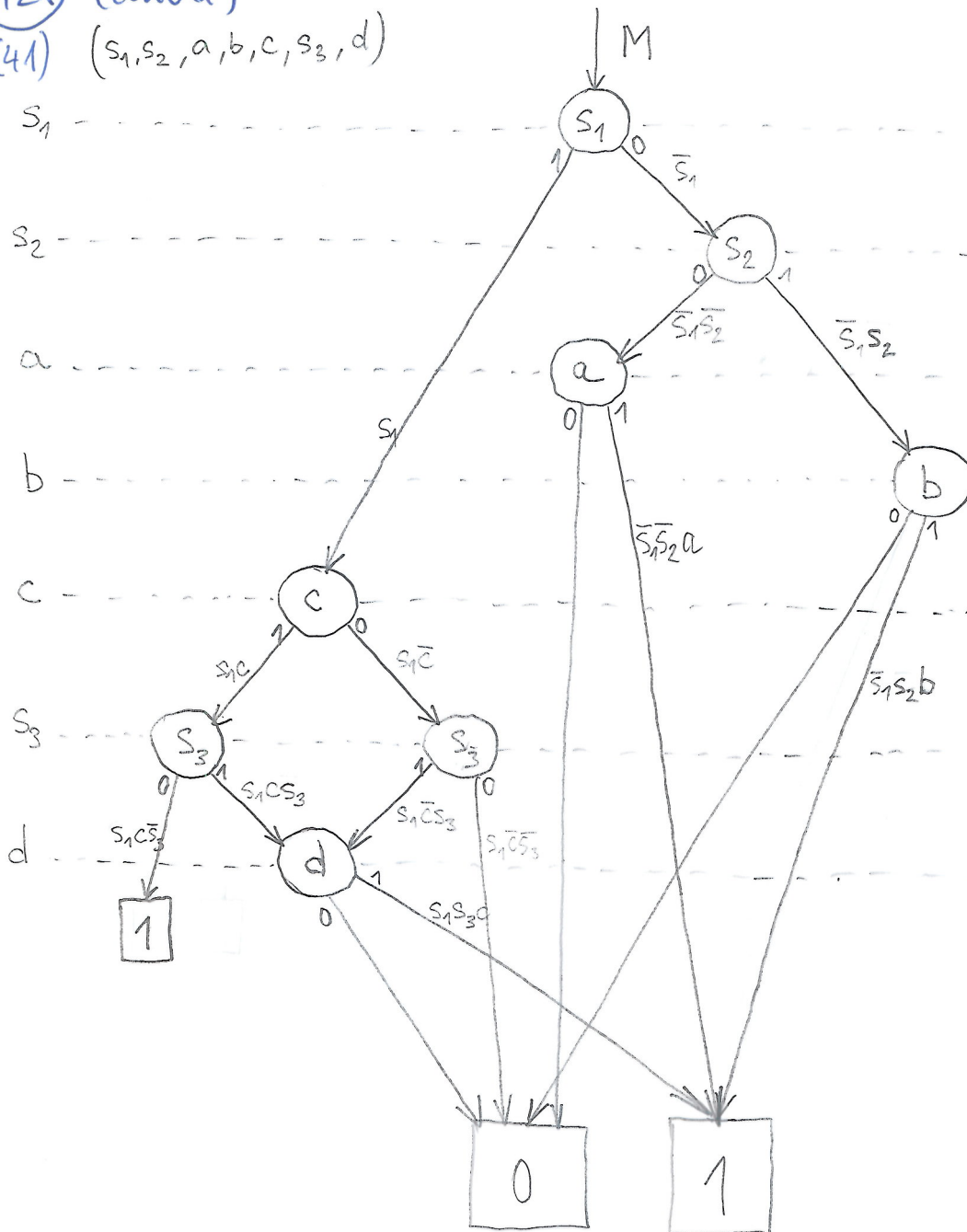
$$M_{s_1 s_2 a} = M_{s_1 s_2 \bar{a}} = \bar{s}_3 c + s_3 d$$

v 1.1

$M_{s_1 s_2 abc} = s_3$ EMOS zadaci iz ROBDD. Ne odgovaram za točnost rješenja.

42. (cont'd)

(41) $(s_1, s_2, a, b, c, s_3, d)$



$$M = \underbrace{s_1s_3d + s_1c s_3}_{s_1(s_3d + c s_3)} + s_1 s_2 b + s_1 s_2 a$$