

Operatii aritmetice cu baza:

• Adunarea:

$$\text{Ex.: } b_{10}: \begin{array}{r} 1301001 \\ + 95360 \\ \hline 225760 \end{array}$$

În caz general (în baza p):

$$\begin{array}{r} a_m a_{m-1} \dots a_1 a_0(p) \\ b_m b_{m-1} \dots b_1 b_0(p) \\ \hline c_K c_{K-1} \dots c_1 c_0(p) \end{array}$$

$$\begin{array}{r} 11101001(2) \\ + 11101001(2) \\ \hline 11100001(2) \end{array}$$

$$\begin{array}{r} 11100001(3) \\ + 2200101(3) \\ \hline 22110002(3) \end{array}$$

$t_0 = 0$

$(a_i + b_i + t_{i-1}) : p = t_{i+1}, \text{rest } c_i$

$K = \max(m, n) + 1$

$c_K = t_K$

$$\begin{array}{r} 11101001(2) \\ + 11101001(2) \\ \hline 11100001(2) \end{array}$$

$$\begin{array}{r} AB34F(2) \\ + CD45E(2) \\ \hline ABCDEF(2) \end{array}$$

• Scădere:

• Ex.: baza 10:

$$\begin{array}{r} 720460 \\ - 95360 \\ \hline 6351 \end{array}$$

În caz general (în baza p)

$A \geq B$:

$$\begin{array}{r} a_m a_{m-1} \dots a_1 a_0(p) \\ - b_m b_{m-1} \dots b_1 b_0(p) \\ \hline c_m c_{m-1} \dots c_1 c_0(p) \end{array}$$

$$\begin{array}{r} 100110(2) \\ - 100011(2) \\ \hline 000011(2) \end{array}$$

$$\begin{array}{r} 16AC05(10) \\ - 3B273(10) \\ \hline 12F9F2(10) \end{array}$$

$t_0 = 0$

$$c_i = \begin{cases} a_i - b_i + t_{i-1}, & \text{dacă } a_i + t_{i-1} \geq b_i \\ t_{i-1}, & \text{dacă } a_i + t_{i-1} < b_i \end{cases}$$

$$\begin{array}{r} 720213(3) \\ - 11022(3) \\ \hline 10212(3) \end{array}$$

• Înmulțirea cu o cifră:

$$\text{Ex.: în baza 10} \quad \begin{array}{r} 1301001 \\ \times 4 \\ \hline 2524004 \end{array}$$

În caz general (în baza p):

$$\begin{array}{r} a_m a_{m-1} \dots a_1 a_0(p) \\ \times b(p) \\ \hline c_m c_{m-1} \dots c_1 c_0(p) \end{array}$$

$t_0 = 0$

$(a_i \times b + t_{i-1}) : p = t_{i+1}, \text{rest } c_i$

$c_{m+1} = t_{m+1}$

$$\begin{array}{r} +1+2+2 \\ \hline 3456(8) \\ \hline 126\ 12(8) \end{array}$$

$$\begin{array}{r} +3+6+8 \\ \hline 3613\ F(8) \\ \hline 71C1B\ * (11) \end{array}$$

$$15 \cdot 8 = 135 : 16 = 8,917$$

228

009

—

$$99+8 = 107 : 16 = 6,911$$

86

—

11

$$\begin{array}{r} +1+1 \\ \hline 2437(5) \\ \hline 20472(5) \end{array}$$

$$\begin{array}{l} 6:5=1, r_1 \\ 5:5=1, r_2 \\ 5:5=1, r_3 \end{array}$$

$$\begin{array}{r} 54+6 = 60 : 16 = 3, r_2 \\ \hline 48 \\ \hline 12 \\ \hline 8 \\ \hline 4 \\ \hline 0 \end{array}$$

$$24+3 = 27 : 16 = 1, r_2 1$$

• Inversare la cifra

$$\text{Ex.: } 4304(10) : 5(10) = 1160, r_4$$

$$\begin{array}{r} 4304 \\ \hline 5 \\ \overline{23} \\ \overline{-20} \\ \overline{30} \\ \overline{-30} \\ \overline{0} \\ \hline 0 \end{array}$$

in caz general (in baza p):

$a_m a_{m-1} \dots a_1 a_0 : b = c_m c_{m-1} \dots c_1 c_0(p)$, rest $r(p)$

$$\begin{array}{l} i = \overline{m, 0} \\ t_m = 0 \end{array}$$

$$(t_i \cdot p + a_i) : b = c_i, \text{ rest } t_{i-1}$$

$$r_i = t_{i-1}$$

$$\begin{array}{r} 1235(8) : 4(8) = 0247(8), r_1 \\ \hline 0 \\ 10 \\ \overline{2} \\ \overline{-2} \\ \overline{4} \\ \overline{-3} \\ \overline{5} \\ \overline{-3} \\ \overline{2} \\ \overline{-3} \\ \overline{5} \\ \overline{-3} \\ \overline{2} \\ \overline{-4} \\ \overline{4} \\ \hline 0 \end{array}$$

$$42:3=14=E$$

$$2147(10) : 3(10) = 0E2, r_1$$

$$\begin{array}{r} 0 \\ 2147 \\ \hline 2 \cdot 10 + 14 = 32 \\ \overline{-3} \\ \overline{2} \\ \overline{-3} \\ \overline{4} \\ \overline{-3} \\ \overline{7} \\ \hline 0 \end{array}$$

$$1356(8) : 5(8) =$$

Seminarul 2 - (conversii)

- Atunci înseamnă prim împărțiri consecutive:

- $198_{(10)} \rightarrow ?_{(4)}$
 $\begin{array}{r} 198 \\ \underline{-16} \\ = 38 \end{array}$
 $\begin{array}{r} 38 \\ \underline{-16} \\ = 22 \end{array}$
 $12 : 16 = 0, \text{ rest } 12$
 $\Rightarrow 198_{(10)} \rightarrow 012_{(4)}$

- $230_{(10)} \rightarrow ?_{(4)}$
 $\begin{array}{r} 230 \\ \underline{-16} \\ = 30 \end{array}$
 $\begin{array}{r} 30 \\ \underline{-16} \\ = 14 \end{array}$
 $5 : 4 = 1, \text{ rest } 1$
 $\begin{array}{r} 1 \\ \underline{-4} \\ = 1 \end{array}$
 $1 : 4 = 0, \text{ rest } 1$
 $\Rightarrow 230_{(10)} = 1101_{(4)}$

- Conversia partei fractionale prin înmulțiri successive

$$0,1_{(10)} = 0,?_{(2)} = 0,1_1 1_2 \dots (2)$$

Conversie în baza scrisă

$$\begin{array}{r} 0,1_{(10)} \times 2_{(10)} = 0,2_1 \\ 0,1_1 \times 2_{(10)} = 0,2_2 \\ \vdots \quad \vdots \quad \vdots \end{array}$$

Condiția de oprire: $f_n = 0$

În mod general se obține o perioadă

Ex.: 1) $0,65 \cdot 8 = 5,20$

$$0,65_{(10)} \rightarrow 0,5(1463)_{(8)}$$

$$\underline{0,20} \cdot 8 = 1,60$$

$$0,60 \cdot 8 = 4,80$$

$$0,80 \cdot 8 = 6,40$$

$$0,40 \cdot 8 = \underline{3,20}$$

2) $0,46_{(10)} \rightarrow ?_{(4)}$

$$0,46 \cdot 4 = 1,84$$

$$0,46_{(10)} \rightarrow 0,1(3113002203)_{(4)}$$

$$\underline{0,84} \cdot 4 = 3,36$$

$$0,36 \cdot 4 = 1,44$$

$$0,44 \cdot 4 = 1,76$$

$$0,76 \cdot 4 = 3,04$$

$$0,04 \cdot 4 = 0,16$$

$$0,16 \cdot 4 = 0,64$$

$$0,64 \cdot 4 = 2,56$$

$$0,56 \cdot 4 = 2,24$$

$$0,24 \cdot 4 = 0,96$$

$$0,96 \cdot 4 = \underline{3,84}$$

$$\begin{array}{r} 66 \\ \underline{-5} \\ = 16 \end{array}$$

3)

$$0,50 \cdot 6 = 6,00$$

$$0,500$$

• Convertirea probabilității căzării intermediare:

$$\text{Adm } p \rightarrow -10 \rightarrow q \\ \text{Subst} \quad \begin{array}{c} \nearrow \\ \text{adm} \end{array} \quad \begin{array}{c} \nearrow \\ \text{adm} \end{array} \\ \therefore +x$$

$$\text{Adm } -10 \rightarrow p/10 \rightarrow 2 \\ \begin{array}{c} \nearrow \\ \text{adm} \end{array} \quad \begin{array}{c} \nearrow \\ \text{adm} \end{array} \\ \therefore +x \quad \text{egual}$$

$$\text{Adm } 2 \rightarrow 8/10 \rightarrow -10 \\ \begin{array}{c} \nearrow \\ \text{adm} \end{array} \quad \begin{array}{c} \nearrow \\ \text{adm} \end{array} \\ \text{raport} \quad \text{subst.}$$

$$\frac{64}{572} \quad \frac{512}{4096} \quad \frac{64}{384}$$

$$001,011,001,010,111,110,011,101_{(2)} = ?_{(10)}$$

$$\begin{array}{r} 64 \\ 1572 \\ \hline 13210 \\ 13210 \\ \hline 0 \end{array} \quad 635_{(8)} = 2 \cdot 8^4 + 5 \cdot 8^3 + 7 \cdot 8^2 + 2 \cdot 8 \cdot 1 + 6 \cdot 1 \\ = 4096 + 5 \cdot 512 + 7 \cdot 64 + 2617 + \frac{384+24+5}{572} \\ = 4096 + 2560 + 87 + \frac{63}{572} \\ = 6743,$$

$$\begin{array}{r} 384 \\ 24 \\ \hline 4096 \\ 4096 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 64 \\ 4096 \\ \hline 4096 \\ 4096 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 4096 \\ 2560 \\ \hline 6456 \\ 6456 \\ \hline 0 \end{array}$$

$$6743 : 572 = 0,80662$$

$$\begin{array}{r} 368 : 16 = 23,90 \\ 32 \\ \hline 48 \\ = 48 \\ \hline 0 \\ 0 \\ \hline 23 : 16 = 1,9375 \\ 16 \\ \hline 76 \\ = 76 \\ \hline 0 \end{array}$$

$$368_{(10)} \rightarrow 170_{(16)}$$

$$\begin{array}{r} 0 \\ 4096 \\ \hline 4096 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 340 \\ 3400 \\ \hline 3040 \\ 3040 \\ \hline 320 \\ 320 \\ \hline 0 \\ 0 \\ \hline 320 \\ 320 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 1080 \\ 2024 \\ \hline 3060 \\ 3060 \\ \hline 0 \end{array}$$

$$2772,07_{(3)} = ?_{(10)}$$

$$\begin{array}{r} 2772,07_{(3)} = 2 \cdot 3^3 + 7 \cdot 3^2 + 7 \cdot 3 + 2 + 0 \cdot \frac{1}{3} + 2 \cdot \frac{1}{9} \\ = 2 \cdot 27 + 9 + 3 + 2 + 0 + \frac{2}{9} \\ = 54 + 27 + \frac{2}{9} \\ = 81,777_{(10)} \end{array}$$

$$\begin{array}{r} 0 \\ 10 \\ \hline 10 \\ 10 \\ \hline 0 \end{array}$$

$$68 : 8 = 8,5$$

$$225,05$$

$$9 : 8 = 1,125$$

$$7 : 8 = 0,875$$

$$9,111 : 8 = 1,13875$$

$$0,777 \cdot 8 = 5,439$$

Coduri de reprezentare a nr. întregi:

m scrie = K octal

	nр. supramulat	nр. submulat
$\overline{[x]}_D$	$\begin{cases} 0 x1, & x \geq 0 \\ 1 x1, & x < 0 \end{cases}$	$\begin{cases} 0, x1, & x \geq 0 \\ 1, x1, & x < 0 \end{cases}$
$\overline{[x]}_i$	$\begin{cases} 0 0 x1, & x \geq 0 \\ 1 \frac{x1}{2^k}, & x < 0 \end{cases}$	$\begin{cases} 0, 0 x1, & x \geq 0 \\ 1,\frac{x1}{2^k}, & x < 0 \end{cases}$
$\overline{[x]}_C$	$\begin{cases} 0 0 x1, & x \geq 0 \\ 1, \uparrow, & x < 0 \end{cases}$	$\begin{cases} 0, 0 x1, & x \geq 0 \\ 1, \uparrow, & x < 0 \end{cases}$

m = 8

$$\begin{array}{l} x, y \geq 1, \\ \begin{array}{c} \nearrow \downarrow \\ + - \end{array} \quad \begin{array}{c} \nearrow \downarrow \\ + - \end{array} \end{array}$$

1) $x = 1 \# 110 = 10001_2$

$\overline{[x]}_D = 00010001_2$

$\overline{[x]}_i = 00010001_2$

$\overline{[x]}_C = 00010001_2$

2) $y = -981$

$$\begin{array}{r} -981 \\ \underline{\times 2} \\ \begin{array}{r} 981 \\ 196 \\ \hline 1961 \end{array} \end{array}$$

$$\begin{array}{r} 981 \\ \underline{\div 2} \\ \begin{array}{r} 490 \\ 48 \\ \hline 10 \end{array} \end{array}$$

$= 001110010101_2$

$$\begin{array}{r} 490 \\ \underline{\div 2} \\ \begin{array}{r} 245 \\ 245 \\ \hline 0 \end{array} \end{array}$$

$3: 16 = 0,93$

$\overline{[y]}_C = 11010101_2$

$\overline{[y]}_i = 10101010_2$

$\overline{[y]}_D = 10101011_2$

3) $s = 0,23_{(10)} = 0,0011101_2$

$0,23 \cdot 2 = 0,46$

$0,46 \cdot 2 = 0,92$

$0,92 \cdot 2 = 1,84$

$0,84 \cdot 2 = 1,68$

$0,68 \cdot 2 = 1,36$

$0,36 \cdot 2 = 0,72$

$0,72 \cdot 2 = 1,44$

$0,44 \cdot 2 = 0,88$

$\overline{[s]}_D = 00011101_2$

$\overline{[s]}_i = 00011101_2$

$\overline{[s]}_C = 00011101_2$

4) $x = -0,5669 = 0,8F(10) = 0,1000111101_2$

$$\begin{array}{r} 0,5669 \\ \times 2 \\ \hline 1,1338 \\ \times 2 \\ \hline 0,1338 \\ \times 2 \\ \hline 0,2676 \\ \times 2 \\ \hline 0,5352 \\ \times 2 \\ \hline 1,0704 \\ \times 2 \\ \hline 0,1408 \\ \times 2 \\ \hline 0,2816 \\ \times 2 \\ \hline 0,5632 \\ \times 2 \\ \hline 1,1264 \\ \times 2 \\ \hline 0,2528 \\ \times 2 \\ \hline 0,5056 \\ \times 2 \\ \hline 1,0112 \\ \times 2 \\ \hline 0,2024 \\ \times 2 \\ \hline 0,4048 \\ \times 2 \\ \hline 0,8096 \\ \times 2 \\ \hline 1,6192 \\ \times 2 \\ \hline 0,3184 \\ \times 2 \\ \hline 0,6368 \\ \times 2 \\ \hline 1,2736 \\ \times 2 \\ \hline 0,5472 \\ \times 2 \\ \hline 1,0944 \\ \times 2 \\ \hline 0,2188 \\ \times 2 \\ \hline 0,4376 \\ \times 2 \\ \hline 0,8752 \\ \times 2 \\ \hline 1,7504 \\ \times 2 \\ \hline 0,5008 \\ \times 2 \\ \hline 1,0016 \\ \times 2 \\ \hline 0,20032 \\ \times 2 \\ \hline 0,40064 \\ \times 2 \\ \hline 0,80128 \\ \times 2 \\ \hline 1,60256 \\ \times 2 \\ \hline 0,30512 \\ \times 2 \\ \hline 0,61024 \\ \times 2 \\ \hline 1,22048 \\ \times 2 \\ \hline 0,44016 \\ \times 2 \\ \hline 0,88032 \\ \times 2 \\ \hline 1,76064 \\ \times 2 \\ \hline 0,35216 \\ \times 2 \\ \hline 0,70432 \\ \times 2 \\ \hline 1,40864 \\ \times 2 \\ \hline 0,28176 \\ \times 2 \\ \hline 0,56352 \\ \times 2 \\ \hline 1,12704 \\ \times 2 \\ \hline 0,22544 \\ \times 2 \\ \hline 0,45088 \\ \times 2 \\ \hline 0,90176 \\ \times 2 \\ \hline 1,80352 \\ \times 2 \\ \hline 0,36072 \\ \times 2 \\ \hline 0,72144 \\ \times 2 \\ \hline 1,44288 \\ \times 2 \\ \hline 0,28856 \\ \times 2 \\ \hline 0,57712 \\ \times 2 \\ \hline 1,15424 \\ \times 2 \\ \hline 0,23088 \\ \times 2 \\ \hline 0,46176 \\ \times 2 \\ \hline 0,92352 \\ \times 2 \\ \hline 1,84704 \\ \times 2 \\ \hline 0,36944 \\ \times 2 \\ \hline 0,73888 \\ \times 2 \\ \hline 1,47776 \\ \times 2 \\ \hline 0,29552 \\ \times 2 \\ \hline 0,59104 \\ \times 2 \\ \hline 1,18208 \\ \times 2 \\ \hline 0,236416 \\ \times 2 \\ \hline 0,472832 \\ \times 2 \\ \hline 0,945664 \\ \times 2 \\ \hline 1,891328 \\ \times 2 \\ \hline 0,378264 \\ \times 2 \\ \hline 0,756528 \\ \times 2 \\ \hline 1,513056 \\ \times 2 \\ \hline 0,3026128 \\ \times 2 \\ \hline 0,6052256 \\ \times 2 \\ \hline 1,2104512 \\ \times 2 \\ \hline 0,2420904 \\ \times 2 \\ \hline 0,4841808 \\ \times 2 \\ \hline 0,9683616 \\ \times 2 \\ \hline 1,9367232 \\ \times 2 \\ \hline 0,38734464 \\ \times 2 \\ \hline 0,77468928 \\ \times 2 \\ \hline 1,54937856 \\ \times 2 \\ \hline 0,309875712 \\ \times 2 \\ \hline 0,619751424 \\ \times 2 \\ \hline 1,239502848 \\ \times 2 \\ \hline 0,2519056864 \\ \times 2 \\ \hline 0,5038113728 \\ \times 2 \\ \hline 1,0076227456 \\ \times 2 \\ \hline 0,20152454912 \\ \times 2 \\ \hline 0,40304909824 \\ \times 2 \\ \hline 0,80609819648 \\ \times 2 \\ \hline 1,61219639296 \\ \times 2 \\ \hline 0,322439278592 \\ \times 2 \\ \hline 0,644878557184 \\ \times 2 \\ \hline 1,289757114368 \\ \times 2 \\ \hline 0,257951422736 \\ \times 2 \\ \hline 0,515902845472 \\ \times 2 \\ \hline 1,031805690944 \\ \times 2 \\ \hline 0,2063611381888 \\ \times 2 \\ \hline 0,4127222763776 \\ \times 2 \\ \hline 0,8254445527552 \\ \times 2 \\ \hline 1,6508891055104 \\ \times 2 \\ \hline 0,33017782110208 \\ \times 2 \\ \hline 0,66035564220416 \\ \times 2 \\ \hline 1,32071128440832 \\ \times 2 \\ \hline 0,26414241681664 \\ \times 2 \\ \hline 0,52828483363328 \\ \times 2 \\ \hline 1,05656966726656 \\ \times 2 \\ \hline 0,21131393345312 \\ \times 2 \\ \hline 0,42262786685624 \\ \times 2 \\ \hline 0,84525573371248 \\ \times 2 \\ \hline 1,69051146742496 \\ \times 2 \\ \hline 0,33810229348496 \\ \times 2 \\ \hline 0,67620458696992 \\ \times 2 \\ \hline 1,35240917393984 \\ \times 2 \\ \hline 0,27048183478796 \\ \times 2 \\ \hline 0,54096366957592 \\ \times 2 \\ \hline 1,08192733915184 \\ \times 2 \\ \hline 0,216385467830368 \\ \times 2 \\ \hline 0,432770935660736 \\ \times 2 \\ \hline 0,865541871321472 \\ \times 2 \\ \hline 1,731083742642944 \\ \times 2 \\ \hline 0,3462167485285888 \\ \times 2 \\ \hline 0,6924334970571776 \\ \times 2 \\ \hline 1,3848669941143552 \\ \times 2 \\ \hline 0,27697339882867104 \\ \times 2 \\ \hline 0,55394679765734208 \\ \times 2 \\ \hline 1,10789359531468416 \\ \times 2 \\ \hline 0,233578719068341632 \\ \times 2 \\ \hline 0,467157438136683264 \\ \times 2 \\ \hline 0,934314876273366528 \\ \times 2 \\ \hline 1,868629752546733056 \\ \times 2 \\ \hline 0,3737259505093466128 \\ \times 2 \\ \hline 0,7474519010186932256 \\ \times 2 \\ \hline 1,4949038020373864512 \\ \times 2 \\ \hline 0,3009807604074772904 \\ \times 2 \\ \hline 0,6019615208149545808 \\ \times 2 \\ \hline 1,2039230416299091616 \\ \times 2 \\ \hline 0,24078460832598183232 \\ \times 2 \\ \hline 0,48156921665196366464 \\ \times 2 \\ \hline 0,96313843330392732928 \\ \times 2 \\ \hline 1,92627686660785465856 \\ \times 2 \\ \hline 0,385254373321570931712 \\ \times 2 \\ \hline 0,770508746643141863424 \\ \times 2 \\ \hline 1,541017493286283726848 \\ \times 2 \\ \hline 0,3082034986572567453696 \\ \times 2 \\ \hline 0,6164069973145134907392 \\ \times 2 \\ \hline 1,2328139946290269814784 \\ \times 2 \\ \hline 0,25656279892580539629584 \\ \times 2 \\ \hline 0,51312559785161079259168 \\ \times 2 \\ \hline 1,02625119570322158518336 \\ \times 2 \\ \hline 0,205250238840644317036672 \\ \times 2 \\ \hline 0,410500477681288634073344 \\ \times 2 \\ \hline 0,821000955362577268146688 \\ \times 2 \\ \hline 1,642001910725154536293376 \\ \times 2 \\ \hline 0,3284003821450349072586732 \\ \times 2 \\ \hline 0,6568007642900698145173464 \\ \times 2 \\ \hline 1,3136015285801396290346928 \\ \times 2 \\ \hline 0,26272030577602981480693856 \\ \times 2 \\ \hline 0,52544061155205962961387712 \\ \times 2 \\ \hline 1,05088122305411925922755424 \\ \times 2 \\ \hline 0,21017624460822385184551088 \\ \times 2 \\ \hline 0,42035248921644770369102176 \\ \times 2 \\ \hline 0,84070497843289540738204352 \\ \times 2 \\ \hline 1,68140995686579081476408704 \\ \times 2 \\ \hline 0,33628199177315816295281744 \\ \times 2 \\ \hline 0,67256398354631632590563488 \\ \times 2 \\ \hline 1,34512796709263265181126976 \\ \times 2 \\ \hline 0,27002559341852653036225952 \\ \times 2 \\ \hline 0,54005118683705306072451904 \\ \times 2 \\ \hline 1,08010237367410612144903808 \\ \times 2 \\ \hline 0,210020474734821224289807616 \\ \times 2 \\ \hline 0,420040949469642448579615232 \\ \times 2 \\ \hline 0,840081898939284897159230464 \\ \times 2 \\ \hline 1,680163797878569794318460928 \\ \times 2 \\ \hline 0,330032759575713958663681856 \\ \times 2 \\ \hline 0,660065519151427917327363712 \\ \times 2 \\ \hline 1,320131038302855834654727424 \\ \times 2 \\ \hline 0,260026207660571167330945488 \\ \times 2 \\ \hline 0,520052415321142334661890976 \\ \times 2 \\ \hline 1,040104830642284669323781952 \\ \times 2 \\ \hline 0,210013166130456933864756384 \\ \times 2 \\ \hline 0,420026332260913867729512768 \\ \times 2 \\ \hline 0,840052664521827735459025536 \\ \times 2 \\ \hline 1,680105329043655470918051072 \\ \times 2 \\ \hline 0,330026333010734492383602144 \\ \times 2 \\ \hline 0,660052666021468984767204288 \\ \times 2 \\ \hline 1,320105332042937969534408576 \\ \times 2 \\ \hline 0,260013166040935979146801152 \\ \times 2 \\ \hline 0,520026332081871958293602304 \\ \times 2 \\ \hline 1,040052664163743916587204608 \\ \times 2 \\ \hline 0,210006583166870979374402304 \\ \times 2 \\ \hline 0,420013166333741958748804608 \\ \times 2 \\ \hline 0,840026332667483917497609216 \\ \times 2 \\ \hline 1,680052665334967834995218432 \\ \times 2 \\ \hline 0,330003275957571167330945488 \\ \times 2 \\ \hline 0,660006551915142334661890976 \\ \times 2 \\ \hline 1,320013166702855834654727424 \\ \times 2 \\ \hline 0,2600026207660571167330945488 \\ \times 2 \\ \hline 0,5200052415321142334661890976 \\ \times 2 \\ \hline 1,040005266452182773545902536 \\ \times 2 \\ \hline 0,2100013166130456933864756384 \\ \times 2 \\ \hline 0,4200026332260913867729512768 \\ \times 2 \\ \hline 0,840005266452182773545902536 \\ \times 2 \\ \hline 1,680005266452182773545902536 \\ \times 2 \\ \hline 0,33000263326674839174995218432 \\ \times 2 \\ \hline 0,6600052665334967834995218432 \\ \times 2 \\ \hline 1,3200052665334967834995218432 \\ \times 2 \\ \hline 0,2600013166702855834654727424 \\ \times 2 \\ \hline 0,52000263326674839174995218432 \\ \times 2 \\ \hline 1,040005266452182773545902536 \\ \times 2 \\ \hline 0,2100006583166870979146802304 \\ \times 2 \\ \hline 0,4200005266452182773545902536 \\ \times 2 \\ \hline 0,8400005266452182773545902536 \\ \times 2 \\ \hline 1,6800005266452182773545902536 \\ \times 2 \\ \hline 0,3300003275957571167330945488 \\ \times 2 \\ \hline 0,6600006551915142334661890976 \\ \times 2 \\ \hline 1,3200005266452182773545902536 \\ \times 2 \\ \hline 0,26000026207660571167330945488 \\ \times 2 \\ \hline 0,52000052415321142334661890976 \\ \times 2 \\ \hline 1,0400005266452182773545902536 \\ \times 2 \\ \hline 0,210000131666870979146802304 \\ \times 2 \\ \hline 0,42000026332260913867729512768 \\ \times 2 \\ \hline 0,8400005266452182773545902536 \\ \times 2 \\ \hline 1,6800005266452182773545902536 \\ \times 2 \\ \hline 0,330000263326674839174995218432 \\ \times 2 \\ \hline 0,66000052665334967834995218432 \\ \times 2 \\ \hline 1,32000052665334967834995218432 \\ \times 2 \\ \hline 0,26000013166702855834654727424 \\ \times 2 \\ \hline 0,520000263326674839174995218432 \\ \times 2 \\ \hline 1,0400005266452182773545902536 \\ \times 2 \\ \hline 0,21000006583166870979146802304 \\ \times 2 \\ \hline 0,42000005266452182773545902536 \\ \times 2 \\ \hline 0,84000005266452182773545902536 \\ \times 2 \\ \hline 1,68000005266452182773545902536 \\ \times 2 \\ \hline 0,33000003275957571167330945488 \\ \times 2 \\ \hline 0,66000006551915142334661890976 \\ \times 2 \\ \hline 1,32000005266452182773545902536 \\ \times 2 \\ \hline 0,260000026207660571167330945488 \\ \times 2 \\ \hline 0,520000052415321142334661890976 \\ \times 2 \\ \hline 1,04000005266452182773545902536 \\ \times 2 \\ \hline 0,2100000131666870979146802304 \\ \times 2 \\ \hline 0,420000026332260913867729512768 \\ \times 2 \\ \hline 0,84000005266452182773545902536 \\ \times 2 \\ \hline 1,68000005266452182773545902536 \\ \times 2 \\ \hline 0,3300000263326674839174995218432 \\ \times 2 \\ \hline 0,660000052665334967834995218432 \\ \times 2 \\ \hline 1,320000052665334967834995218432 \\ \times 2 \\ \hline 0,260000013166702855834654727424 \\ \times 2 \\ \hline 0,52000002633326674839174995218432 \\ \times 2 \\ \hline 1,04000005266452182773545902536 \\ \times 2 \\ \hline 0,210000006583166870979146802304 \\ \times 2 \\ \hline 0,420000005266452182773545902536 \\ \times 2 \\ \hline 0,840000005266452182773545902536 \\ \times 2 \\ \hline 1,680000005266452182773545902536 \\ \times 2 \\ \hline 0,330000003275957571167330945488 \\ \times 2 \\ \hline 0,660000006551915142334661890976 \\ \times 2 \\ \hline 1,320000005266452182773545902536 \\ \times 2 \\ \hline 0,2600000026207660571167330945488 \\ \times 2 \\ \hline 0,5200000052415321142334661890976 \\ \times 2 \\ \hline 1,040000005266452182773545902536 \\ \times 2 \\ \hline 0,21000000131666870979146802304 \\ \times 2 \\ \hline 0,4200000026332260913867729512768 \\ \times 2 \\ \hline 0,840000005266452182773545902536 \\ \times 2 \\ \hline 1,680000005266452182773545902536 \\ \times 2 \\ \hline 0,33000000263326674839174995218432 \\ \times 2 \\ \hline 0,6600000052665334967834995218432 \\ \times 2 \\ \hline 1,3200000052665334967834995218432 \\ \times 2 \\ \hline 0,2600000013166702855834654727424 \\ \times 2 \\ \hline 0,520000002633326674839174995218432 \\ \times 2 \\ \hline 1,040000005266452182773545902536 \\ \times 2 \\ \hline 0,2100000006583166870979146802304 \\ \times 2 \\ \hline 0,4200000005266452182773545902536 \\ \times 2 \\ \hline 0,8400000005266452182773545902536 \\ \times 2 \\ \hline 1,6800000005266452182773545902536 \\ \times 2 \\ \hline 0,3300000003275957571167330945488 \\ \times 2 \\ \hline 0,6600000006551915142334661890976 \\ \times 2 \\ \hline 1,3200000005266452182773545902536 \\ \times 2 \\ \hline 0,26000000026207660571167330945488 \\ \times 2 \\ \hline 0,52000000052415321142334661890976 \\ \times 2 \\ \hline 1,0400000005266452182773545902536 \\ \times 2 \\ \hline 0,210000000131666870979146802304 \\ \times 2 \\ \hline 0,42$$

Operării cu cod complementar:

$$[\bar{x}]_C \oplus [\bar{y}]_C = \underbrace{[\bar{x} + y]_C}_{\text{in baza}}$$

$$[\bar{x}]_C \odot [\bar{y}]_C = [\bar{x}]_C + [\bar{-y}]_C$$

Obs.: „+” \oplus , “-” $=$ “-”
“-” \oplus , “-” $=$ “+” \Rightarrow dupăcare

$$[\bar{x}]_C \oplus [\bar{y}]_C = \begin{array}{r} 00010001 \\ 10101011 \\ \hline 11111100 \end{array} \quad \text{Nu avem dupăcare}$$

$$[\bar{x}]_C \odot [\bar{y}]_C = [\bar{x}]_C \oplus [\bar{-y}]_C = \begin{array}{r} 00010001 \\ 01010101 \\ \hline 01100110 \end{array} \quad \text{Avem dupăcare}$$

$$\bar{x} \oplus \bar{y} = \begin{array}{r} 11111111 \\ 10101011 \\ \hline 01010110 \end{array} \quad \text{Avem dupăcare}$$

$$[\bar{x}]_C \oplus [\bar{s}]_C = \begin{array}{r} 00011101 \\ 00011101 \\ \hline 00111010 \end{array} \quad \text{Nu avem dupăcare}$$

Reprezentare nr. în virgulă fixă:

$$[\bar{x}]_{10} = \underline{\quad}, \underline{\quad}_{(2)}$$

$$\begin{array}{r} | s | \quad z \quad | \quad \{x\} \quad | \\ \hline 1 \quad 10 \quad 11 \quad 111 \quad 0 \end{array}$$

$m = 11$

$$x = 44,23_{(10)} = 2F,3A_{(16)} = 00101111,00111010_{(2)}$$

$$\begin{array}{r} 44 : 16 = 2,9125 & 0,23 : 16 \\ \hline 2 \quad 16 \quad 16 \quad 16 \\ \hline 2,9125 & 0,014375 \\ 2 \cdot 16 = 0,92 & 0,014375 \\ \hline 0,92 & 0,014375 \end{array}$$

$$00101111,00111010_{(2)}$$

$$y = -27,33$$

$$-27,33 = 1B,54_{(16)} = 00011011,0101010100_{(2)}$$

$$\begin{array}{r} -27 : 16 = -1,9121 & 0,33 : 16 \\ \hline -1 \quad 16 \quad 16 \quad 16 \\ \hline -1,9121 & 0,020833 \\ -2 \cdot 16 = 0,91 & 0,020833 \\ \hline 0,91 & 0,020833 \end{array}$$

$$10011011,0101010101_{(2)}$$

Virgula mobilă:

$$[\bar{x}]_{10} = \underline{\quad}, \underline{\quad}_{(2)}$$

mantisa subunitate
0, ...
mantisa supradunitate
1, ...

$$1) \quad x = 47, 23 = 2F, 3AE \text{ in }$$

$$\begin{array}{r} 0,88 \\ \times 16 \\ \hline 528 \\ 88 \\ \hline 1,08 \end{array}$$

$$\begin{array}{r} 0,08 \\ \times 16 \\ \hline 48 \\ 48 \\ \hline 0,00 \end{array}$$

$$\begin{array}{r} 0,28 \\ \times 16 \\ \hline 168 \\ 28 \\ \hline 0,48 \end{array}$$

$$\begin{aligned} &= 0,1077710011201011100010010_{(2)} \\ &= 1,0777100111010111000010010 \cdot 2^5 \end{aligned}$$

$$\begin{array}{r} 727 \\ \times 5 \\ \hline 365 \\ 365 \\ \hline 1825 \end{array}$$

$$\begin{array}{r} 732 : 16 = 8,824 \\ 72 \\ \hline 12 \\ 112 \\ \hline 8 \\ 8 \\ \hline 0,824 \end{array}$$

$$0,70000010_1011100111010102110000101$$

$$732 = 100000010$$

$$2) \quad y = -27, 33_{(6)} = 7B, 54 + AE_{(6)} =$$

$$\begin{array}{r} 27 \cdot 26 = 7,241 \\ \hline 27 \\ 27 \\ \hline 0,241 \end{array}$$

$$\begin{array}{r} 0,33 \\ \times 26 \\ \hline 198 \\ 33 \\ \hline 5,28 \end{array}$$

$$\begin{array}{r} 0,28 \\ \times 26 \\ \hline 168 \\ 28 \\ \hline 0,48 \end{array}$$

$$\begin{array}{r} 0,48 \\ \times 26 \\ \hline 288 \\ 48 \\ \hline 0,68 \end{array}$$

$$\begin{array}{r} 0,68 \\ \times 26 \\ \hline 408 \\ 52 \\ \hline 0,88 \end{array}$$

$$\begin{aligned} &= 00011011.0101010001111010_{(4)} \\ &= 0,11011010 \cdot 010001111010 \cdot 2^5 \end{aligned}$$

$$1,10000100_111011010101000111101011$$

$$\begin{aligned} 3) \quad z &= \frac{-15}{26^2} \quad \text{noteste unter } 122 \\ &= -15 \cdot 26^{-2} \\ &= -0,0566 \\ &= -0,00001111 \\ &= -1,111 \cdot 2^{-5} \end{aligned}$$

$$\begin{array}{r} 127 \\ \times 5 \\ \hline 635 \\ 635 \\ \hline 310 \end{array} \quad 122 : 26 = 4,9210$$

$$4,9210$$

$$4,9210$$

$$1,01111010,11100000000000000000000000000000$$

9.1.8. 3) $(p \wedge q \rightarrow r) \rightarrow (p \rightarrow r) \wedge q$

$$((p \wedge q) \rightarrow r) \rightarrow ((p \rightarrow r) \wedge q)$$

$$((\neg p \vee \neg q) \vee r) \rightarrow ((\neg p \vee r) \wedge \neg q)$$

$$(\neg p \vee \neg q \vee r) \rightarrow ((\neg p \wedge q) \vee (\neg r \wedge q))$$

$$\boxed{((p \wedge q) \rightarrow r) \vee ((\neg p \wedge q) \vee (\neg r \wedge q))} \rightarrow \text{FND}$$

<u>p</u>	<u>q</u>	<u>r</u>	<u>$p \wedge q \rightarrow r$</u>	<u>$\neg p \wedge q$</u>	<u>$\neg r \wedge q$</u>	
0	0	0	0	0	0	X
0	0	1	0	0	0	X
0	1	0	0	1	0	✓
0	1	1	1	1	1	✓
1	0	0	0	0	0	X
1	0	1	0	0	0	X
1	1	0	0	0	1	✓
1	1	1	1	1	1	✓

$$\begin{array}{ll} p \wedge q \wedge r & \neg p \wedge q \\ F & T \end{array}$$

T T F

Seminar 4 - 26.10.2023:

9.1.2. 1) $A = \neg p \vee (q \wedge r) \rightarrow p \wedge \neg q \wedge r$

Use tabelul de adevar si se va arata ca este o formula de contingenta care nu este modelabila sau anti-modelabila, care sunt mai putine

$$(\neg p \vee (q \wedge r)) \rightarrow (p \wedge \neg q \wedge r)$$

$$(p \wedge (\neg q \vee r)) \vee (p \wedge \neg q \wedge r)$$

$$\begin{matrix} (p \wedge \neg q) \vee (p \wedge r) \vee (p \wedge \neg q \wedge r) \\ A \quad B \quad C \end{matrix}$$

<u>p</u>	<u>q</u>	<u>r</u>	<u>A</u>	<u>B</u>	<u>C</u>	
F	F	F	F	F	F	F
F	F	A	F	F	F	F
F	A	F	F	F	F	F
F	A	A	F	F	F	F
A	F	F	A	F	F	A
A	F	A	A	A	F	A
A	A	F	F	F	F	F
A	A	A	A	A	A	A

9.1.1.3.: verifică $p \uparrow (q \uparrow r) \equiv (p \uparrow q) \uparrow r$

<u>p</u>	<u>q</u>	<u>r</u>	<u>$q \uparrow r$</u>	<u>$p \uparrow (q \uparrow r)$</u>	<u>$p \uparrow q$</u>	<u>$(p \uparrow q) \uparrow r$</u>
F	F	F	T	T	T	T
F	F	T	T	T	T	F
F	T	F	T	T	T	T
F	T	T	F	T	T	F
T	F	F	T	F	T	T
T	F	T	T	F	T	F
T	T	F	T	F	F	T
T	T	T	F	T	F	T

3. 1. 3 3)

$$V \models V: p \rightarrow q = V; (p \rightarrow q) \rightarrow (p \rightarrow q \wedge r) = V$$

\vdash $(p \rightarrow q) \rightarrow ((p \rightarrow q) \rightarrow (p \rightarrow q \wedge r))$

P	q	r	$p \rightarrow q$	$q \wedge r$	$p \rightarrow q \wedge r$	$p \rightarrow r$	V
F	F	F	T	F	T	T	T
F	F	T	T	F	T	T	T
F	T	F	T	F	T	T	T
F	T	T	T	T	T	T	T
T	F	F	F	F	F	F	T
T	F	T	F	F	F	T	F
T	T	F	T	F	F	F	T
T	T	T	T	T	T	T	T



$$\overbrace{(p \rightarrow (q \vee r))}^V \rightarrow \overbrace{((p \rightarrow q) \vee (p \rightarrow r))}^V$$

P	q	r	$q \vee r$	\vee	$p \rightarrow q$	$p \rightarrow r$	\vee	V
F	F	F	F	T	T	T	T	T
F	F	T	T	T	T	T	T	T
F	T	F	T	T	T	T	T	T
F	T	T	T	T	T	T	T	T
T	F	F	F	F	F	F	F	T
T	F	T	T	T	F	T	T	T
T	T	F	T	T	T	F	T	T
T	T	T	T	T	T	T	T	T

Seminare 5 - 2. 7. 2023:

Seminar 6 - 9.11.2023 :

$$\begin{aligned}
 9.1.6. \quad 3) & (U \rightarrow (V \rightarrow Z)) \rightarrow (V \rightarrow (U \rightarrow Z)) \equiv \\
 & \equiv \neg(\neg U \vee (\neg V \vee Z)) \vee (\neg V \vee (\neg U \vee Z)) \\
 & \equiv (U \wedge \neg V \wedge \neg Z) \vee \neg U \vee \neg V \vee Z \quad (\text{FND cu 4 cuturi}) \\
 & \equiv \underbrace{(U \vee \neg U \vee \neg V \vee \neg Z)}_T \wedge \underbrace{(V \vee \neg V \vee \neg U \vee \neg Z)}_T \wedge \underbrace{(\neg Z \vee \neg V \vee \neg U \vee \neg Z)}_T \quad (\text{FNC cu 3 cluze tautologice})
 \end{aligned}$$

$$\begin{aligned}
 9.1.5. \quad & (U \rightarrow V) \wedge (U \wedge V \rightarrow Z) \wedge (U \wedge \neg Z) \equiv \\
 & \equiv (\neg U \vee V) \wedge (\neg(U \wedge V) \vee Z) \wedge (U \wedge \neg Z) \\
 & \equiv (\neg U \vee V) \wedge (\neg U \vee \neg V \vee Z) \wedge (U \wedge \neg Z) \\
 & \equiv (\neg U \vee V) \wedge (\neg U \vee \neg V \vee Z) \wedge U \wedge \neg Z \quad (\text{FND cu 4 cuturi}) \\
 & \equiv (\neg U \wedge \neg U \wedge \neg U \wedge \neg Z) \vee (\neg U \wedge \neg V \wedge \neg U \wedge \neg Z) \vee (\neg U \wedge \neg Z \wedge \neg U \wedge \neg Z) \\
 & \quad (V \wedge \neg U \wedge \neg V \wedge \neg Z) \vee (\neg V \wedge \neg U \wedge \neg V \wedge \neg Z) \vee (V \wedge \neg Z \wedge \neg U \wedge \neg Z) \\
 & \equiv F \vee F \vee F \vee F \vee F \vee F \\
 & \equiv F
 \end{aligned}$$

9.1. m. Folosind tabele semantice duble, tipul formulei A sau A este consistentă, scrieți toate modelele sale

$$\begin{array}{c}
 A = (p \wedge q \rightarrow r) \rightarrow (p \rightarrow r) \wedge q \wedge r \quad \checkmark \\
 \wedge \qquad \beta(1) \\
 \neg(p \wedge q \rightarrow r) \alpha \quad (p \rightarrow r) \wedge q \alpha \quad \checkmark \\
 | \alpha(2) \qquad | \alpha(3) \\
 p \wedge q \beta \quad \checkmark \qquad p \rightarrow r \alpha \quad \checkmark \\
 | \quad | \qquad | \quad | \\
 \neg r \quad \neg r \quad \neg r \\
 | \alpha(5) \qquad | \quad | \quad | \\
 p \quad \neg p \quad r \quad \beta(4) \\
 | \quad | \quad | \quad | \\
 q \quad \neg q \quad r \quad \neg r \\
 \odot \quad \odot \quad \odot \quad \odot
 \end{array}$$

Tablă completă și dischisă $\Rightarrow A$ -consistentă

$$FND(A) = (\neg r \wedge p \wedge q) \vee (\neg p \wedge \neg q) \vee (\neg r \wedge \neg q)$$

Seminar 7 - 16.11.2023 :

1. Dem. că A este tautologie

$$3) \quad A = (p \rightarrow q \vee r) \leftrightarrow (p \rightarrow q) \vee (p \rightarrow r)$$

$$A \equiv A_1 \leftrightarrow A_2 \equiv (A_1 \rightarrow A_2) \wedge (A_2 \rightarrow A_1)$$

A tautologie $\Leftrightarrow A_1 \rightarrow A_2$ tautologie
 $A_2 \rightarrow A_1$ tautologie

$$\neg(A_1 \rightarrow A_2) \alpha(1) \vee$$

$$| \alpha(1)$$

$$p \rightarrow q \vee r \alpha(2)$$

$$|$$

$$\neg((p \rightarrow q) \vee (p \rightarrow r)) \alpha(3) \vee$$

$$| \alpha(3)$$

$$\neg(p \rightarrow q) \alpha(4) \vee$$

$$|$$

$$\neg(p \rightarrow r) \alpha(5) \vee$$

$$| \alpha(5)$$

$$P$$

$$|$$

$$\neg q$$

$$| \alpha(5)$$

$$P$$

$$|$$

$$\neg r$$

$$\neg(A_1 \rightarrow A_2) \text{ cu } \checkmark$$

| $\alpha(1)$

$$p \rightarrow q \vee r \text{ (2) } \checkmark$$

|

$$\neg((p \rightarrow q) \vee (p \rightarrow r)) \text{ (3) } \checkmark$$

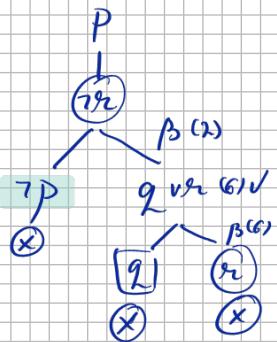
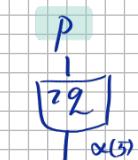
| $\alpha(3)$

$$\neg(p \rightarrow q) \text{ (4) } \checkmark$$

|

$$\neg(p \rightarrow r) \text{ (5) } \checkmark$$

| $\alpha(5)$



$$\neg(A_2 \rightarrow A_1) \equiv \neg((p \rightarrow q) \vee (p \rightarrow r)) \rightarrow (p \rightarrow q \vee r) \text{ (7) } \checkmark$$

| $\alpha(7)$

$$(p \rightarrow q) \vee (p \rightarrow r) \text{ (2) } \checkmark$$

$$\neg(p \rightarrow q \vee r) \text{ (3) } \checkmark$$

| $\alpha(3)$

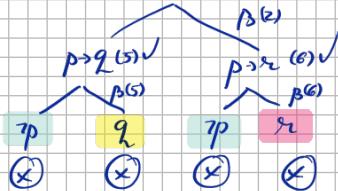
$$P$$

$$\neg(q \vee r) \text{ (4) } \checkmark$$

| $\alpha(4)$

$$\neg q$$

$$\neg r$$



3.1.76.

$$\supset \neg(p \rightarrow r) \rightarrow \neg p \vdash (p \rightarrow q) \rightarrow (p \rightarrow r)$$

$$((\neg(p \rightarrow r) \rightarrow \neg p) \wedge (\neg(p \rightarrow q) \rightarrow (p \rightarrow r))) \text{ (1)} \checkmark$$

$\alpha(1)$

$$\neg(p \rightarrow r) \rightarrow \neg p \text{ (2)} \checkmark$$

|

$$\neg((p \rightarrow q) \rightarrow (p \rightarrow r)) \text{ (3)} \checkmark$$

$\alpha(3)$

$$p \rightarrow q \text{ (4)} \checkmark$$

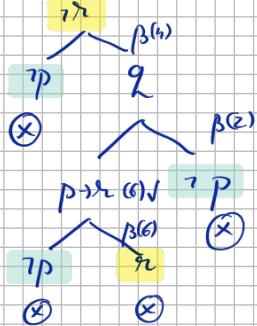
|

$$\neg(p \rightarrow r) \text{ (5)} \checkmark$$

$\alpha(5)$

p

|



9.1.22

Tabelă închisă \Rightarrow are loc relația de consecință logică

Seminar 8 - 23.11.2023:

5.1. 28*

$$\textcircled{3} \quad p \wedge (p \rightarrow r), q \vee r \vdash p \rightarrow (q \rightarrow r)$$

$$\neg V \equiv \neg(p \rightarrow (q \rightarrow r)) \equiv \neg(\neg p \vee (\neg q \vee r)) \equiv p \wedge q \wedge r$$

$$U_1 \equiv p \wedge (p \rightarrow r) \equiv p \wedge (p \vee r)$$

$$U_2 \equiv q \vee r$$

$$S^o = \{p, q, r, \neg p \vee r, q \vee r\}$$

$$C_6 = \text{res}_p(C_1, C_4) = r$$

$$C_7 = \text{res}_q(C_3, C_4) = p$$

$$C_2 = \text{res}_q(C_3, C_5)$$

$$S^1 = \{q, \neg p\}$$

$$C_8 = \text{res}_r(C_6, C_3) = \perp \Rightarrow$$

inconsistență \Rightarrow Are loc relația de consecvență logică

$$5.1. 25: \quad 3) \quad q \wedge r \rightarrow p, \quad p \vee q, \quad q \rightarrow r \vdash p$$

$$\neg V \equiv \neg p \not\models C_1$$

$$U_1 = (q \wedge r) \rightarrow p \equiv \neg(q \wedge r) \vee p \equiv \neg q \vee \neg r \vee p \not\models C_2$$

$$U_2 = p \vee q \not\models C_3$$

$$U_3 = q \rightarrow r \equiv \neg q \vee r \not\models C_4$$

$$S = \{ \neg p, \neg q \vee \neg r \vee p, p \vee q, \neg q \vee r \}$$

$$S \setminus Y - \text{consistent} \Rightarrow S \setminus Y = \{C_2, C_3, C_4\}$$

$$Y = \{C_1\}$$

$$C_5 = \text{res}_p(C_1, C_2) = \neg q \vee r$$

$$C_6 = \text{res}_p(C_1, C_3) = q$$

$$C_7 = \text{res}_p(C_5, C_6) = \neg r$$

$$C_8 = \text{res}_q(C_4, C_6) = r$$

$$C_9 = \text{res}_p(C_7, C_8) = \perp \text{ - inconsistent}$$

\xrightarrow{TCC} S inconsistentă \Rightarrow are loc deductia logică

1. 24.*

$$3) S_1 = \{ q \vee r, \neg q \vee r, p \vee r \}$$

Pas 1: Eliminare clauze tautologice: $\cancel{\text{f}}$

Pas 2: Elim. clauze subsumante: $\cancel{\text{f}}$

Pas 3: Elim. clauze care conțin literare pur: $\cancel{\text{f}}$

Pas 4: Clauza unitate: $\neg p$

$$S_2 = \{ q \vee r, \neg q \vee r, \neg r \}: \text{nr-clauze unitate}$$

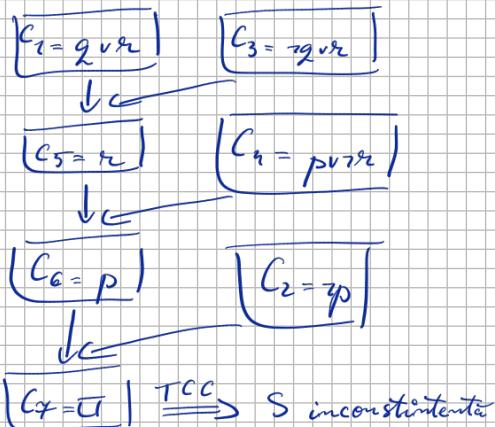
$$S_3 = \{ q, \neg q \}: q\text{-clauza unitate}$$

$$S_4 = \{ \top \} - \text{inconsistență} \xrightarrow{TCC} S_1 - \text{inconsistență}$$

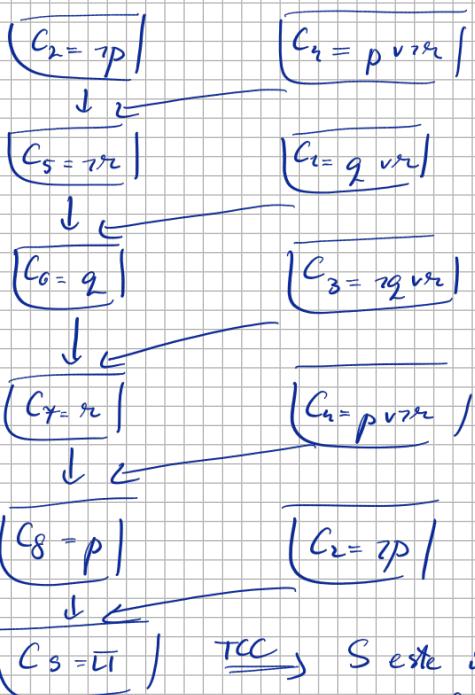
Seminar 20 - 7.12.2023:

3. 1. 24. Construiește o respingere liniară din multimea de clauze S. Există respingeri input și unit din S?

$$3) S = \{ q \vee r, \neg p, \neg q \vee r, p \vee \neg r \}$$



Aceasta este o respingere input $\xrightarrow{T. Echiv} \text{f}$
respingeră unit



Este o rezoluție unită input

9.1. 26. 3) Num. logica silegismului $(p \rightarrow q) \rightarrow ((q \rightarrow r) \rightarrow (p \rightarrow r))$ utilizand o metoda directa

$$A: (p \rightarrow q) \rightarrow ((q \rightarrow r) \rightarrow (p \rightarrow r))$$

								A
						a)	b)	
p	q	r	$p \rightarrow q$	$q \rightarrow r$	$p \rightarrow r$	$a) \rightarrow b)$		
F	F	F	T	T	T	T	T	
F	F	T	T	T	T	T	T	
F	T	F	T	F	T	T	T	
F	T	T	T	T	T	T	T	
T	F	F	F	T	F	F	T	
T	F	T	F	T	T	T	T	
T	T	F	T	F	F	T	T	
T	T	T	T	T	T	T	T	

$\Rightarrow A$ este Tautologie

Predicata:

9.2.2 Suma a două nr. pare este un număr par

$$D = \mathbb{N}$$

const -

$$f: \mathbb{N}^2 \rightarrow \mathbb{N}, f(x,y) = x+y$$

$P: \mathbb{N} \rightarrow \{T, F\}, P(x) = "x este par"$

$$(\forall x)(\forall y) (P(x) \wedge P(y) \rightarrow P(f(x,y)))$$

9.2.3 * Dati o interpretare cu dom. finit si cu dom. ∞ pt. fct. f(x) care mai gas a.v. una sa fie model si cealalta anti-model

$$U = ((\forall x) P(x) \rightarrow (\forall x) Q(x)) \rightarrow \forall x (P(x) \rightarrow Q(x))$$

$$\mathcal{I}_1 = \subset D_1, m_1 >$$

$$D_1 = \mathbb{N} (\infty)$$

$$m_1(P): \mathbb{N} \rightarrow \{T, F\}, m_1(P(x)) = "x impar"$$

$$m_1(Q): \mathbb{N} \rightarrow \{T, F\}, m_1(Q(x)) = "x: 2"$$

$$\begin{aligned} \mathcal{V}^{I_1}(U) &= \mathcal{V}^{I_1}((\forall x) P(x) \rightarrow (\forall x) Q(x)) \rightarrow \mathcal{V}^{I_1}((\forall x) (P(x) \rightarrow Q(x))) \\ &= \mathcal{V}^{I_1}((\forall x) (P(x))) \rightarrow \mathcal{V}^{I_1}((\forall x) Q(x)) \rightarrow \mathcal{V}^{I_1}((\forall x) (P(x) \rightarrow Q(x))) \\ &= (\bar{F} \rightarrow \bar{T}) \rightarrow \bar{T} \\ &= \bar{T} \rightarrow \bar{T} \\ &= \mathcal{I}_1 \text{ este model cu dom. } \infty \end{aligned}$$

$$\mathcal{I}_2 = \subset D_2, m_2 >$$

$$D_2 = \{2, 4\}$$

$$m_2(P): D_2 \rightarrow \{T, F\}, m_2(P(x)) = "x par"$$

$$m_2(Q): D_2 \rightarrow \{T, F\}, m_2(Q(x)) =$$

Seminar 10 - 14. 12. 2023.

9.2.7

$$U = (\forall x)(\exists y)(\exists z)(P_{(x)} \wedge (\exists u)(Q(x, u) \rightarrow (\exists v)(Q(y, v) \wedge Q(z, v))))$$

Passus 3:

$$\equiv (\forall x)(\exists y)(\exists z)(P_{(x)} \wedge (\exists u)(\exists v)(Q(x, u) \wedge Q(y, v) \wedge Q(z, v)))$$

Passus 4:

$$\equiv (\forall x)(\exists y)(\exists z)(\exists u)(\exists v)(P_{(x)} \wedge (\neg Q(x, u) \vee Q(y, v) \vee Q(z, v)))$$

Passus 5:

$$y \in f(a), z \in g(a), u \in h(a), t \in j(a)$$

$$(\forall x)(\neg P(g(a)) \wedge (\neg Q(x, h(a)) \vee Q(f(a), j(a))))$$

Passus 6:

$$U^{\text{Sg}_1} = P(g(a)) \wedge (\neg Q(x, h(a)) \vee Q(f(a), j(a)))$$

Passus 7 FNC:

$$P(g(a)) \wedge (\neg Q(x, h(a)) \vee Q(f(a), j(a)))$$

9.2.23.

$$\neg((\forall x)(P(x) \rightarrow Q(x)) \rightarrow ((\forall x)(P(x) \rightarrow (\forall y)(Q(x) \rightarrow (\forall z)(Q(z)))) \wedge \dots)$$

$\downarrow \alpha(1)$

$$(\forall x)(P(x) \rightarrow Q(x)) \quad \cancel{\text{Sg}}$$

\downarrow

$$\neg((\forall x)P(x) \rightarrow (\forall x)Q(x)) \quad \cancel{\text{Sg}}$$

$\downarrow \alpha(3)$

$$(\forall x)P(x) \quad \cancel{\text{Sg}}$$

\downarrow

$$\neg((\forall x)Q(x)) \quad \cancel{\text{Sg}}$$

$\downarrow \bigcap(5) - \text{a const. monad}$

$$\neg Q(a)$$

$\downarrow f(c_2)$

$$P(a) \quad \cancel{\text{Sg}}$$

$$(\forall x)(P(x)) \quad \cancel{\text{Sg}}$$

$\downarrow \delta_{(2)}$

$$P(a) \rightarrow Q(a) \quad \cancel{\text{Sg}}$$

\downarrow

$$(\forall x)(P(x) \rightarrow Q(x)) \quad \cancel{\text{Sg}}$$

$\leftarrow \rightarrow \beta(a)$

$\neg P(a)$

$Q(a)$

$$\begin{aligned}
 & \neg((\forall x) P(x) \rightarrow (\forall x) Q(x)) \rightarrow \neg(\forall x(P(x) \rightarrow Q(x))) \text{ (1)} \\
 & \quad \downarrow \alpha(1) \\
 & (\forall x) P(x) \rightarrow (\forall x) Q(x) \text{ (2)} \\
 & \quad \downarrow \\
 & \neg((\forall x)(P(x) \rightarrow Q(x))) \text{ (3)} \\
 & \quad \downarrow \int^{\text{(3)}} - \alpha \text{ const. nov} \\
 & \neg(P(x) \rightarrow Q(x)) \text{ (4)} \\
 & \quad \downarrow \alpha(4) \\
 & P(x) \\
 & \quad \downarrow \\
 & \neg Q(x) \\
 & \quad \downarrow \beta^{(2)} \\
 & \neg(\forall x) P(x) \text{ (5)} \quad (\forall x) Q(x) \text{ (6)} \\
 & \quad \downarrow \beta^{(5)} \quad \downarrow \delta^{(6)} \\
 & \neg P(b) \quad Q(a) \\
 & \quad \odot \quad \otimes
 \end{aligned}$$

§. 2 - 14.

$$U = (\forall y)(\exists x) P(x, y) \Leftrightarrow (\exists y)(\exists x) P(x, y)$$

$$\begin{aligned}
 & \neg((\exists y)(\exists x) P(x, y) \rightarrow (\forall y)(\exists x) P(x, y)) \text{ (1)} \\
 & \quad \downarrow \alpha(1) \\
 & (\exists y)(\exists x) P(x, y) \text{ (2)} \\
 & \quad \downarrow \\
 & \neg((\forall y)(\exists x) P(x, y)) \text{ (3)} \\
 & \quad \downarrow \int^{\text{(3)}} - a \text{ const. nov} \\
 & (\exists x) P(x, a) \text{ (4)} \\
 & \quad \downarrow \int^{\text{(4)}} - b \text{ const. nov} \\
 & \neg((\exists x) P(x, b)) \text{ (5)} \\
 & \quad \downarrow \int^{\text{(5)}} - c \text{ const. nov} \\
 & P(c, a) \\
 & \quad \downarrow \delta^{(5)} - a, b, c \\
 & \neg P(c, b) \\
 & \quad \downarrow \\
 & P(c, b) \\
 & \quad \downarrow \\
 & \neg P(c, b) \\
 & \quad \downarrow \\
 & \neg((\exists x) P(x, b)) \text{ (5)}
 \end{aligned}$$

Seminar 12 - 15.12.2023:

$$\begin{aligned} \text{S. 2. 8. } & \left\{ \begin{array}{l} A_1 = P(a, f(a), g(h(a))) \\ A_2 = P(y, f(z), g(w)) \end{array} \right. \\ & \left\{ \begin{array}{l} A_3 = P(x, g(f(a)), h(x,y)) \\ A_4 = P(f(y), z, g(y)) \end{array} \right. \\ & \left\{ \begin{array}{l} A_5 = P(g(y), x, f(g(y))) \\ A_6 = P(z, f(z,w), f(w)) \end{array} \right. \end{aligned}$$

Pas 1: Adulesco sau prod?

Pas 2: Adulesco aritate?

Pas 3: Daca nu are unic character
 \exists substit.

Pentru A_1, A_2 :

Pas 1: $\Delta A(P)$

Pas 2: $\Delta A(3)$

Pas 3: $\Theta_1 = \{y \in a\}$

$$\Theta_1(A_1) = P(a, f(a), g(h(a)))$$

$$\Theta_1(A_2) = P(a, f(z), g(w))$$

$$\Theta_2 = \{x \in z\}$$

$$\Theta_2(\Theta_1(A_1)) = P(a, f(z), g(h(a)))$$

$$\Theta_2(\Theta_1(A_2)) = P(a, f(z), g(w))$$

$$\Theta_3 = \{z \in h(a)\}$$

$$\Theta_3(\Theta_2(\Theta_1(A_1))) = P(a, f(h(a)), g(a))$$

$$\Theta_3(\Theta_2(\Theta_1(A_2))) = P(a, f(h(a)), g(w))$$

$\rightarrow A_1, A_2$ - unifiable, HGU(A_1, A_2) = $\{y \in a, x \in h(a), z \in h(a)\}$

Pentru A_3, A_4 :

Pas 1: $\Delta A(P)$

Pas 2: $\Delta A(3)$

Pas 3:

$$\Theta_1 = \{x \in f(y)\}$$

$$\Theta_1(A_3) = P(f(y), g(f(a)), h(f(y), y))$$

$$\Theta_1(A_4) = P(f(y), z, g(y))$$

$$\Theta_2 = \{z \in g(f(a))\}$$

$$\Theta_2(\Theta_1(A_3)) = P(f(y), g(f(a)), h(f(y), y))$$

$$\Theta_2(\Theta_1(A_4)) = P(f(y), g(f(a)), g(y))$$

Nu se pot face substitutii $\Rightarrow A_3, A_4$ nu sunt unifiable

Pentru A_5, A_6 :

Pas 1: ΔA

Pas 2: ΔA

Pas 3:

$$\Theta_1 = \{z \in g(y)\}$$

$$\Theta_1(A_5) = P(g(y), f(g(u), f(g(v), u)), f(g(w), v))$$

$$\Theta_1(A_6) = P(g(y), f(g(u), f(g(v), u)), f(w))$$

$$\Theta_2 = \{u \in g(y)\}$$

$$\Theta_2(\Theta_1(A_5)) = P(g(y), f(g(u), f(g(v), u)), f(g(w), v))$$

$$\Theta_2(\Theta_1(A_6)) = P(g(y), f(g(u), f(g(v), u)), f(w))$$

$$\Theta_3 = \{v \in g(y)\}$$

$$\Theta_3(\Theta_2(\Theta_1(A_5))) = P(g(y), f(g(u), f(g(v), u)), f(g(w), v))$$

$$\Theta_3(\Theta_2(\Theta_1(A_6))) = P(g(y), f(g(u), f(g(v), u)), f(w))$$

$\rightarrow A_5, A_6$ sunt unifiable

$$\text{HGU} = \{z \in g(y), u \in f(g(v), g(w)), v \in g(y)\}$$

S. 2. 12. 3.

$$(P(x) \wedge Q(x)) \wedge (R(x) \rightarrow P(x)), (R(y) \rightarrow W(y)), (\neg x) (W(x) \rightarrow P(x)), \neg P(a), \neg P(b), \neg W(a) \vdash (\neg x) Q(x)$$

$$S_1 = \{P(a) \vee Q(a) \vee R(a), \neg R(y) \vee W(y), \neg W(a) \vee P(a), \neg P(a), \neg P(b), \neg W(a), \neg Q(a)\}$$

$$S_1 = \{ C_1, C_2, C_3, C_4, C_5, C_6, C_7 \}$$

$$C_7 = \neg Q(\alpha)$$

$$C_1 = P(\beta) \vee Q(\beta) \vee R(\beta)$$

$\frac{\text{Ex} \in S}{\text{Ex} \in C_1}$

$$C_8 = P(\alpha) \vee Q(\alpha)$$

$$C_2 = \neg R(\gamma) \vee V(\gamma)$$

$\frac{\text{Ex} \in S}{\text{Ex} \in C_2}$

$$C_9 = P(\gamma) \vee W(\gamma)$$

$$C_3 = \neg V(\alpha) \vee P(\alpha)$$

$\frac{\text{Ex} \in S}{\text{Ex} \in C_3}$

$$C_{10} = P(\gamma)$$

$$C_4 = \neg P(\alpha)$$

$\frac{\text{Ex} \in S}{\text{Ex} \in C_4}$

$$C_{11} = T$$

$\frac{\text{T.C.C.}}{S \text{ este inconsistentă} \Rightarrow \text{are loc contradicția}}$

3. 2. 2. 6. 5.

$$(U \rightarrow (\exists y)(P(y, y) \leftrightarrow \neg P(x, y))) \not\equiv U$$

$$\neg U \equiv (\forall x)(\forall y)((P(y, y) \rightarrow \neg P(x, y)) \wedge (\neg P(x, y) \rightarrow P(y, y)))$$

$$\neg U \equiv (\forall x)(P(y, y) \vee \neg P(x, y)) \wedge (P(x, y) \vee P(y, y))$$

$$\neg U \equiv (\forall x)(P(x, y) \vee \neg P(x, y)) \wedge (P(x, y) \vee P(y, y))$$

$C_1 \qquad C_2$

$$S = \{ \neg P(x, y) \vee P(x, y), P(x, y) \vee P(y, y) \}$$

$$C_1 \mid \frac{\text{faut}}{\neg P(x, y)} \neg P(x, y)$$

$$C_2 \mid \frac{\text{faut}}{P(x, y)} P(x, y)$$

$$C_1 \qquad C_2$$

$\frac{}{\neg P(x, y) \vee P(x, y)}$

$C_3 = T \xrightarrow{\text{T.C.C.}} S \text{ - inconsistentă} \Rightarrow U \text{ tautologică}$

3.3.1. Bt. următoarele funcții booleane de 3 variabile, date prin intermediul tabelilor de valori, scrieți cele 2 forme canonice: conjunctivă și disjunctivă. Simplificarea funcției utilizând diagramele Karnaugh.

x	y	z	$f(x, y, z)$
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

mo	M ₃
$m_0 = \bar{x} \bar{y} \bar{z}$	1
$m_1 = \bar{x} \bar{y} z$	0
$m_2 = x \bar{y} \bar{z}$	0
$M_3 = x \bar{y} y z$	0
$m_4 = x \bar{y} z$	0
$M_5 = \bar{x} y \bar{y} z$	0
$M_6 = \bar{x} \bar{y} v z$	0
$M_7 = \bar{x} \bar{y} \bar{y} z$	0

$$FCC(f) = M_3 \wedge M_5 \wedge M_6 \wedge M_7 \\ = (x \bar{y} y z) \wedge (\bar{x} y \bar{y} z) \wedge (\bar{x} \bar{y} v z) \wedge (\bar{x} \bar{y} \bar{y} z)$$

$$FCB(f) = m_0 \vee m_1 \vee m_2 \vee m_4 = \bar{x} \bar{y} \bar{z} \vee \bar{x} \bar{y} z \vee \bar{x} y \bar{z} \vee x \bar{y} \bar{z}$$

x	\bar{x}
y	m_2
\bar{y}	m_1
z	\bar{z}

$$\begin{aligned} m_{01} &= m_0 \vee m_2 = \bar{y} \bar{z} \\ m_{02} &= m_0 \vee m_1 = \bar{x} \bar{y} \\ m_{03} &= m_2 \vee m_0 = \bar{x} \bar{z} \end{aligned}$$

$$M(f) = \{m_{01}, m_{02}, m_{03}\}$$

$$C(f) = M(f) \Rightarrow$$

⇒ cauză de simplificare

$$f(x, y, z) = \bar{y} \bar{z} \vee \bar{x} \bar{y} \vee \bar{x} \bar{z}$$

3.3.2. Simplificarea următoarele funcții booleane de n variabile, date prin formule disjunctive, utilizând diagramele Karnaugh

$$f_3(x_1, x_2, x_3, x_4) = \overline{x_1 x_2 x_3 x_4} \vee \overline{x_1 x_2 \bar{x}_3 \bar{x}_4} \vee \overline{x_1 \bar{x}_2 x_3 \bar{x}_4} \vee \overline{x_1 \bar{x}_2 \bar{x}_3 x_4} \vee \overline{x_1 x_2 \bar{x}_3 x_4} \vee \overline{x_1 \bar{x}_2 x_3 \bar{x}_4} \vee \overline{\bar{x}_1 \bar{x}_2 \bar{x}_3 \bar{x}_4} \vee \overline{x_1 \bar{x}_2 x_3 x_4} \vee \overline{\bar{x}_1 x_2 \bar{x}_3 x_4} \vee \overline{x_1 \bar{x}_2 \bar{x}_3 x_4} \vee \overline{\bar{x}_1 x_2 x_3 \bar{x}_4} \vee \overline{\bar{x}_1 x_2 x_3 x_4}$$

x_1	\bar{x}_1
x_2	m_7
\bar{x}_2	m_4
x_3	m_8
\bar{x}_3	m_0
x_4	m_6
\bar{x}_4	m_2

$$max_1 = m_7 \vee m_4 \vee m_0 \vee m_2 = x_1 \bar{x}_2$$

$$max_2 = m_7 \vee m_4 \vee m_1 \vee m_3 = \bar{x}_1 x_2$$

$$max_3 = m_4 \vee m_6 = \bar{x}_1 x_2 \bar{x}_3$$

$$max_4 = m_6 \vee m_7 = \bar{x}_1 x_2 x_3$$

$$max_5 = m_0 \vee m_2 = \bar{x}_1 \bar{x}_2 \bar{x}_3 \bar{x}_4$$

$$M(f) = \{max_1, max_2, max_3, max_4, max_5\}$$

$$C(f) = \{max_1, max_2, max_5\}$$

$$M(f) \neq C(f) \neq \emptyset \rightarrow cauz \text{ II}$$

$$g(x_1, x_2, x_3, x_4) = x_1 \bar{x}_2 \vee \bar{x}_2 x_3 \vee \bar{x}_1 x_2 x_3$$

$$h(x_1, x_2, x_3, x_4) = \bar{x}_1 x_2 \bar{x}_4$$

$$l_2(x_1, x_2, x_3, x_4) = \bar{x}_2 \bar{x}_3 x_1$$

$$f_1(x_1, x_2, x_3, x_4) = g(x_1, x_2, x_3, x_4) \vee h(x_1, x_2, x_3, x_4) = x_1 \bar{x}_2 \vee \bar{x}_2 x_3 \vee \bar{x}_1 x_2 x_3 \vee \bar{x}_1 x_2 \bar{x}_4$$

$$f_2(x_1, x_2, x_3, x_4) = g(x_1, x_2, x_3, x_4) \vee l_2(x_1, x_2, x_3, x_4) = x_1 \bar{x}_3 \vee \bar{x}_2 \bar{x}_3 \vee \bar{x}_1 x_2 x_3 \vee \bar{x}_1 \bar{x}_3 x_4$$

9. 3.3. Simplificare următoarele funcții booleene de 3 variabile, date prin mintermuri expresiile, utilizând diagrame Karnaugh.

$$3) f(x_1, x_2, x_3) = m_1 \vee m_2 \vee m_3 \vee m_4 \vee m_5 \vee m_7$$

$x_1 \setminus x_2 \setminus x_3$	00	01	10	11
0	m_1	m_3	m_2	
1	m_4	m_5	m_7	

$$\begin{aligned} \text{max}_1 &= m_1 \vee m_3 \vee m_5 \vee m_7 = x_3 \\ \text{max}_2 &= m_3 \vee m_2 = \overline{x_1} \vee x_2 \\ \text{max}_3 &= m_4 \vee m_5 = x_1 \vee x_2 \end{aligned}$$

$$M(f) = \{\text{max}_1, \text{max}_2, \text{max}_3\}$$

$$C(f) = M(f) \Rightarrow \text{caz } I \Rightarrow f(x_1, x_2, x_3) = x_3 \vee \overline{x_1}x_2 \vee x_1x_2$$

9. 3.4. Simplificare următoarele funcții booleene de 4 variabile, utilizând diagrame Karnaugh:

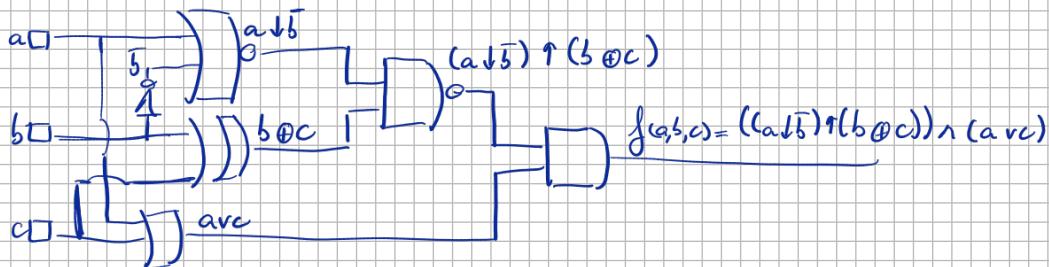
$$f(x_1, x_2, x_3, x_4) = x_1x_3 \vee x_1\overline{x_2}\overline{x_3}\overline{x_4} \vee \overline{x_1}\overline{x_2}\overline{x_3} \vee \overline{x_1}\overline{x_3} \vee x_3x_4$$

x_1	x_2	x_3	x_4	$x_1 \overline{x_2} \overline{x_3} \overline{x_4}$	$\overline{x_1} \overline{x_2} \overline{x_3} \overline{x_4}$	$\overline{x_2} \overline{x_3}$	x_3x_4	f	
0	0	0	0	0	0	1	0	1	m_0
0	0	0	1	0	0	0	0	1	m_1
0	0	1	0	0	1	0	0	1	m_2
0	0	1	1	0	0	0	1	1	m_3
0	1	0	0	0	0	1	0	1	m_4
0	1	0	1	0	0	1	0	1	m_5
0	1	1	0	0	0	0	0	0	
0	1	1	1	0	0	0	1	1	m_6
1	0	0	0	1	0	0	0	1	m_7
1	0	0	1	0	0	0	0	1	m_8
1	0	1	0	0	0	0	0	0	
1	0	1	1	0	0	0	1	1	m_{10}
1	1	0	0	0	0	0	0	0	
1	1	0	1	0	0	0	0	1	m_{13}
1	1	1	0	0	0	0	0	0	
1	1	1	1	0	0	0	1	1	m_{15}

$x_1 \setminus x_2 \setminus x_3 \setminus x_4$	00	01	11	10
00	m_0	m_1	m_7	
01	m_4	m_5	m_{13}	m_8
11	m_3	m_6	m_{15}	m_{11}
10	m_2			

Seminar 24 - 28.07.2024:

S. 3.9. Să se desenează un circuit cu 3 variabile, să se simplifice și să se deseneze circuitul simplificat

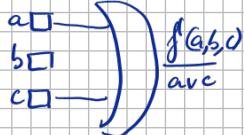


	a	b	c	\bar{a}	\bar{b}	\bar{c}	$a+b$	$b+c$	$\bar{a} \uparrow \bar{b}$	$\bar{a} \uparrow \bar{c}$	$a \uparrow b$	$a \uparrow c$	f
m_0	0	0	0	1	1	1	0	0	1	1	0	0	0
m_1	0	0	1	1	1	0	0	1	1	0	1	1	m_1
m_2	0	1	0	0	0	1	1	1	0	0	0	0	
m_3	0	1	1	0	0	1	1	0	1	1	1	1	m_3
m_4	1	0	0	1	1	1	0	0	1	1	1	1	m_4
m_5	1	0	1	1	1	0	0	1	1	1	1	1	m_5
m_6	1	1	0	0	0	1	1	1	1	1	1	1	m_6
m_7	1	1	1	0	0	0	0	0	1	1	1	1	m_7

$$S(f) = \{(0,0,0), (0,1,0), (1,0,0), (1,0,1), (1,1,0), (1,1,1)\}$$

	max ₁	max ₂	max ₃
m_1	*	*	*
m_3	*	*	
m_4		*	
m_5	*	*	
m_6		*	
m_7	*	*	

$$\begin{aligned} C(f) &= \{\text{max}_1, \text{max}_2\} \\ H(f) &= C(f) \Rightarrow \text{Const}_1 \rightarrow \\ &\Rightarrow \text{Formă simplificată} \\ f(a,b,c) &= c \vee a \end{aligned}$$



S. 3.4. Utilizând met. lui Quine simplificarea formulelor funcției booleane de 3 variabile

$$\begin{aligned} 3) f(x_1, x_2, x_3) &= x_2 (x_1 \uparrow x_3) \vee \bar{x}_2 x_3 \\ &= x_2 (\frac{x_1 \wedge x_3}{x_1 \wedge x_3}) \vee \bar{x}_2 x_3 \\ &= x_2 (\bar{x}_1 \vee x_3) \vee \bar{x}_2 x_3 \\ &= \bar{x}_1 x_2 \vee x_2 x_3 \vee \bar{x}_2 x_3 \\ &= \bar{x}_1 x_2 \vee x_3 \end{aligned}$$

	max ₁	max ₂	
m_1		*	
m_2	*		
m_3	*	*	
m_5		*	
m_7	*	*	

$$H(f) = C(f) \Rightarrow \text{Const}_1 \rightarrow$$

\Rightarrow