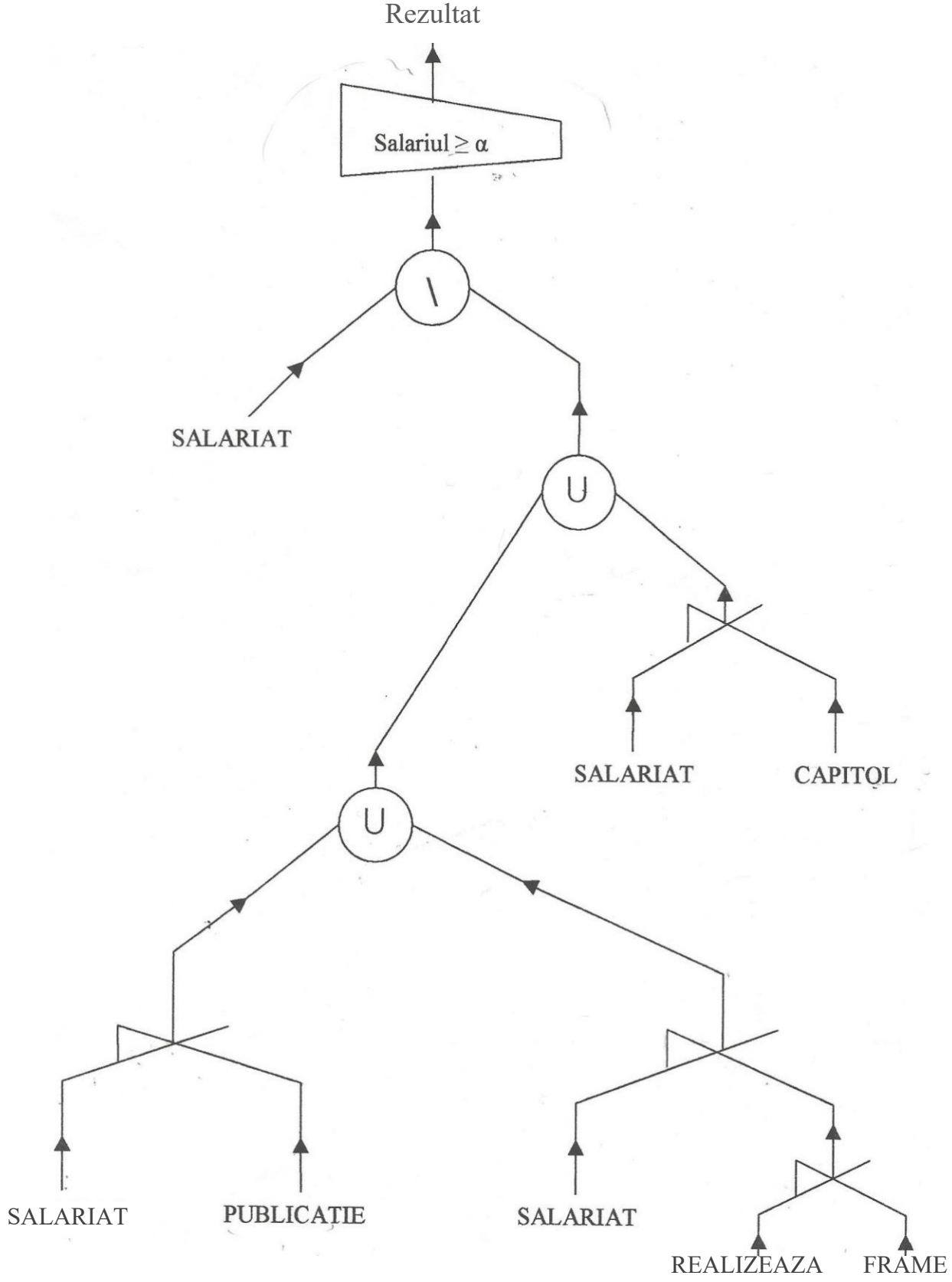
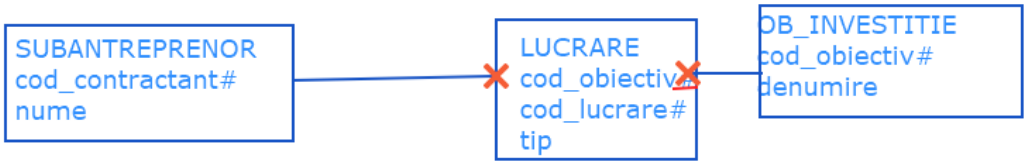
1.


Rezultat
Salariul ≥ α
\
SALARIAT
U
SALARIAT
CAPITOL
U
SALARIAT
PUBLICATIE
SALARIAT
REALIZEAZA
FRAME

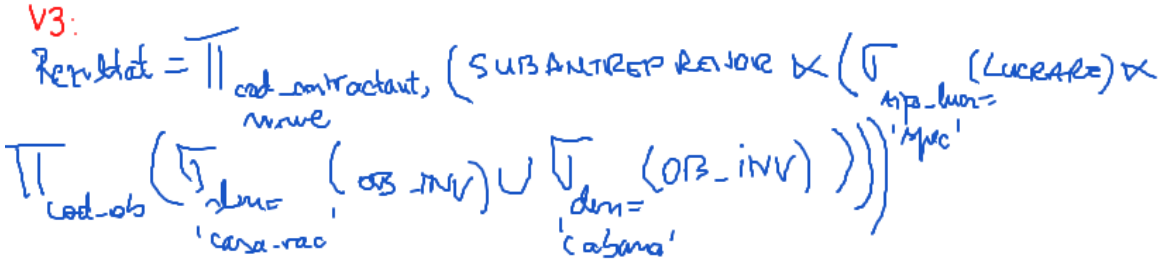


V1:
R1 = SELECT(OB_INVESTITIE, denumire = 'casa_vacanta')
R2 = SELECT(OB_INVESTITIE, denumire = 'cabana')
R3 = UNION(R1, R2)
R4 = PROJECT(R3, cod_obiectiv)
R5 = SELECT(LUCRARE, tip='specializat')
R6 = SEMIJOIN(R5, R4)
R7 = SEMIJOIN(SUBANTREPRENOR, R6)
Rezultat = R8 = PROJECT(R7, cod_contractant, nume)

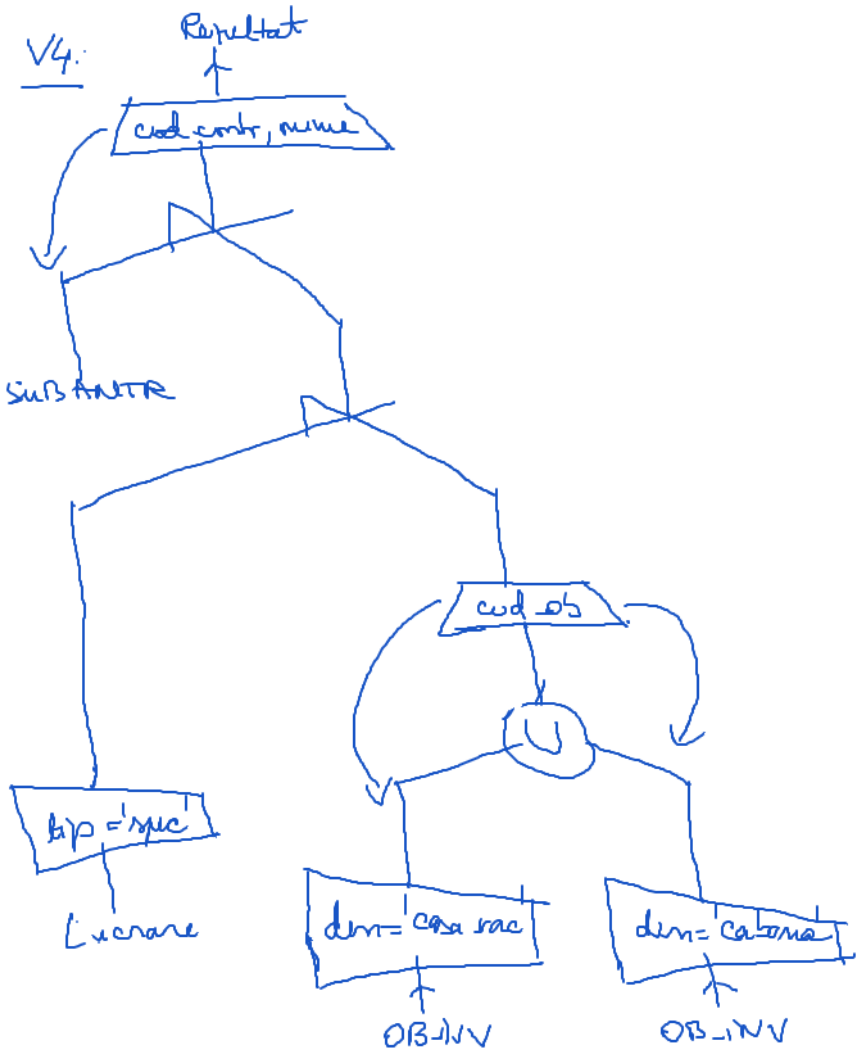
V2:
Rezultat = PROJECT(SEMIJOIN(SUBANTREPRENOR, SEMIJOIN(SELECT(LUCRARE, tip='specializat'), PROJECT(UNION(SELECT(OB_INVESTITIE, denumire = 'casa_vacanta'), SELECT(OB_INVESTITIE, denumire = 'cabana'), cod_obiectiv))), cod_contractant, nume)

2.

V3:



V4:



3.

CONTRACTANT(cod_contactant#, ...)
CONTRACT(cod_contract, val_inv, ...,cod_contractant)

V1:
R1=PROJECT(CONTRACT, val_investitie, durata, cod_contractant)
R2 = SELECT(R1, val_investitie > lim1)
R3 = SELECT(R2, val_investitie < lim2)

R4 = PROJECT(CONTRACTANT, cod_contractant, tip_contractant, telefon)
R5 = SELECT(R4, tip_contractant = 'inv')
R6 = PROJECT(R5, cod_contractant, telefon)
Rezultat = JOIN(R6, R3)

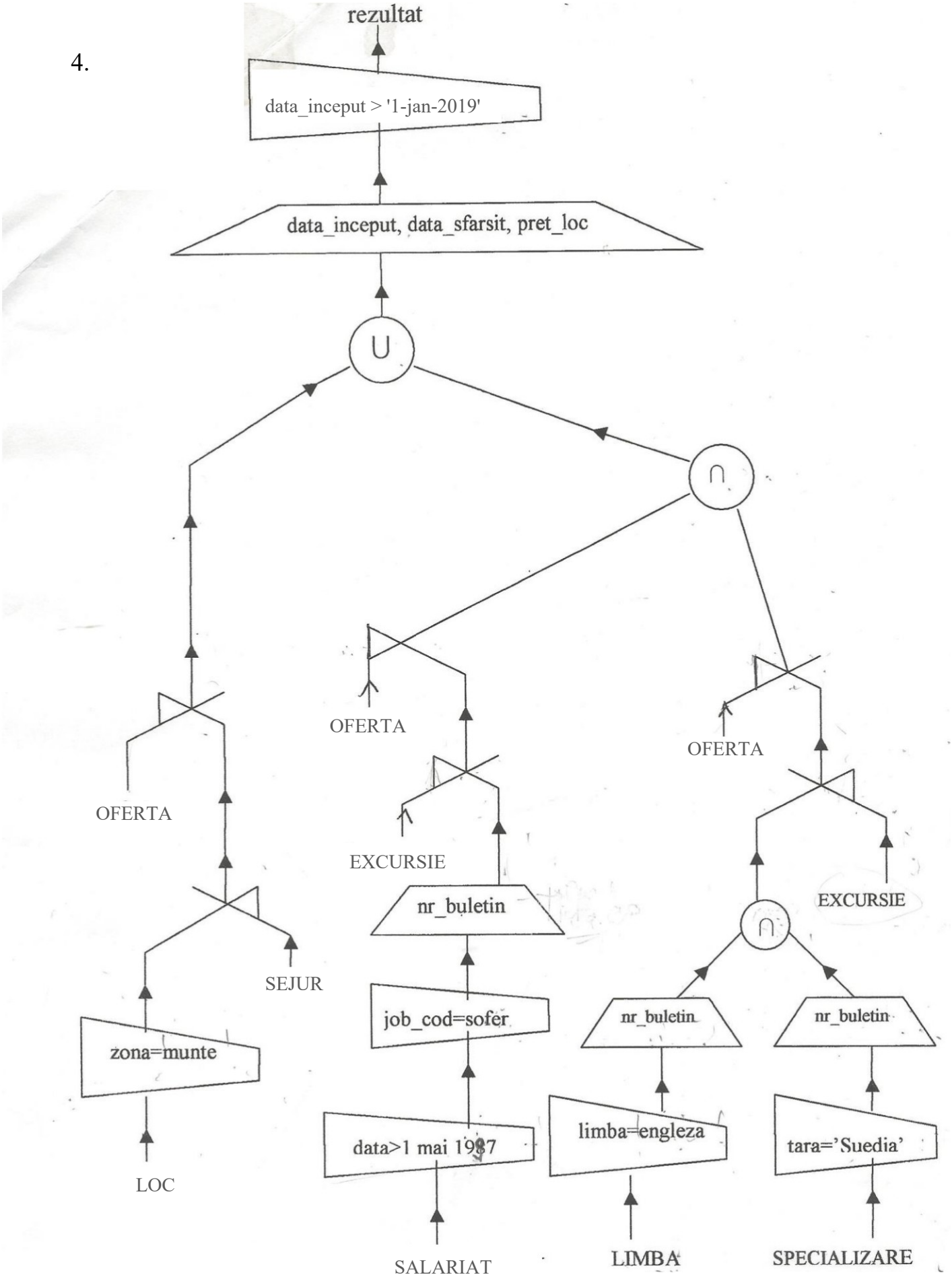
V3: $Rezultat = \overline{\Pi}_{cod\_contractant, telefon}\left(\overline{\sigma}_{tip\_contractant = 'inv'}\left(\overline{\Pi}_{cod\_contractant, tip\_contractant, telefon}(CONTRACTANT)\right)\right) \bowtie \overline{\sigma}_{val\_inv < lim2}\left(\overline{\sigma}_{val\_inv > lim1}\left(\overline{\Pi}_{val\_inv, durata, cod\_contractant}(CONTRACT)\right)\right) \overset{P4}{=}$

$\overset{P4}{=} \alpha \bowtie \overline{\sigma}_{val\_inv < lim2 \wedge val\_inv > lim1}\left(\overline{\Pi}_{val\_inv, durata, cod\_contractant}(CONTRACT)\right) \overset{P5}{=} \alpha \bowtie \overline{\Pi}_{val\_inv, durata, cod\_contractant}\left(\overline{\sigma}_{val\_inv < lim2 \wedge val\_inv > lim1}(CONTRACT)\right) \overset{P5}{=}$

$\overset{P5}{=} \overline{\Pi}_{cod\_contractant, telefon}\left(\overline{\Pi}_{cod\_contractant, tip\_contractant, telefon}\left(\overline{\sigma}_{tip\_contractant = 'inv'}(CONTRACTANT)\right)\right) \bowtie \beta \overset{P3}{=} \overline{\Pi}_{cod\_contractant, telefon}\left(\overline{\sigma}_{tip\_contractant = 'inv'}(CONTRACTANT)\right)$

$\bowtie \beta = Rezultat\_optimizat$

4.



Observație: Am presupus că atributul *nr_buletin* este cheie primară.