“Matematici Speciale”

Pentru studentii sectiei frecventa redusa FCIM

PROBLEMELE PENTRU LUCRAEA DE CONTROL*(Fiecare student rezolva problemele cu numărul corespunzător numărului său din registrul grupei)*

PROBLEMA I.

Este data functia logica $f(x_1, x_2, x_3, x_4)$ prin setul de valori a argumentelor pentru care primeste valoarea 1

1. De alcatuit tabelul de adevar;
2. De obtinut forma canonica disjunctiva normala (FCDN) si forma canonica conjunctiva normala (FCCN) ;
3. De minimizat FCDN prin 3 metode: Quine, Quine-McKluskey, Karnaugh;
4. De impilentat schema loGIica in baza: ŞI-NU , SAU-NU
5. De construit diagrama temporara pentru functia $f(x_1, x_2, x_3, x_4)$..

Задана логическая функция $f(x_1, x_2, x_3, x_4)$ набором значений аргументов для которых функция принимает значение 1

1. СОСТАВИТЬ ТАБЛИЦУ ИСТИННОСТИ;
2. нАЙТИ СОВЕРШЕННУЮ ДИЗЪЮНКТИВНУЮ НОРМАЛЬНУЮ ФОРМУ (СДНФ) И СОВЕРШЕННУЮ КОНЪЮНКТИВНУЮ НОРМАЛЬНУЮ ФОРМУ (СКНФ) ;
3. МИНИМИЗИРОВАТЬ СДНФТРЕМЯ МЕТОДАМИ:КВАЙНА, КВАЙНА-МАККЛАСКИ, КАРНО;
4. РЕАЛИЗОВАТЬ ЛОГИЧЕСКИЕ СХЕМЫ В БАЗИСАХ И-НЕ, ИЛИ-НЕ
5. пОСТРОИТЬ ВРЕМЕННУЮ ДИАГРАММУ ДЛЯ ФУНКЦИИ $f(x_1, x_2, x_3, x_4)$..

Var.1 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 2, 7, 8, 9, 10, 11, 13)$;

Var.2 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 5, 7, 8, 10, 13, 15)$;

Var.3 $f(x_1, x_2, x_3, x_4) = \Sigma(4, 6, 8, 9, 10, 11, 15)$

Var.4 $f(x_1, x_2, x_3, x_4) = \Sigma(2, 3, 6, 7, 8,14, 15)$;

Var.5 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 4, 7, 10, 11, 12)$;

Var.6 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 5, 7, 8, 9, 12, 13, 15)$

Var.7 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 3, 6, 9, 12, 14, 15)$;

Var.8 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 4, 6, 7, 8, 9, 15)$;

Var.9 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 3, 4, 5, 7, 8, 10, 11)$;

Var.10 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 2, 3, 7, 8, 12, 14, 15)$;

Var.11 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 5, 6, 8, 9, 10, 14)$;

Var.12 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 2, 9, 10, 11, 12, 13, 15)$;

Var.13 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 6, 7, 9, 12, 13, 14, 15)$

Var.14 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 4, 10, 11, 13,14)$;

Var.15 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 5, 6, 7, 9, 13, 14, 15)$;

Var.16 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 3, 4, 9,12, 15)$;

Var.17 $f(x_1, x_2, x_3, x_4) = \Sigma(2, 3, 4, 7, 10, 12, 13, 14)$;

Var.18 $f(x_1, x_2, x_3, x_4) = \Sigma(4, 5, 7, 9, 10, 11, 12, 15)$;

Var.19 $f(x_1, x_2, x_3, x_4) = \Sigma(3, 4, 6, 8, 10, 11, 12, 14)$;

Var.20 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 4, 8, 10, 11, 12)$;

Var.21 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 5, 7, 8, 9, 12, 13, 15)$

Var.22 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 3, 4, 5, 8, 9, 10, 11)$;

Var.23 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 5, 7, 8, 10, 13, 15)$;

Var.24 $f(x_1, x_2, x_3, x_4) = \Sigma(4, 6, 8, 9, 10, 11, 15)$

Var.25 $f(x_1, x_2, x_3, x_4) = \Sigma(2, 3, 6, 7, 8,14, 15)$;

Var.26 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 4, 7, 10, 11, 12)$;

Var.27 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 5, 7, 8, 9, 12, 13, 15)$

Var.28 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 3, 6, 9, 12, 14, 15)$;

Var.29 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 4, 6, 7, 8, 9, 15)$;

Var.30 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 3, 4, 5, 7, 8, 10, 11)$;

Var.31 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 2, 3, 7, 8, 12, 14, 15)$;

Var.32 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 5, 6, 8, 9, 10, 14)$;

Var.33 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 2, 9, 10, 11, 12, 13, 15)$;

Var.34 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 6, 7, 9, 12, 13, 14, 15)$

Var.35 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 4, 10, 11, 13,14)$;

Var.36 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 5, 6, 7, 9, 13, 14, 15)$;

Var.37 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 2, 3, 4, 9,12, 15)$;

Var.38 $f(x_1, x_2, x_3, x_4) = \Sigma(2, 3, 4, 7, 10, 12, 13, 14)$;

Var.39 $f(x_1, x_2, x_3, x_4) = \Sigma(4, 5, 7, 9, 10, 11, 12, 15)$;

Var.40 $f(x_1, x_2, x_3, x_4) = \Sigma(3, 4, 6, 8, 10, 11, 12, 14)$;

Var.41 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 1, 2, 4, 8, 10, 11, 12)$;

Var.42 $f(x_1, x_2, x_3, x_4) = \Sigma(1, 5, 7, 8, 9, 12, 13, 15)$

Var.43 $f(x_1, x_2, x_3, x_4) = \Sigma(0, 3, 4, 5, 8, 9, 10, 11)$;

PROBLEMA II

. Utilizând algoritmul Ford si Bellman-Kalaba de aflat drumurile de valoare minimă şi maximă între vârfurile 1 şi 8 în graful dat:

Используя алгоритмы Форда и Bellman-Kalaba найти минимальные и максимальные пути между вершинами 1 и 8 в заданном графе:

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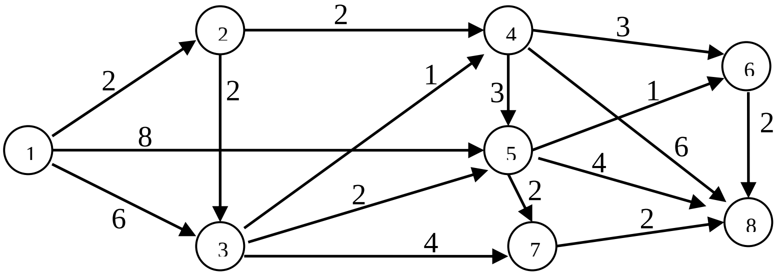

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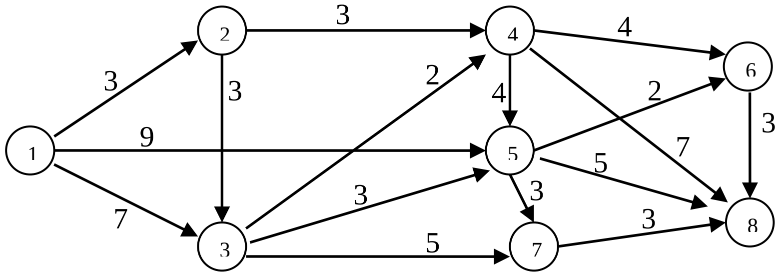

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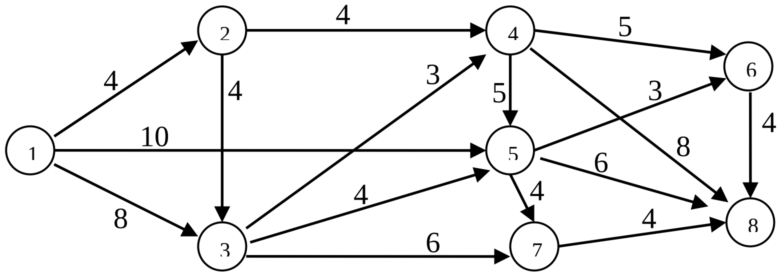

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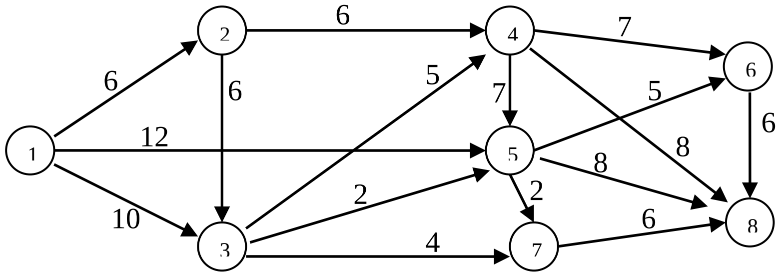

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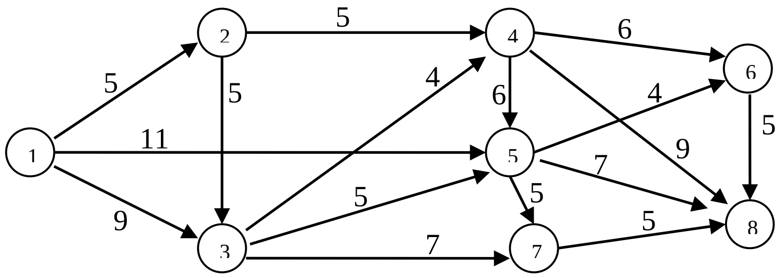

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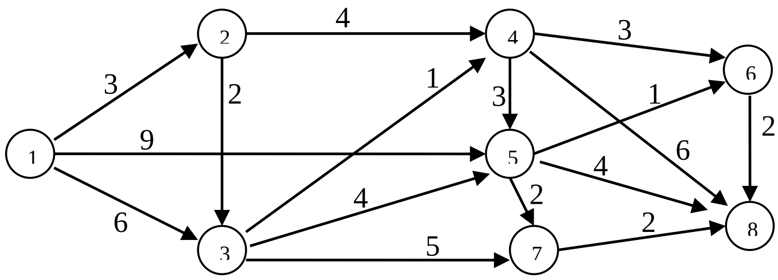

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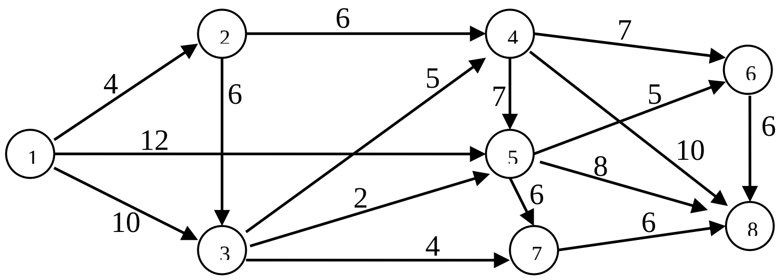

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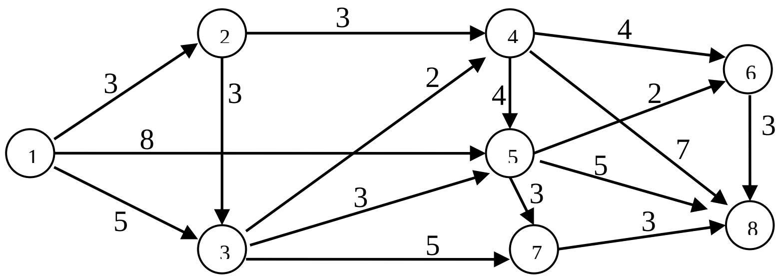

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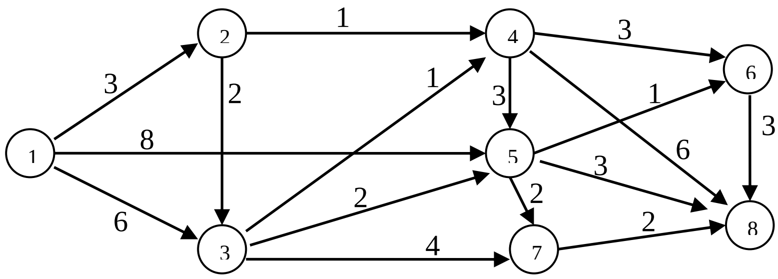

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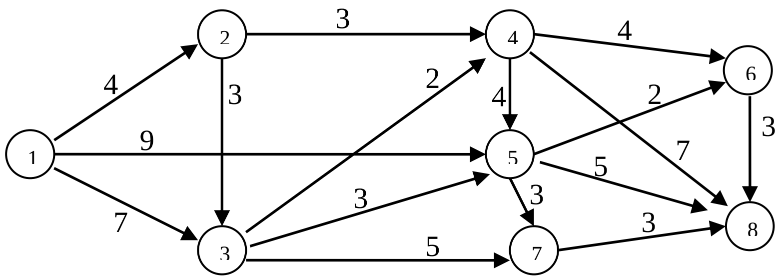

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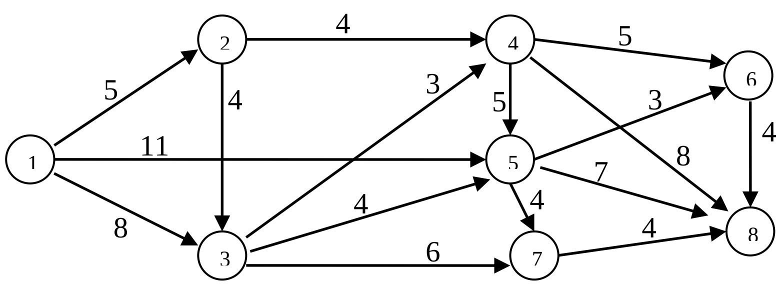

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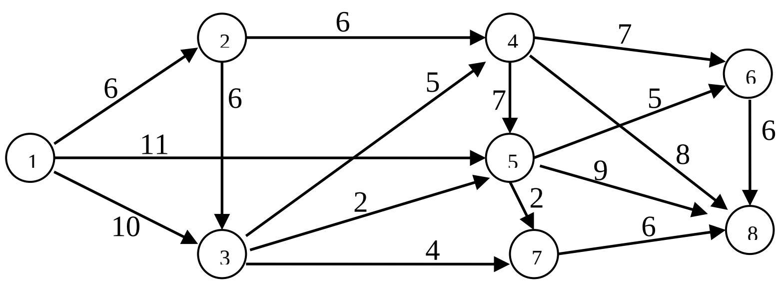

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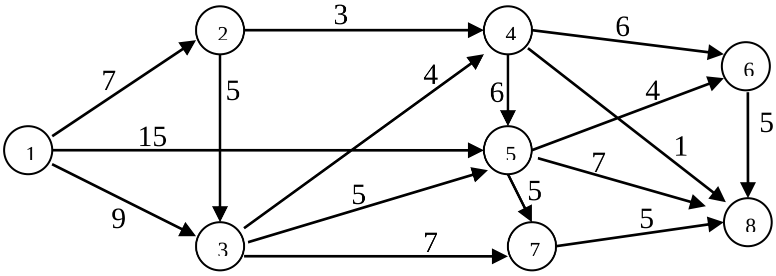

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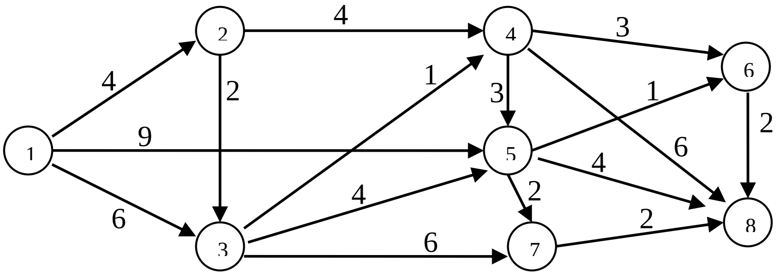

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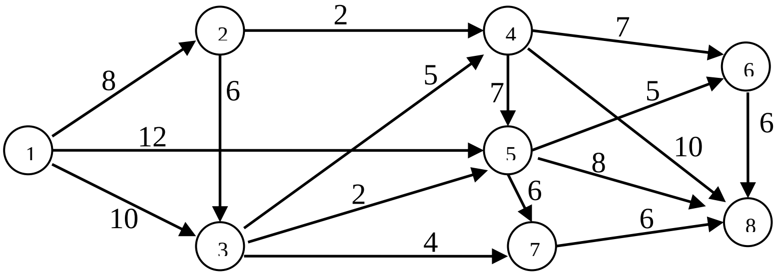

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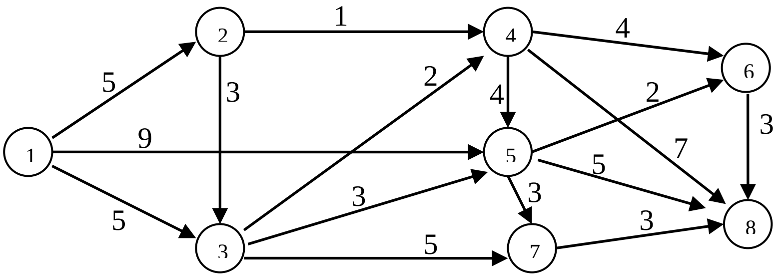

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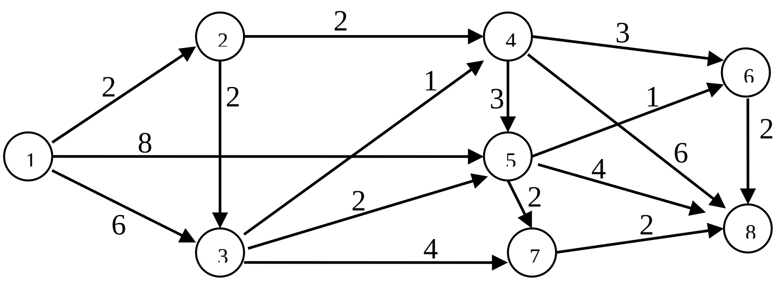

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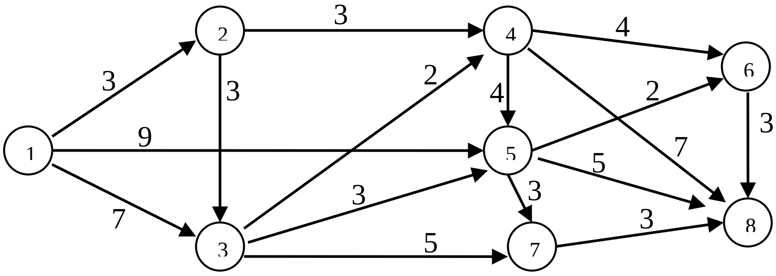
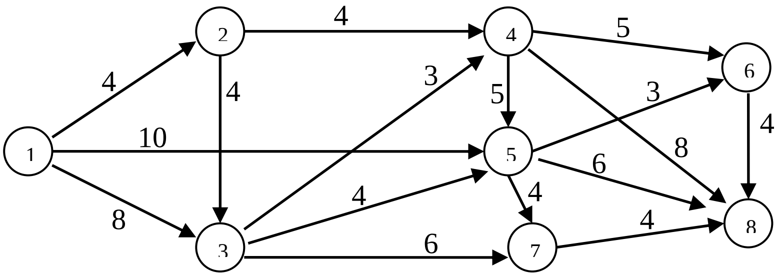
Var.19





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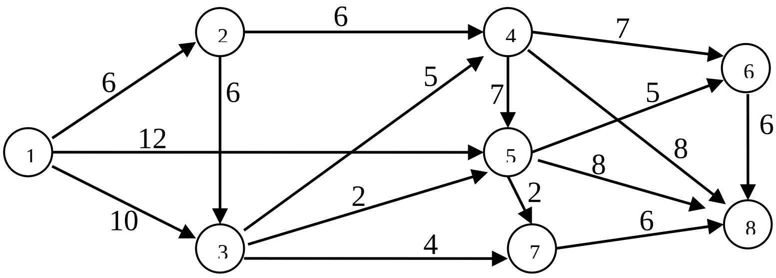

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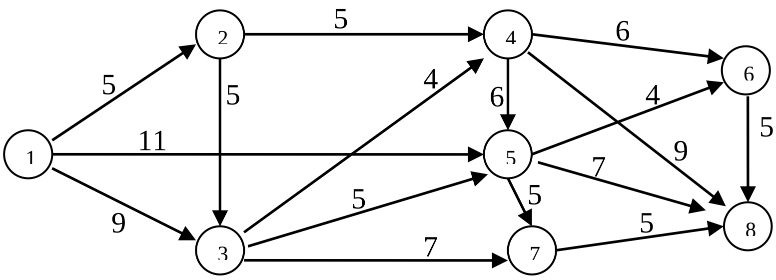

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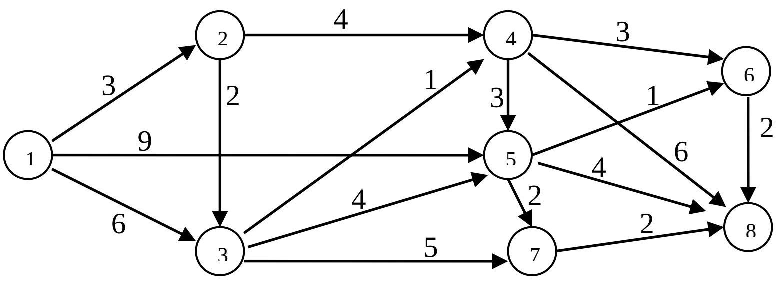

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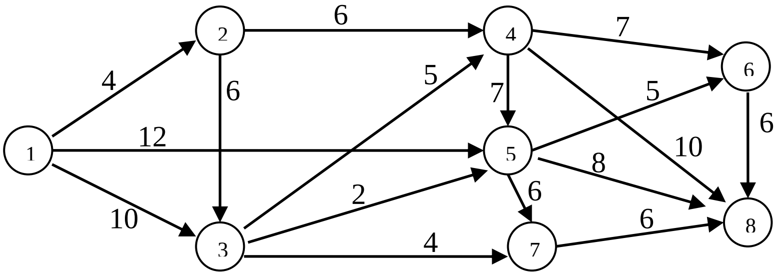

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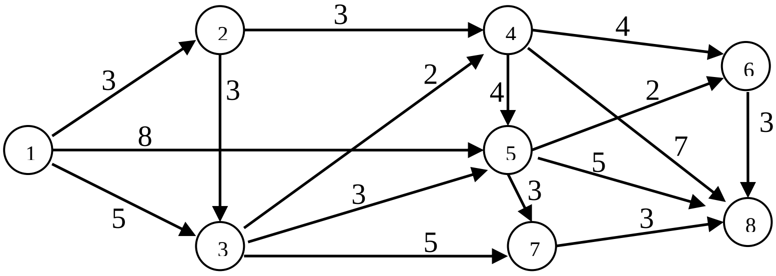

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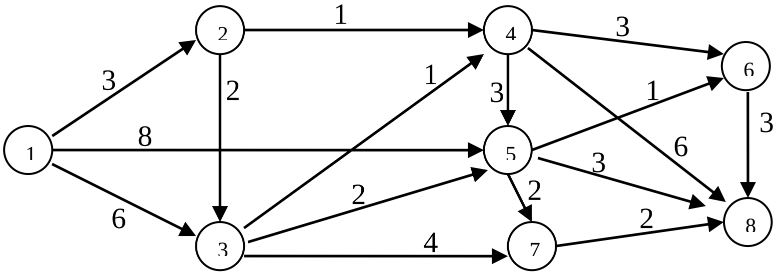

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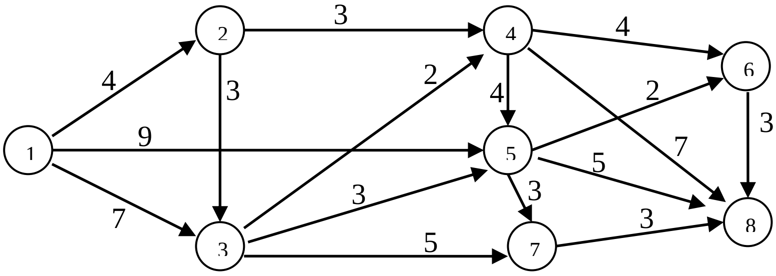

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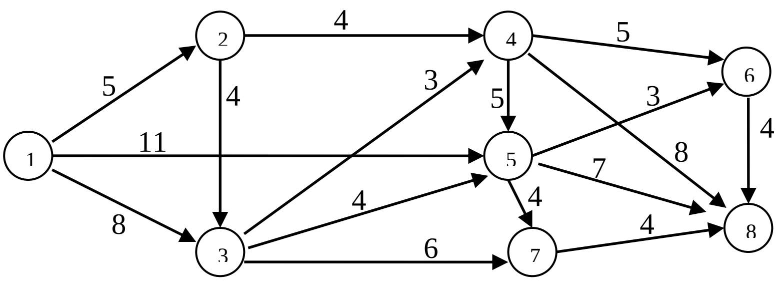

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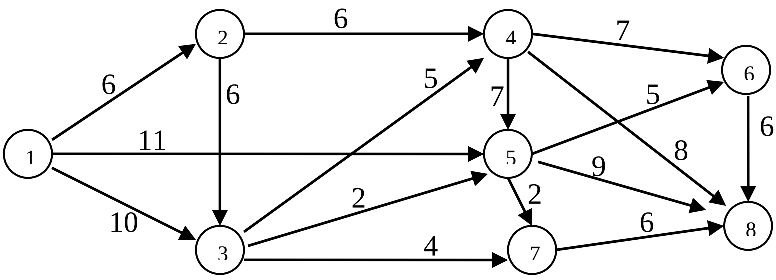

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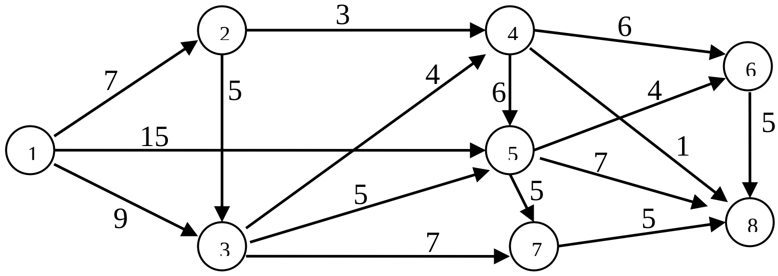

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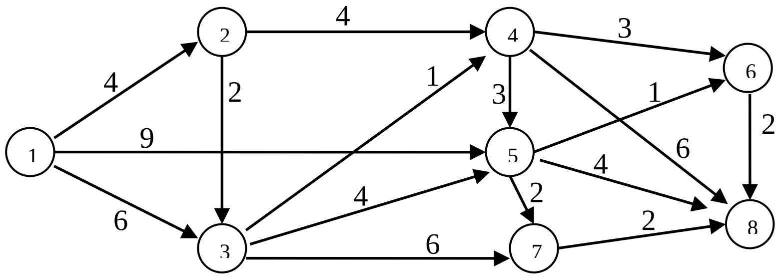

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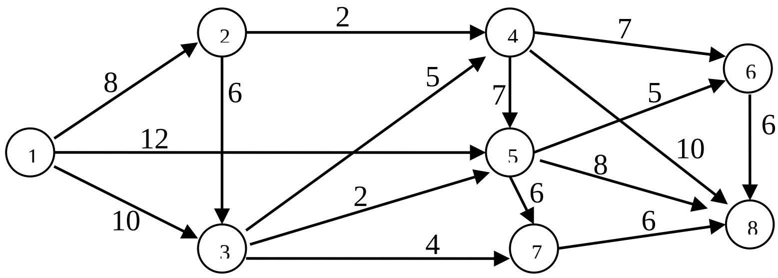

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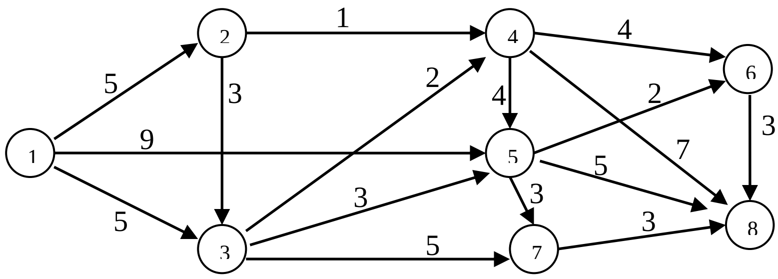

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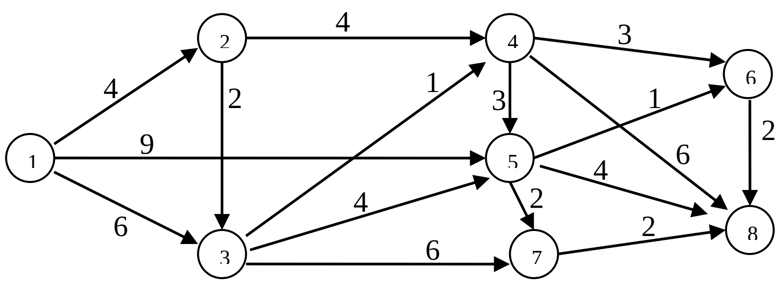

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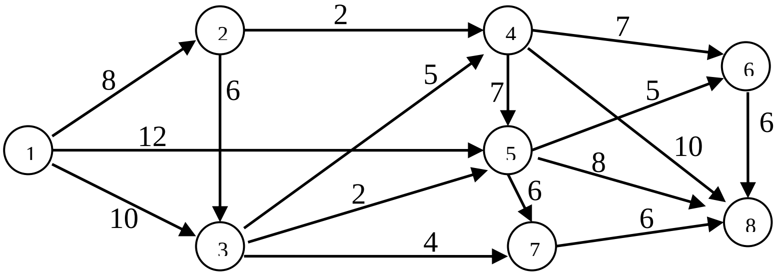

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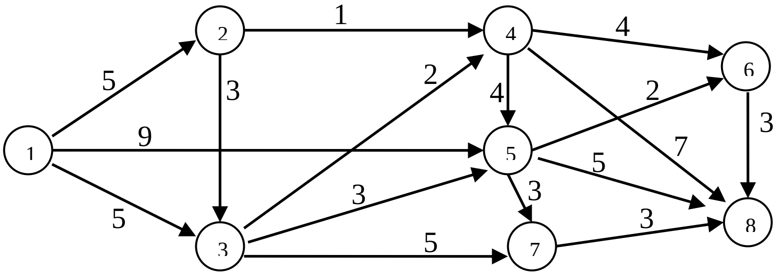

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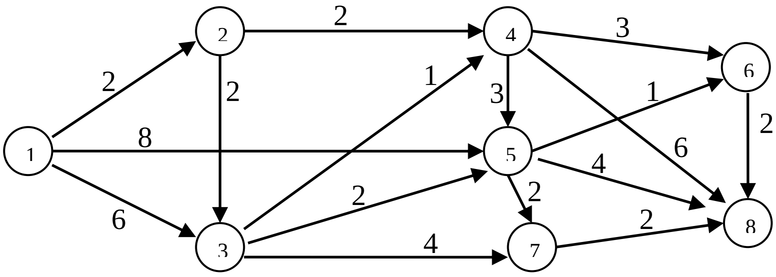

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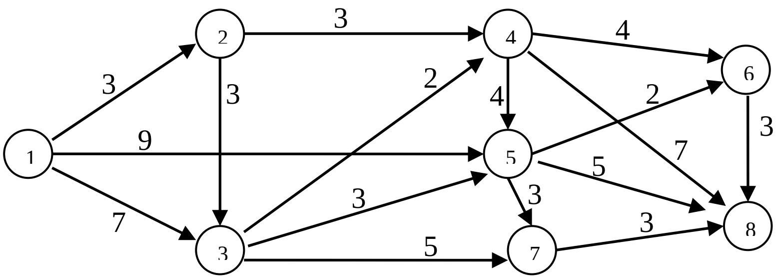

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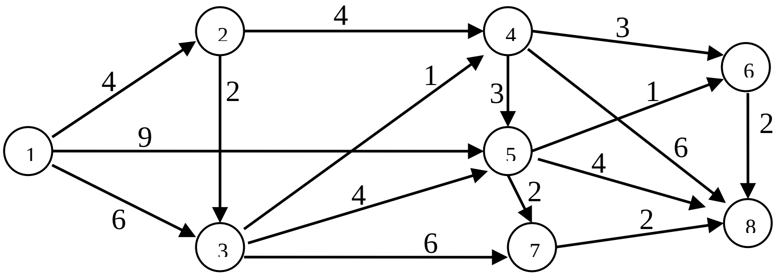

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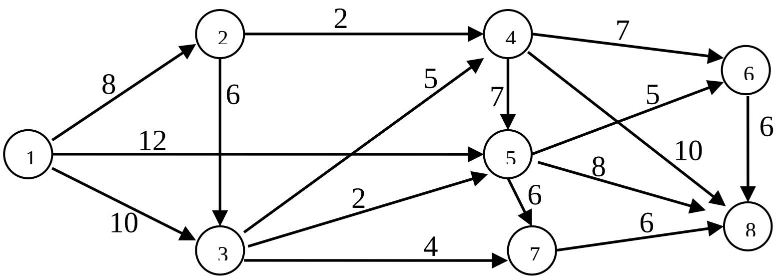

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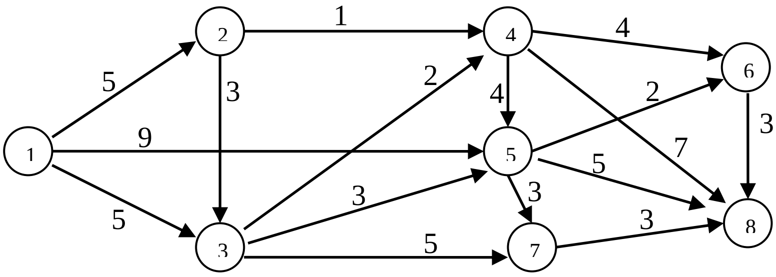

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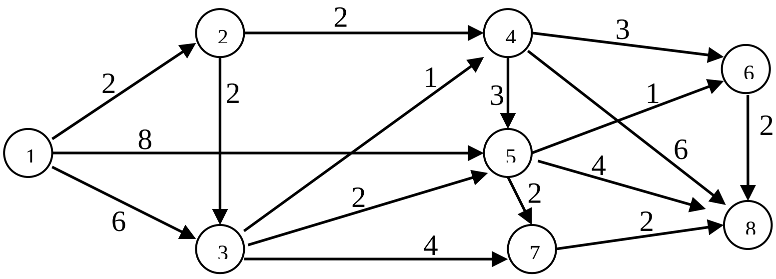

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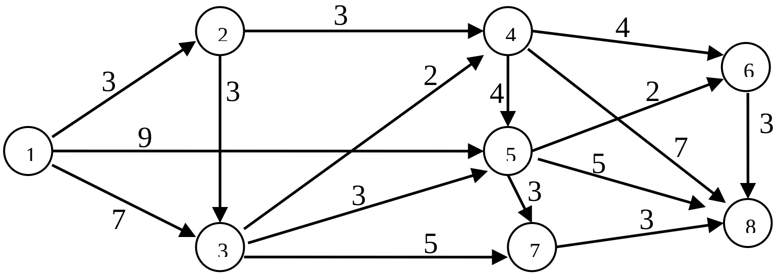

O alta formulare a problemei de determinare a drumului minim si maxim

Другая формв записи задачи на нахождение минимального и максимального пути в графе:

2. Fiind dat graful ponderat *G*=(*V*, U, P), unde *V* este mulţimea vârfurilor, U - mulţimea arcelor si P – multimea ponderilor să se determine utilizind algoritmii Ford şi Bellman-Kalaba drumurile de lungime minimă(maximă) din virful v_1 in virful v_8 .

В заданном взвешанном графе G=(V, U, P), где V множество вершин, U – множество дуг и P – множество весов найти используя алгоритмы Форда и Беллмана-Калаба минимальные и максимальные пути из вершины v_1 в вершину v_8 .

a) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=2$, $p_{13}=6$, $p_{15}= 8$, $p_{23}= 2$, $p_{24}=2$, $p_{34}=1$, $p_{35}= 2$, $p_{37} = 4$, $p_{45}= 3$, $p_{46}=3$, $p_{48}=6$, $p_{56}=1$, $p_{57}=2$, $p_{58}=4$, $p_{68}=2$, $p_{78}=1$.

b) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=3$, $p_{13}=7$, $p_{15}= 9$, $p_{23}= 3$, $p_{24}=3$, $p_{34}=2$, $p_{35}= 3$, $p_{37} = 5$, $p_{45}= 2$, $p_{46}=4$, $p_{48}=7$, $p_{56}=2$, $p_{57}=3$, $p_{58}=5$, $p_{68}=3$, $p_{78}=3$.

c) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=4$, $p_{13}=8$, $p_{15}= 10$, $p_{23}= 4$, $p_{24}=4$, $p_{34}=3$, $p_{35}= 4$, $p_{37} = 6$, $p_{45}= 2$, $p_{46}=5$, $p_{48}=8$, $p_{56}=3$, $p_{57}=4$, $p_{58}=6$, $p_{68}=3$, $p_{78}=2$.

d) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=5$, $p_{13}=9$, $p_{15}= 11$, $p_{23}= 5$, $p_{24}=5$, $p_{34}=4$, $p_{35}= 5$, $p_{37} = 7$, $p_{45}= 6$, $p_{46}=6$, $p_{48}=8$, $p_{56}=4$, $p_{57}=2$, $p_{58}=7$, $p_{68}=5$, $p_{78}=5$.

e) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=6$, $p_{13}=8$, $p_{15}= 12$, $p_{23}= 2$, $p_{24}=6$, $p_{34}=5$, $p_{35}= 4$, $p_{37} = 8$, $p_{45}= 7$, $p_{46}=7$, $p_{48}=10$, $p_{56}=5$, $p_{57}=4$, $p_{58}=8$, $p_{68}=6$, $p_{78}=4$.

f) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_5), (v_2,v_3), (v_2,v_4), (v_3, v_4), (v_3, v_5), (v_3,v_7), (v_4,v_5), (v_4,v_6), (v_4,v_8), (v_5,v_6), (v_5,v_7), (v_5,v_8), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $p_{12}=2$, $p_{13}=8$, $p_{15}= 6$, $p_{23}= 2$, $p_{24}=2$, $p_{34}=1$, $p_{35}= 2$, $p_{37} = 4$, $p_{45}= 3$, $p_{46}=3$, $p_{48}=6$, $p_{56}=1$, $p_{57}=2$, $p_{58}=5$, $p_{68}=2$, $p_{78}=1$.

Pentru Antrenament

Fiind dat graful ponderat $G=(V,U,P)$, unde V este mulţimea vârfurilor, U este mulţimea arcelor şi P este ponderea (valoarea) arcelor(m este penultima cifra , iar n – ultima cifra din carnetul de note a studentului) să se determine drumurile de valoare minimă şi drumurile de valoare maximă din vârful v_1 până în vârful v_8. Să se folosească algoritmii Ford si Bellman-Kalaba.

В заданном взвешенном графе $G=(V,U,P)$, где V множество вершин, U множество дуг и P множество весов дуг (m – предпоследняя, а n- последняя цифра номера зачетной книжки студента) , найти пути минимальной и максимальной длины из вершины v_1 до вершины v_8. Использовать алгоритмы Форда и Беллмана-Калаба.

$V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_3), (v_2,v_5), (v_2,v_6), (v_3,v_6), (v_4,v_3), (v_4,v_6) (v_4,v_7), (v_5,v_6), (v_5,v_8), (v_6,v_7), (v_6,v_8), (v_7,v_8)\}$, $P=(p_{ij})$, $p_{ij}=p(v_i,v_j)$, $(v_i,v_j)\in U$, $P_{12}=5+n$; $P_{13}=4+m$; $P_{14}=6+m+n$; $P_{23}=5+3m$; $P_{25}=4+2m$; $P_{26}=7+n$; $P_{36}=4+m+n$; $P_{43}=3+2m$; $P_{46}=7+m+2n$; $P_{47}=4+m$; $P_{56}=7+2n$; $P_{58}=7+3m+n$; $P_{67}=3+4m$; $P_{68}=8+m+n$; $P_{78}=2+m+n$.

PROBLEMA III.

1. Determina-ţi valoarea fluxului maximal in reţeaua de transport conform algoritmului Ford-Fulkersson. *Найти максимальный поток в транспортной сети используя алгорифм Форда- Фалкерссона*

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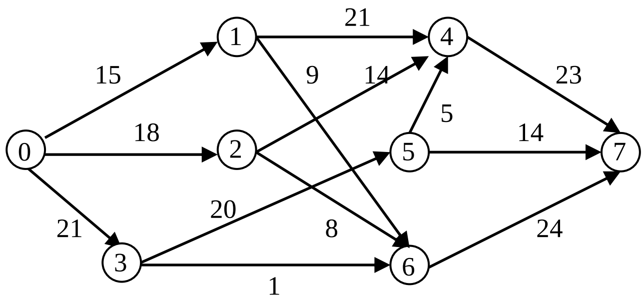

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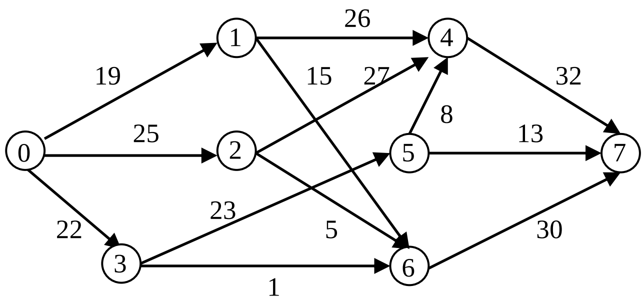

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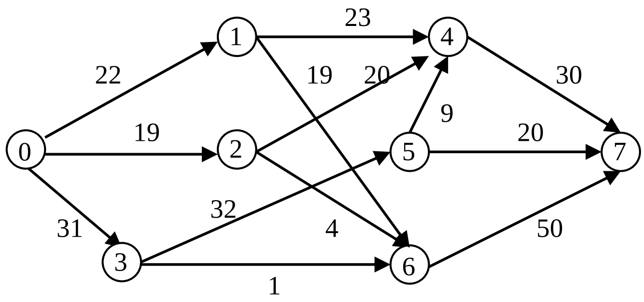

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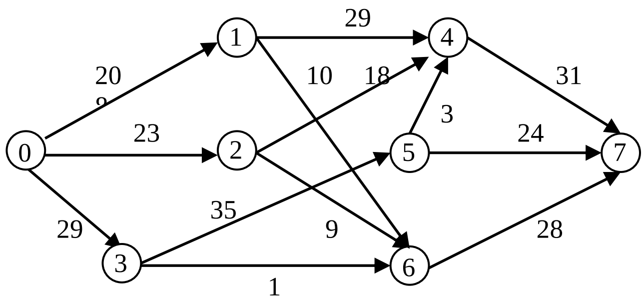

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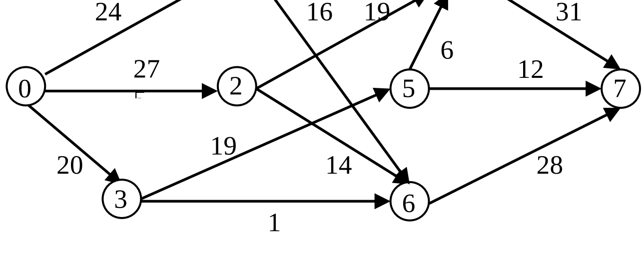

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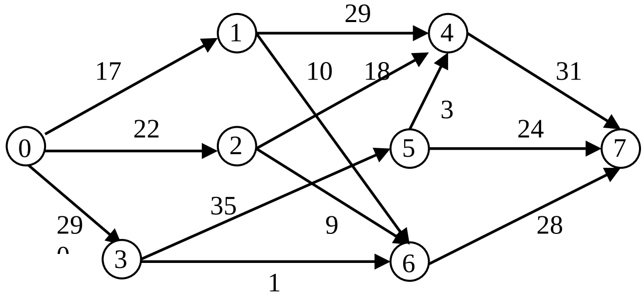

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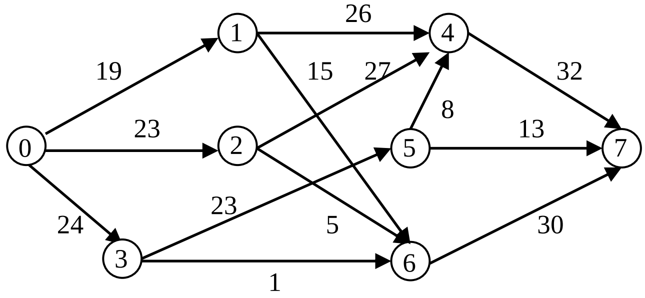

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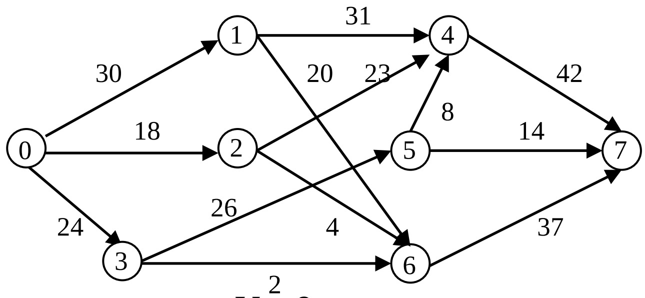

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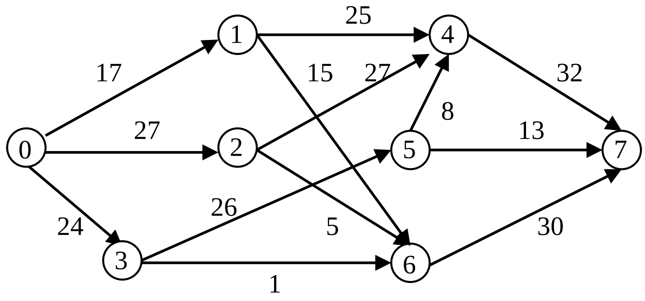

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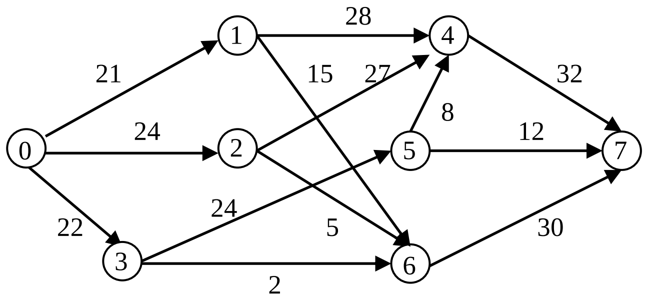

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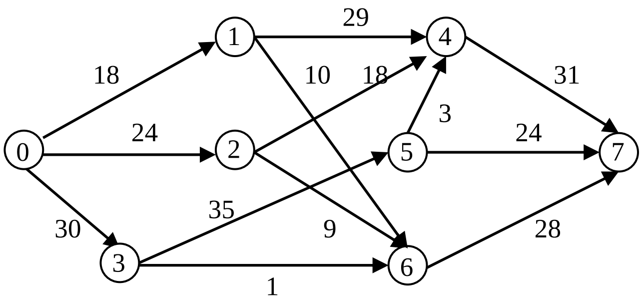

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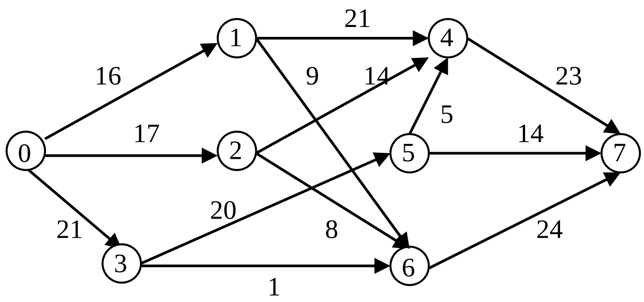

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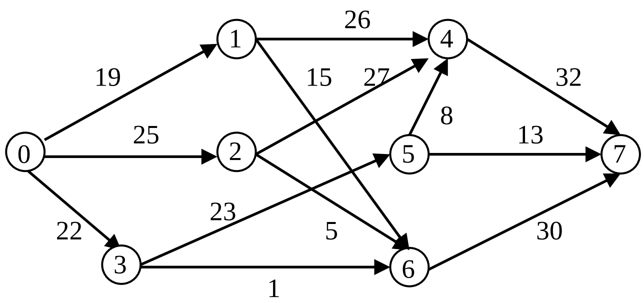

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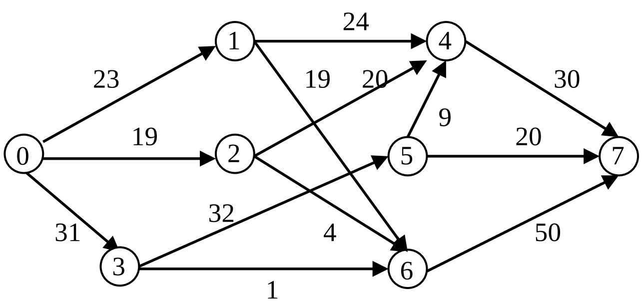

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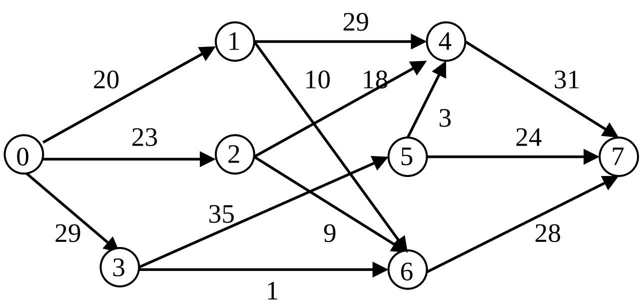

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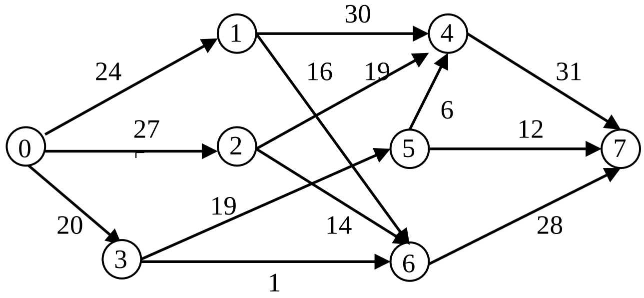

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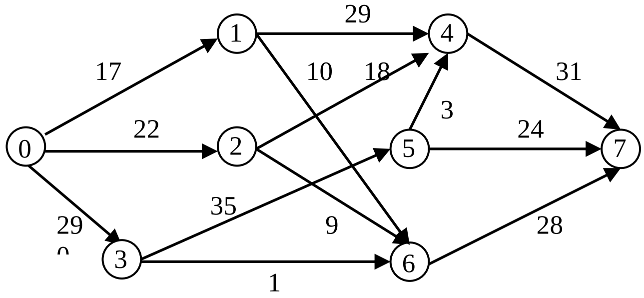

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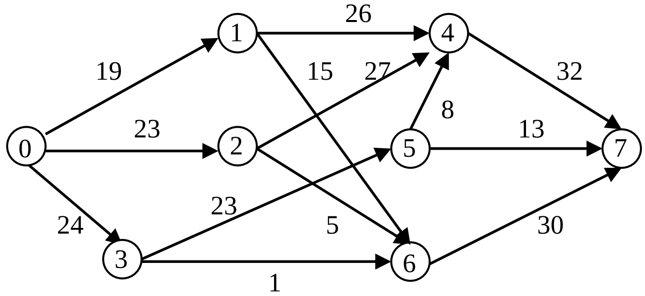

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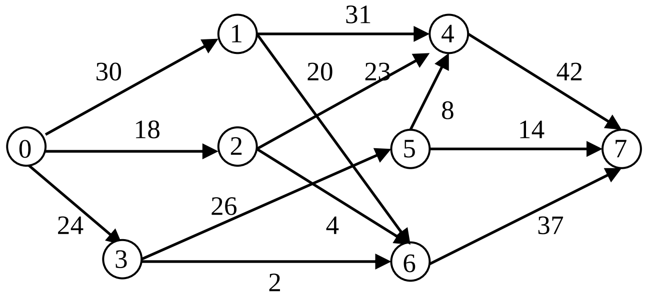

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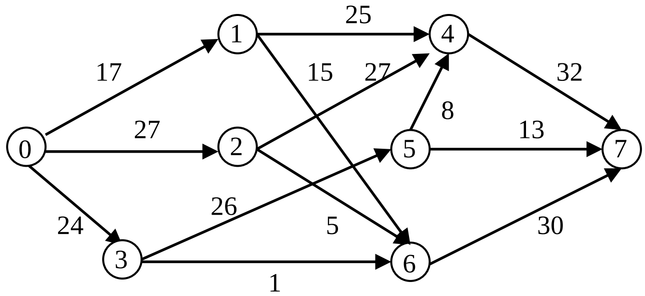

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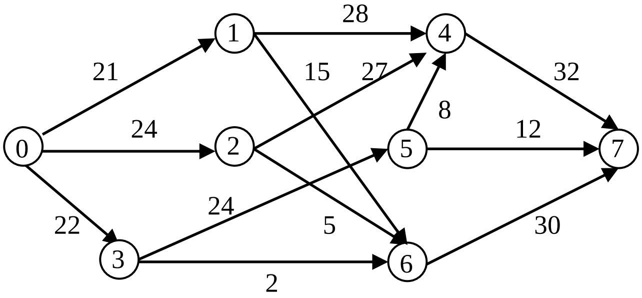

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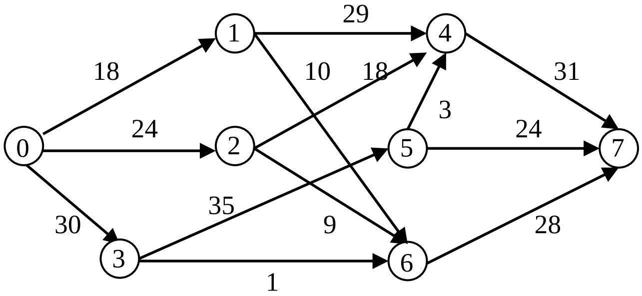

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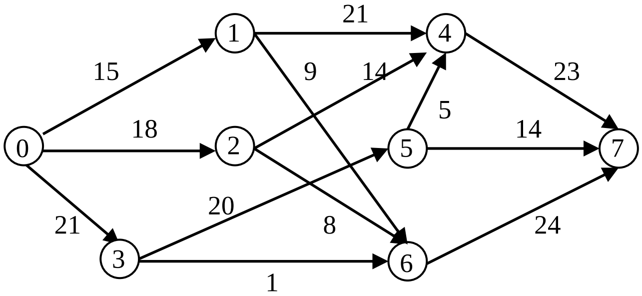

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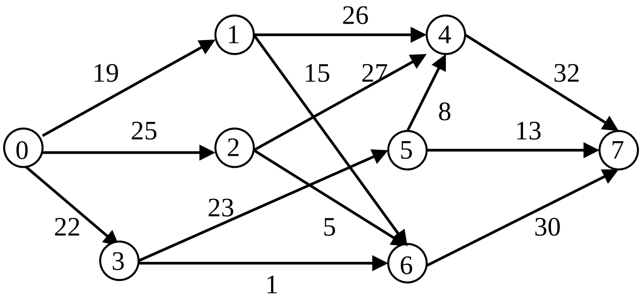

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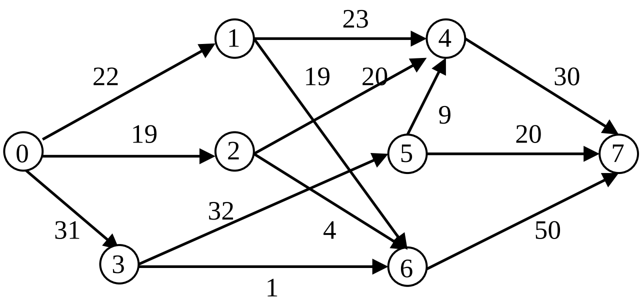

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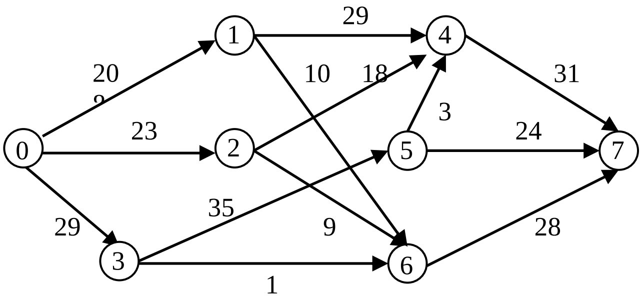

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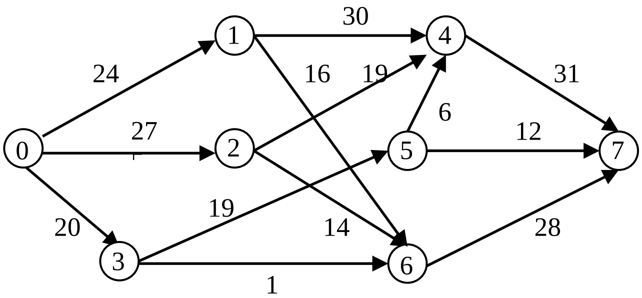

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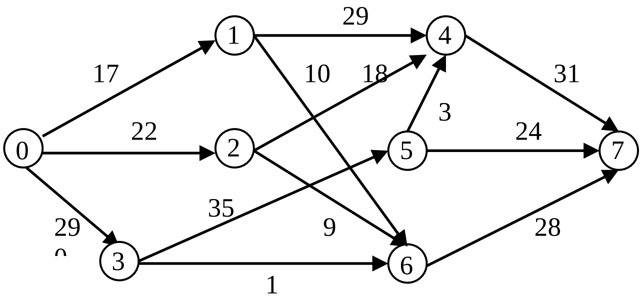

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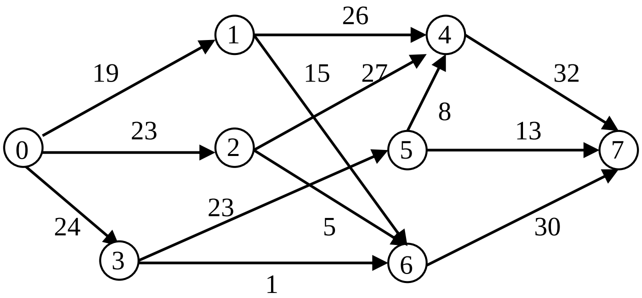

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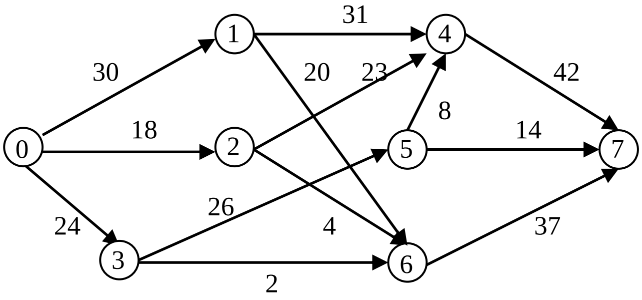

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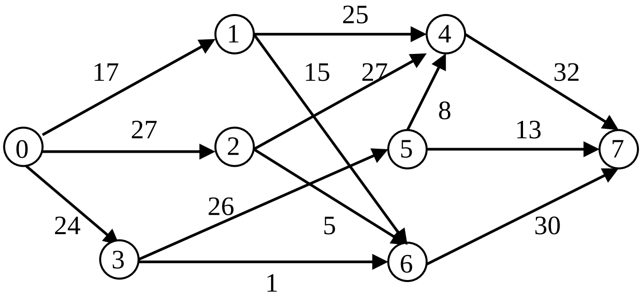

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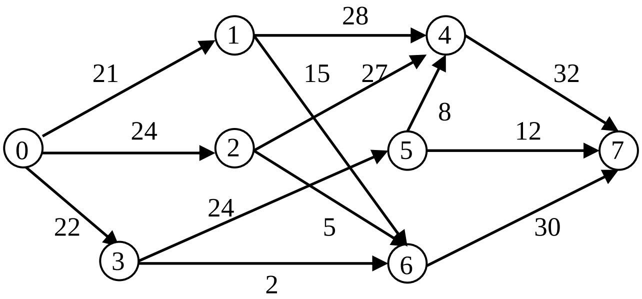

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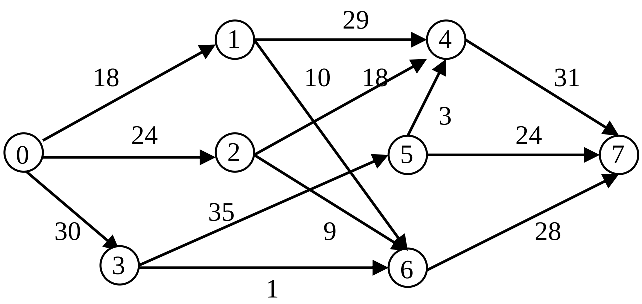

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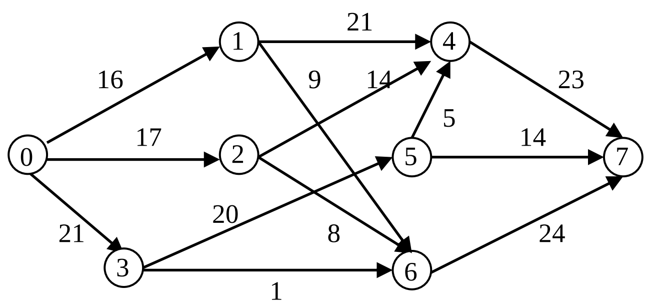

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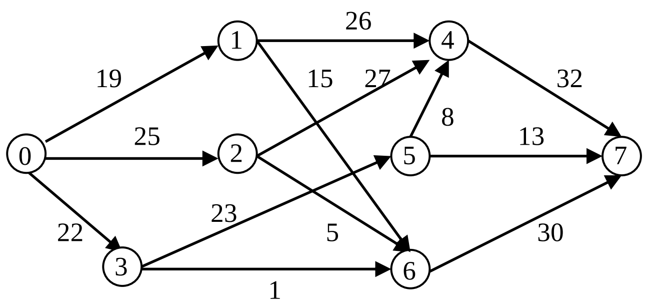

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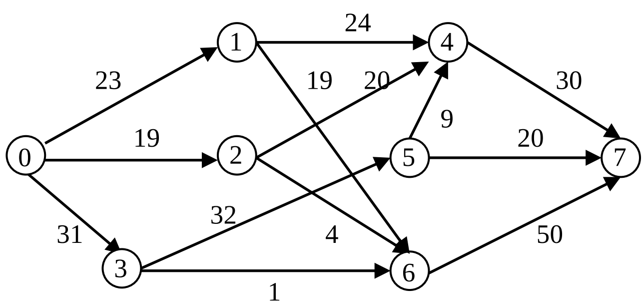

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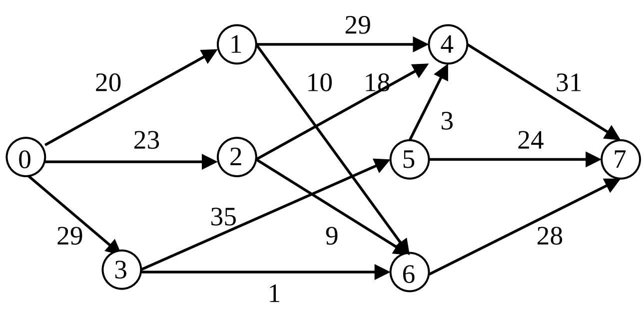

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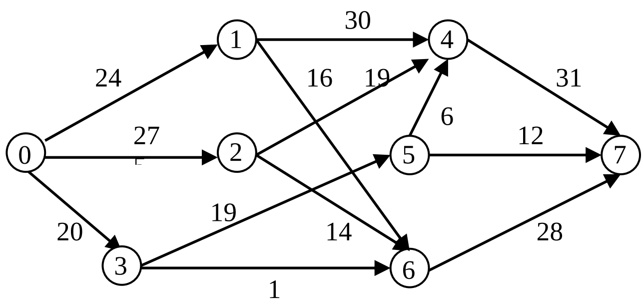

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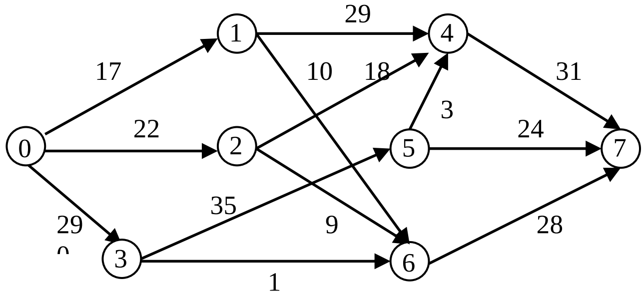

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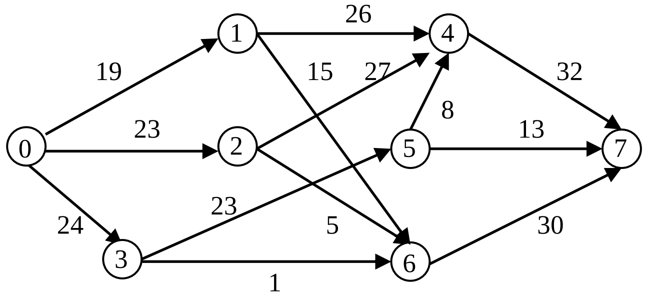

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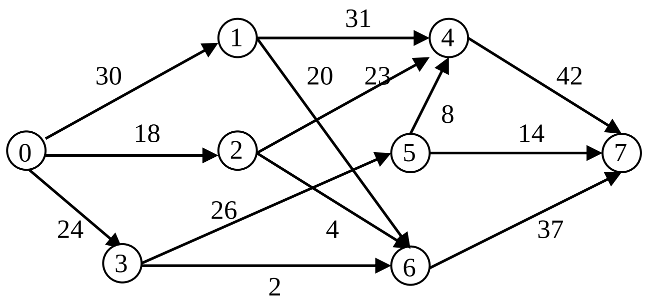

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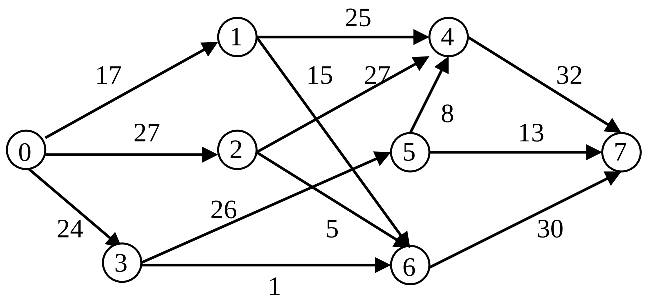

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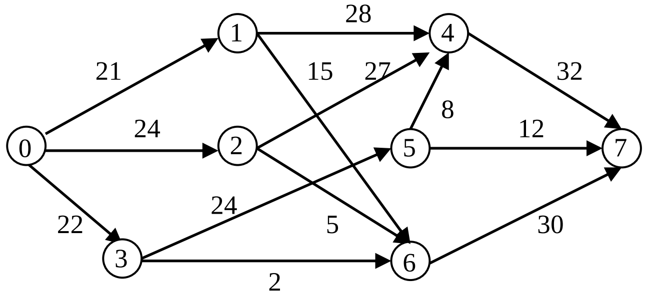

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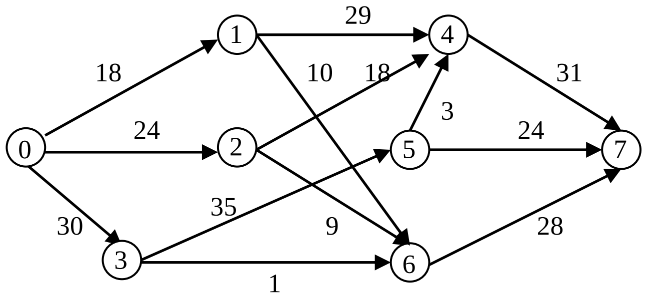

O alta formulare a problemei de determinare a fluxului maxim in reteaua de transport.

Другая формулировка задачм нахождения максимального потока в транспортной сети

Fiind dată reţeaua de transport $G=(V,U,C)$, unde V este mulţimea vârfurilor, U este mulţimea arcelor şi C este mulţimea capacitatăţilor arcelor, să se determine fluxul maxim în reţea utilizînd algoritmul Ford-Fulkersson.

В заданной транспортной сети $G=(V,U,C)$, где V множество вершин, U множество дуг и C -множество пропускных способностей дуг, вычислить максимальный поток используя алгоритм Форда-Фалкерссона

a) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=19$, $c_{13}=24$, $c_{14}= 16$, $c_{25}= 25$, $c_{27}= 12$, $c_{35}=20$, $c_{37}= 7$, $c_{46}=14$ $c_{47}=1$, $c_{58}= 28$, $c_{65}=5$, $c_{68}=11$, $c_{78}=23$.

b) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=24$, $c_{13}=27$, $c_{14}= 20$, $c_{25}= 30$, $c_{27}= 16$, $c_{35}=19$, $c_{37}= 14$, $c_{46}=19$ $c_{47}=1$, $c_{58}= 31$, $c_{65}=6$, $c_{68}=12$, $c_{78}=28$.

c) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=20$, $c_{13}=22$, $c_{14}= 24$, $c_{25}= 26$, $c_{27}= 15$, $c_{35}=27$, $c_{37}= 5$, $c_{46}=23$ $c_{47}=2$, $c_{58}= 32$, $c_{65}=8$, $c_{68}=13$, $c_{78}=27$.

d) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=30$, $c_{13}=18$, $c_{14}= 24$, $c_{25}= 31$, $c_{27}= 20$, $c_{35}=23$, $c_{37}=4$, $c_{46}=26$, $c_{47}=2$, $c_{58}= 42$, $c_{65}=8$, $c_{68}=14$, $c_{78}=37$.

e) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=22$, $c_{13}=19$, $c_{14}= 31$, $c_{25}= 23$, $c_{27}= 19$, $c_{35}=20$, $c_{37}=4$, $c_{46}=32$ $c_{47}=1$, $c_{58}= 30$, $c_{65}=9$, $c_{68}=20$, $c_{78}=50$

f) $V=\{v_1, v_2, v_3, v_4, v_5, v_6, v_7, v_8\}$, $U=\{(v_1,v_2), (v_1,v_3), (v_1,v_4), (v_2,v_5), (v_2,v_7), (v_3, v_5), (v_3,v_7), (v_4,v_6), (v_4,v_7), (v_5,v_8), (v_6,v_5), (v_6,v_8), (v_7,v_8)\}$, $C=(c_{ij})$, $c_{ij}=c(v_i,v_j)$, $(v_i,v_j)\in U$, $c_{12}=25$, $c_{13}=18$, $c_{14}= 21$, $c_{25}= 31$, $c_{27}= 9$, $c_{35}=14$, $c_{37}=8$, $c_{46}=20$ $c_{47}=1$, $c_{58}= 32$, $c_{65}=7$, $c_{68}=14$, $c_{78}=37$