import math

def maxvertex(k, V, S):

    m = 0

    v = -1

    for i, w in enumerate(V[k]):

        if i in S:

            continue

        if w[2] == 1:

            if m < w[0]:

                m = w[0]

                v = i

        else:

            if m < w[1]:

                m = w[1]

                v = i

        return v

def maxflow(T):

    w = [x[0] for x in T]

    return min(\*w)

def updateV(V, T, f):

    for t in T:

        if t[1] == -1:

            continue

        sgn = V[t[2]][t[1]][2]

        V[t[1]][t[2]][0] -= f \* sgn

        V[t[1]][t[2]][1] += f \* sgn

        V[t[2]][t[1]][0] -= f \* sgn

        V[t[2]][t[1]][1] += f \* sgn

verticles = [[[2,2,2], [10,0,1], [0,0,1], [8,0,1], [0,0,1], [0,0,1], [0,0,1]],

    [[10,0,-1], [0,0,1], [5,0,1], [12,0,1], [10,0,1], [0,0,1], [6,0,1]],

    [[0,0,1], [8,0,-1], [0,0,1], [0,0,1], [5,0,-1], [5,0,1], [11,0,1]],

    [[8,0,-1], [13,0,-1], [0,0,1], [0,0,1], [4,0,1], [12,0,1], [0,0,1]],

    [[0,0,1], [10,0,-1], [5,0,1], [4,0,-1], [0,0,1], [6,0,-1], [9,0,1]],

    [[0,0,1], [0,0,1], [5,0,-1], [12,0,-1], [6,0,1], [0,0,1], [7,0,1]],

    [[0,0,1], [6,0,-1], [11,0,-1], [0,0,1], [9,0,-1], [7,0,-1], [0,0,1]]]

N = len(verticles)

init = 0

end = 5

Tinit = (math.inf, -1, init)

f = []

j = init

while j != -1:

    k = init

    T = [Tinit]

    S = {init}

    while k != end:

        j = maxvertex(k, verticles, S)

        if j == -1:

            if k == init:

                break

            else:

                k = T.pop()[2]

                continue

        c = verticles[k][j][0] if verticles[k][j][2] == 1 else verticles[k][j][1]

        T.append((c, j, k))

        S.add(j)

        if j == end:

            f.append(maxflow(T))

            updateV(verticles, T, f[-1])

            break

        k = j

F = sum(f)

print(f"Від {init} до {end} максимальний потік дорівнює: = {F}")