EmReingoldmJNievergeltNarsngDe

Combinatorial	algorithms

	1	2	3	4
1	Х	2	13	6
2	21	Х	45	12
3	11	12	Х	34
4	16	17	18	Х

solution:1 2 4 3 1 == 2+12+18+11=43

reduce rows:2+12+11+16

	1	2	3	4
1	Х	0	11	4
2	9	Х	33	0
3	0	1	Х	23
4	0	1	2	Х

redu	ice co	olum	ns:2
1	2	3	4

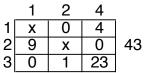
	1	2	3	4
1	Х	0	9	4
2	9	Х	31	0
3	0	1	Х	23
4	0	1	0	Х

X(4,3)

include(4,3)

43

	1	2	3	4
1	Х	0	9	4
2	9	Х	31	0
3	0	1	Х	23
4	0	1	Х	Х



reduceR: reduceC:9 reduceR reduceC:

52

	1	2	3	4
1	Х	0	0	4
2	9	Х	22	0
3	0	1	Х	23
4	0	1	Х	Х

X(3,1)

include(3,1)

	1	2	4
1	Х	0	4
2	9	Х	0
3	Х	1	23

X(3,1)

43

	1	2	4
1	Х	0	4
2	9	Х	0
3	Х	1	23

X(1,2) include(1,2)

reduceR:1

reduceR:4 -->47 stop include(2,4) solution is along this path.

0 Χ 0

solution path 3 1 2 4 pathlength 43

reducec:9-->52 stc

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	1	2	3	4
1	Х	10	15	20
2	5	Х	9	10
2	6	13	Х	12
4	8	8	9	Х

R:10+5+6

	1	2	3	4
1	Х	0	5	10
2	0	Х	4	5
3	0	7	Х	6
4	0	0	1	Х

	C:1+	-5		
	1	2	3	4
1	Х	0	4	5
2	0	Х	3	0
3	0	7	Х	1
4	0	0	0	Х

35

include(1,2)					
	1	3	4		
2	0	3	0		
3	0	Х	1		
4	0	0	Х		

)	x(1,2)			
	1	2	3	4	
1	Х	Х	4	5	>35
2	0	Х	3	0	
3	0	7	Х	1	
4	0	0	0	Х	

35 include((2,4) 1 3 3 0 x 4 0 0

lb: 35

)	(2,4)	
	1	3	4
2	0	3	Х
3	0	Х	1
4	0	0	Χ

>35

35 include(4,3) 1 3 0

)	
1	3
0	Х
0	Х
) 1 0 0

The shortest cycle is 1 2 4 3

If we has starteted with (4,1), we would have to abandon it.

>35

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	1	2	3	4
1	Х	1	2	3
2	4	Х	5	6
2	7	8	Х	9
4	10	11	12	Χ

c:1+2

	1	2	3	4
1	Х	0	1	2
2	0	Х	1	2
2	0	1	Х	2
4	0	1	2	Х

	1	2	3	4
1	Х	0	0	0
2	0	Х	0	0
2 3	0	1	Х	0
4	0	1	1	Х

lb: 25

I(1,2)

_	/ 4	\sim
_		-
_		, _

	1	3	4
2	0	0	0
3	0	Х	0
4	0	1	Χ

	1	2	3	4
1	Х	Х	0	0
2	0	Х	0	0
2	0	1	Х	0
4	0	1	1	Х

I(2,3)

	1	4
3	0	0
4	0	Х

r:1 lb: 26

	1	2	3	4
1	Х	Х	0	0
2	0	Х	0	0
3	0	0	Χ	0
_/ I	$\overline{}$	\cap	1	_

I(3,4)

I(4,1)

Path: 1,2,3,4,1 min length is 25.

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	1	2	3	4
1	Х	1	2	3
2	4	Х	5	6
2	7	8	Х	9
4	10	11	12	Х

r: 1+4+7+10 = 22

c:1+2

	1	2	3	4
1	Х	0	1	2
2	0	Х	1	2
2	0	1	Χ	2
4	0	1	2	X

 1
 2
 3
 4

 1
 x
 0
 0
 0

 2
 0
 x
 0
 0

 3
 0
 1
 x
 0

 4
 0
 1
 1
 x

lb: 25 I(1,3)

E(1,3)

	1	2	4
2	0	Х	0
3	0	1	0
4	0	1	Χ

	1	2	3	4
1	Х	0	Х	0
2	0	Х	0	0
2	0	1	Х	0
4	0	1	1	Х

this will lead to lb:26

try(1,2) and continue