known Upper Bind

1 of the solution know as per assignment of task is concern that is the diagonal cost

a-1, b-2, c-3, d-4

11 + 15 + 19 + 28 = 73 ——— (1)

How will we use kub?

If any combination is resulting more than 73, we will not explore it. Bound

The minimum of columns and their summation can be as LB minimum cost

[58..73]

We may update the knw(73) to any lower value if the combination entitles each tasks to each agent.

How do we decide that it is the most minimum solution?

step 1

[58 .. 73] uniquely left

57

a,1 — 11 — 11 + 60

a,2 — 12 — 12 + 58 ✓

a,3 — 18 — 18 + 65

a,4 — 40 — 40 + 78

sumoflowest({a,1})
min{(2,2),(3,2),(4,2)} 14
+ min{(2,3),(3,3),(4,3)} 13
+ min{(2,4)(3,4)(4,4)} 22

sumoflowest({a,2})
min{(2,3),(3,3),(4,3)} 13
+ min{(2,4),(3,4),(4,4)} 22
+ min{(2,1),(3,1),(4,1)} 11

sumoflowest({a,3})
min{(2,4),(3,4),(4,4)} 22
+ min{(2,1),(3,1),(4,1)} 11
+ min{(2,2),(3,2),(4,2)} 14

sumoflowest({a,4})
min{(2,1),(3,1),(4,1)} 11
+ min{(2,2),(3,2),(4,2)} 14
+ min{(2,3),(3,3),(4,3)} 13

78 > 73

* No more exploration. stop

Step 2

60

(15) 12

10

a→2, b→1

12 + 10 + sumoflowest({(a,2), (b,1)})

+ min({3,3}, (4,3)) 19

+ min (3,4)(4,4)} 23

68

68 > 64.

13

a→2, b→3

12 + 13 + sumoflowest((a,2), (b,3))

+ min((3,1)(4,1)] 11

+ min[(3,4),(4,4)} 23

59

22.

a→2, b→4

12 + 22 + sumoflowest((a,2),(b,4))

+ min(3,1)(4,1) 11

+ min(3,3)(3,4) 19.

64

65

64 > 61 x

step3 [58..64]

12 + 13 + 17 + 28 →
sum of them
28 (d,4)

c-1
a→2, b→3, c-1

64

52

Kub : 64 < 73

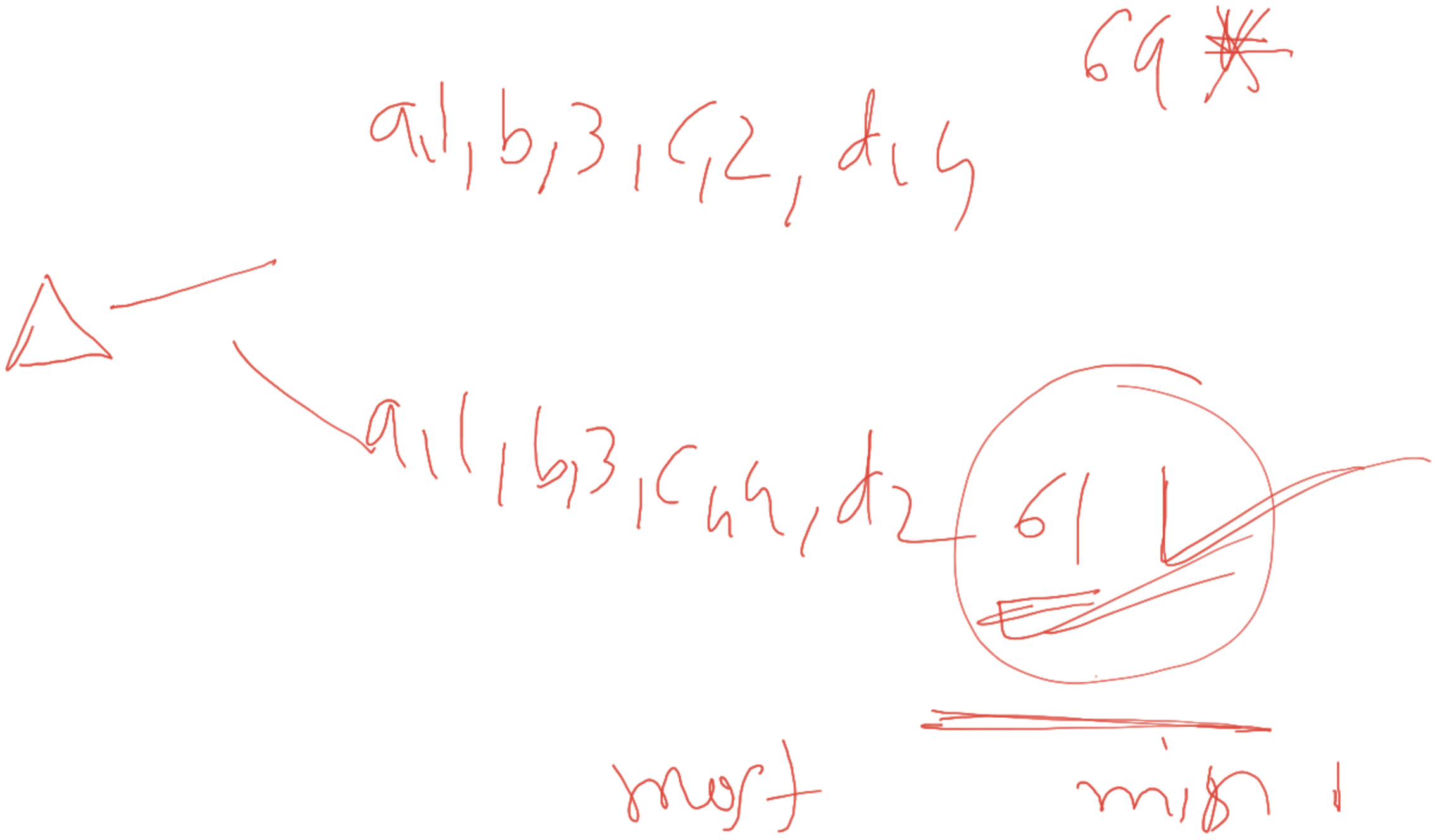
c-4
12 + 13 + 23 +
sum
17
(d,1)

a→2, b→3, c-4

65

8 9

65 > 64


a,1, b,3, c,2, d,4
a,1, b,3, c,4, d,2
61