Number of Input-Splits: 2

12, 15, 17, 18, 19, 80, 88, 91

Number of Reducers: 1

Input Split 0

15 91 80 12 19 80 18

17 15 80 18 19 18

Input Split 1

19 15 80 18 19 18

18 15 18 18 88 18

Answers:

A. Pair Approach

Mapper #0 output

((15, 91), 1)

((15, \*), 1)

((15, 80), 1)

((15, \*), 1)

((15, 12), 1)

((15, \*), 1)

((15, 19), 1)

((15, \*), 1)

((15, 80), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((91, 80), 1)

((91, \*), 1)

((91, 12), 1)

((91, \*), 1)

((91, 19), 1)

((91, \*), 1)

((91, 80), 1)

((91, \*), 1)

((91, 18), 1)

((91, \*), 1)

((80, 12), 1)

((80, \*), 1)

((80, 19), 1)

((80, \*), 1)

((12, 19), 1)

((12, \*), 1)

((12, 80), 1)

((12, \*), 1)

((12, 18), 1)

((12, \*), 1)

((19, 80), 1)

((19, \*), 1)

((19, 18), 1)

((19, \*), 1)

((80, 18), 1)

((80, \*), 1)

((17, 15), 1)

((17, \*), 1)

((17, 80), 1)

((17, \*), 1)

((17, 18), 1)

((17, \*), 1)

((17, 19), 1)

((17, \*), 1)

((17, 18), 1)

((17, \*), 1)

((15, 80), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((15, 19), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((80, 18), 1)

((80, \*), 1)

((80, 19), 1)

((80, \*), 1)

((80, 18), 1)

((80, \*), 1)

((18, 19), 1)

((18, \*), 1)

((19, 18), 1)

((19, \*), 1)

Mapper #1 Output

((19, 15), 1)

((19, \*), 1)

((19, 80), 1)

((19, \*), 1)

((19, 18), 1)

((19, \*), 1)

((15, 80), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((15, 19), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((80, 18), 1)

((80, \*), 1)

((80, 19), 1)

((80, \*), 1)

((80, 18), 1)

((80, \*), 1)

((18, 19), 1)

((18, \*), 1)

((19, 18), 1)

((19, \*), 1)

((18, 15), 1)

((18, \*), 1)

((15, 18), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((15, 88), 1)

((15, \*), 1)

((15, 18), 1)

((15, \*), 1)

((18, 88), 1)

((18, \*), 1)

((88, 18), 1)

((88, \*), 1)

Shuffle & Sort

((12, \*), [1,1,1])

((12, 18), 1)

((12, 19), 1)

((12, 80), 1)

((15, \*), [1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1])

((15, 12), 1)

((15, 18), [1,1,1,1,1,1,1,1])

((15, 19), [1,1,1])

((15, 80), [1,1,1,1])

((15, 88), 1)

((15, 91), 1)

((17, \*), [1,1,1,1,1])

((17, 15), 1)

((17, 18), [1,1])

((17, 19), 1)

((17, 80), 1)

((18, \*), [1,1,1,1])

((18, 15), 1)

((18, 19), [1,1])

((18, 88), 1)

((19, \*), [1,1,1,1,1,1,1])

((19, 15), 1)

((19, 18), [1,1,1,1])

((19, 80), [1,1])

((80, \*), [1,1,1,1,1,1,1,1,1])

((80, 12), 1)

((80, 18), [1,1,1,1,1])

((80, 19), [1,1,1])

((88, \*), [1])

((88, 18), 1)

((91, \*), [1,1,1,1,1])

((91, 12), [1])

((91, 18), [1])

((91, 19), [1])

((91, 80), [1,1])

Same Shuffle & Sort output is the Reducer #0 input (We have 1 reducer)

Reducer #0 Output

((12, 18), 1/3)

((12, 19), 1/3)

((12, 80), 1/3)

((15, 12), 1/18)

((15, 18), 8/18)

((15, 19), 3/18)

((15, 80), 4/18)

((15, 88), 1/18)

((15, 91), 1/18)

((17, 15), 1/5)

((17, 18), 2/5)

((17, 19), 1/5)

((17, 80), 1/5)

((18, 15), 1/4)

((18, 19), 2/4)

((18, 88), 1/4)

((19, 15), 1/7)

((19, 18), 4/7)

((19, 80), 2/7)

((80, 12), 1/9)

((80, 18), 5/9)

((80, 19), 3/9)

((88, 18), 1)

((91, 12), 1/5)

((91, 18), 1/5)

((91, 19), 1/5)

((91, 80), 2/5)

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B. Stripe Approach

Mapper #0 Output

[15, [91=1,80=2,12=1,19=1,18=1]]

[91, [80=2,12=1,19=1,18=1]]

[80, [12=1,19=1]]

[12, [19=1,80=1,18=1]]

[19, [80=1,18=1]]

[80, [18=1]]

[17, [15=1,80=1,18=2,19=1]]

[15, [80=1,18=2,19=1]]

[80, [18=2,19=1]]

[18, [19=1]]

[19, [18=1]]

Mapper #1 Output

[19, [15=1, 80=1, 18=1]]

[15, [80=1, 18=2, 19=1]]

[80, [18=2, 19=1]]

[18, [19=1]]

[19, [18=1]]

[18, [15=1]]

[15, [18=3, 88=1]]

[18, [88=1]]

[88, [18=1]]

Shuffle & Sort

{12, [19=1,80=1,18=1]}

{15, [[91=1,80=2,12=1,19=1,18=1], [80=1, 18=2, 19=1], [80=1, 18=2, 19=1], [18=3, 88=1]]}

{17, [15=1,80=1,18=2,19=1]}

{18, [[19=1], [19=1], [15=1], [88=1]]}

{19, [[80=1,18=1], [18=1], [15=1, 80=1, 18=1], [18=1]]}

[80, [[12=1,19=1], [18=2,19=1], [18=1], [18=2, 19=1]]}

[88, [18=1]]

[91, [80=2,12=1,19=1,18=1]]

Same Shuffle & Sort output is the Reducer #0 input (We have 1 reducer)

Reducer #0 Output

{12, [19=1/3,80=1/3,18=1/3]}

{15, [91=1/18,80=4/18,12=1/18,19=3/18,18=8/18,88=1/18]}

{17, [15=1/5,80=1/5,18=2/5,19=1/5]}

{18, [19=2/4, 15=1/4, 88=1/4]}

{19, [80=2/7, 18=4/7, 15=1/7]}

{80, [12=1/9,18=5/9, 19=3/9]}

{88, 18=1}

{91, [80=2/5,12=1/5,19=1/5,18=1/5]}