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W2D1

Compute Relative Frequencies

Number of Input-Splits: 2

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

(Please use the same window definition, we have been using)

OPTIONAL NO EXTRA CREDIT: In-Mapper Combining Pair Approach, In-Mapper Combining Stripe Approach.

Input-Split 0	Input-Split 1
15 91 80 12 19 80 18	19 15 80 18 19 18
17 15 80 18 19 18	18 15 18 18 88 18

1. Pair Approach

W(X) 0	W(X) 1
W(15) = {91, 80, 12, 19, 80, 18} W(91) = {80, 12, 19, 80, 18} W(80) = {12, 19} W(12) = {19, 80, 18} W(19) = {80, 18} W(80) = {18} W(17) = {15, 80, 18, 19, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19}	W(19) = {15, 80, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = {18} W(18) = {15} W(15) = { 18, 18, 88, 18} W(18) = {88} W(88) = {18}

W(19) = { 18 }	
Mapper 0 Output	Mapper 1 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)	((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)

((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)	((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)
Reducer Input	Reducer Output
((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])	Sum 3 ((12, 18), 1/3) ((12, 19), 1/3) ((12, 80), 1/3) Sum 18 ((15, 12), 1/18) ((15, 18), 8/18) ((15, 19), 3/18)

((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])	((15, 80), 4/18) ((15, 88), 1/18) ((15, 91), 1/18) Sum 5 ((17, 15), 1/5) ((17, 18), 2/5) ((17, 19), 1/5) ((17, 80), 1/5) Sum 4 ((18, 15), 1/4) ((18, 19), 2/4) ((18, 88), 1/4) Sum 7 ((19, 15), 1/7) ((19, 18), 4/7) ((19, 80), 2/7) Sum 9 ((80, 12), 1/9) ((80, 18), 5/9) ((80, 19), 3/9) Sum 1 ((88, 18), 1) Sum 5 ((91, 12), 1/5) ((91, 18), 1/5) ((91, 19), 1/5) ((91, 80), 2/5)

2. Stripe Approach

W(X) 0	W(X) 1
W(15) = {91, 80, 12, 19, 80, 18}	W(19) = {15, 80, 18}
W(91) = {80, 12, 19, 80, 18}	W(15) = {80, 18, 19, 18}
W(80) = {12, 19}	W(80) = {18, 19, 18}
W(12) = {19, 80, 18}	W(18) = {19}
W(19) = {80, 18}	W(19) = {18}

W(80) = {18} W(17) = {15, 80, 18, 19, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = { 18 }	 W(18) = {15} W(15) = { 18, 18, 88, 18} W(18) = {88} W(88) = {18}
Mapper 0 Output	Mapper 1 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)])	(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)])
Reducer Input	Reducer Output
(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)], [(88, 1)]]) (19, [[(80, 1), (18, 1)], [(18, 1)], [(15, 1), (80, 1), (18, 1)], [(18, 1)]]) (80, [[(12, 1), (19, 1)], [(18, 1)], [(18, 2), (19, 1)], [(18,2), (19, 1)]]) (88, [[(18,1)]]) (91, [[(80, 2), (12, 1), (19, 1), (18, 1)]])	(12, [19/117, 80/117, 18/117]) (15, [91/712, 320/712, 12/712, 57/712, 144/712, 88/712]) (17, [15/150, 80/150, 36/150, 19/150]) (18, [38/126, 88/126]) (19, [160/247, 72/247, 15/247]) (80, [12/159, 57/159, 90/159]) (88, [1]) (91, [160/209, 12/209, 19/209, 18/209])

3. In-Mapper Combining Pair Approach

W(X) 0	W(X) 1
W(15) = {91, 80, 12, 19, 80, 18} W(91) = {80, 12, 19, 80, 18} W(80) = {12, 19} W(12) = {19, 80, 18} W(19) = {80, 18} W(80) = {18}	W(19) = {15, 80, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = {18}

W(17) = {15, 80, 18, 19, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = { 18 }	W(18) = {15} W(15) = { 18, 18, 88, 18} W(18) = {88} W(88) = {18}
Mapper 0 Output	Mapper 1 Output
((15, 91), 1) ((15, *), 1) ((15, 80), 3) ((15, *), 3) ((15, 12), 1) ((15, *), 1) ((15, 19), 2) ((15, *), 2) ((15, 18), 3) ((15, *), 3) ((91, 80), 2) ((91, *), 2) ((91, 12), 1) ((91, *), 1) ((91, 19), 1) ((91, *), 1) ((91, 18), 1) ((91, *), 1) ((80, 12), 1) ((80, *), 1) ((80, 19), 2) ((80, *), 2) ((12, 19), 1) ((12, *), 1) ((12, 80), 1) ((12, *), 1) ((12, 18), 1) ((12, *), 1) ((19, 80), 1) ((19, *), 1) ((19, 18), 2) ((19, *), 2)	((19, 15), 1) ((19, *), 1) ((19, 80), 1) ((19, *), 1) ((19, 18), 2) ((19, *), 2) ((15, 80), 1) ((15, *), 1) ((15, 18), 5) ((15, *), 5) ((15, 19), 1) ((15, *), 1) ((80, 18), 2) ((80, *), 2) ((80, 19), 1) ((80, *), 1) ((18, 19), 1) ((18, *), 1) ((18, 15), 1) ((18, *), 1) ((15, 88), 1) ((15, *), 1) ((18, 88), 1) ((18, *), 1) ((88, 18), 1) ((88, *), 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) ((80, 18), 3) ((80, *), 3) ((18, 19), 1) ((18, *), 1)	
Reducer Input	Reducer Output
((12, *), [1, 1, 1]) ((12, 18), [1]) ((12, 19), [1]) ((12, 80), [1]) ((15, *), [1,3,1,2,3, 1, 5,1,1]) ((15, 12), [1]) ((15, 18), [3, 5]) ((15, 19, [2, 1]) ((15, 80), [3, 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, 2, 1, 1, 2]) ((19, 15), [1]) ((19, 18), [2, 2])	Sum 3 ((12, 18), 1/3) ((12, 19), 1/3) ((12, 80), 1/3) Sum 18 ((15, 12), 1/18) ((15, 18), 8/18) ((15, 19), 3/18) ((15, 80), 4/18) ((15, 88), 1/18) ((15, 91), 1/18) Sum 5 ((17, 15), 1/5) ((17, 18), 2/5) ((17, 19), 1/5) ((17, 80), 1/5) Sum 4 ((18, 15), 1/4) ((18, 19), 2/4) ((18, 88), 1/4) Sum 7 ((19, 15), 1/7)

((19, 80), [1, 1]) ((80, *), [1, 2, 3, 2, 1]) ((80, 12), [1]) ((80, 18), [3, 2]) ((80, 19), [2, 1]) ((88, *), [1]) ((88, 18), [1]) ((91, *), [2, 1, 1, 1]) ((91, 12), [1]) ((91, 18), [1]) ((91, 19), [1]) ((91, 80), [2])	((19, 18), 4/7) ((19, 80), 2/7) Sum 9 ((80, 12), 1/9) ((80, 18), 5/9) ((80, 19), 3/9) Sum 1 ((88, 18), 1) Sum 5 ((91, 12), 1/5) ((91, 18), 1/5) ((91, 19), 1/5) ((91, 80), 2/5)

4. In-Mapper Combining Stripe Approach

W(X) 0	W(X) 1
W(15) = {91, 80, 12, 19, 80, 18} W(91) = {80, 12, 19, 80, 18} W(80) = {12, 19} W(12) = {19, 80, 18} W(19) = {80, 18} W(80) = {18} W(17) = {15, 80, 18, 19, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = { 18 }	W(19) = {15, 80, 18} W(15) = {80, 18, 19, 18} W(80) = {18, 19, 18} W(18) = {19} W(19) = {18} W(18) = {15} W(15) = { 18, 18, 88, 18} W(18) = {88} W(88) = {18}
Mapper 0 Output	**Mapper 1 Output**
(15, [(91, 1), (80, 3), (12, 1), (19, 2), (18, 3)]) (91, [(80, 2), (12, 1), (19, 1), (18, 1)]) (80, [(12, 1), (19, 2), (18, 3)]) (12, [(19, 1), (80, 1), (18, 1)]) (19, [(80, 1), (18, 2)]) (17, [(15, 1), (80, 1), (18, 2), (19, 1)]) (18, [(19, 1)])	(19, [(15, 1), (80, 1), (18, 2)]) (15, [(80, 1), (18, 5), (19, 1), (88, 1)]) (80, [(18,2), (19, 1)]) (18, [(19, 1), (15, 1), (88, 1)]) (88, [(18,1)])
Reducer Input	**Reducer Output**
(12, [[(19, 1), (80, 1), (18, 1)]])	(12, [(19, 1), (80, 1), (18, 1)])

(15, [[(91, 1), (80, 3), (12, 1), (19, 2), (18, 3)], [(80, 1), (18, 5), (19, 1), (88, 1)]]) (17, [[(15, 1), (80, 1), (18, 2), (19, 1)]]) (18, [[(19, 1)], [(19, 1), (15, 1), (88, 1)]]) (19, [[(80, 1), (18, 2)], [(15, 1), (80, 1), (18, 2)]]) (80, [[(12, 1), (19, 2), (18, 3)], [(18,2), (19, 1)]]) (88, [[(18,1)]]) (91, [[(80, 2), (12, 1), (19, 1), (18, 1)]])	(15, [(91, 1), (80, 4), (12, 1), (19, 3), (18, 8), (88, 1)]) (17, [(15,1), (80, 1), (18, 2), (19, 1)]) (18, [(19,2), (15,1), (88, 1)]) (19, [(80,2), (18, 4), (15, 1)]) (80, [(12,1), (19,3), (18,5)]) (88, [(18,1)]) (91, [(80,2), (12,1),(19,1),(18,1)])