(i) Pair Approach

Number of splits ← 2

Number of Reducers ← 1

Mapper Input	Mapper 0	Mapper 1
record 1	15 91 80 12 19 80 18	19 15 80 18 19 18
record 2	17 15 80 18 19 18	18 15 18 18 88 18

Mapper output	Mapper 0		Mapper 1	
	((15,91),1)	((15,*),1)	((19,15),1)	((19,*),1)
	((15,80),1)		((19,80),1)	
	((15,12),1)		((19,18),1)	
	((15,19),1)		((15,80),1)	((15,*),1)
	((15,80),1)		((15,18),1)	
	((15,18),1)		((15,19),1)	
	((91,80),1)	((91,*),1)	((15,18),1)	
	((91,12),1)		((80,18),1)	((80,*),1)
	((91,19),1)		((80,19),1)	
	((91,80),1)		((80,18),1)	
	((91,18),1)		((18,19),1)	((18,*),1)
	((80,12),1)	((80,*),1)	((19,18),1)	((19,*),1)
	((80,19),1)			
	((12,19),1)	((12,*),1)		
	((12,80),1)			
	((12,18),1)			
	((19,80),1)	((19,*),1)		
	((19,18),1)			
	((80,18),1)	((80,*),1)		

(2)

((17,15),1)
((17,80),1)
((17,18),1)
((17,19),1)
((17,18),1)
((15,80),1)
((15,18),1)
((15,19),1)
((15,18),1)
((80,18),1)
((80,19),1)
((80,18),1)
((18,19),1)
((19,18),1)

((17,*),1)
((15,*),1)
((80,*),1)
((18,*),1)
((19,*),1)

((18,15),1)
((15,18),1)
((15,18),1)
((15,88),1)
((15,18),1)
((18,88),1)
((88,18),1)

((18,*),1)
((15,*),1)
((18,*),1)
((88,*),1)

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

// Shuffle sort then

- Reducer Input -

((12,*),[1,1,1]) // 3
((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]) // 18
((15,12),[1])
((15,18),[1,1,1,1,1,1,1,1]) // 8
((15,19),[1,1,1])
((15,80),[1,1,1,1])
((15,88),[1])
((15,91),[1])

Reducer input cont'd

((17,*), [1,1,1,1,1] // 5
((17,15), [1])
((17,18), [1,1])
((17,19), [1])
((17,80), [1])
((18,*), [1,1,1,1] // 4
((18,15), [1])
((18,19), [1,1])
((18,88), [1])
((19,*), [1,1,1,1,1,1,1] // 7
((19,15), [1])
((19,18), [1,1,1,1])
((19,80), [1,1])
((80,*), [1,1,1,1,1,1,1,1,1]) // 9
((80,12), [1])
((80,18), [1,1,1,1,1] // 5
((80,19), [1,1,1])
((88,*), [1])
((88,18), [1])
((91,*), [1,1,1,1,1] // 5
((91,12), [1])
((91,18), [1])
((91,19), [1])
((91,80), [1,1])

Reducer output (one Reducer)

((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)

Stripe Approach

Mapper Input	Mapper 0	Mapper 1
record 1	15 91 80 12 19 80 18	19 15 80 18 19 18
record 2	17 15 80 18 19 18	18 15 18 18 88 18

Mapper output

Mapper 0

(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

(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})

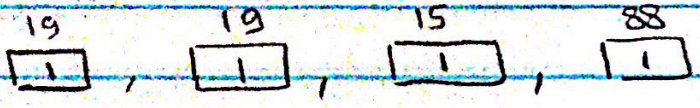
Reducer Input

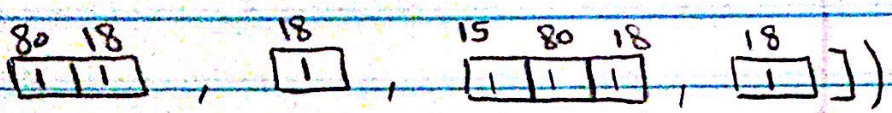
(12, [{19:1, 80:1, 18:1}])

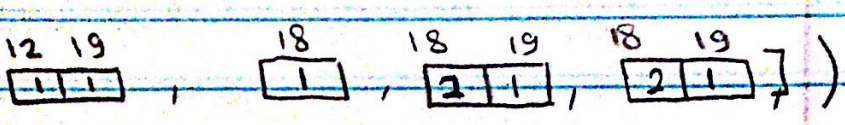
(15, [{91:1, 80:2, 12:1, 19:1, 18:1}, {80:1, 18:2, 19:1}, {80:1, 18:2, 19:1}, {18:3, 88:1}])

(17, [{15:1, 80:1, 18:2, 19:1}])

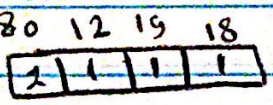
Reducer Input Cont'd

(18, [])

(19, [])

(80, [])

(88, [])

(91, [])

Reducer output

Sum		12	15	17	18	19	[illegible]	88	91
3	12				1/3	1/3	1/3		
18	15	1/18			8/18	3/18	4/18	1/18	1/18
5	17		1/5		2/5	1/5	1/5		
4	18 [illegible]		1/4			2/4		1/4	
7	19 [illegible]		1/7		4/7		2/7		
9	80 [illegible]	1/9	5/9		3/9				
1	88 [illegible]				1				
5	91	1/5			1/5	1/5	2/5		