



Gradiane Online Accelerated Learning

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00: MapReduce

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Number of questions: 3
Positive points per question: 3.0
Negative points per question: 1.0

Gradiane quiz on MapReduce. You can attempt to answer the questions as many times as you like. Questions get randomly regenerated each time. The score of the *last* submission gets saved into our records (that is, once you get a perfect score, don't resubmit with a bad one).

- Using the matrix-vector multiplication described in Section 2.3.1, applied to the matrix and vector:

| | | | |
|----|----|----|----|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 |

| |
|---|
| 1 |
| 2 |
| 3 |
| 4 |

apply the Map function to this matrix and vector. Then, identify in the list below, one of the key-value pairs that are output of Map.

- ☐ a) (3,45) ☐ b) (1,13) ☐ c) (2,70) ☐ d) (4,28)

- Suppose our input data to a map-reduce operation consists of integer values (the keys are not important). The map function takes an integer i and produces the list of pairs (p, i) such that p is a prime divisor of i . For example, $\text{map}(12) = [(2,12), (3,12)]$.

The reduce function is addition. That is, $\text{reduce}(p, [i_1, i_2, \dots, i_k])$ is $(p, i_1 + i_2 + \dots + i_k)$.

Compute the output, if the input is the set of integers 15, 21, 24, 30, 49. Then, identify, in the list below, one of the pairs in the output.

- ☐ a) (2,47) ☐ b) (7,70) ☐ c) (6,54) ☐ d) (7,48)

- Suppose we have the following relations:

| R | | S | |
|---|---|---|---|
| A | B | B | C |
| 0 | 1 | 0 | 1 |
| 1 | 2 | 1 | 2 |
| 2 | 3 | 2 | 3 |

and we take their natural join by the algorithm of Section 2.3.7. Apply the Map function to the tuples of these relations. Then, construct the elements that are input to the Reduce function. Identify one of these elements in the list below.

- ☐ a) (0, (0, (S, 1)))

- ☐ a) $(1, [(R,0)])$
- ☐ b) $(1, [(R,0)])$
- ☐ c) $(2, [(R,1)])$
- ☐ d) $(1, [(R,0), (S,2)])$