2021 Introduction to Massive Data Analysis

HW1 - Matrix Multiplication

Deadline: 2021.10.8 (Fri.) 23:59

Please write a MapReduce program in Hadoop(Java) or spark(python) to solve the following question.

Question: Matrix Multiplication

If M is a matrix with element m_{ij} in row i and column j, and N is a matrix with element n_{jk} in row j and column k, then the product $P = MN$ is the matrix P with element p_{ik} in row i and column k, where $p_{ik} = \sum m_{ij} n_{jk}$

Data format:

Input:

10	0	20
0	30	0
40	0	50

$M(i * j)$

1	2	3
4	5	0
6	7	8

$N(j * k)$

$i, j, k \leq 1000$

$0 \leq m_{ij}, n_{jk} \leq 1000$

```
M,0,0,10
M,0,1,0
M,0,2,20
M,1,0,0
M,1,1,30
M,1,2,0
M,2,0,40
M,2,1,0
M,2,2,50
```

```
N,0,0,1
N,0,1,2
N,0,2,3
N,1,0,4
N,1,1,5
N,1,2,0
N,2,0,6
N,2,1,7
N,2,2,8
```

Output:

130	160	190
120	150	0
340	430	520

The output data set containing these matrices are represented as follows.

```
0,0,130
0,1,160
0,2,190
1,0,120
1,1,150
1,2,0
2,0,340
2,1,430
2,2,520
```

Assignment Requirements:

Part1 Code(80%)

Code(.java or .py)
Note: Output data is calculated from input.txt (two 500 500 matrices) which we provided.

Part2 Report(20%)

Java :

1. Report.pdf (Explain how do you design your mapper and reducer)
2. The screenshot of your result.

Python:

1. Report.pdf (Explain how do you design your mapper and reducer.)
2. Outputfile.txt (write your result to this file)

Please pack the above files into a zip file. Name it as "**MDA_HW1_studentID.zip**"