ICP3 – Hadoop and Map Reduce

CS5590 - Summer 2020

MATRIX MULTIPLICATION

# Map Function

**Algorithm 1:** The Map Function

1 **for** *each element* $m_{ij}$ *of* $M$ **do**
2 | produce $(key, value)$ pairs as $((i,k),(M,j,m_{ij}))$, for $k = 1,2,3,..$ up to the number of columns of $N$
3 **for** *each element* $n_{jk}$ *of* $N$ **do**
4 | produce $(key, value)$ pairs as $((i,k),(N,j,n_{jk}))$, for $i = 1,2,3,...$ up to the number of rows of $M$
5 **return** *Set of (key, value) pairs that each key,* $(i,k)$*, has a list with values* $(M,j,m_{ij})$ *and* $(N,j,n_{jk})$ *for all possible values of* $j$

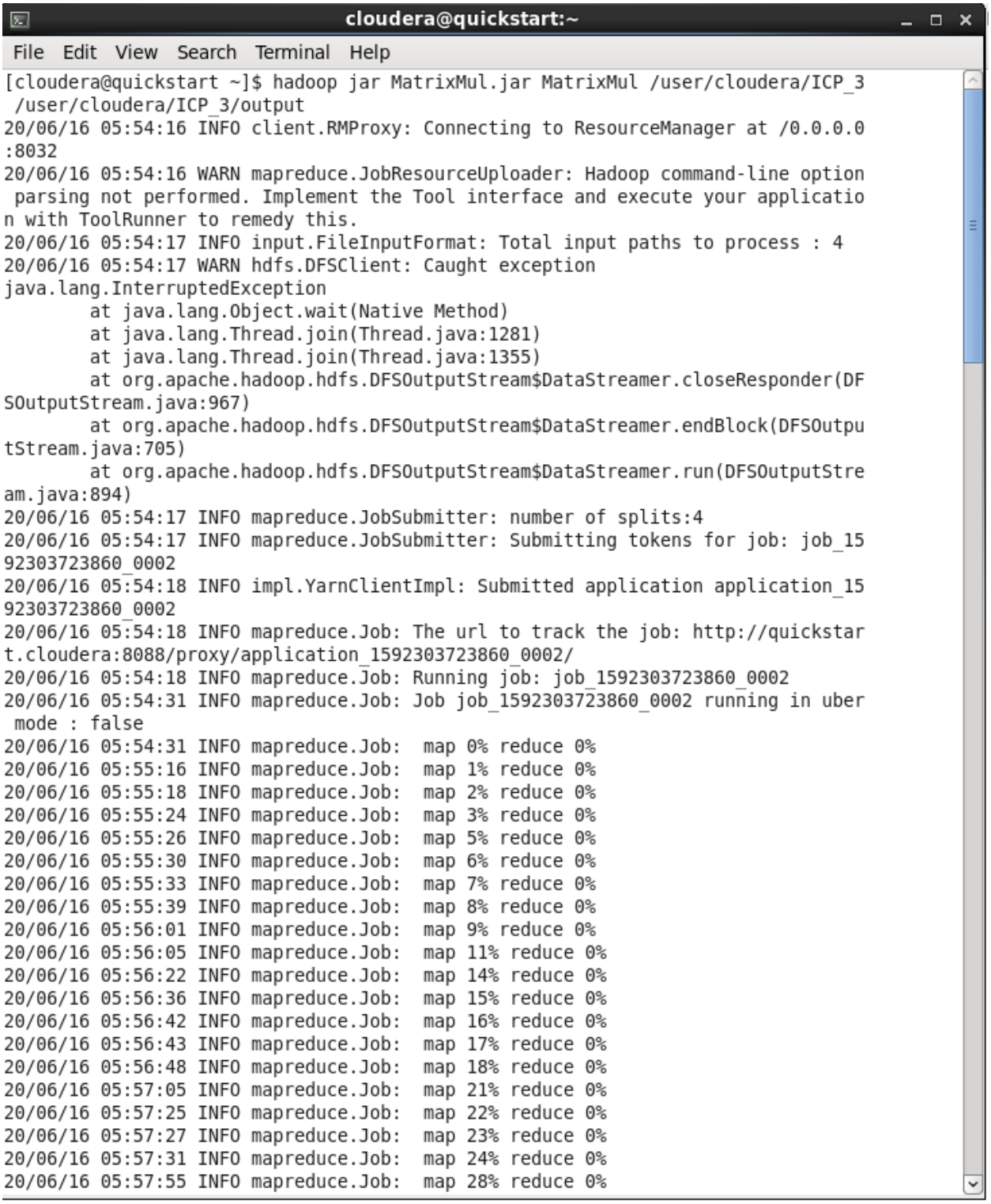
# Reduce Function

**Algorithm 2:** The Reduce Function

1 **for** *each key (i,k)* **do**
2 | sort values begin with $M$ by $j$ in $list_M$
3 | sort values begin with $N$ by $j$ in $list_N$
4 | multiply $m_{ij}$ and $n_{jk}$ for $j_{th}$ value of each list
5 | sum up $m_{ij} * n_{jk}$
6 **return** $(i,k), \sum_{j=1} m_{ij} * n_{jk}$

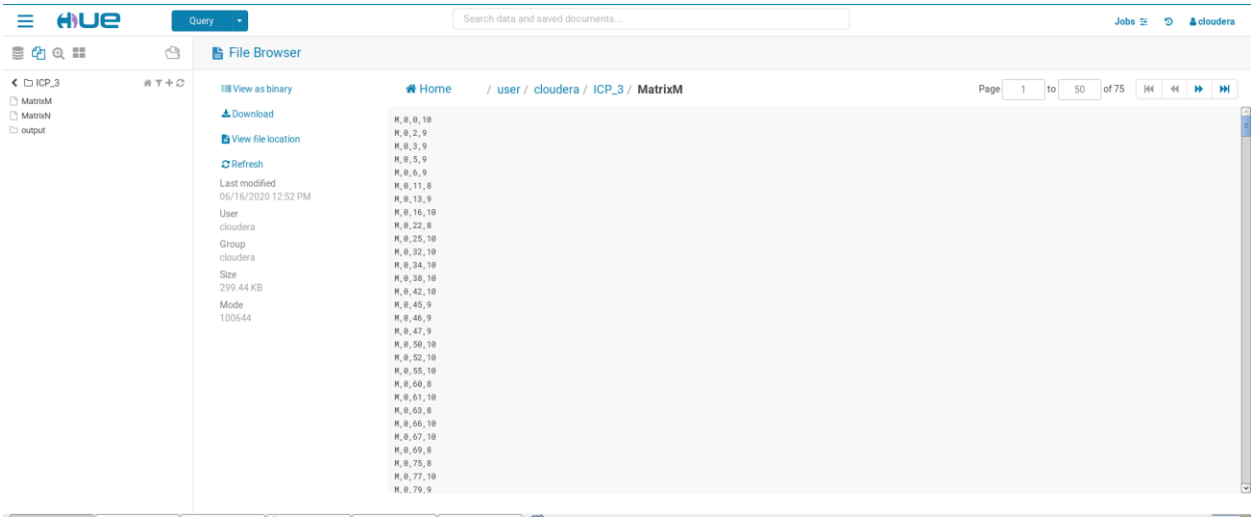
Map-Reduce Job

Hadoop jar MatrixMul.jar MatrixMul /user/cloudera/ICP_3  /user/cloudera/ICP_3/output

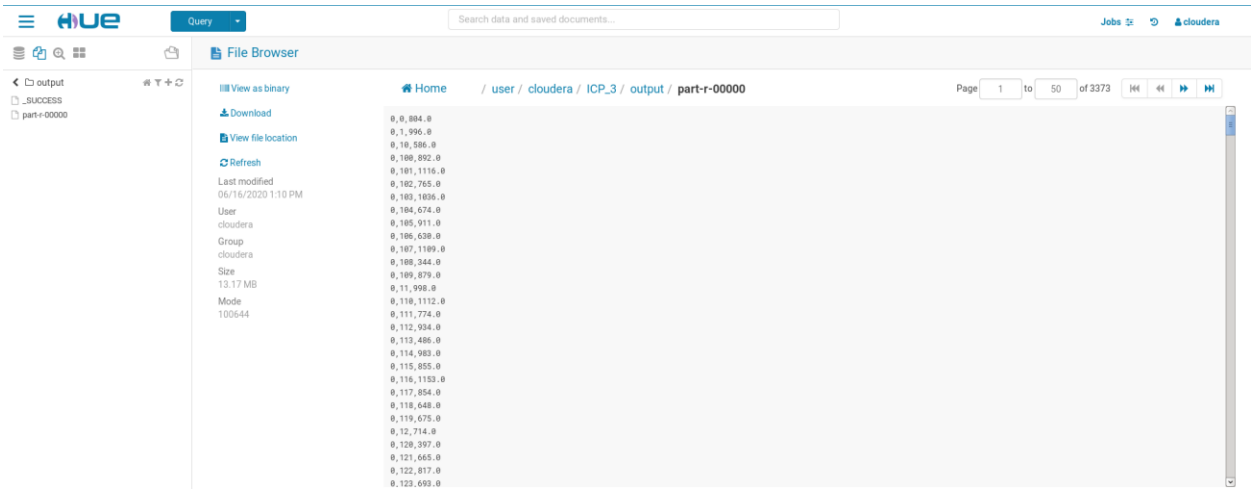


SCREENSHOTS

Cloudera:




Result:




Reference:

https://umkc.app.box.com/s/xk4jj0do3p7fa3swx6utcuazx3wny8j8

https://lendap.wordpress.com/2015/02/16/matrix-multiplication-with-mapreduce/