Map-reduce pseudo code for Sum of Two Matrices

We have two matrix A and B as shown below and we want to do addition of them using map reduce.

$$\mathbf{A}+\mathbf{B} = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix} + \begin{bmatrix} b_{11} & b_{12} & \cdots & b_{1n} \\ b_{21} & b_{22} & \cdots & b_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ b_{m1} & b_{m2} & \cdots & b_{mn} \end{bmatrix}$$

$$= \begin{bmatrix} a_{11}+b_{11} & a_{12}+b_{12} & \cdots & a_{1n}+b_{1n} \\ a_{21}+b_{21} & a_{22}+b_{22} & \cdots & a_{2n}+b_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1}+b_{m1} & a_{m2}+b_{m2} & \cdots & a_{mn}+b_{mn} \end{bmatrix}$$

We have matrix A, above example has m and n as row and column for both matrix

Now result summation matrix C(m,n) = amn + bmn

MapReduce :

Map function generates key,value pairs and reduce function uses the output of the map function and will do addition and generates key,value pairs.

The **Map Function** works as like below algorithm.

1. For each element amn of A do
2. Generate(key,value) pairs as ((m,n),(A,amn))
3. For each element bmn of B do
4. Generate(key,value) pairs as ((m,n),(B,bmn))
5. Return key,value pair.

Reduce Function: The reduce function works as like below algorithm, it uses the output of map function.

1. For each key (m,n) do
2. Do summation amn of list A and bmn of list B
3. **Return** (m,n), amn + bmn