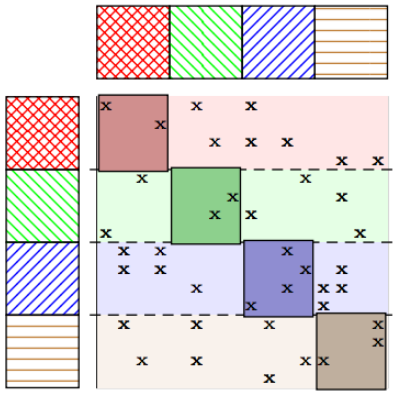
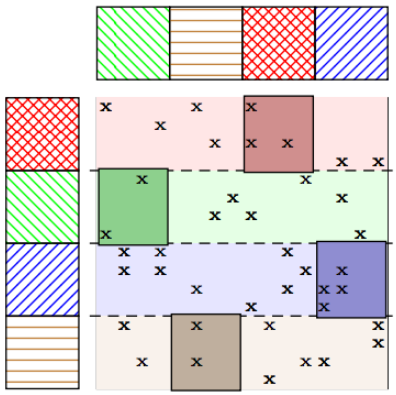
(a) **DSGD**

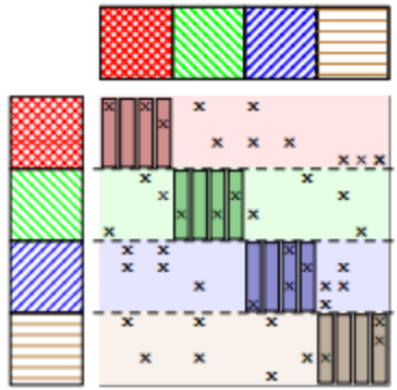


(a-1) Initially W and H are partitioned into 4x4 blocks. Each worker runs SGD on the diagonal active areas as indicated.

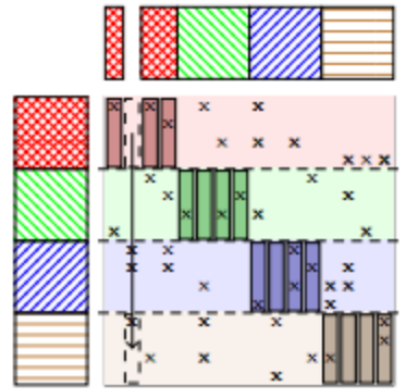


(a-2) After each work completes processing data points in its own active area, the columns of item parameter H^T are exchanged randomly and the active area changes. This process is reacted for each iteraction.

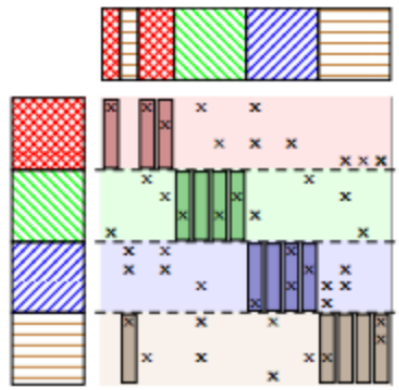
(b) **NOMAD**



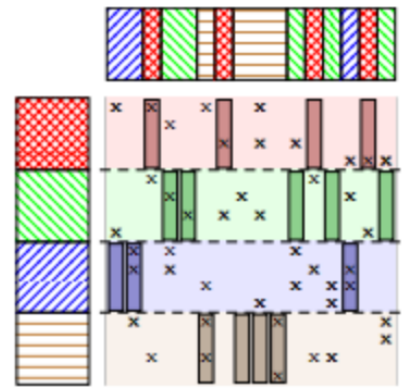
(b-1) Initial assignment of W and H. Each worker works only on the diagonal active area in the beginning.



(b-2) After a worker finishes processing column j, it sends the corresponding item parameter $\mathbf{h}_j$ to another worker. Here, $\mathbf{h}_2$ is sent from worker 1 to 4



(b-3) Upon receipt, the column is processed by the new worker. Here, worker 4 can now process column 2 since it owns the column.



(b-4) During the execution of the algorithm, the ownership of the item parameters $\mathbf{h}_j$ changes.