Circulant Matrix Based Redistribution (1A)

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Please send corrections (or suggestions) to youngwlim@hotmail.com.

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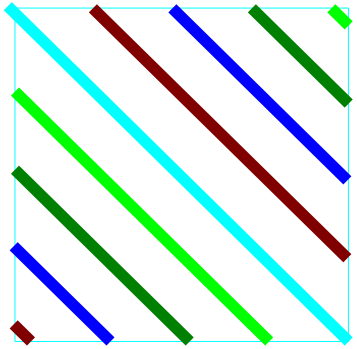
Circulant Matrix



Cyclic(x) → Cyclic(Kx) data redistribution problem

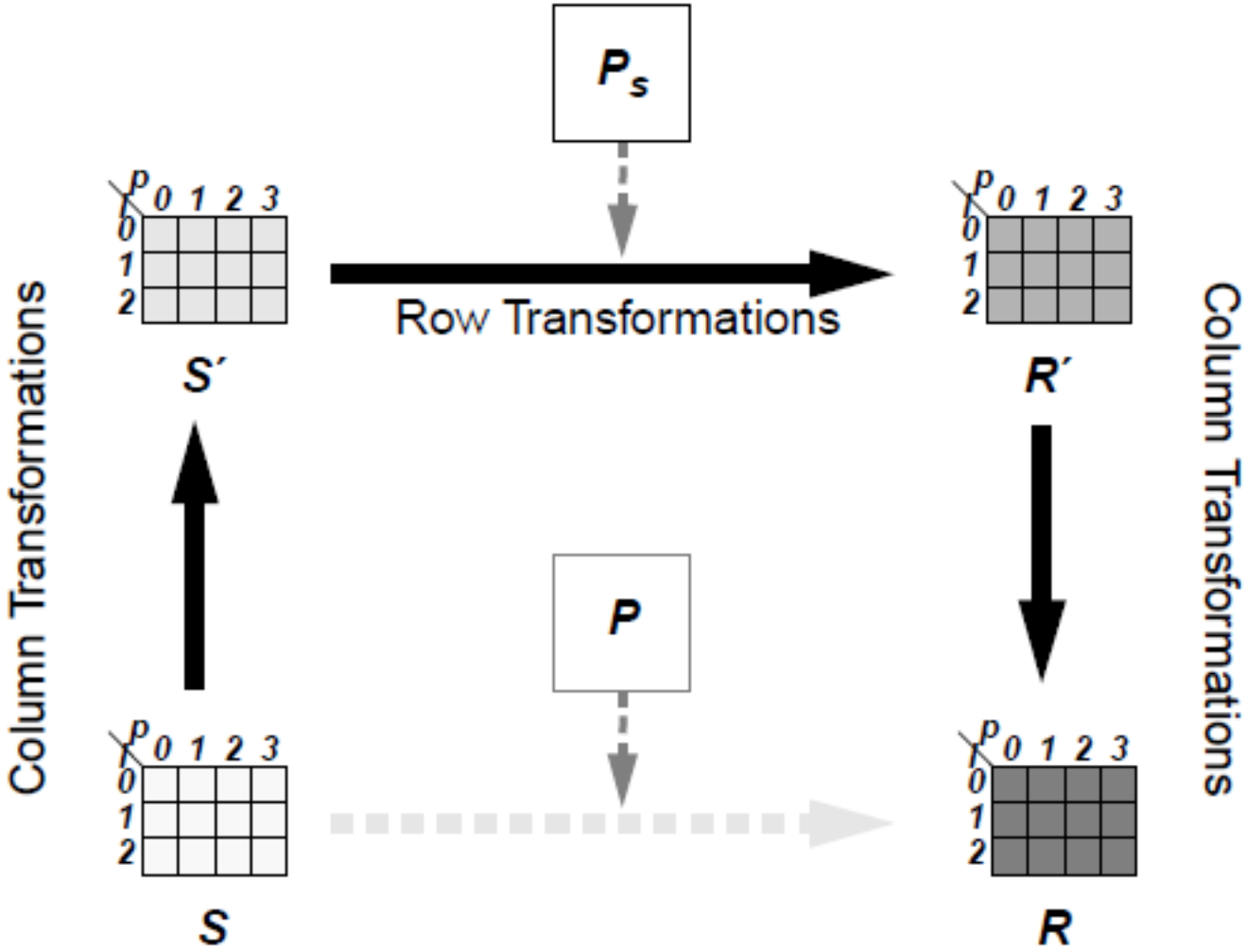
Destination Processor
Table

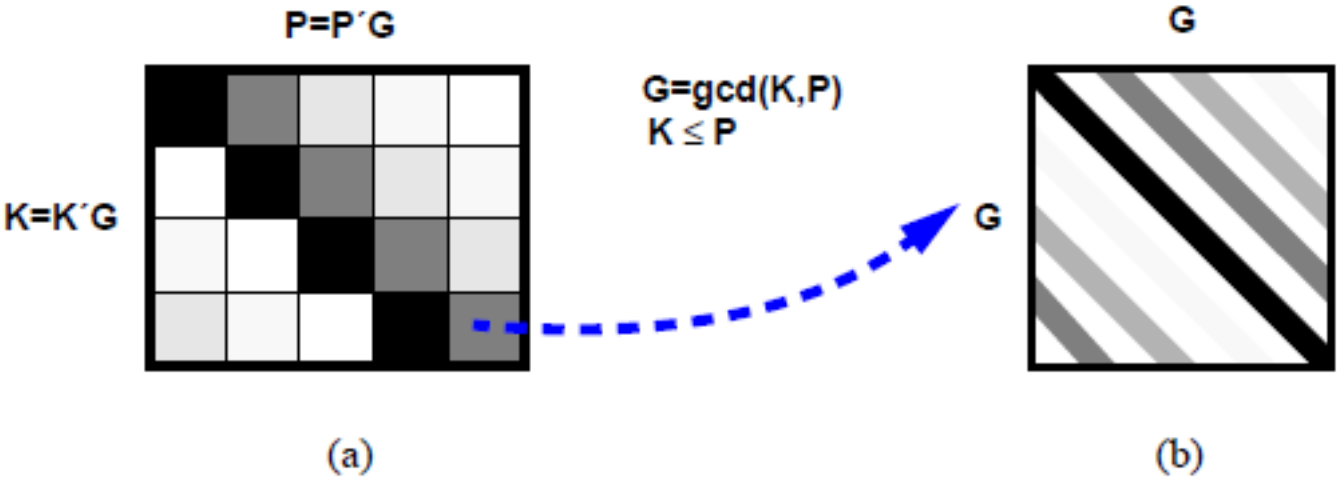
(i * j) mod N

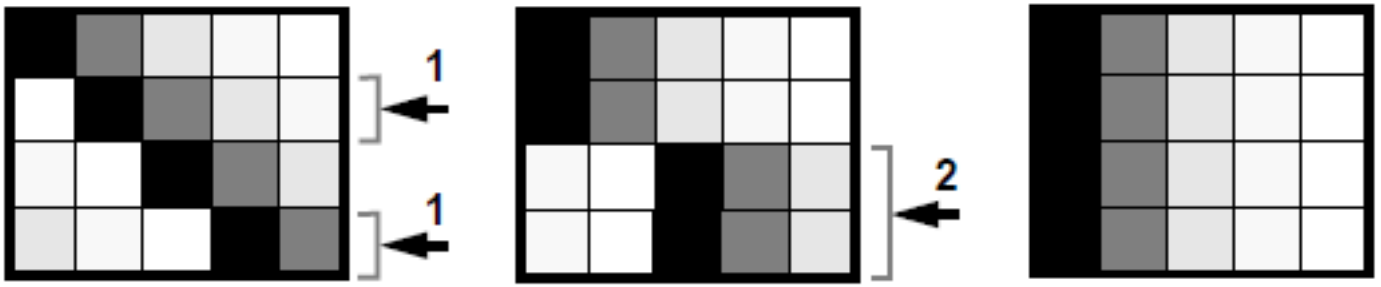
Log N steps

Data Redistribution Algorithm

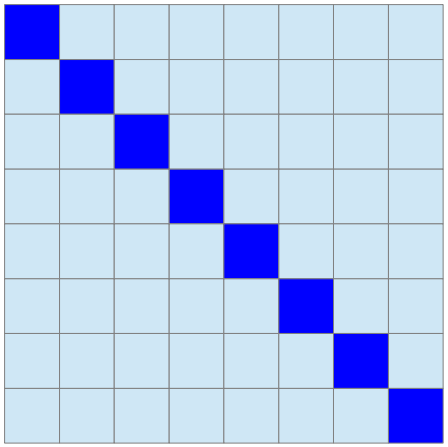
Explore possible Log steps
in various cases of data redistributions
using Prolog Logic Programming -

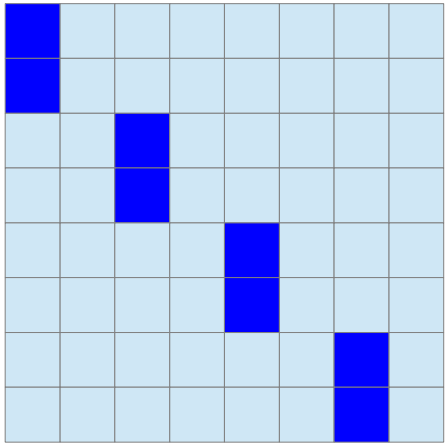

P_s
Row Transformations
Column Transformations
Column Transformations
P
S´
R´
S
R

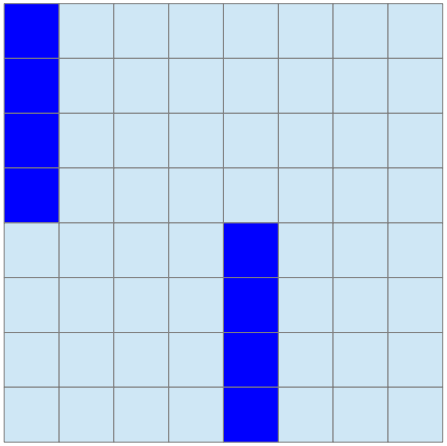

P=P´G
G
G=gcd(K,P)
K ≤ P
K=K´G
G
(a)
(b)

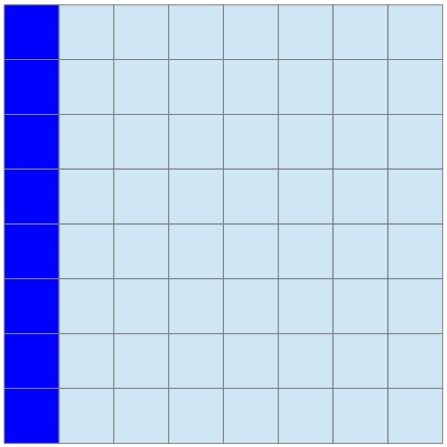

1
1
2

Prolog Rules for converting a matrix









References

[1] http://en.wikipedia.org/
[2] Y. W. Lim, "Efficient algorithms for block-cyclic redistribution of arrays", Alogrithmica, 1999