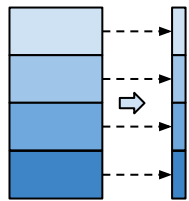


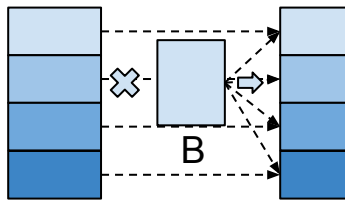
A C

(a)  $C = \text{supply}(A, \text{"abs"})$



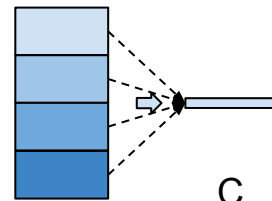
A C

(c)  $C = \text{agg.row}(A, \text{"+"})$



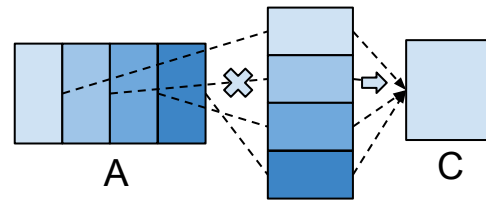
A C

(e)  $C = \text{multiply}(A, B)$



A C

(g)  $C = \text{agg.col}(A, \text{"+"})$

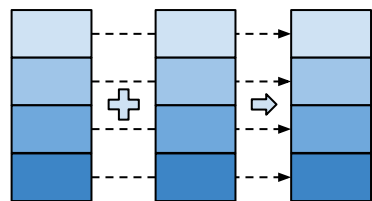


A

B

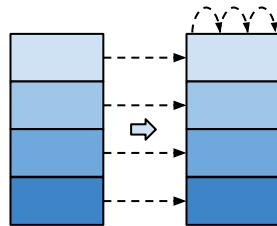
C

(i)  $C = \text{multiply}(A, B)$



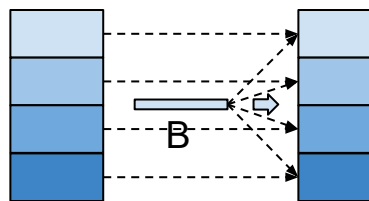
A B C

(b)  $C = \text{mapply}(A, B, \text{"+"})$



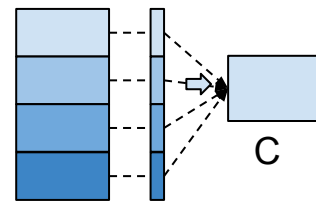
A C

(d)  $C = \text{cum.row}(A, \text{"+"})$



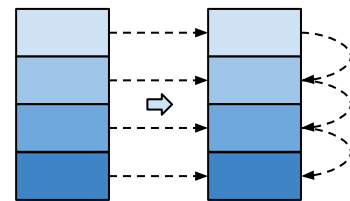
A C

(f)  $C = \text{groupby.col}(A, B, \text{"+"})$



A B C

(h)  $C = \text{groupby.row}(A, B, \text{"+"})$



A C

(j)  $C = \text{cum.col}(A, \text{"+"})$