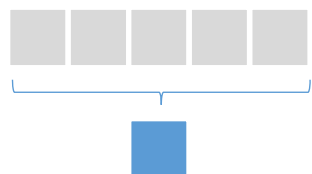
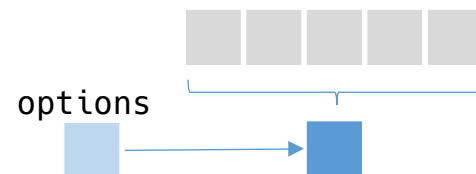


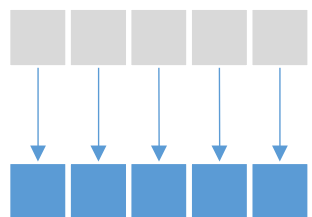
## Vector operations in TDR



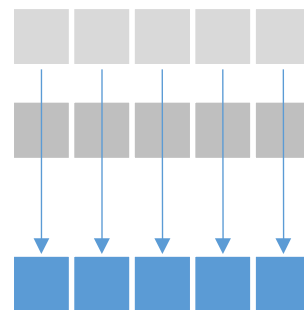
Vector  
aggregation function  
(unary)



Vector  
aggregation function  
(unary, with options)

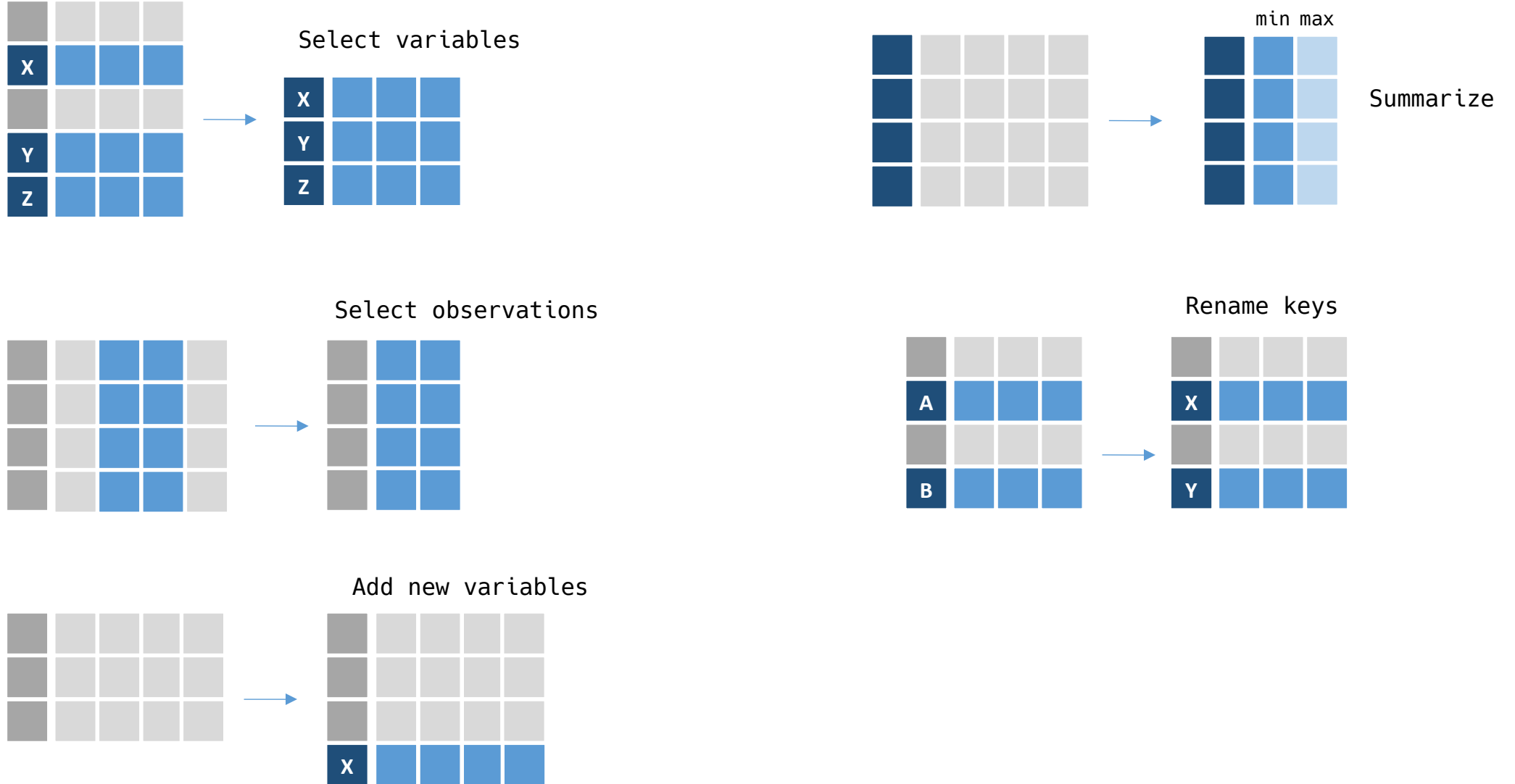


Vector  
element-wise function  
(unary)



Vector  
element-wise function  
(binary)

## DataFrame operation in TDR (tentative)



# DataFrame Combine operations in TDR (tentative)

Combine data sets

<b>a</b>	X1	A	B	C
	X2	1	2	3



<b>b</b>	X1	A	B	D
	X3	T	F	T

Mutating joins

X1	A	B	C
X2	1	2	3
X3	T	F	NA

**a.join(b, by: :x1)**  
(left\_join)

X1	A	B	D
X3	T	F	T
X2	1	2	NA

**b.join(a, by: :x1)**  
(right\_join)

X1	A	B
X2	1	2
X3	T	F

**a.inner\_join(b, by: :x1)**

X1	A	B	C	D
X2	1	2	3	NA
X3	T	F	NA	T

**a.full\_join(b, by: :x1)**

Filtering joins

X1	A	B
X2	1	2

**a.semi\_join(b, by: :x1)**

X1	C
X2	3

**a.anti\_join(b, by: :x1)**

# DataFrame Combine operations in TDR (set and binding, tentative)

## Combine data sets

<b>y</b>	X1	A	B	C
	X2	1	2	3



<b>z</b>	X1	B	C	D
	X2	2	3	4

## Set operations

X1	B	C
X2	2	3

**y.intersect(z)**

X1	A	B	C	D
X2	1	2	3	4

**y.union(z)**

X1	A
X2	1

**y.set\_diff(z)**

## Binding

X1	A	B	C	B	C	D
X2	1	2	3	2	3	4

**y.bind\_vector(z)**  
(bind\_rows)

X1	A	B	C
X2	1	2	3
X1	B	C	D
X2	2	3	4

**y.bind\_obs(z)**  
(bind\_cols)

## DataFrame Grouping usecase in TDR (tentative)

