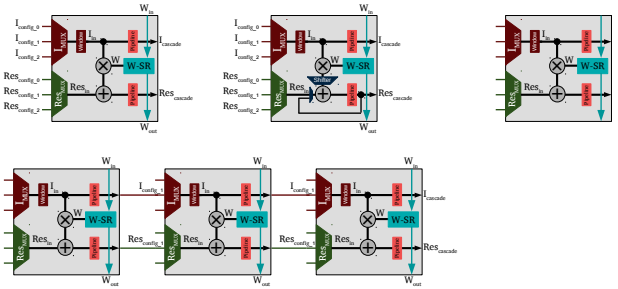
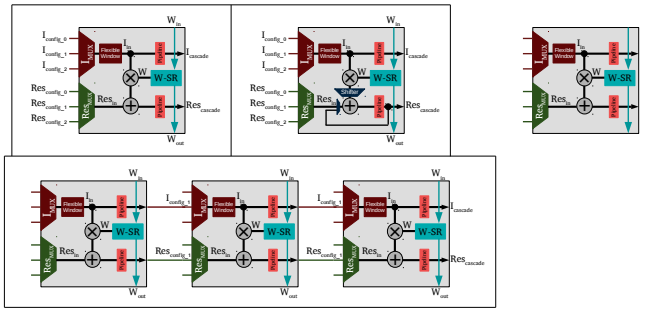
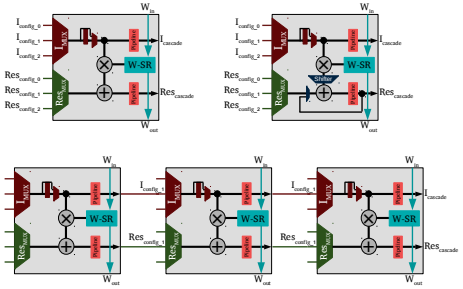


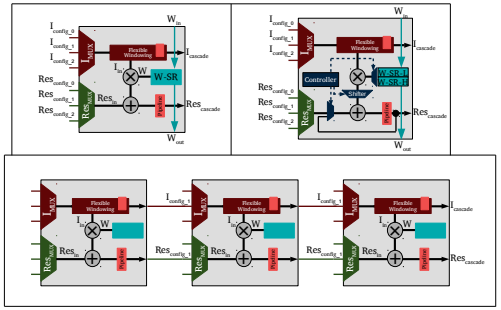
New

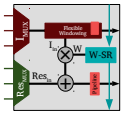


Newer

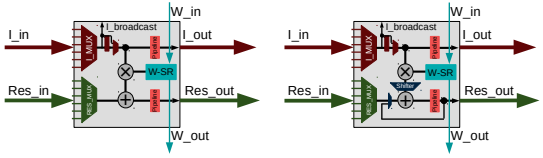


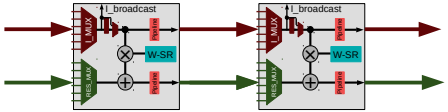
Old



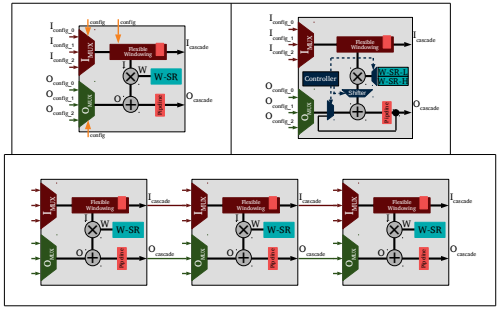


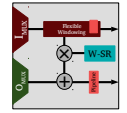
Newest



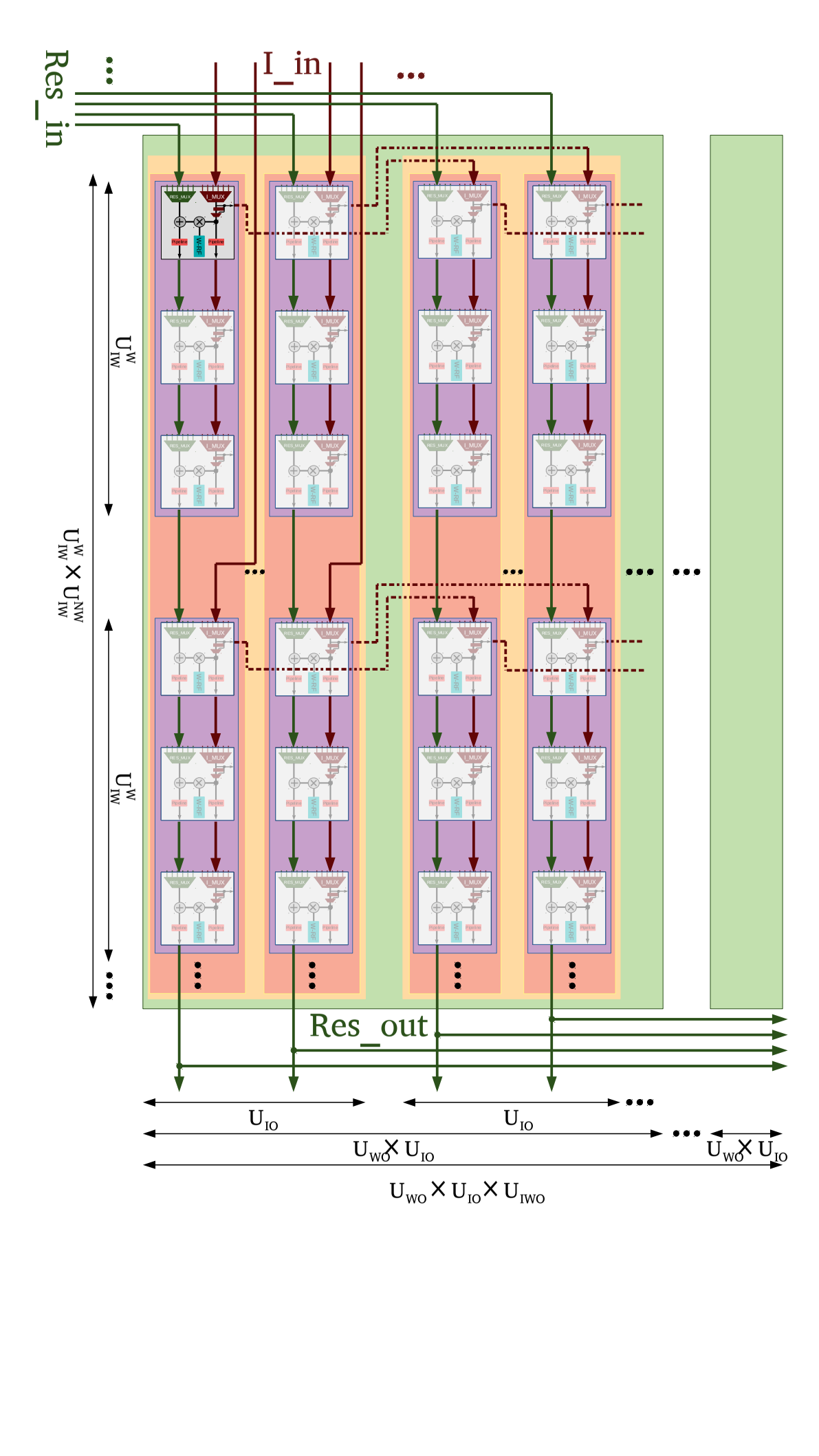


Older

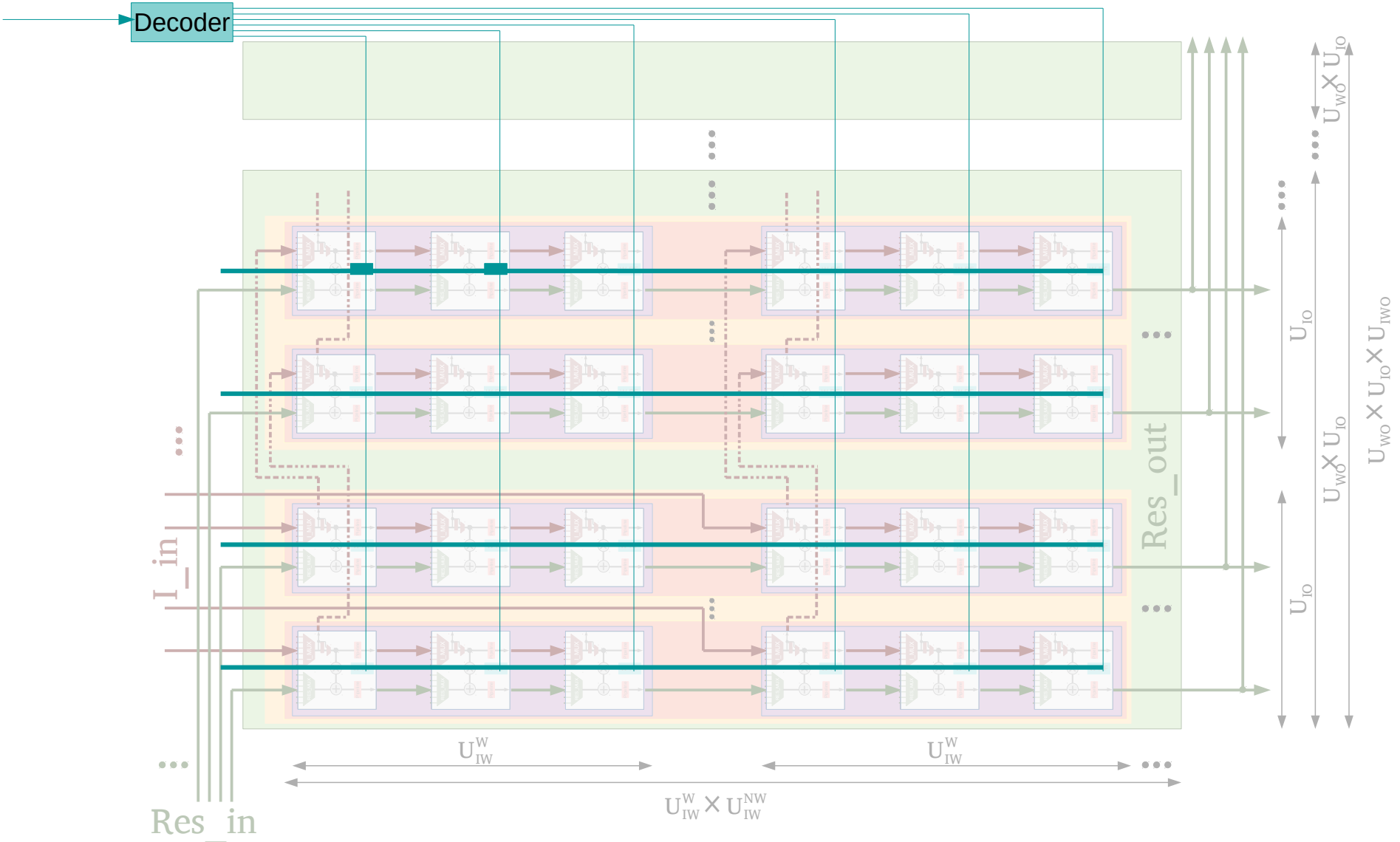




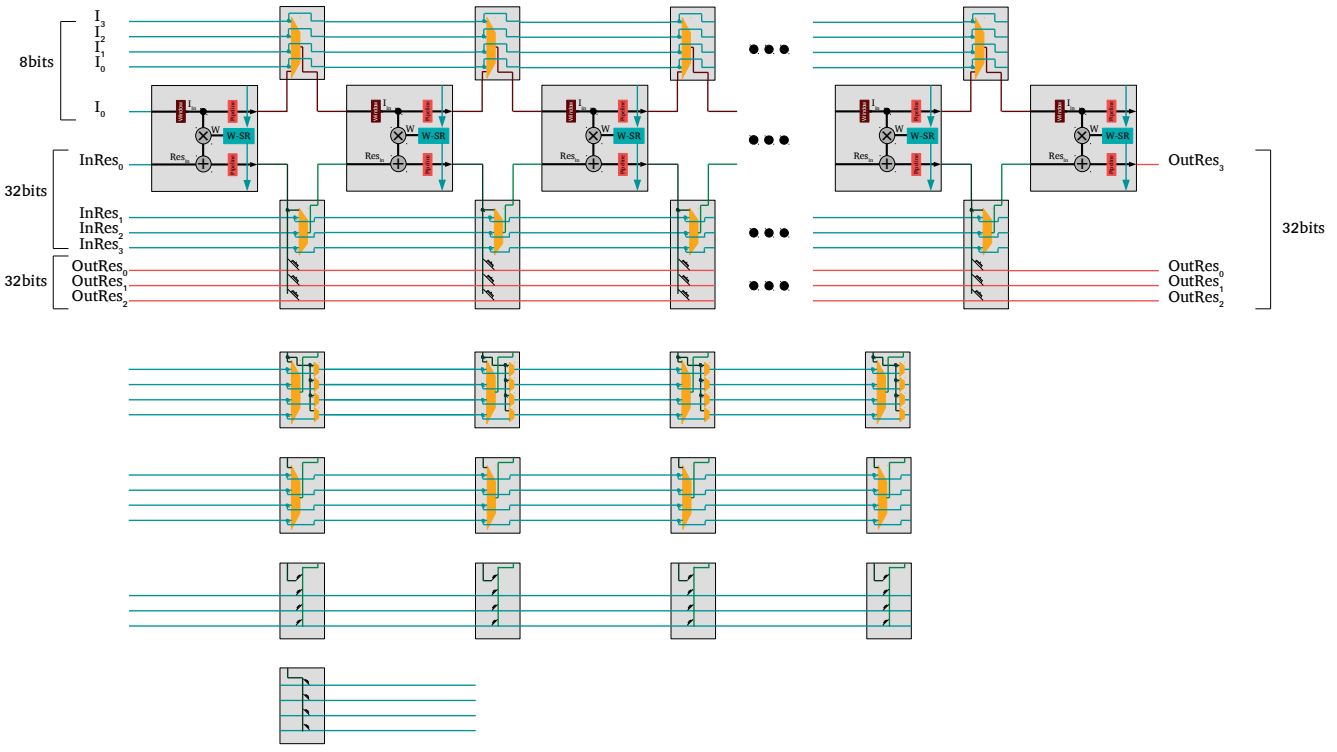
Newest2


Res_in
I_in
Res_out
U_{IW}^{W}
$U_{IW}^{W} \times U_{IW}^{NW}$
U_{IW}^{W}
U_{IO}
U_{IO}
$U_{WO} \times U_{IO}$
$U_{WO} \times U_{IO}$
$U_{WO} \times U_{IO} \times U_{IWO}$

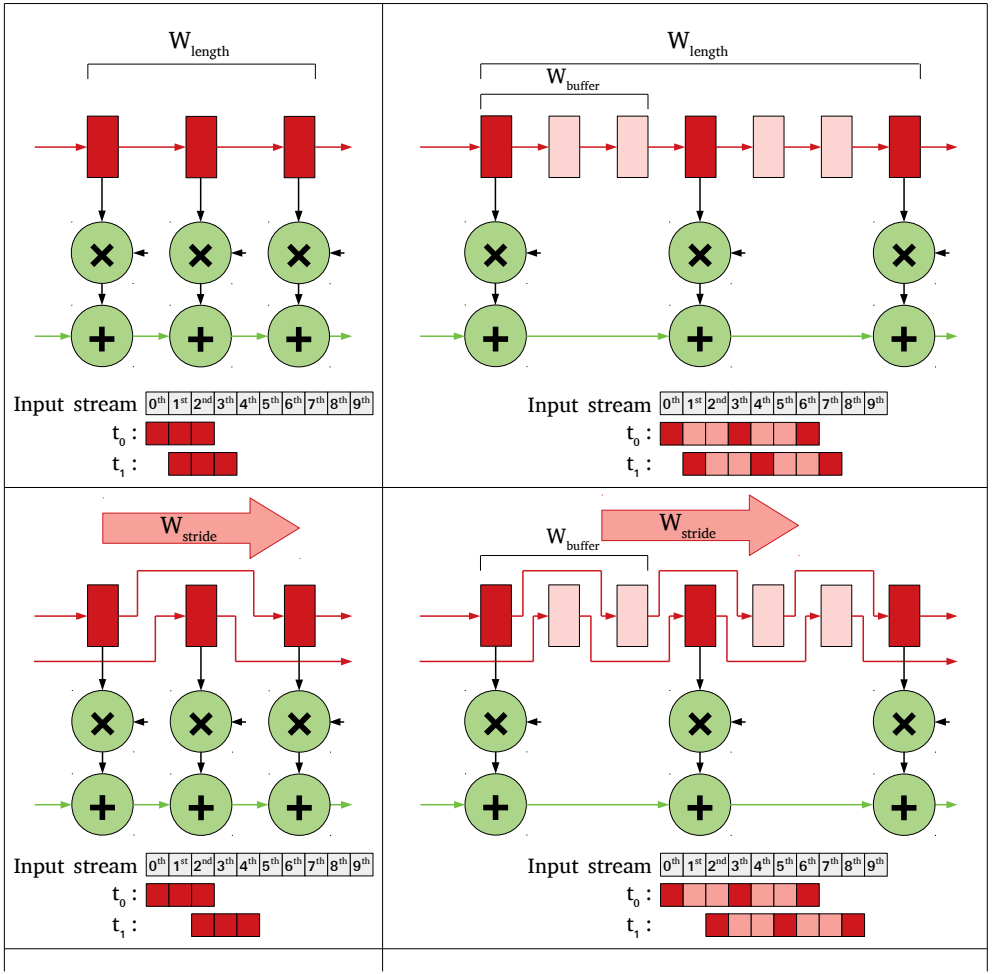
I_{in}
O_{in}
O_{out}
U_{IW}^{W}
U_{IW}^{W}
$U_{IW}^{W} \times U_{IW}^{NW}$
U_{IO}
U_{IO}
$U_{WO} \times U_{IO}$
$U_{WO} \times U_{IO}$
$U_{WO} \times U_{IO} \times U_{IWO}$


Decoder
I_in
Res_in
Res_out
U_{IW}^{W}
U_{IW}^{W}
$U_{IW}^{W} \times U_{IW}^{NW}$
U_{IO}
$U_{WO} \times U_{IO}$
U_{IO}
$U_{WO} \times U_{IO}$
$U_{WO} \times U_{IO} \times U_{IWO}$

1D Super Flex arch.



Windowed param: fx (filter

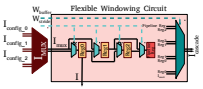


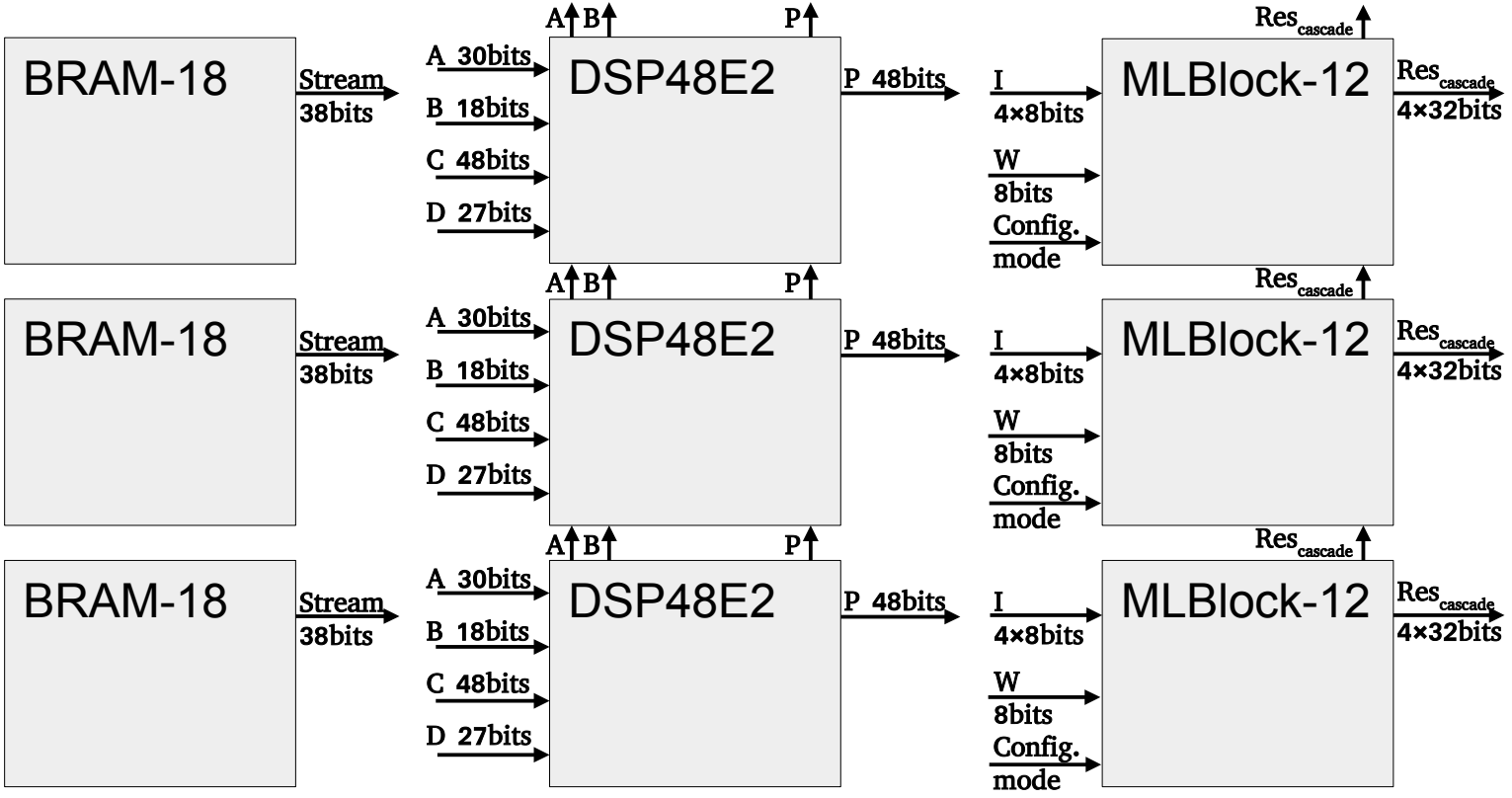
Iteration step may affects:
1- window size
2- speed of windowing
3- sample rate (dilated convolutions)

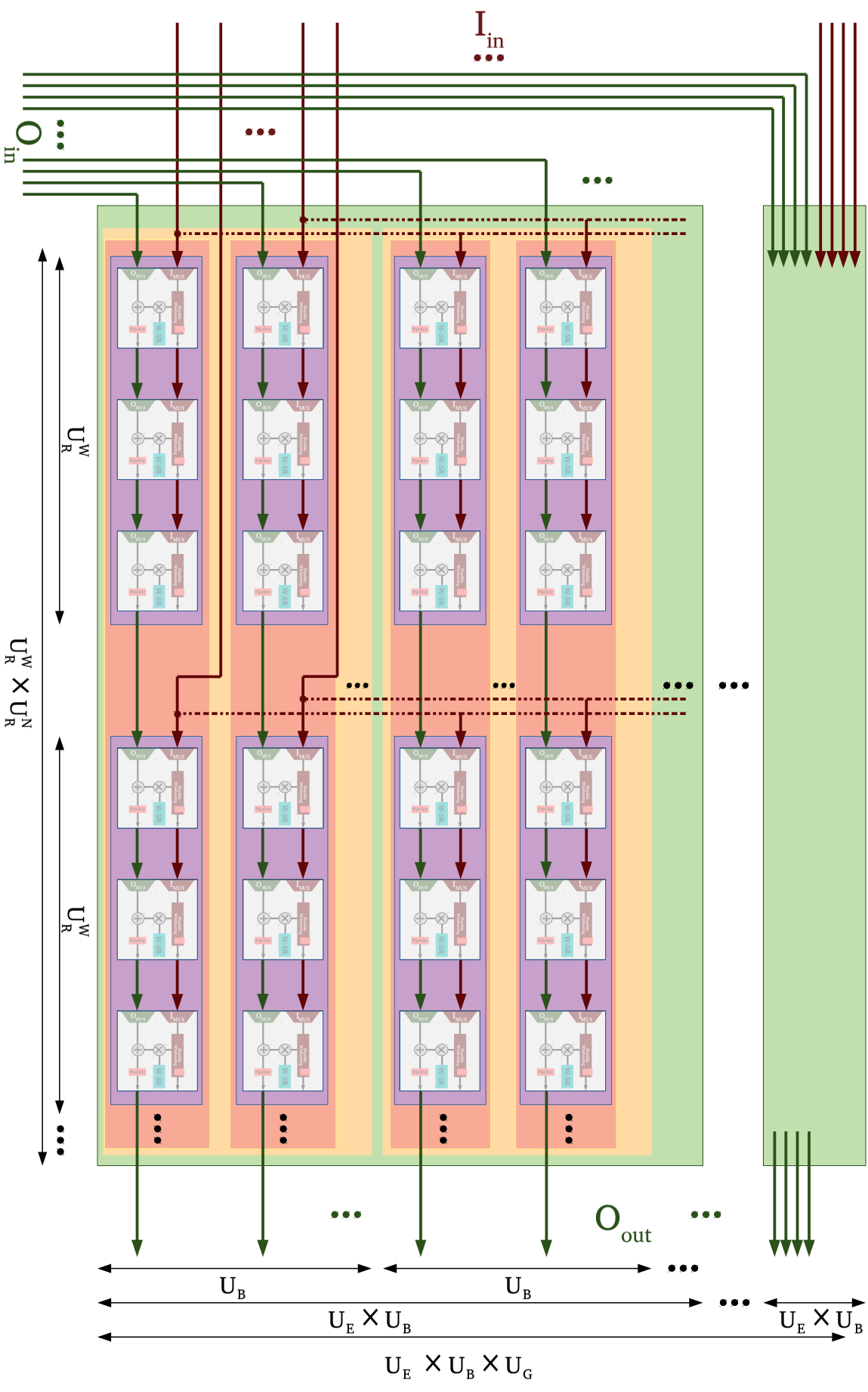
W_{stride}

Accompany of Windowed param: x (input param)

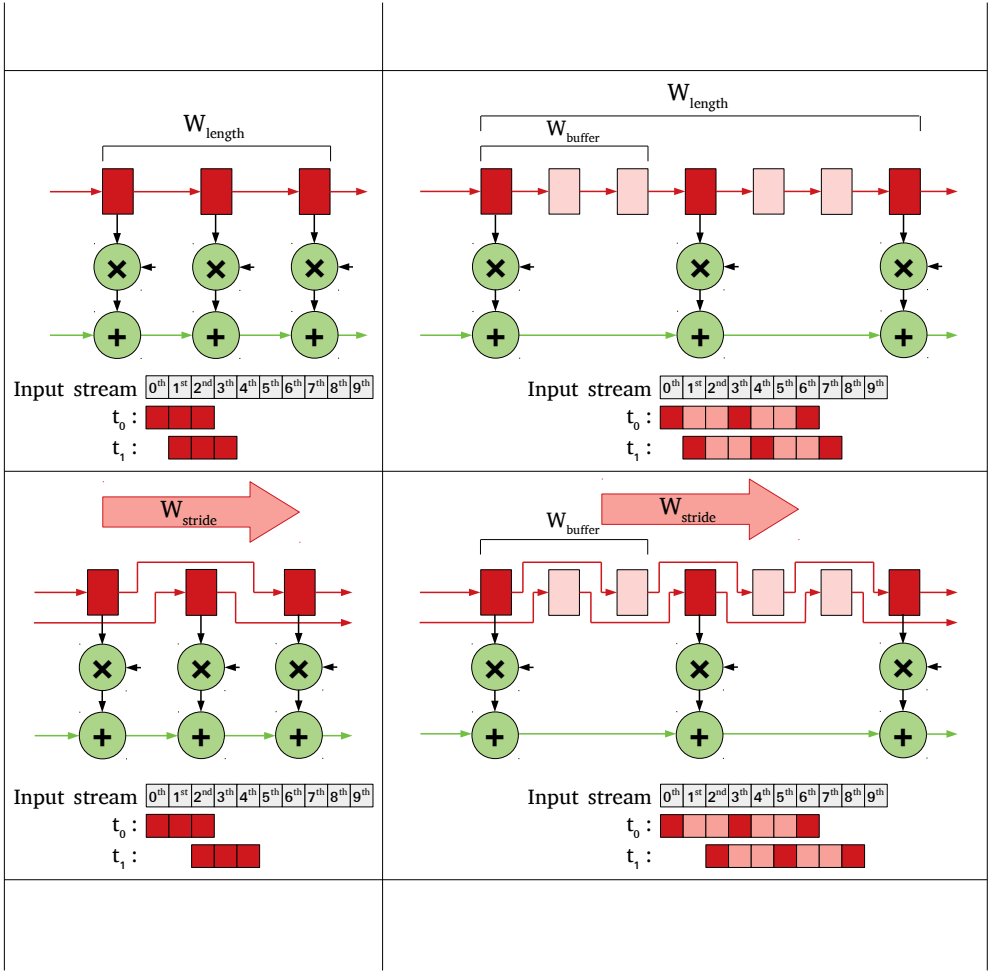
Both: X & fx


Flexible Windowing Circuit
W_{config}
W_{config}
I_{config_0}
I_{config_1}
I_{config_2}
MUX 3:1
I
I
I
Pipeline Regs
Pipeline Regs
Pipeline Regs
Pipeline Regs
Pipeline Regs
Pipeline Regs
MUX
W_{out}


BRAM-18
Stream
38bits
A
B
P
A 30bits
B 18bits
C 48bits
D 27bits
DSP48E2
P 48bits
I
4×8bits
W
8bits
Config.
mode
Res cascade
MLBlock-12
Res cascade
4×32bits
BRAM-18
Stream
38bits
A
B
P
A 30bits
B 18bits
C 48bits
D 27bits
DSP48E2
P 48bits
I
4×8bits
W
8bits
Config.
mode
Res cascade
MLBlock-12
Res cascade
4×32bits
BRAM-18
Stream
38bits
A
B
P
A 30bits
B 18bits
C 48bits
D 27bits
DSP48E2
P 48bits
I
4×8bits
W
8bits
Config.
mode
Res cascade
MLBlock-12
Res cascade
4×32bits


I_{in}
O_{in}
U_R^W
$U_R^W \times U_R^N$
U_R^W
O_{out}
U_B
U_B
$U_E \times U_B$
$U_E \times U_B$
$U_E \times U_B \times U_G$

Windowed param: fx (filter



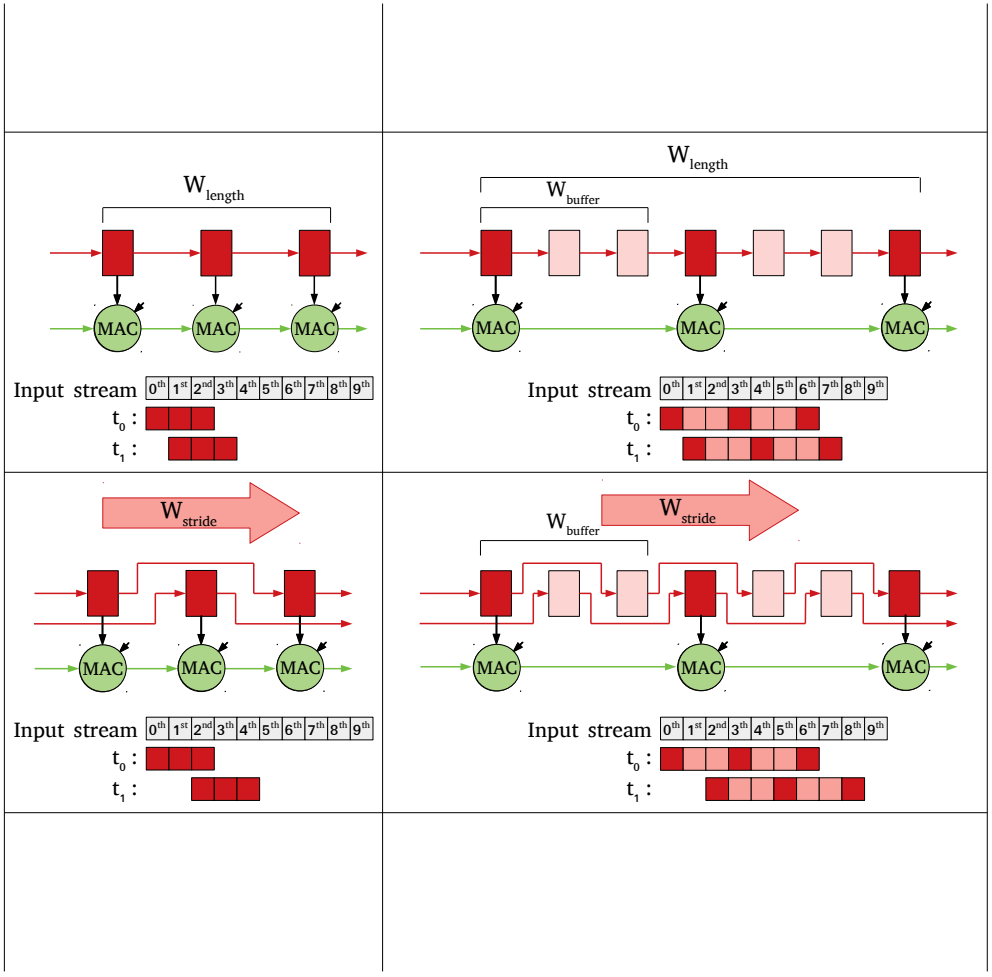
Iteration step may affects:
1- window size
2- speed of windowing
3- sample rate (dilated convolutions)

W_{stride}

Accompany of Windowed param: x (input param)

Both: X & fx

Windowed param: fx (filter



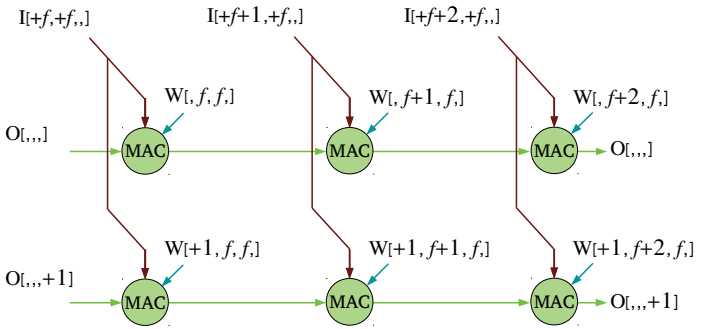
Iteration step may affects:
1- window size
2- speed of windowing
3- sample rate (dilated convolutions)

W_{stride}

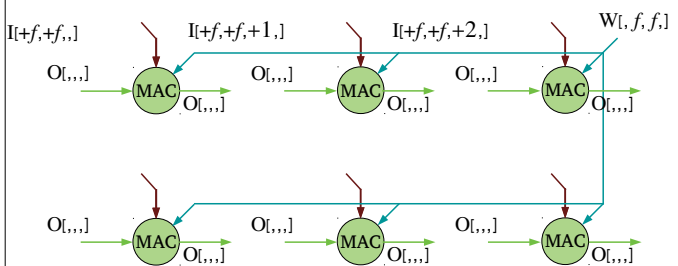
Accompany of Windowed param: x (input param)

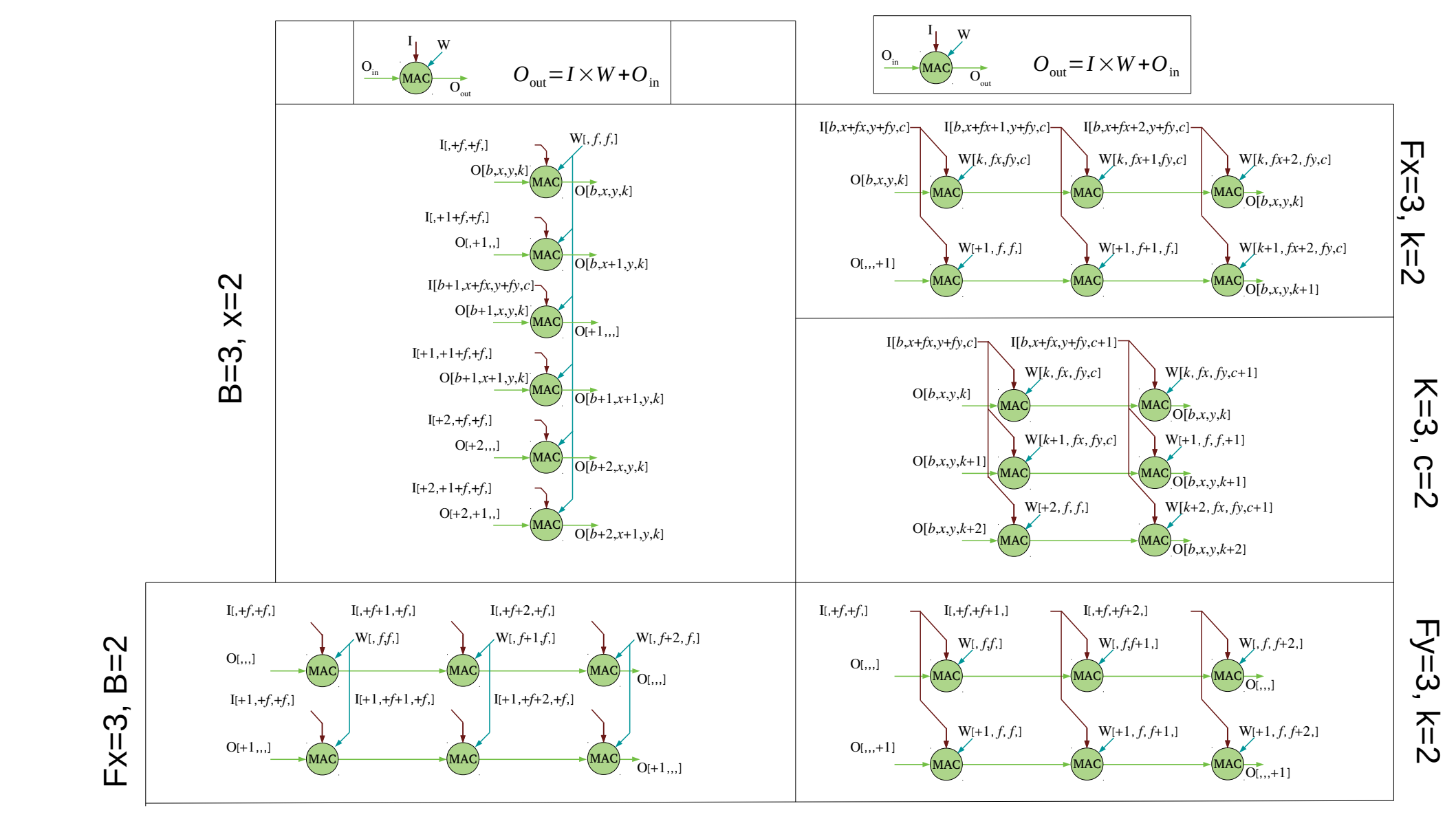
Both: X & fx

O[,,,]+=I[+*f*,+*f*,,]×W[, *f*, *f*,]
O[,,,]+=I[+*f*+1,+*f*,,]×W[, *f*+1, *f*,]
O[,,,]+=I[+*f*+2,+*f*,,]×W[, *f*+2, *f*,]
O[,,,+1]+=I[+*f*,+*f*,,]×W[+1, *f*, *f*,]
O[,,,+1]+=I[+*f*+1,+*f*,,]×W[+1, *f*+1, *f*,]
O[,,,+1]+=I[+*f*+2,+*f*,,]×W[+1, *f*+2, *f*,]



O[,,,]+= I[+*f*,+*f*,,]× W[, *f*, *f*,]
O[+1,+1,,]+= I[+1+*f*,+*f*,+1,]× W[, *f*, *f*,]
O[+2,,,]+= I[+*f*,+*f*,+2,]× W[, *f*, *f*,]
O[,+1,,]+= I[+1+*f*,+*f*,,]× W[, *f*, *f*,]
O[+1,,,]+= I[+*f*,+*f*,+1,]× W[, *f*, *f*,]
O[+2,+1,,]+= I[+1+*f*,+*f*,+2,]× W[, *f*, *f*,]

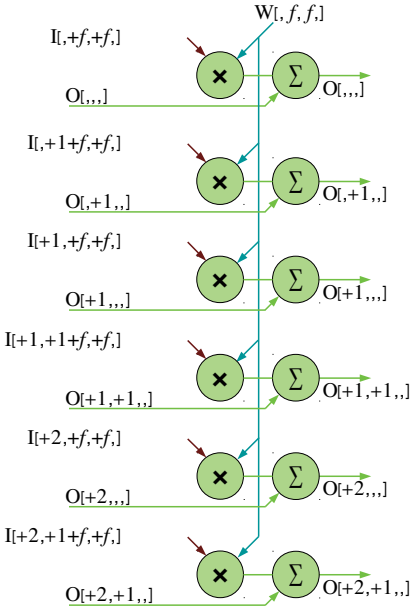


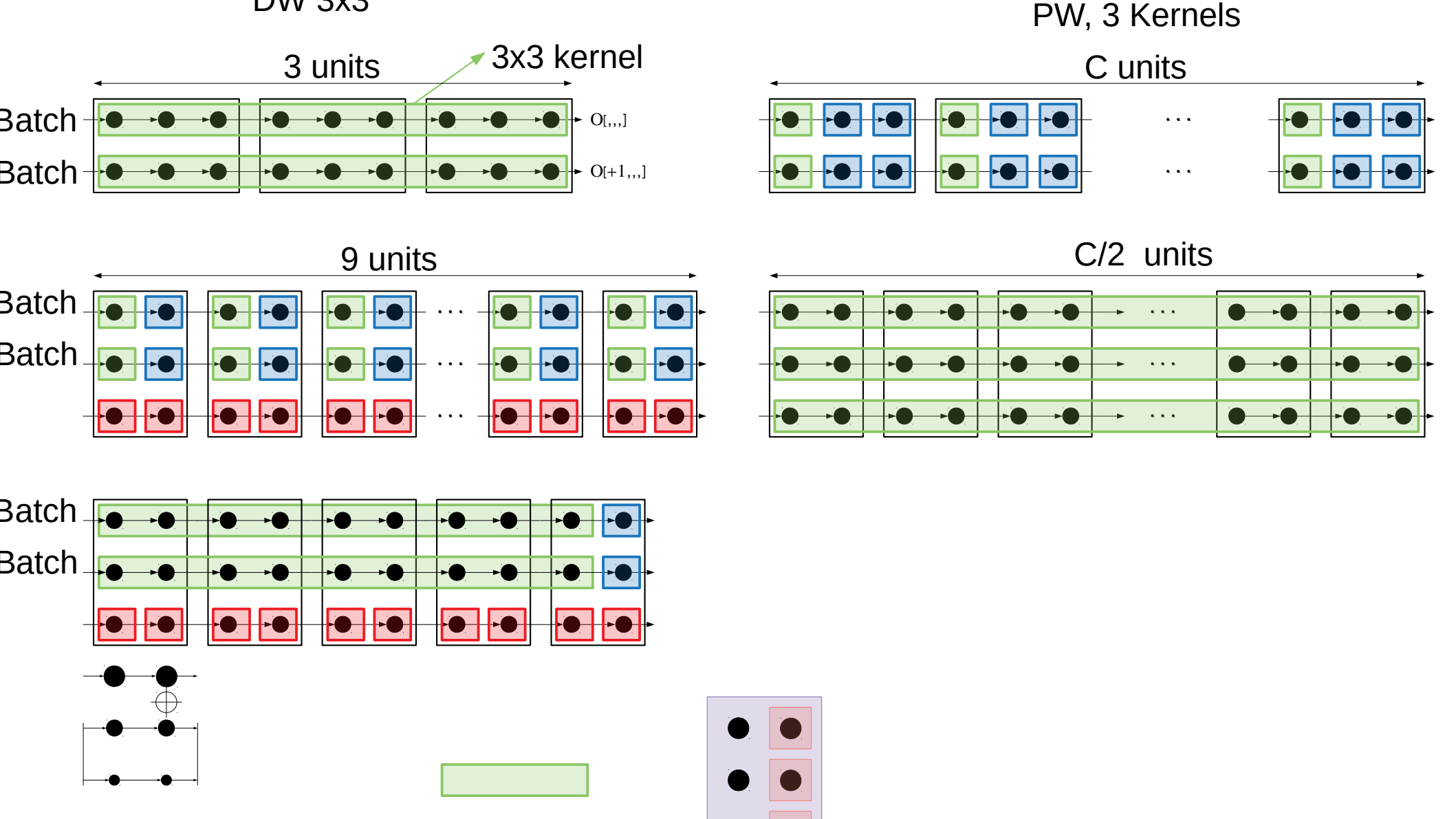

I
W
O_in
MAC
O_out
O_out = I × W + O_in
B=3, x=2
Fx=3, k=2
K=3, c=2
Fx=3, B=2
Fy=3, k=2

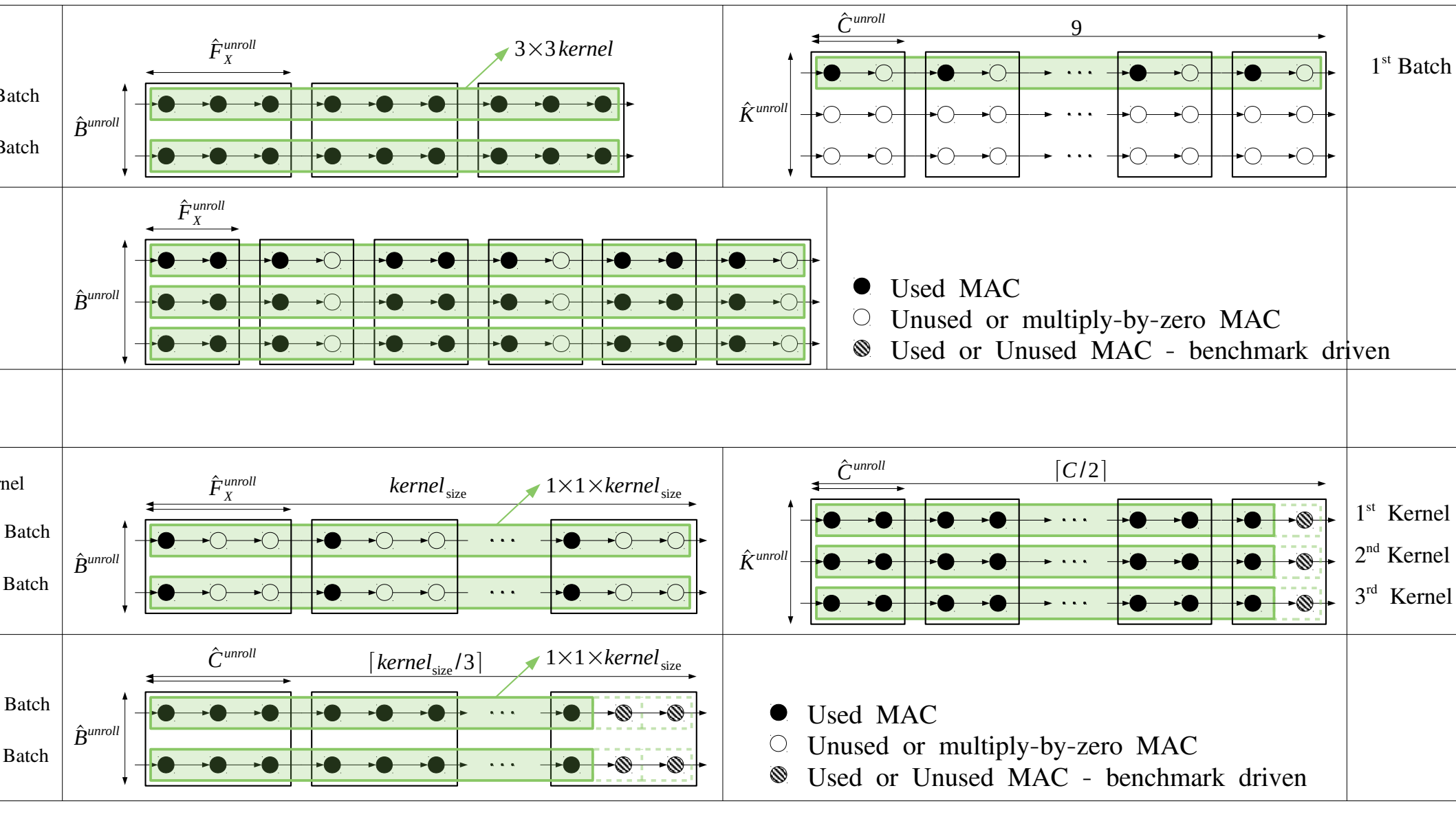
B=3, Fx=2

Fy=3, X=2

C=3, B=2


W[, f, f,]
I[,+f,+f,]
O[,,,]
O[,,,]
I[,+1+f,+f,]
O[,+1,,]
O[,+1,,]
I[+1,+f,+f,]
O[+1,,,]
O[+1,,,]
I[+1,+1+f,+f,]
O[+1,+1,,]
O[+1,+1,,]
I[+2,+f,+f,]
O[+2,,,]
O[+2,,,]
I[+2,+1+f,+f,]
O[+2,+1,,]
O[+2,+1,,]


DW 3x3
3 units
3x3 kernel
Batch
Batch
O[,,,]
O[+1,,,]
PW, 3 Kernels
C units
9 units
C/2 units


$\hat{F}_X^{unroll}$
3×3 kernel
$\hat{B}^{unroll}$
$\hat{C}^{unroll}$
9
$\hat{K}^{unroll}$
1st Batch
Used MAC
Unused or multiply-by-zero MAC
Used or Unused MAC - benchmark driven
$kernel_{size}$
$1\times1\times kernel_{size}$
$\lceil C/2 \rceil$
1st Kernel
2nd Kernel
3rd Kernel
$\lceil kernel_{size}/3 \rceil$