CS & IT ENGINEERING

Data Structures

Arrays
Chapter-
Lec- 02

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Arrays-2

RMO

$A[-5..5][-3..3]$

$5-(-5)+1 = 11$

$3-(-3)+1 = 7$

$w = 2$ bytes

$B.A = 1000$

address $(A[1][1])$

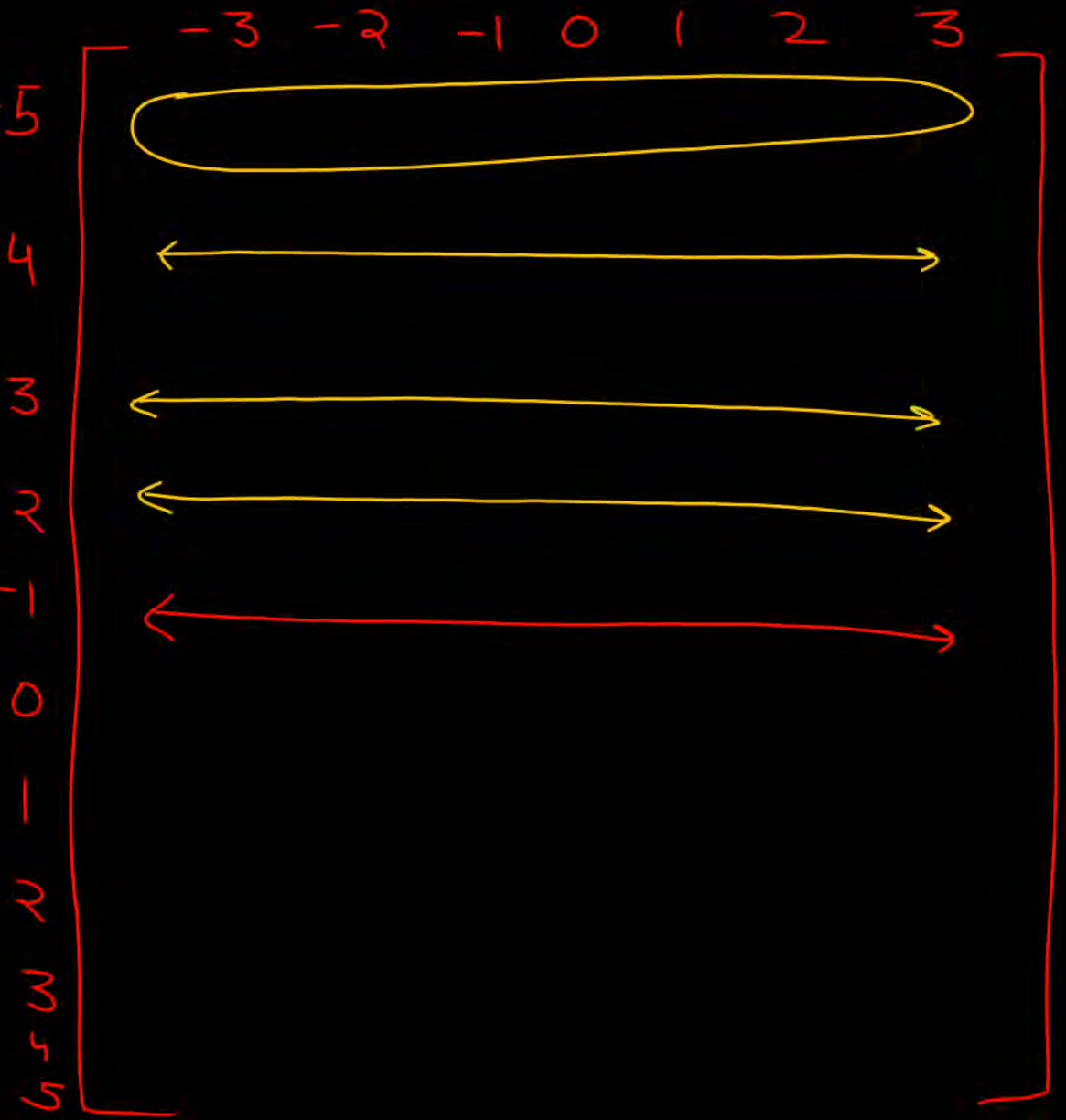
यहाँ का E2 no ⇒ 7

rows already filled

$= -5$ to 0

$= 0-(-5)+1$

$= 6$ rows



RMO

$A[-5..5][-3..3]$

$5-(-5)+1 = 11$

$3-(-3)+1 = 7$

$w = 2$ bytes

$B.A = 1000$

address $(A[1][-1])$

यहाँ का रो no ⇒ 7

after 6 rows (-3 to 0)

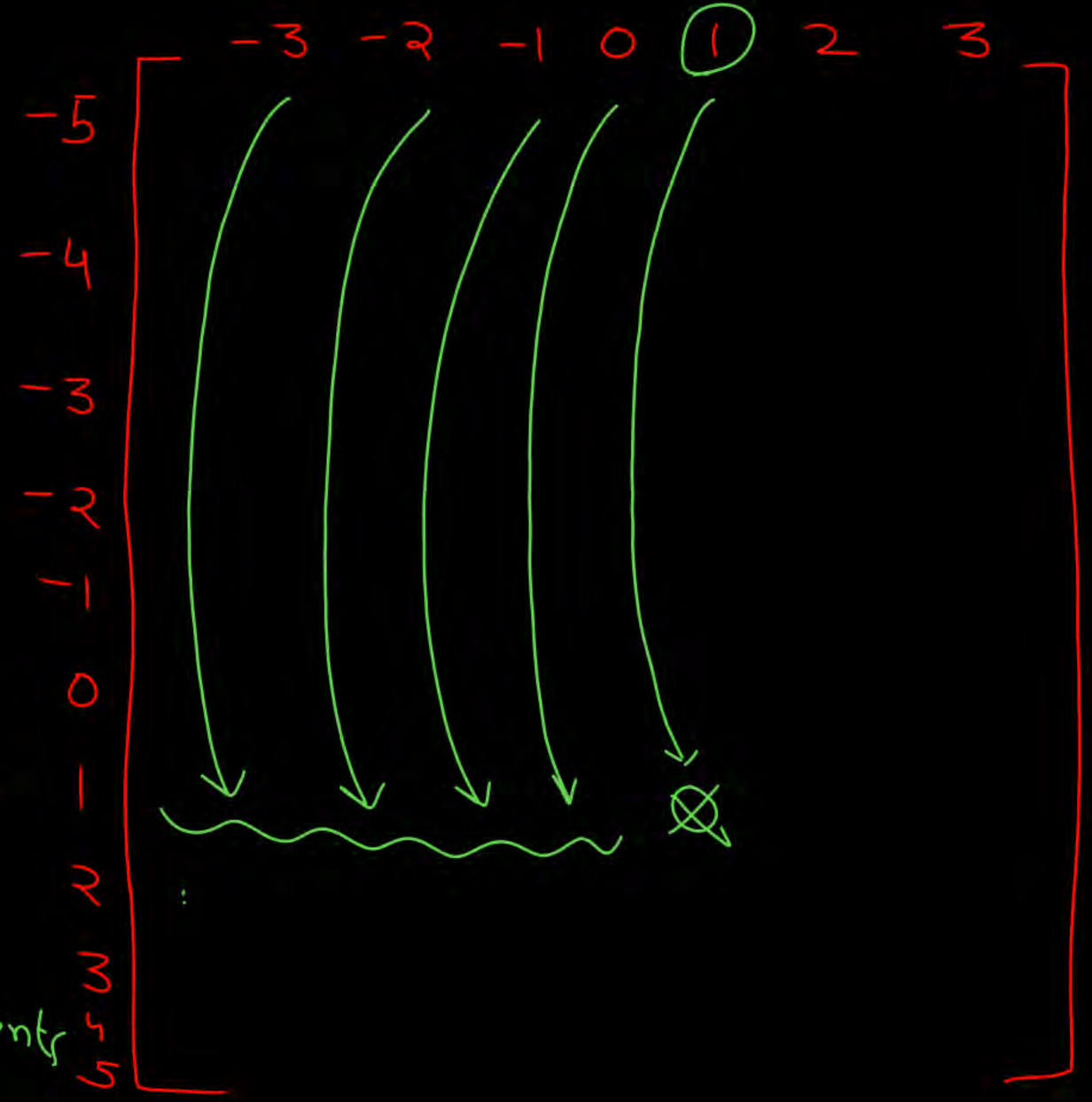
$= 0-(-3)+1$

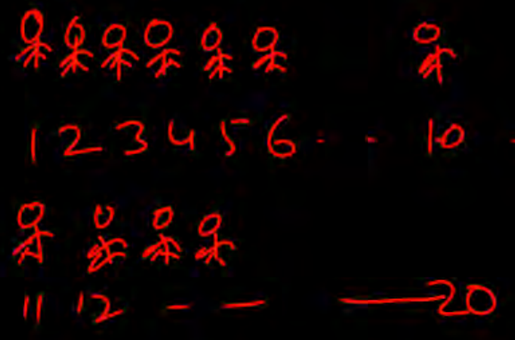
$= 4$ elements

6 rows & 4 elements ⟹

Elem. already filled before $A[1][1]$

$= 6 \times 7 + 4 = 46$ elements

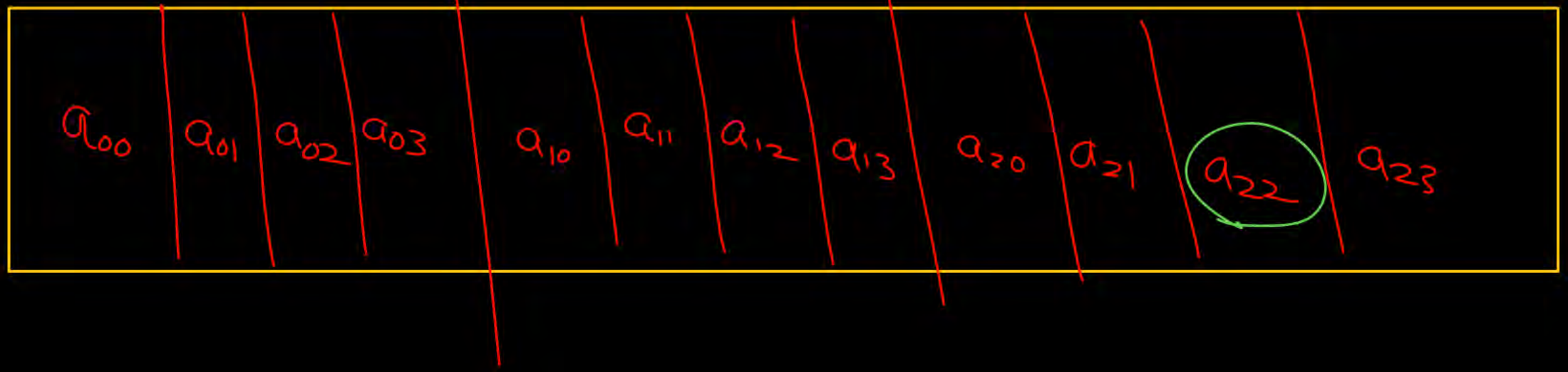




A

	0	1	2	3
0	a_{00}	a_{01}	a_{02}	a_{03}
1	a_{10}	a_{11}	a_{12}	a_{13}
2	a_{20}	a_{21}	a_{22}	a_{23}

S6



8

RMO

A[-5..5][-7..7]

7-(-7)+1 = 15

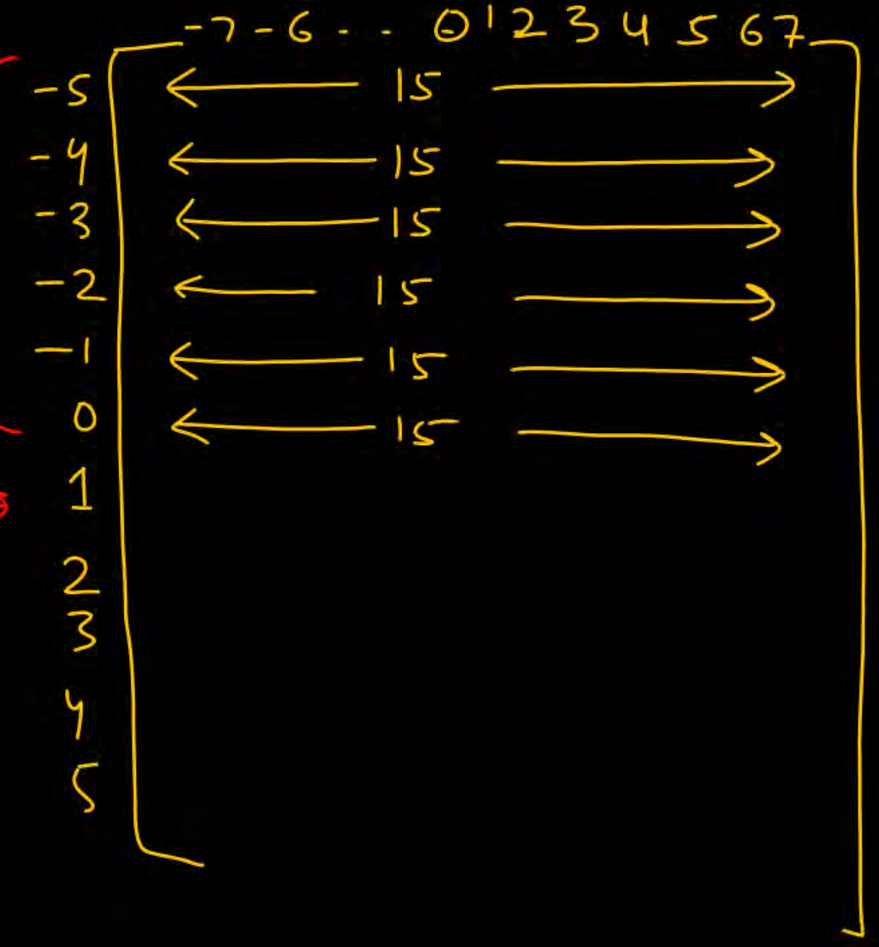
w = 4 bytes, BA = 1000

add(A[1][3])

-5 to 0

= 0-(-5)+1

= 6 rows



① Every index in this dimension represent = 15 element

row with index -5 ⇒ 15 ele

" " " -4 ⇒ 15 ele

-3 ⇒ 15 ele

-2 ⇒ 15 ele

-1

8

RMO

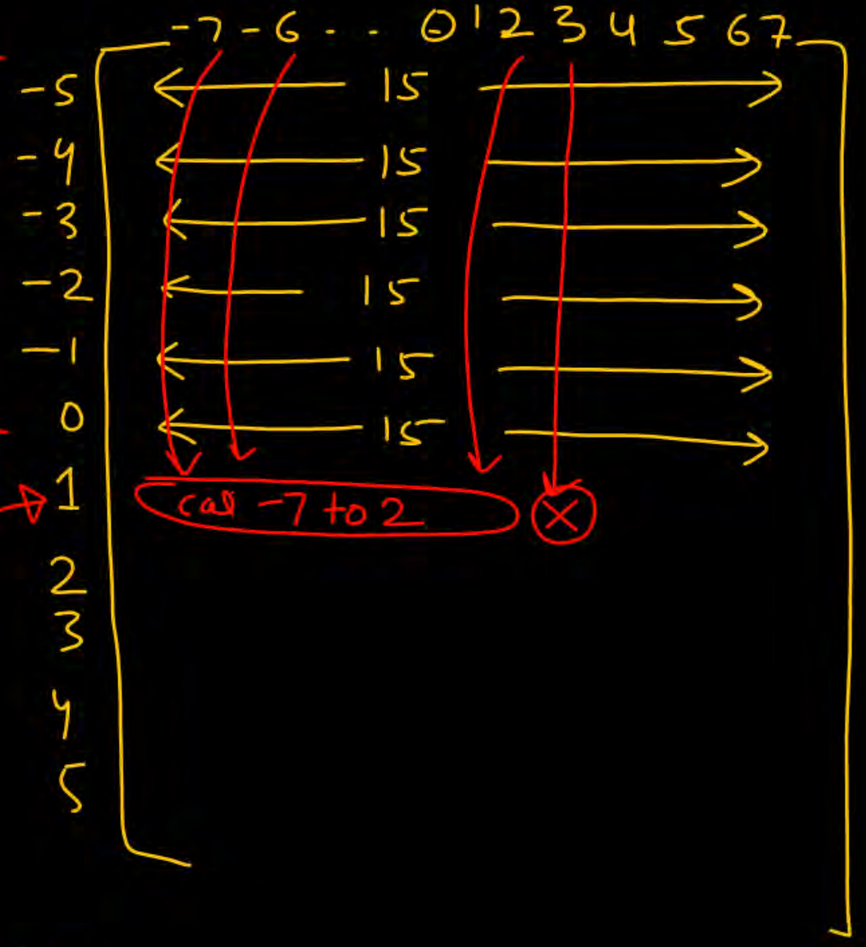
A[-5..5][-7..7]

w = 4 bytes, BA = 1000

add (A[1][3])

7-(-7)+1 = 15

-5 to 0
= 0-(-5)+1
= 6 rows



① Every index in this dimension represent = 15 element

With in row with index 1 ele already filled before A_{13}

= cal with index -7 to 2

= 2-(-7)+1

= 10 ele

Q

RMO

A[-5..5][-7..7]

w = 4 bytes, BA = 1000

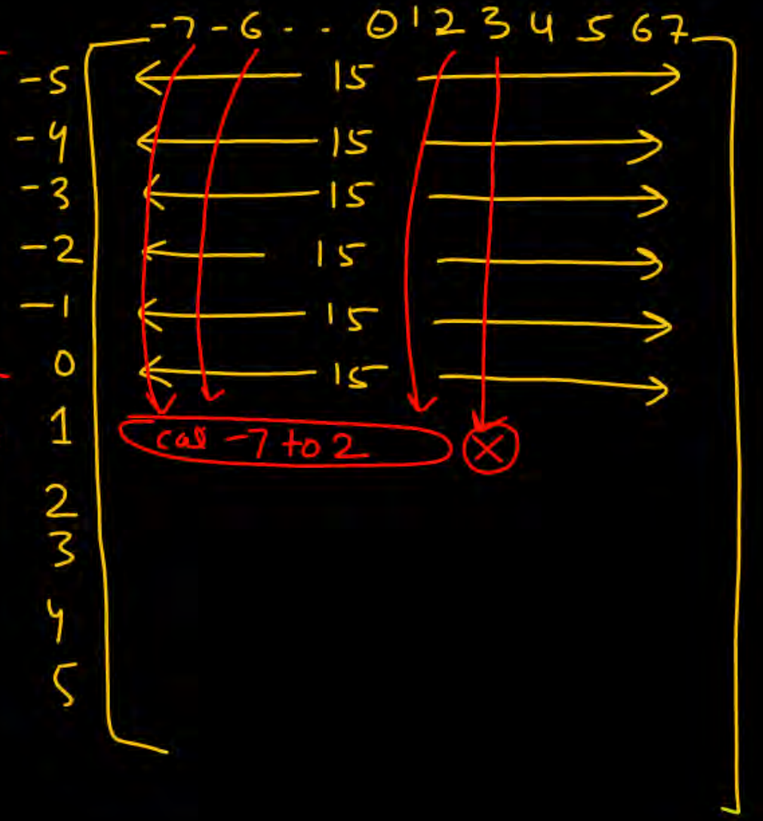
7-(-7)+1 = 15

add (A[1][3])

-5 to 0

= 0-(-5)+1

= 6 rows

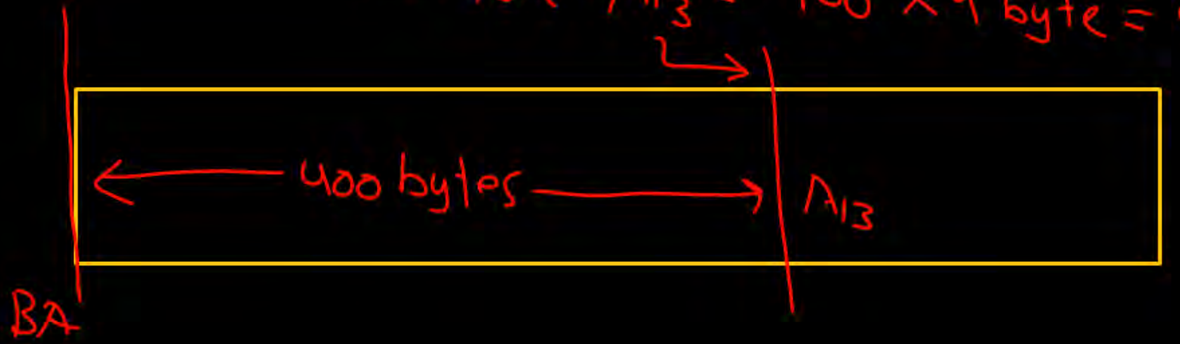


Elem already filled before A_{13}

= 6 × 15 + 10

= 100 elements

Memory already filled before A_{13} = 100 × 4 byte = 400 byte



add(A_{13}) = 1000 + 400

= 1400

A[M][N]

add(A_{ij})

→ 0 to j-1

→ 1) rows already filled before

row with index i = index 0 to i-1

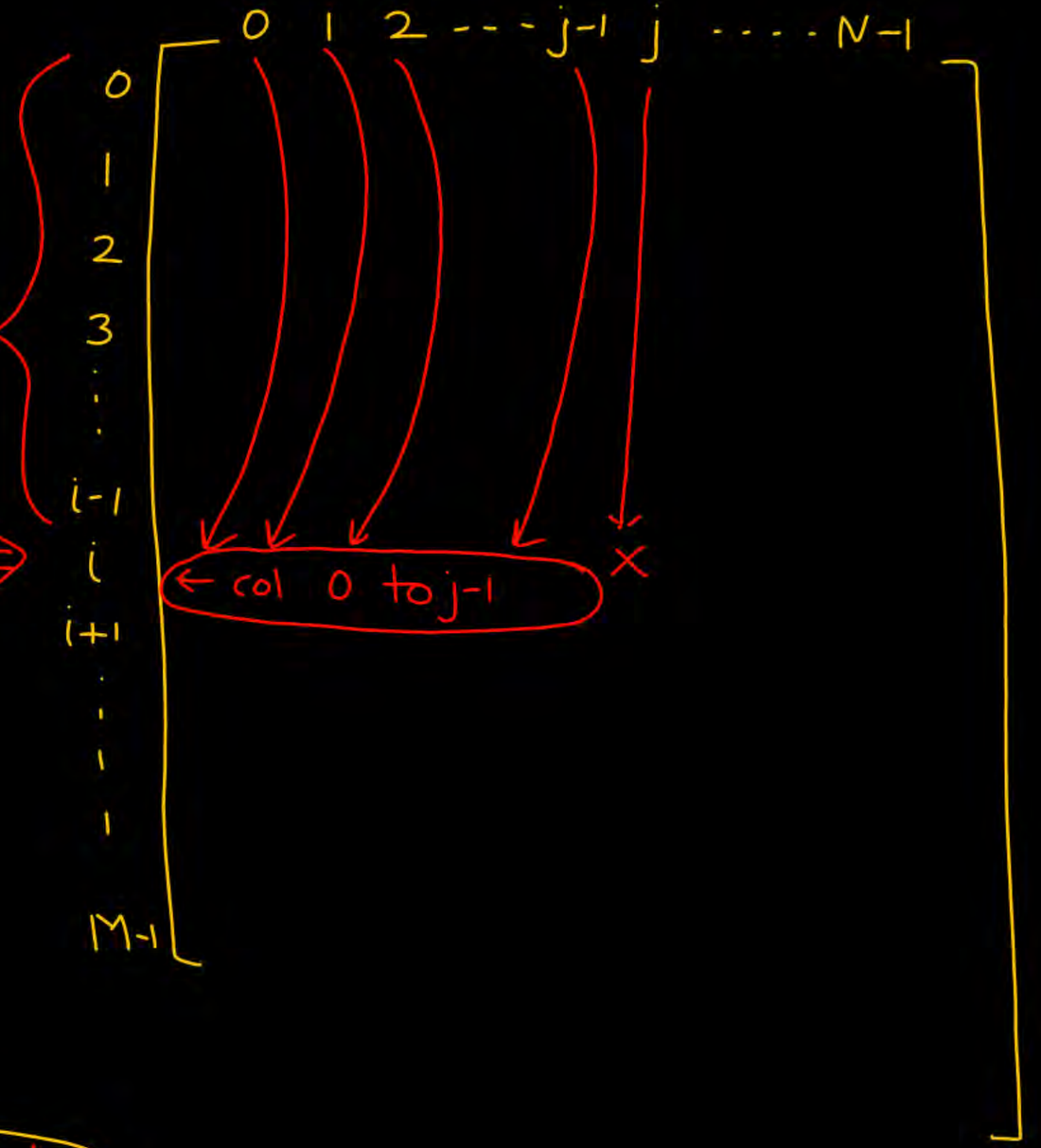
= (i-1) - 0 + 1

= i rows

Within row with index i, ele. already filled before A_{ij} = 0 to j-1

= j-1-0+1

= j elements



8

$A[-20..20][-15..15]$ — $15-(-15)+1 = 31$

w = 2 bytes, BA = 1000

add (A[2][6])

-20 to 1 : $1-(-20)+1 = 22$

-15 to 5 : $5-(-15)+1 = 21$

Total elements already filled before $A_{26} = 22 \times 31 + 21$

$= 703$ elements

8/

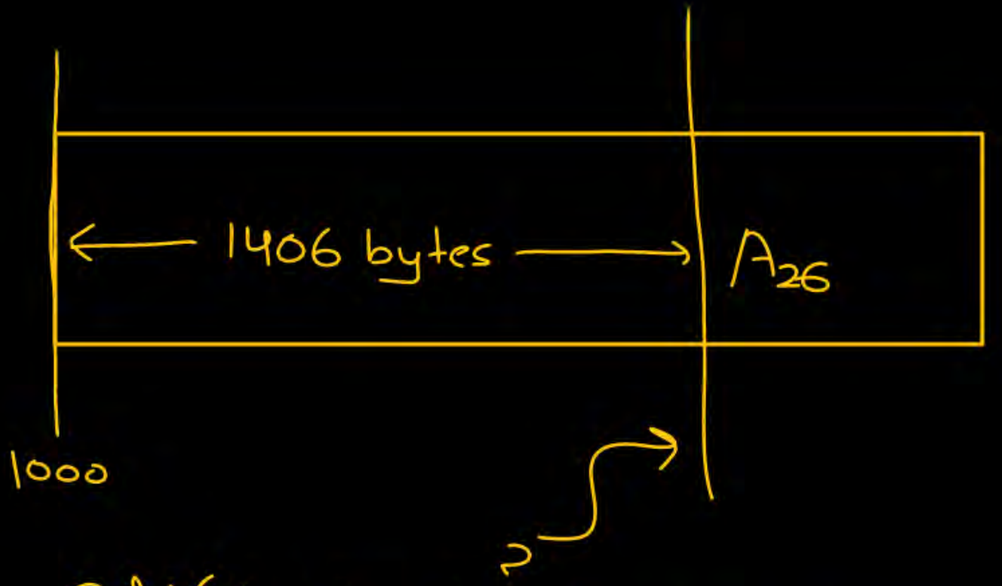
$A[-20..20][-15..15]$ — $15-(-15)+1 = 31$

w = 2 bytes, BA = 1000

add (A[2][6])

-20 to 1 : $1-(-20)+1 = 22$

-15 to 5 : $5-(-15)+1 = 21$

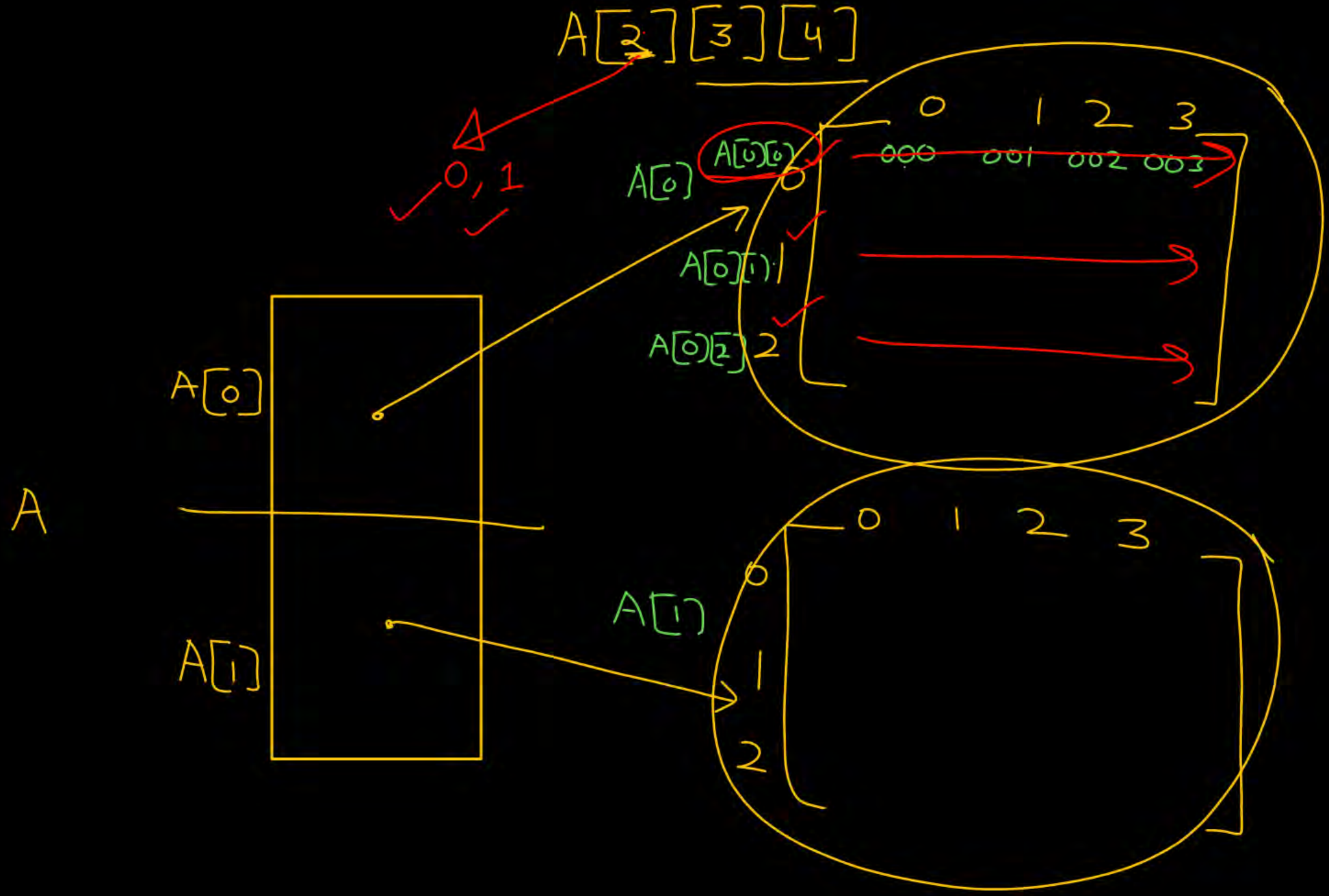


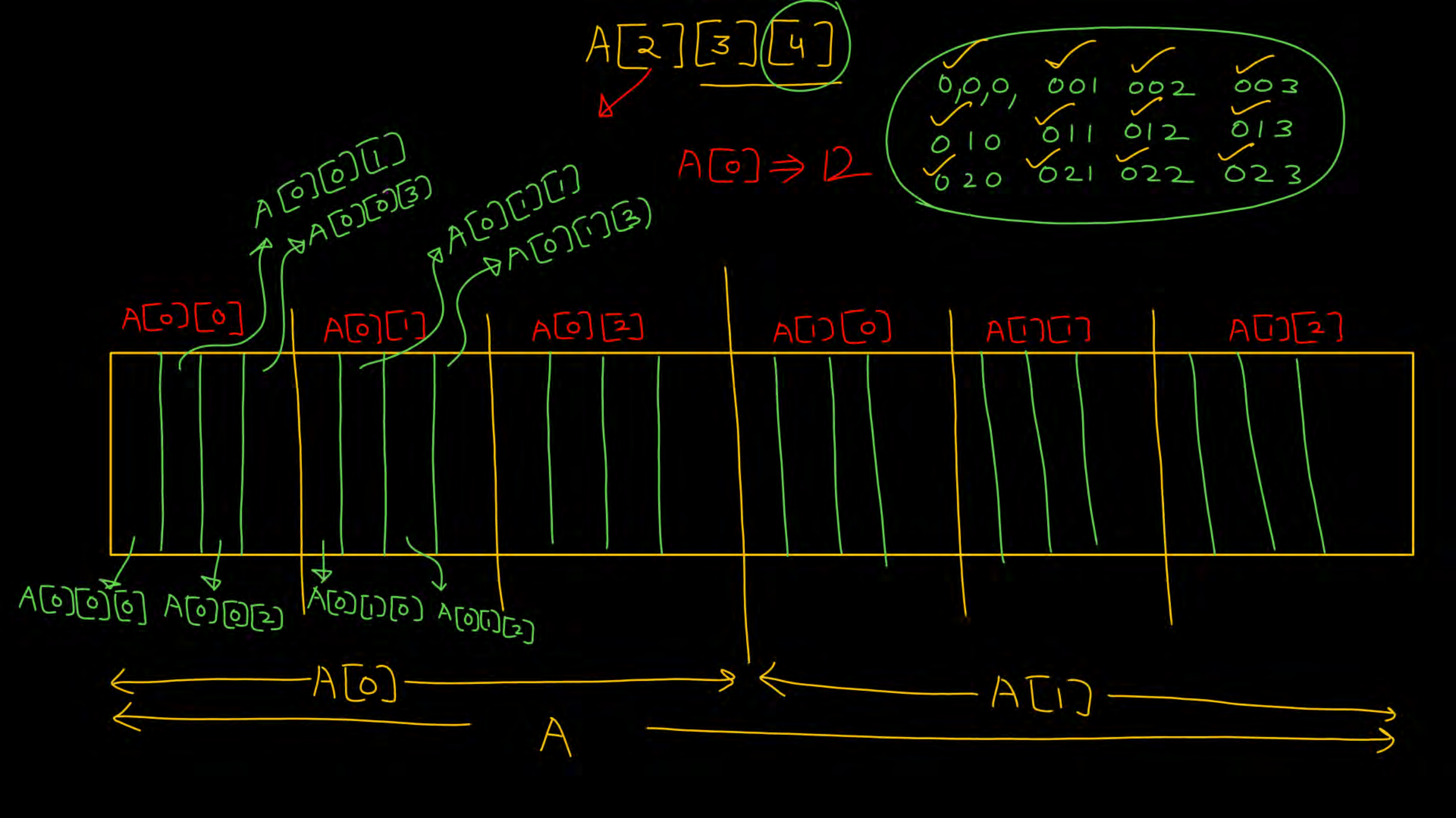
$add(A_{26}) = 1000 + 1406 = 2406$

Total elements already filled before $A_{26} = 22 \times 31 + 21$

$= 703$ elements

Memory already filled before $A_{26} = 703 \times 2 = 1406$ bytes


A[3][3][4]
0, 1
A[0]
A[0][0]
A[0][1]
A[0][2]
0 1 2 3
000 001 002 003
A
A[0]
A[1]
A[1]
0 1 2 3
0
1
2


A[2][3][4]
A[0] ⇒ 12
0,0,0, 001 002 003
010 011 012 013
020 021 022 023
A[0][0][1]
A[0][0][3]
A[0][1][1]
A[0][1][3]
A[0][0]
A[0][1]
A[0][2]
A[1][0]
A[1][1]
A[1][2]
A[0][0][0]
A[0][0][2]
A[0][1][0]
A[0][1][2]
A[0]
A[1]
A

A[3][4][5]

Every index in 1st dime rep. how many elements = 4 x 5

Every index in 2nd dim. rep. how many elements = 5 elements

C programming

Q A[3][3][5]

RMO

w = 4 bytes

BA = 1000

add(A 2 2 3)

A[3][3][5]

Every index in this dim = 15 ele

Every index in this dim = 5 ele

How many index already filled

0 to 1

= 1-0+1

= (2)

How many index covered = 0 to 1

= 1-0+1

= 2 index

0 to 2

2-0+1

= 3

(2×15 + 2×5 + 3)

C programming

8/ A[3][3][5]

RMO

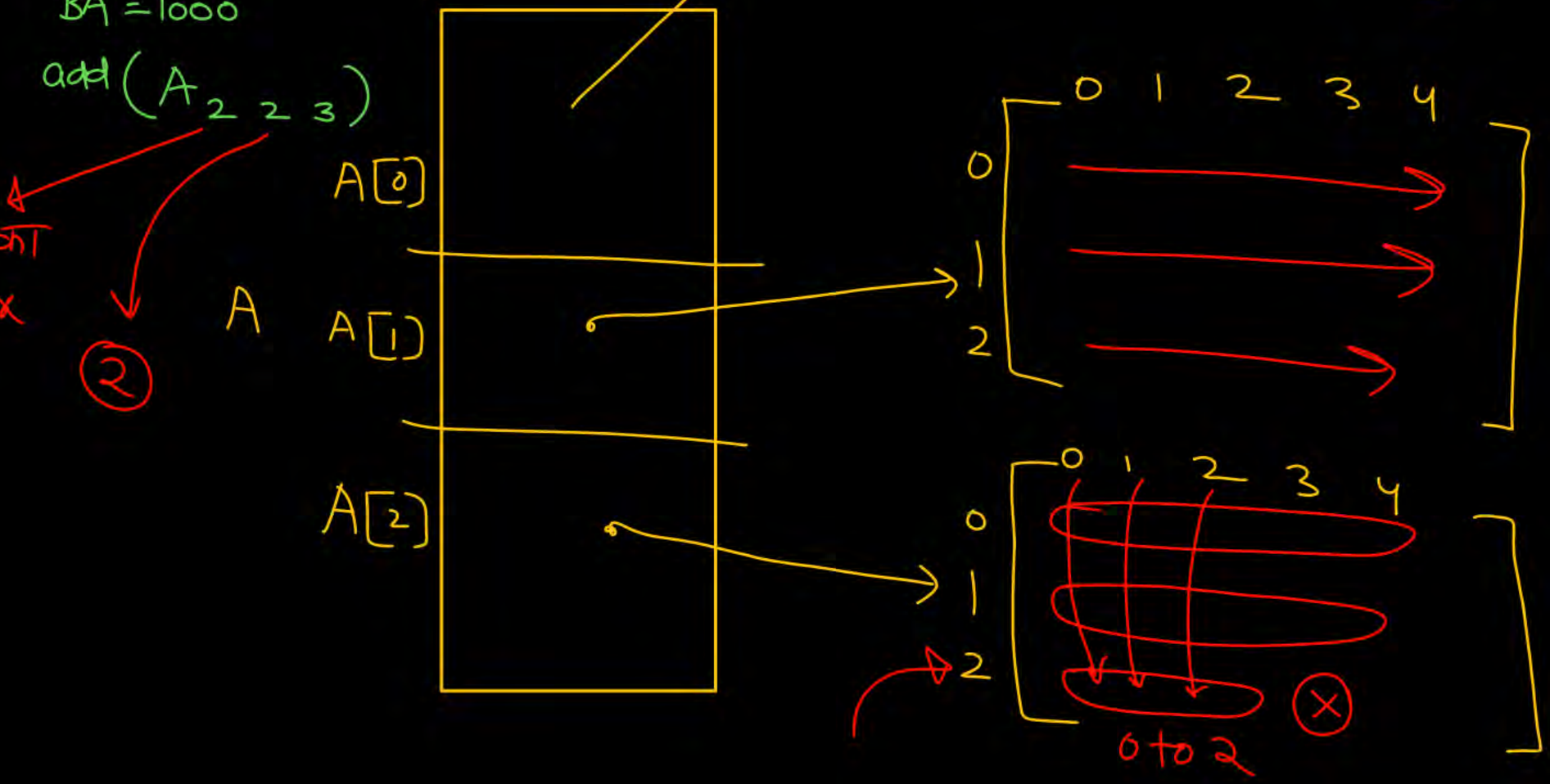
w = 4 bytes

BA = 1000

add(A 2 2 3)

matrix ch1 index

② ②



C prog

A[5][6][4]

24 4

w = 2 bytes

BA = 1000

add (A_{342})

0 to 2 → 2-0+1 → 3

0 to 3 → 3-0+1 → 4

0 to 1 → 1-0+1 → 2

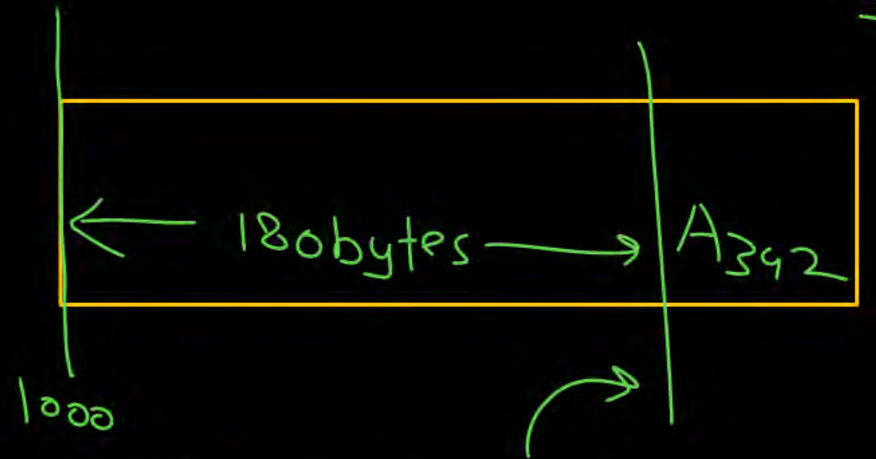
(3×6×4 + 4×4 + 2)

Total ele. already filled before A_{342} = 90 elem.

Memory already filled before A_{342}

= 90×2 bytes

= 180 byte



= 1000 + 180 = 1180

Q

$w = 2$ byte

$BA = 1000$

$A[-5..5][-3..3][-5..5]$ — (11) (7) (11)

$11 \times 7 \times 11$

add (A_{000})

-5 to -1 : $-1-(-5)+1$ ⇒ (5)

-3 to -1 : $-1-(-3)+1$ (3)

-5 to -1 : $-1-(-5)+1$ (5)

$5 \times 7 \times 11$

3×11

$(5 \times 7 \times 11 + 3 \times 11 + 5)$

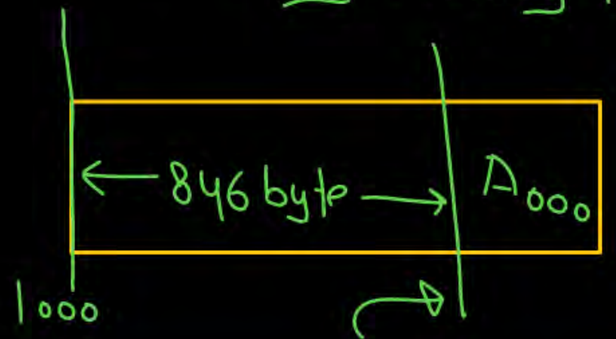
Total elements already filled before A_{000}

$= (5 \times 7 \times 11 + 3 \times 11 + 5)$

$= 423$ elements

Memory already filled $= 423 \times 2$

$= 846$ bytes



$1000 + 846 = \underline{1846}$

$w = 2$ byte
$BA = 1000$
add $(A_{0,5,2}^{(3)})$

$A[-5..5]^{11}[-10..10]^{21}[-3..3]^{7}[-4..4]^{9}$

-5 to -1
$-1-(-5)+1$
$5 \times 21 \times 7 \times 9$

-10 to 9
$9-(-10)+1$
$15 \times 7 \times 9$

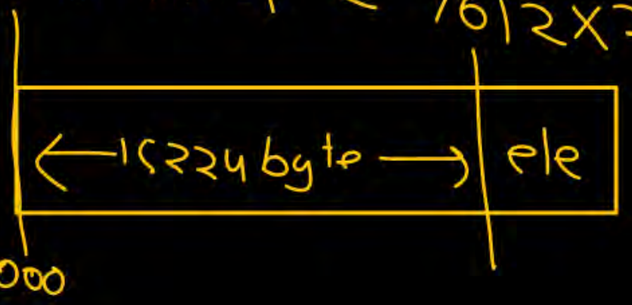
-3 to 1
$1-(-3)+1$
5×9

-4 to 2
$2-(-4)+1$
7

$63 \times 12 = 126 \times 63 = 7560$

Total ele. already filled before $A_{0,5,2,3}$ $= 5 \times 21 \times 7 \times 9 + 15 \times 7 \times 9 + 5 \times 9 + 7$
$= 120 \times 63 + 52$
$= 7560 + 52$
$= 7612$

Memory already filled $= 7612 \times 2 = 15224$ bytes



$\Rightarrow 1000 + 15224$
$= 16224$

Q. A[-10..10][-5..8][-4..6][-3..3]

ω : 2 bytes
BA = 0
addr(A[-3][-1][0][0])

RMO

Batch related Problem ?

① Last lecture of C to be uploaded
② Weekly Test - DS


THANK YOU GW
SOLDIERS !