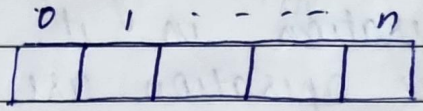
LC — lower limit column

LR — lower limit row.

ARRAY

1 0 Multidimensional Array.

A[n] A : 

$$A[n] = BA + size * (n - L)$$

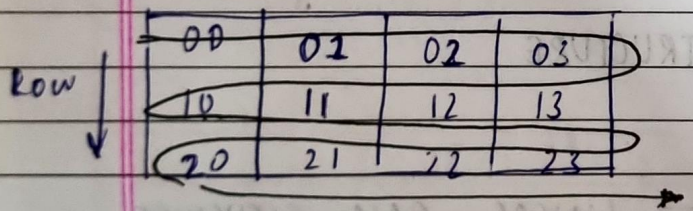
Q. given an array A[1300 .... 1900] with base address 1020 and assuming every element takes 2 bytes find address for A[1700]

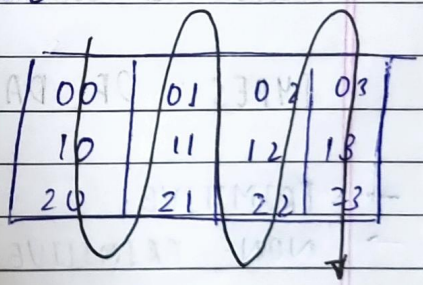
$$A[1700] = 1020 + 2 * (1700 - 1300)$$

$$= 1020 + 2 * (400)$$

$$= 1020 + 800$$

$$= 1820$$





Row Major

Column Major

ROW MAJOR $A[i][j] = B + W * (i * N) + j$

W : size N : No. of columns

i & j : index B : Base address

$A[i][j] : B + W * (i * N) + j$

Row Column

POSITION 1,2 → 1 1 1 4 2

1,2 : $1 + 1 * (1 * 4) + 2$

$= 7$

ROW MAJOR $A[i][j] : B + W((i - LR) * N + (j - LC))$

COLUMN MAJOR $A[i][j] = B + W * (i + j * M)$

M : No. of elements ~~columns~~ rows

$A[i][j] : B + W * (i + j * M)$

1,2 : $1 + 1 * (1 + 2 * 3)$

$= 1 + 7$

$= 8$

2,2 : $1 + 1 * (2 + 2 * 3)$

$= 9$

COLUMN MAJOR $A[i][j] : B + W * ((i - LR) + (j - LC) * M)$

where LC & LR = lower limit for colum & lower limit for row resp.

Q Let A be a 2-D array of integers taking 1 bytes what is the address for A[i][j] if it stored in Row Major & Column Major. base address 100

A[1 ---- 10] [1 ---- 15]

given LR = 1 W = 1
LC = 1
BA = 100
N = 15
M = 10

Row Major $A[i][j] = 100 + W[(i-1)*15 + (j-1)]$

$A[i][j] = 100 + [(15i - 15) + (j-1)]$

column Major $A[i][j] = 100 + [(i-1) + (j-1)*10]$

$A[i][j] = 100 + [(i-1) + 10j - 10]$

$A[i][j] = 100 + 15i - 15 + j - 1$

$= 15i + j + 84$

$A[i][j] = 100 + i - 1 + 10j - 10$

$= i + 10j + 89$