100	104	108	112
116	120	12004	128
132	136	140	144
148	152	156	160

Base address = 100

Width = 4

Row = 4, col = 4

ROW MAJOR

A[2][2] = ?

Current addr = base + width * ((current row – first row) * no. of cols + (current col – first col))

CA = 100 + 4((2-0)*4 + (2-0)) = 140

100	116	132	148
104	120	136	152
108	124	140	156
112	128	144	160

COLUMN MAJOR

A[2][1] = ?

Current addr = base + width * ((current col – first col) * no of rows + (current row – first row))

CA = 100 + 4((2-0) + (1-0)*4) = 124

1608 = 1500 + 4 * ((5-1) * rows + 3)

A matrix A[m] [m] is stored in the memory with each element requiring 4 bytes of storage. If the base address at A[1] [1] is 1500 and the address of A[4][5] is 1608, determine the order of the matrix when it is stored in Column Major Wise. [2]

Width = 4

1608 = 1500 + 4 (3 + (4*r))

108 = 12 + 16r

96/16 = r = 6

6*6

A matrix ARR[-4 ….. 6, 3 ……. 8] is stored in the memory with each element requiring 4 bytes of storage. If the base address is 1430, find the address of ARR[3] [6] when the matrix is stored in Row Major Wise.

Width = 4

Base = 1430

Row = -4 - 6

Col = 3 – 8 + 1 = 6

A[3][6] = 1430 + 4((3-(-4) * 6 + (6-3)) = 1430 + 4(45) = 1610

(c) A matrix P[15] [10] is stored with each element requiring 8 bytes of storage. If the base address at P[0] [0] is 1400, determine the address at P[10] [7] when the matrix is stored in Row Major Wise. [2]

Row = 15

Col = 10

Width = 8

Base p[0][0] = 1400

P[10][7] = 1400 + 8 ((10 – 0) * 10 + (7-0))

1400 + 107*8 = 2256

***

The array D [-2…10][3…8] contains double type elements. If the base address is 4110, find the address of D [4] [5], when the array is stored in Column Major Wise.

Rows = 13

Cols = 6

width = 8 (double)

Base = 4110

D[4][5] = 4110 + 8((5-3) * 13 + (4-(-2)) = 4110 + 256 = 4366

An array AR [-4…. 6, -2 ….. 12], stores elements in Row Major Wise, with the address AR[2] [3] as 4142 . If each element requires 2 bytes of storage, find the Base address.

Cols = 15 (last – first + 1)

Arr[2][3] = base + 2((2-(-4)) * 15 + (3+2))

Base = 4142 – 190 = 3952

Half adder

X	Y	Sum	Carry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Sum = X’Y + XY’ = X XOR Y

Carry = X AND Y

FULL ADDER

A’B’C + A’BC’ + AB’C’ + ABC

C’(A’B+AB’) + C(A’B’ + AB)

C’(A XOR B) + C((A XOR B)’)

C’Y + CY’

C XOR Y = C XOR A XOR B

A’BC + AB’C + ABC’+ ABC

A’BC + ABC + AB’C + ABC + ABC’ + ABC

BC + AC + AB

A’BC + AB’C + ABC’+ ABC

ABC’ + ABC + C(A’B + AB’)

AB + C AND A XOR B