

# CS & IT ENGINEERING

Data Structure & Programming

Array

DPP.- 01

Discussion Notes



By- Abhishek Sir

#Q. Consider a 1D array a with 9 elements. If the base address of the array is 108 and the size of each array element is 4 bytes, the address of a[7] is- \_\_\_\_\_  
(Assume array index starts from 0)

$$BA + i \times \text{Size}$$

$$108 + 7 \times 4 = 108 + 28 = 136$$



**[NAT]**

#Q. Consider a 1D array  $a[-127 \dots, +255]$  where  $-127$  and  $+255$  are the starting index and ending index of the array respectively. The number of elements in the array is \_\_\_\_\_.

$$LB \text{ — } UB$$

$$\rightarrow UB - LB + 1$$

$$255 - (-127) + 1$$

$$= 255 + 127 + 1 = \underline{383}$$

[NAT]

#Q. Consider a 1D array a with 19 elements. If the base address of the array is 108 and the size of each array element is 4 bytes, the address of a[7] is-  
(Assume array index starts from -11)\_\_\_\_\_

$$A[i] = BA + (i - LB) \times \text{Size}$$

$$108 + (7 - (-11)) \times 4B$$

$$108 + 18 \times 4 = 108 + 72$$

$$\underline{180}$$

#Q. Consider a 2D array  $a[-127 \text{ to } +255][-13 \text{ to } +14]$ . The number of elements in the array is 10724.  $LB_1$   $UB_1$   $LB_2$   $UB_2$

No. of element Rows :  $255 - (-127) + 1$

383 x 28

3064

766X

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10724

2

6

No. of element in column  $14 - (-13) + 1 = 28$   
Columns

383 Rows



#Q. Consider the natural numbers from 1 to 256 are stored in a 2D array  $\text{arr}[-28 \text{ to } 3][-3 \text{ to } 3]$ . Find the element present at location  $\text{arr}[-16][1]$ . (Suppose, the elements are stored in row-major order) 89

1 Bare Address  $A[-16][1]$

$$1 + \left[ (-16 - (-28)) \times (3 - (-3) + 1) + (1 - (-3)) \right] \times 1$$

$$1 + [12 \times 7 + 4] \times \textcircled{1} = \textcircled{89}$$

#Q. Consider the natural numbers from 1 to 256 are stored in a 2D array  $\text{arr}[-28 \text{ to } 3][-3 \text{ to } 3]$ . Find the address of the location  $\text{arr}[-16][1]$  if the starting address of the array is 625 and size of each element is 4 bytes. (Suppose, the elements are stored in row-major order)

$$625 + \left[ (-16 - (-28)) \times (3 - (-3) + 1) + (1 - (-3)) \right] \times 4$$

$$625 + \textcircled{88} \times 4 = \begin{array}{r} 625 \\ 352 \\ \hline 977 \end{array}$$



[NAT]

#Q. Consider the whole numbers from 0 to 127 are stored in a 2D array arr[0 to 15][0 to 7]. Find the element present at location arr[6][4]. (Suppose, the elements are stored in column-major order) 70

$$0 + [(4 - 0) \times 16 + (6 - 0)] \times 1$$

$$0 + [64 + 6] = \textcircled{70}$$



#Q. Consider a 2D array  $\text{arr}[-15 \text{ to } 15][\underline{-7} \text{ to } 7]$ . Find the address of the location  $\text{arr}[-1][5]$  if the starting address of the array is 500 and size of each element is 4 bytes. (Suppose, the elements are stored in column-major order) 2044.

Ans  $[-1][5]$

$$500 + \left[ (5 - (-7)) \times (15 - (-15) + 1) + (-1 - (-15)) \right] \times 4$$

$$500 + [12 \times 31 + 14] \times 4$$

$$500 + [372 + 14] \times 4 = \textcircled{2044}$$



**THANK - YOU**