

# Data Structure

## Arrays-I

DPP-01

[NAT]

1. 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)

[NAT]

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

[NAT]

3. 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)

[NAT]

4. Consider a 2D array  $a[-127 \text{ to } +255][-13 \text{ to } +14]$ . The number of elements in the array is \_\_\_\_\_.

[NAT]

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

[NAT]

6. Consider the natural numbers from 1 to 256 are stored in a 2D array  $arr[-28 \text{ to } 3][-3 \text{ to } 3]$ . Find the address of the location  $arr[-16][1]$  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) \_\_\_\_\_.

[NAT]

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

[NAT]

8. Consider a 2D array  $arr[-15 \text{ to } 15][-7 \text{ to } 7]$ . Find the address of the location  $arr[-1][5]$  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) \_\_\_\_\_

## Answer Key

- |            |           |
|------------|-----------|
| 1. (136)   | 5. (89)   |
| 2. (383)   | 6. (977)  |
| 3. (180)   | 7. (70)   |
| 4. (10724) | 8. (2044) |



## Hints and Solutions

### 1. (136)

Address of  $a[7] = 108 + (7-0)*4 = 136$ .

### 2. (383)

Number of elements in the array  $= 255 - (-127) + 1 = 383$

### 3. (180)

Address of  $a[7] = 108 + (7 - (-11)) * 4 = 180$ .

### 4. (10724)

Number of elements in each row  $= 255 - (-127) + 1 = 383$

Number of elements in each column  $= +14 - (-13) + 1 = 28$

Number of elements in the 2D array  $= 383 * 28 = 10724$

### 5. (89)

Number of elements in each column  $= 3 - (-3) + 1 = 7$

The element present at  $\text{arr}[-16][1]$

$= (-16 - (-28)) * 7 + (1 - (-3) + 1)$

$= 89$ .

### 6. (977)

Number of elements in each column  $= 3 - (-3) + 1 = 7$

Address of location  $\text{arr}[-16][1]$

$= 625 + [(-16 - (-28)) * 7 + (1 - (-3))] * 4$

$= 977$

### 7. (70)

Number of elements in each row  $= 16$

The element present at  $\text{arr}[6][4] = (4-0) * 16 + (6-0) = 70$

### 8. (2044)

Number of elements in each row  $= 15 - (-15) + 1 = 31$

Address of location  $\text{arr}[-1][5]$

$= 500 + [(5 - (-7)) * 31 + (-1 - (-15))] * 4$

$= 2044$



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