

Data Structure & Programming

DPP: 1

Array

- Q1** 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)
- Q2** 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 _____.
- Q3** 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)_____.
- Q4** Consider a 2D array $a[-127 \text{ to } +255][-13 \text{ to } +14]$. The number of elements in the array is _____.
- Q5** 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)_____.
- Q6** 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)_____.
- Q7** Consider the whole numbers from 0 to 127 are stored in a 2D array $\text{arr}[0 \text{ to } 15][0 \text{ to } 7]$. Find the element present at location $\text{arr}[6][4]$. (Suppose, the elements are stored in column-major order)_____.
- Q8** Consider a 2D array $\text{arr}[-15 \text{ to } 15][-7 \text{ to } 7]$. 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)_____.



Answer Key

Q1 136~136

Q2 383~383

Q3 180~180

Q4 10724~10722

Q5 89~88

Q6 977~977

Q7 70~66

Q8 2044~2044



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Hints & Solutions

Q1 Text Solution:

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

Q2 Text Solution:

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

Q3 Text Solution:

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

Q4 Text Solution:

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 = $383 * 28 = 10724$

Q5 Text Solution:

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

The element present at $arr[-16][1]$

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

$= 89$.

Q6 Text Solution:

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

Address of location $arr[-16][1]$

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

$= 977$

Q7 Text Solution:

Number of elements in each row = 16

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

Q8 Text Solution:

Number of elements in each column = $7 - (-7) + 1 = 15$

Address of location $arr[-1][5]$

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

$= 500 + [12 * 31 + 14] * 4$

$= 500 + [372 + 14] * 4$

$= 2044$



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