# Multi-Dimensional Array related problems
# (Total 15 questions)

| SL | Problem statement | Difficulty levels |
|----|-------------------|-------------------|
| 1. | WAP that will take 9 integers into a 3 by 3 array (2D) and show them as traditional matrix view. <br><br> <table><tr><td>**Sample input**</td><td>**Sample output**</td></tr><tr><td>9 8 7 6 5 4 3 2 1</td><td>9 8 7<br>6 5 4<br>3 2 1</td></tr><tr><td>1 1 1 2 2 2 3 3 3</td><td>1 1 1<br>2 2 2<br>3 3 3</td></tr></table> | * |
| 2. | WAP that will take (m x n) integers into a *m by n* array (2D) and print them both row-wise and column-wise. <br><br> <table><tr><td>**Sample input (m,n)**</td><td>**Sample output**</td></tr><tr><td>2 3<br>1 2 3<br>6 5 4</td><td>Row-wise: 1 2 3 6 5 4<br>Column-wise: 1 6 2 5 3 4</td></tr><tr><td>3 3<br>1 1 1<br>2 2 2<br>3 3 3</td><td>Row-wise: 1 1 1 2 2 2 3 3 3<br>Column-wise: 1 2 3 1 2 3 1 2 3</td></tr></table> | * |
| 3. | WAP that will take inputs of a 3 by 3 matrix into a 2D array. Now find the determinant of this matrix. http://www.mathsisfun.com/algebra/matrix-determinant.html <br><br> <table><tr><td>**Sample input**</td><td>**Sample output**</td></tr><tr><td>1 2 3<br>4 5 6<br>7 8 9</td><td>0</td></tr></table> | * |

| 4. | WAP that will take inputs of a n sized square matrix into a 2D array. Now show all the elements of its two diagonals. Reference: http://en.wikipedia.org/wiki/Main_diagonal | * |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 5<br>1 2 3 4 5<br>5 4 3 2 1<br>2 2 2 2 2<br>6 7 8 9 0<br>1 9 3 7 4 | Major diagonal: 1 4 2 9 4<br>Minor diagonal: 5 2 2 7 1 |

| 5. | WAP that will take the size of an identity matrix from the user and generate the identity matrix into a 2D array. Finally display it. Reference:http://en.wikipedia.org/wiki/Identity_matrix | * |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 5 | 1 0 0 0 0<br>0 1 0 0 0<br>0 0 1 0 0<br>0 0 0 1 0<br>0 0 0 0 1 |

| 6. | WAP that will take inputs of two *m x n* sized matrix into two 2D array, suppose A and B. Now do C = A + B. Finally display all the elements from matrix / 2D array C. | * |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 2 3<br>1 2 3<br>2 3 4<br>1 1 1<br>2 2 2 | 2 3 4<br>4 5 6 |

| 7. | WAP that will take inputs of two *3 x 3* sized matrix into two 2D array, suppose A and B. Now do C = A * B (multiplication). Finally display all the elements from matrix / 2D array C. | *** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 1 2 3<br>4 5 6<br>7 8 9<br>2 2 2<br>2 2 2<br>1 1 1 | 9 9 9<br>24 24 24<br>39 39 39 |

| 8. | WAP that will take inputs of *m x n* sized matrix into a 2D array and find the maximum element with index locationfrom that matrix. | * |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 3 3<br>1 2 3<br>4 5 6<br>2 9 2 | Max: 9<br>Location: [2][1] |
| 2 3<br>9 8 7<br>3 4 5 | Max: 9<br>Location: [0][0] |

| 9. | WAP that will take (n x n) integer inputs into a square matrix of dimension n (where n must be an odd number). Then calculate sum of the integers at first row, last row and two diagonals without overlap. Please see the sample input-output. | ** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 5<br>1 2 3 4 5<br>2 3 4 1 6<br>3 4 9 6 7<br>4 2 6 7 8<br>5 4 3 2 1 | 52 |
| 7<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1 | 23 |

| 10. | WAP that will take (n x n) integer inputs into a square matrix of dimension n (where n must be an odd number). Then calculate sum of the integers based on following position pattern (consider only the boxed position during the sum). Please see the input-output. | ** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 5<br>1 2 3 4 5<br>2 3 4 1 6<br>3 4 9 6 7<br>4 2 6 7 8<br>5 4 3 2 1 | 71 |
| 7<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1 | 25 |

| 11. | WAP that will take (n x n) integer inputs into a square matrix of dimension n (where n must be an odd number). Then calculate sum of the integers based on following position pattern (consider only the boxed position during the sum). Please see the input-output. | ** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 5<br>1 2 3 4 5<br>2 3 4 1 6<br>3 4 9 6 7<br>4 2 6 7 8<br>5 4 3 2 1 | 65 |
| 7<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1<br>1 1 1 1 1 1 1 | 33 |

| 12. | WAP that will take (m x n) integer inputs into a matrix of dimension m x n. Now reverse that matrix within itself and display it. Reversal means swap 1st column with the nth column, swap 2nd column with the (n-1)th column and so on… | ** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 3 3<br>1 2 3<br>4 5 6<br>2 9 2 | 3 2 1<br>6 5 4<br>2 9 2 |
| 2 6<br>1 2 3 4 5 6<br>9 8 7 6 5 4 | 6 5 4 3 2 1<br>4 5 6 7 8 9 |

| 13. | WAP that will take (n x n) integer inputs into a square matrix of dimension n. Now determine whether the matrix is symmetric or not.<br> Reference: http://en.wikipedia.org/wiki/Symmetric_matrix | ** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 3<br>1 7 3<br>7 4 5<br>3 5 6 | Yes |
| 2<br>1 3<br>4 2 | No |

| 14. | WAP that will take (m x n) positive integer inputs into a matrix of dimension m x n. Now replace all the duplicate integers by -1 in that matrix. Finally display it. | *** |
|---|---|---|

| Sample input | Sample output |
|---|---|
| 3 3<br>1 7 3<br>7 4 5<br>3 5 6 |  1 7 3<br>-1 4 5<br>-1 -1 6 |
| 2 6<br>2 2 2 2 2 2<br>6 5 4 3 2 1 | 2 -1 -1 -1 -1 -1<br>6 5 4  3 -1 1 |

| 15. | WAP that will take (m x n) integer inputs into a matrix of dimension m x n. Now just simply add all the integers in that matrix and show the result. | * |

| Sample input | Sample output |
|---|---|
| 3 3<br>1 7 3<br>7 4 5<br>3 5 6 | 41 |
| 2 6<br>2 2 2 2 2 2<br>6 5 4 3 2 1 | 33 |