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Batch : A1

1. 1D array

a) Write a python code to create an array and perform following operations

- Insertion
- Deletion
- Update

```
In [7]: my_array = []

# insert elements into the array
my_array.append(5)
my_array.append(10)
my_array.append(15)

# print the array
print("Original Array: ", my_array)

# delete an element at index 1
del my_array[1]

# print the updated array
print("After Deletion: ", my_array)

# update an element at index 0
my_array[0] = 20

# print the updated array
print("After Updation: ", my_array)
```

Original Array: [5, 10, 15]

After Deletion: [5, 15]

After Updation: [20, 15]

b) Write a python code to search an element from the given array.

```
In [4]: my_array = [5, 10, 15, 20, 25]

# search for an element
search_value = 15

# using `in` operator
if search_value in my_array:
    print(f"{search_value} is present in the array.")
else:
```

```

    print(f"{search_value} is not present in the array.")

# using `index()` method
index = my_array.index(search_value)
if index != -1:
    print(f"{search_value} is present in the array at index {index}.")
else:
    print(f"{search_value} is not present in the array.")

```

15 is present in the array.

15 is present in the array at index 2.

c) Write a python code to sort the elements of an array.

```

In [5]: my_array = [5, 10, 15, 20, 25]

# sort the array in ascending order
my_array.sort()
print("Ascending order: ", my_array)

# sort the array in descending order
my_array.sort(reverse=True)
print("Descending order: ", my_array)

```

Ascending order: [5, 10, 15, 20, 25]

Descending order: [25, 20, 15, 10, 5]

2. 2D array

a) Write a python code to create a matrix and display the elements of a matrix.

```

In [6]: matrix = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]

# display the elements of the matrix
for row in matrix:
    for element in row:
        print(element, end=" ")
    print()

```

1 2 3

4 5 6

7 8 9

b) Write a python code to perform transpose of a matrix.

```

In [8]: matrix = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
# transpose the matrix
transpose = list(map(list, zip(*matrix)))

# display the original matrix
print("Original matrix:")
for row in matrix:
    print(row)

# display the transposed matrix
print("Transposed matrix:")
for row in transpose:
    print(row)

```

Original matrix:

[1, 2, 3]

[4, 5, 6]

[7, 8, 9]

Transposed matrix:

[1, 4, 7]

[2, 5, 8]

[3, 6, 9]

c) Write a python code to perform addition of two matrices.

```
In [11]: # create two matrices
matrix1 = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
matrix2 = [[9, 8, 7], [6, 5, 4], [3, 2, 1]]

# function to perform addition of matrices
def add_matrices(matrix1, matrix2):
    # get the number of rows and columns of the matrices
    rows = len(matrix1)
    cols = len(matrix1[0])
    # create a new matrix for storing the result
    result = [[0 for row in range(rows)] for col in range(cols)]
    # perform addition
    for row in range(rows):
        for col in range(cols):
            result[row][col] = matrix1[row][col] + matrix2[row][col]
    return result

# get the result of addition
result = add_matrices(matrix1, matrix2)

# display the matrices and the result
print("Matrix 1:")
for row in matrix1:
    print(row)
print("Matrix 2:")
for row in matrix2:
    print(row)
print("Result of addition:")
for row in result:
    print(row)
```

Matrix 1:

[1, 2, 3]

[4, 5, 6]

[7, 8, 9]

Matrix 2:

[9, 8, 7]

[6, 5, 4]

[3, 2, 1]

Result of addition:

[10, 10, 10]

[10, 10, 10]

[10, 10, 10]

d) Write a python code to perform Subtraction of two matrices.

```
In [10]: # create two matrices
matrix1 = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
matrix2 = [[9, 8, 7], [6, 5, 4], [3, 2, 1]]
```

```
# function to perform subtraction of matrices
def subtract_matrices(matrix1, matrix2):
    # get the number of rows and columns of the matrices
    rows = len(matrix1)
    cols = len(matrix1[0])
    # create a new matrix for storing the result
    result = [[0 for row in range(rows)] for col in range(cols)]
    # perform subtraction
    for row in range(rows):
        for col in range(cols):
            result[row][col] = matrix1[row][col] - matrix2[row][col]
    return result

# get the result of subtraction
result = subtract_matrices(matrix1, matrix2)

# display the matrices and the result
print("Matrix 1:")
for row in matrix1:
    print(row)
print("Matrix 2:")
for row in matrix2:
    print(row)
print("Result of subtraction:")
for row in result:
    print(row)
```

```
Matrix 1:
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
Matrix 2:
[9, 8, 7]
[6, 5, 4]
[3, 2, 1]
Result of subtraction:
[-8, -6, -4]
[-2, 0, 2]
[4, 6, 8]
```