Exercises

1) Write a Python program to find the union of two arrays.
2) Write a Python program to find the intersection of two arrays.
3) Write a Python program to find the difference between two arrays.
4) Write a Python program to remove all duplicate elements from an array.
5) Write a Python program to create a 2D array and print its values.
6) Write a Python program to add two matrices.
7) Write a Python program to subtract two matrices.
8) Write a Python program to multiply two matrices.
9) Write a Python program to find the transpose of a matrix.
10) Write a Python program to find the sum of diagonal elements of a matrix.

Exercises and solution

1) Write a Python program to find the union of two arrays.

```
arr1 = [1, 2, 3, 4, 5]
arr2 = [3, 4, 5, 6, 7]
union_arr = list(set(arr1 + arr2))
print(union_arr)
```

2) Write a Python program to find the intersection of two arrays.

```
arr1 = [1, 2, 3, 4, 5]
arr2 = [3, 4, 5, 6, 7]
intersection_arr = [x for x in arr1 if x in arr2]
print(intersection_arr)
```

3) Write a Python program to find the difference between two arrays.

```
arr1 = [1, 2, 3, 4, 5]
arr2 = [3, 4, 5, 6, 7]
difference_arr = [x for x in arr1 if x not in arr2]
print(difference_arr)
```

4) Write a Python program to remove all duplicate elements from an array.

```
arr = [1, 2, 3, 2, 4, 5, 1]
unique_arr = list(set(arr))
print(unique_arr)
```

5) Write a Python program to create a 2D array and print its values.

```
rows = 3
cols = 3
arr = [[0]*cols for _ in range(rows)]
```

```
for i in range(rows):
    for j in range(cols):
        arr[i][j] = i * j
for i in range(rows):
    for j in range(cols):
        print(arr[i][j], end=' ')
    print()
```

6) Write a Python program to add two matrices.

```
X = [[1,2,3],
    [4,5,6],
    [7,8,9]]
Y = [[10,11,12],
    [13,14,15],
    [16,17,18]]

result = [[0,0,0],
          [0,0,0],
          [0,0,0]]

for i in range(len(X)):
    for j in range(len(X[0])):
        result[i][j] = X[i][j] + Y[i][j]

for r in result:
    print(r)
```

7) Write a Python program to subtract two matrices.

```
X = [[1,2,3],
    [4,5,6],
    [7,8,9]]
Y = [[10,11,12],
    [13,14,15],
    [16,17,18]]
```

```
result = [[0,0,0],
          [0,0,0],
          [0,0,0]]

for i in range(len(X)):
   for j in range(len(X[0])):
       result[i][j] = X[i][j] - Y[i][j]

for r in result:
   print(r)
```

8) Write a Python program to multiply two matrices.

```
# define the matrices as arrays
matrix1 = [[1, 2, 3],
           [4, 5, 6],
           [7, 8, 9]]

matrix2 = [[10, 11, 12],
           [13, 14, 15],
           [16, 17, 18]]

# create an empty result matrix with the correct dimensions
result = [[0, 0, 0],
          [0, 0, 0],
          [0, 0, 0]]

# iterate through each row of the first matrix
for i in range(len(matrix1)):
   # iterate through each column of the second matrix
   for j in range(len(matrix2[0])):
       # iterate through each row of the second matrix
       for k in range(len(matrix2)):
           # multiply the corresponding elements of the two matrices and
add the result to the appropriate cell in the result matrix
           result[i][j] += matrix1[i][k] * matrix2[k][j]
```

```
# print the result matrix
for row in result:
    print(row)
```

9) Python program to find the transpose of a matrix:

```
# define a matrix
matrix = [[1, 2],
          [3, 4],
          [5, 6]]

# create an empty result matrix
result = [[0, 0, 0],
          [0, 0, 0]]

# iterate through the rows of the matrix
for i in range(len(matrix)):
   # iterate through the columns of the matrix
   for j in range(len(matrix[0])):
       result[j][i] = matrix[i][j]

# print the transpose matrix
for r in result:
   print(r)
```

10) Python program to find the sum of diagonal elements of a matrix:

```
# define a matrix
matrix = [[1, 2, 3],
          [4, 5, 6],
          [7, 8, 9]]

# initialize the sum to 0
sum = 0

# iterate through the rows of the matrix
```

```
for i in range(len(matrix)):
  # iterate through the columns of the matrix
  for j in range(len(matrix[0])):
     # check if the current element is on the diagonal
     if i == j:
        sum += matrix[i][j]

# print the sum of diagonal elements
print("The sum of diagonal elements is:", sum)
```