IARE

INSTITUTE OF AERONAUTICAL ENGINEERING

(An Autonomous Institute affiliated to JNTUH, Hyderabad)

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LABORATORY WORK BOOK

Name of the Student : HIMAKAR C

Class : CSE-B Semester : VI

Course Code : ACICOR Course Name : DMKD Laboratory

Roll Number									
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Name of the Course Faculty : Dr. D. Durga Bhavani Faculty ID : IARE10921

Exercise Number : Week Number : 02 Date : 26/3/24

S. No.	Exercise Number	EXERCISE NAME	MARKS AWARDED						
			Aim/ Preparation	Algorithm / Procedure / Performance in the Lab		Source Code / Calculations and Graphs	Program Execution / Results and Error Analysis	Viva-Voce	Total
			4	4		4	4	4	20
1	2.1	Dot and matrix product of 2 Arrays	4	2	2	4	4	4	20
2	2.2	Compute Eigen values of matrix							
3	2.3	Solve a linear matrix equation							
4	2.4	Compute Inverse of a matrix							
5	2.5	Compute Rank of matrix							
6	2.6	Compute Determinant of a matrix							
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Signature of the Student

Signature of the Faculty

START WRITING FROM HERE

2.1 Dot and matrix product of two arrays

```
import numpy as np
l = []
m, n = map(int, input('Enter rows and columns:').split())
for i in range(m):
    l.append(list(map(int, input().split())))
l = np.array(l)
ll = []
m, n = map(int, input('Enter rows & columns:').split())
for j in range(m):
    list1 = list(map(int, input().split()))
    ll.append(list1)
ll=np.array(ll)
print('Dot Product is:')
Print(np.dot(l, ll))
print('Matrix product is:')
Print(np.multiply(l, ll))
```

INPUT/OUTPUT:

```
Enter rows and columns: 3 3
1 2 3
4 5 6
7 8 9
```

ROLL NUMBER :

```
Enter rows and columns: 3 3
5 6 7
8 9 9
3 3 3
Dot Product is:
[[30 33 34]
 [78 87 91]
 [126 141 148]]
Matrix Product is:
[[ 5 12 21]
 [32 45 54]
 [21 24 27]]
```

ROLL NUMBER :

2.2 Compute Eigen values of a matrix

```
import numpy as np
l = []
m, n = map(int, input('Enter rows & columns: ').
                                        split())
for i in range(m):
    l.append(list(map(int, input().split())))
l = np.array(l)
a, b = np.linalg.eig(l)
print('Eigen values are:')
print(a)
```

INPUT/OUTPUT:

```
Enter rows and columns: 3 3
1 2 3
4 5 6
7 8 9
Eigen values are:
[ 1.61168440e+01 -1.1168e+00 -1.3036e-15]
```

2.3 Solve a linear matrix equation such as

$3x^0 + x' = 9, \quad x^0 + 2x' = 8$

```
import numpy as np
l = np.array(list(map(int, input('Enter
                coefficients of equation: ').split())))
l1 = np.array(list(map(int, input('Enter values
                of constants: ').split())))
sol = np.linalg.solve(l, l1)
Print('Solution is: ')
Print('x1 = ', sol.[0])
print('x2 = ', sol[1])
```

INPUT/OUTPUT:

```
Enter coefficients of equation: [3, 1] [1, 2]
Enter values of constants: [9, 8]
Solution is:
x1 = 2.0
x2 = 3.0
```

2.4 Compute multiplicative inverse of matrix.

```
import numpy as np
l = [ ]
m, n = map (int, input ('Enter rows & columns.').split())
for i in range (m):
    l.append (list (map (int, input().split())))
l = np.array(l)
Print ('Inverse of Matrix is:')
Print (np.linalg.inv(l))
```

INPUT/OUTPUT:

```
Enter rows and columns: 3 3
1 2 3
5 4 2
1 2 2
Inverse of Matrix is:
[[ 0.66667   0.33333  -1.33333]
 [-1.33333  -0.166667  2.16667]
 [ 1.        0.       -1.     ]]
```

2.5 compute the rank of a matrix

```
import numpy as np
l = []
m, n = map(int, input('Enter rows & colums:').split())
for i in range(m):
    l.append(list(map(int, input().split())))
l = np.array(l)
print('Rank of Matrix is:')
print(np.linalg.matrix_rank(l))
```

INPUT/OUTPUT:

```
Enter rows & columns: 3 3
1 2 3
2 3 4
5 6 7
Rank of Matrix is:
2
```

ROLL NUMBER :

2.6 compute the determinant of an array

```
import numpy as np
l = []
m, n = map(int, input('Enter rows & columns: ').split())
for i in range(m):
    l.append(list(map(int, input().split())))
l = np.array(l)
print('Determinant of Matrix is:')
print(np.linalg.det(l))
```

INPUT/OUTPUT:

```
Enter rows and columns: 3 3
1 2 3
4 5 6
7 8 9
Determinant of Matrix is:
0.0
```