MACHINE LEARNING (CSI0702)

PRACTICAL-1
(NUMPY)

Submitted By:

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Submitted To:

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1.

```
import numpy as np
a=np.array([1,2,3,4,5,6])
b=np.array([6,5,4,3,2,1])
c=np.zeros((6,1))
for i in range(len(a)):
  c[i]=a[i]*b[i]

print(c)
```

output:

```
[Running] python -u "s:\TERM
7\ML\PRACTICALS\LAB-1\tempCodeRunnerFile.py"
[[ 6.]
 [10.]
 [12.]
 [12.]
 [10.]
 [ 6.]]

[Done] exited with code=0 in 0.256 seconds
```

2.

```
import numpy as np
a=np.array([[1,2,3,4,5,6]])
b=np.array([[6,5,4,3,2,1]])
c=np.zeros((1,6))
for i in range(len(a)):
  c[i]=a[i]*b[i]

print(c)
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\b.py"
[[ 6. 10. 12. 12. 10.  6.]]

[Done] exited with code=0 in 0.267 seconds
```

3.

```
      import numpy as np

a=np.arange(10).reshape(5,2)
print(a)
print(a.ndim)
print(a.size)
print(type(a))
```

output:

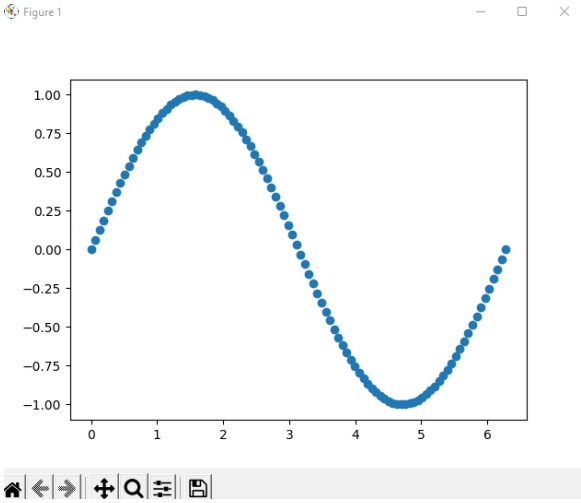
```
[Running] python -u "s:\TERM
7\ML\PRACTICALS\LAB-1\tempCodeRunnerFile.py"
[[0 1]
 [2 3]
 [4 5]
 [6 7]
 [8 9]]
2
10
<class 'numpy.ndarray'>
```

4.

```
import numpy as np
from numpy import pi
import matplotlib.pyplot as plt

a=np.linspace(0,2,9)
print(a)
b=np.linspace(0,2*pi,100)
print(b)
c=np.sin(b)
plt.scatter(b,c)
plt.show()
print(c)
```

output:




```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\d.py"
[0.   0.25 0.5  0.75 1.   1.25 1.5  1.75 2.  ]
[0.         0.06346652 0.12693304 0.19039955 0.25386607 0.31733259
 0.38079911 0.44426563 0.50773215 0.57119866 0.63466518 0.6981317
 0.76159822 0.82506474 0.88853126 0.95199777 1.01546429 1.07893081
 1.14239733 1.20586385 1.26933037 1.33279688 1.3962634  1.45972992
 1.52319644 1.58666296 1.65012947 1.71359599 1.77706251 1.84052903
 1.90399555 1.96746207 2.03092858 2.0943951  2.15786162 2.22132814
 2.28479466 2.34826118 2.41172769 2.47519421 2.53866073 2.60212725
 2.66559377 2.72906028 2.7925268  2.85599332 2.91945984 2.98292636
 3.04639288 3.10985939 3.17332591 3.23679243 3.30025895 3.36372547
 3.42719199 3.4906585  3.55412502 3.61759154 3.68105806 3.74452458
 3.8079911  3.87145761 3.93492413 3.99839065 4.06185717 4.12532369
 4.1887902  4.25225672 4.31572324 4.37918976 4.44265628 4.5061228
 4.56958931 4.63305583 4.69652235 4.75998887 4.82345539 4.88692191
 4.95038842 5.01385494 5.07732146 5.14078798 5.2042545  5.26772102
 5.33118753 5.39465405 5.45812057 5.52158709 5.58505361 5.64852012
 5.71198664 5.77545316 5.83891968 5.9023862  5.96585272 6.02931923
 6.09278575 6.15625227 6.21971879 6.28318531]
[ 0.00000000e+00  6.34239197e-02  1.26592454e-01  1.89251244e-01
  2.51147987e-01  3.12033446e-01  3.71662456e-01  4.29794912e-01
  4.86196736e-01  5.40640817e-01  5.92907929e-01  6.42787610e-01
  6.90079011e-01  7.34591709e-01  7.76146464e-01  8.14575952e-01
  8.49725430e-01  8.81453363e-01  9.09631995e-01  9.34147860e-01
  9.54902241e-01  9.71811568e-01  9.84807753e-01  9.93838464e-01
  9.98867339e-01  9.99874128e-01  9.96854776e-01  9.89821442e-01
  9.78802446e-01  9.63842159e-01  9.45000819e-01  9.22354294e-01
  8.95993774e-01  8.66025404e-01  8.32569855e-01  7.95761841e-01
  7.55749574e-01  7.12694171e-01  6.66769001e-01  6.18158986e-01
  5.67059864e-01  5.13677392e-01  4.58226522e-01  4.00930535e-01
  3.42020143e-01  2.81732557e-01  2.20310533e-01  1.58001396e-01
  9.50560433e-02  3.17279335e-02 -3.17279335e-02 -9.50560433e-02
```

5.

```
import numpy as np
a=np.array([[1,1],
            [0,1]])
b=np.array([[2,0],
            [3,4]])
print(a*b,"\n")
print(a@b,"\n")
print(a.dot(b))
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\e.py"
[[2 0]
 [0 4]]

[[5 4]
 [3 4]]

[[5 4]
 [3 4]]

[Done] exited with code=0 in 0.264 seconds
```

6.

```
import numpy as np
a=np.array([(1,2,3,4),(3,4,5,6)])
print(a[1,2])
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\f.py"
5

[Done] exited with code=0 in 0.265 seconds
```

7.

```
import numpy as np
a = np.array([0.0, 10.0, 20.0, 30.0])
b = np.array([1.0, 2.0, 3.0])
c = a[:, np.newaxis] + b
print(c)
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\g.py"
[[ 1.  2.  3.]
 [11. 12. 13.]
 [21. 22. 23.]
 [31. 32. 33.]]

[Done] exited with code=0 in 0.249 seconds
```

8.

```
import numpy as np
a= np.array([1,2,3])
print(a.min())
print(a.max())
print(a.sum())
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\h.py"
1
3
6

[Done] exited with code=0 in 0.257 seconds
```

9.

```
import numpy as np
x = np.array([(1, 2., 3.)], dtype='i, f, f')
print(x[0])
print(type(x))
print(type(x[0]))
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\i.py"
(1, 2., 3.)
<class 'numpy.ndarray'>
<class 'numpy.void'>

[Done] exited with code=0 in 0.245 seconds
```

10.

```
import numpy as np
from numpy import pi
a = np.ones(3, dtype=np.int32)
b = np.linspace(0,pi,3)
print(b.dtype.name)
print(a+b)
c=np.exp((a+b)*1j)
print(c)
print(c.dtype.name)
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\j.py"
float64
[1.         2.57079633 4.14159265]
[ 0.54030231+0.84147098j -0.84147098+0.54030231j -0.54030231-0.84147098j]
complex128

[Done] exited with code=0 in 0.249 seconds
```

11.

```
import numpy as np
a= np.array([1,2,3])
print(np.log(a))
print(np.log10(a))
print(np.log2(a))
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\k.py"
[0.         0.69314718 1.09861229]
[0.         0.30103    0.47712125]
[0.        1.         1.5849625]

[Done] exited with code=0 in 0.252 seconds
```

12.

```
import numpy as np
a = np.array([(8,9,10),(11,12,13)])
print(a)
print(a.reshape(3,2))
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\l.py"
[[ 8  9 10]
 [11 12 13]]
[[ 8  9]
 [10 11]
 [12 13]]

[Done] exited with code=0 in 0.253 seconds
```

13.

```
import numpy as np
a = np.array([10,20,30,40,50,60,70,80,90])
print(np.sqrt(a))
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\n.py"
[3.16227766 4.47213595 5.47722558 6.32455532 7.07106781 7.74596669
 8.36660027 8.94427191 9.48683298]

[Done] exited with code=0 in 0.254 seconds
```

14.

```
import numpy as np
a = np.array([(1,2,3),(4,5,6)])
print(a.ndim)
print(a.itemsize)
print(a.size)
print(a.shape)
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\m.py"
2
4
6
(2, 3)

[Done] exited with code=0 in 0.265 seconds
```

15.

```
import numpy as np
a = np.array([("bhavya", 9, 37, 24), ("harsh", 24, 47, 35), ("jinay", 35, 40,
30), ("rohan", 68, 25, 41), ("tirth", 82, 35, 35)], dtype=[("name", str, 10),
("roll_no", int), ("practical", int), ("theory", int)])
print(a[1])
print("name of student witn roll number less than 50 roll number")
print(a[a["roll_no"] < 50]["name"])
b = (a["theory"]+a["practical"])
print("total marks of all students : ")
print(a["name"])
print(b)
```

output:

```
[Running] python -u "s:\TERM 7\ML\PRACTICALS\LAB-1\o.py"
('harsh', 24, 47, 35)
name of student witn roll number less than 50 roll number
['bhavya' 'harsh' 'jinay']
total marks of all students :
['bhavya' 'harsh' 'jinay' 'rohan' 'tirth']
[61 82 70 66 70]

[Done] exited with code=0 in 0.269 seconds
```