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Batch-H3

### Practical No 3:

Prepare/Take [datasets](#) for any real-life application. Read a [dataset](#) into an array. Perform the following operations on it:

1. Perform all matrix operations
2. Horizontal and vertical stacking of Numpy Arrays
3. Custom sequence generation
4. Arithmetic and Statistical Operations, Mathematical Operations, Bitwise Operators
5. Copying and viewing arrays
6. Data Stacking, Searching, Sorting, Counting, Broadcasting

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Practical no.3.py - C:/Users/SATISH/OneDrive/Desktop/861_edu/Practice(file handling)/Practical no.3.py (3.11.3)
File Edit Format Run Options Window Help

import numpy as np
Maths1=np.array ( [21,32,43,54,56,42,11,76,41])
Science1=np.array ( [51,53,98,58,38,29,27,68,83])
EDS1=np.array ( [34,53,52,62,61,26,72,61,46])
EGR1=np.array ( [45,64,71,84,72,46,26,17,56])

data1=np.array ( [Maths1,Science1,EDS1,EGR1])
print ( "Term1 :\n",data1)

Maths2=np.array ( [34,56,54,32,31,42,52,62,69])
Science2=np.array ( [44,72,15,52,62,77,86,74,34])
EDS2=np.array ( [74,84,26,72,47,24,62,83,72])
EGR2=np.array ( [35,62,79,75,75,46,58,36,38])

data2=np.array ( [Maths2,Science2,EDS2,EGR2])
print ( "Term2 :\n",data2)

#Matrix operations
add=np.add ( data1,data2)
print ( "The addition of two matrices is: \n",add)
subtract=np.subtract ( data2,data1)
print ( "The subtraction of two matrices is: \n",subtract)

subtract=np.subtract ( data2,data1)
print ( "The subtraction of two matrices is: \n",subtract)
multiply=np.multiply ( data1,data2)
print ( "The multiplication of two matrices is: \n",multiply)
divide=np.divide ( data1,data2)
print ( "The division of two matrices is: \n",divide)
transpose__1=np.transpose ( data1)
print ( "The transpose of first matrix is: \n",transpose__1)
transpose__2=np.transpose ( data2)
print ( "The transpose of second matrix is: \n",transpose__2)
mean__1=np.mean ( data1,axis=1)
print ( "Mean in row of data1 is : \n",mean__1)
mean__2=np.mean ( data2,axis=0)
print ( "Mean in column of data2 is :\n", mean__2)
SD=np.std ( data1)
print ( "The standard deviation of first matrix is: \n",SD)
VN=np.var ( data2)
print ( "The variance of first matrix is: \n",VN)

#Arithmetic and Statistical Operations, Mathematical Operations, Bitwise Operators
a=data1+5
print ( "The Addition :\n",a)
```

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Practical no.3.py - C:/Users/SATISH/OneDrive/Desktop/861_edu/Practice(file handling)/Practical no.3.py (3.11.3)
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#Arithmetic and Statistical Operations, Mathematical Operations, Bitwise Operators
a=data1+5
print ( "\nAddition :\n",a)
min1=np.min ( data2,axis=1)
print ( "\nMinimum in row in data2:",min1)
min2=np.min ( data1,axis=0)
print ( "\nMinimum in column in data1 :",min2)
max1=np.max ( data1,axis=1)
print ( "\nMaximum in row in data1 :",max1)
max2=np.max ( data2,axis=0)
print ( "\nMaximum in column in data2 :",max2)
e1=np.exp ( data1)
print ( "\nExponential :\n",e1)
e2=np.exp ( data2)
print ( "\nExponential :\n",e2)
b=data1&90
print ( "\nBitwise and :\n",b)

#Horizontal and vertical stacking
Hstack=np.hstack ( data1)
print ( "The horizontal stacking of two matrices is: \n",Hstack)
Vstack=np.vstack ( data2)

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Practical no.3.py - C:/Users/SATISH/OneDrive/Desktop/861_edu/Practice(file handling)/Practical no.3.py (3.11.3)
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#Horizontal and vertical stacking
Hstack=np.hstack ( data1)
print ( "The horizontal stacking of two matrices is: \n",Hstack)
Vstack=np.vstack ( data2)
print ( "The vertical stacking of two matrices is: \n",Vstack)

#Sequence generation
sequence__1=np.arange ( 15)
print ( "The first sequence is: \n",sequence__1)
sequence__2=np.arange ( 24,50,2)
print ( "The second sequence is: \n",sequence__2)
sequence__3=EDS1.reshape ( 3,3)
print ( "The third sequence is: \n",sequence__3)
sequence__4=np.random.randint ( 0,10,5)
print ( "The fourth sequence is : \n",sequence__4)

#Copying and viewing arrays
copy2=data2.copy ( )
print ( "\nCopying arrays :\n",copy2)
view1=data1.view ( )
print ( "\nViewing arrays :\n",view1)

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Practical no.3.py - C:/Users/SATISH/OneDrive/Desktop/861_edu/Practice(file handling)/Practical no.3.py (3.11.3)
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#Copying and viewing arrays
copy2=data2.copy ( )
print ( "\nCopying arrays :\n",copy2)
view1=data1.view ( )
print ( "\nViewing arrays :\n",view1)

#Data Stacking, Searching, Sorting, Counting, Broadcasting
stack=np.dstack ( data1)
print ( "\nData stacking :",stack)
ind=np.where ( data1==27)
print ( "\nSearching :",ind)
sort= np.sort ( data2)
print ( "\nSorting :",sort)
count=np.count_nonzero ( data2>85)
print ( "\nCounting :",count)
br=data2*2
print ( "\nBroadcasting :",br)

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IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr 4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/SATISH/OneDrive/Desktop/861__eds/Practice (file handling) /Practical no.3.py
Term1 :
[[21 32 43 54 56 42 11 76 41]
[51 53 98 58 38 29 27 68 83]
[34 53 52 62 61 26 72 61 46]
[45 64 71 84 72 46 26 17 56]]
Term2 :
[[34 56 54 32 31 42 52 62 69]
[44 72 15 52 62 77 86 74 34]
[74 84 26 72 47 24 62 83 72]
[35 62 79 75 75 46 58 36 38]]
The addition of two matrices is:
[[ 55 88 97 86 87 84 63 138 110]
[ 95 125 113 110 100 106 113 142 117]
[108 137 78 134 108 50 134 144 118]
[ 80 126 150 159 147 92 84 53 94]]
The subtraction of two matrices is:
[[ 13 24 11 -22 -25 0 41 -14 28]
[ -7 19 -83 -6 24 48 59 6 -49]
[ 40 31 -26 10 -14 -2 -10 22 26]
[-10 -2 8 -9 3 0 32 19 -18]]
Ln: 169 Col: 0
```

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IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
The subtraction of two matrices is:
[[ 13 24 11 -22 -25 0 41 -14 28]
[ -7 19 -83 -6 24 48 59 6 -49]
[ 40 31 -26 10 -14 -2 -10 22 26]
[-10 -2 8 -9 3 0 32 19 -18]]
The multiplication of two matrices is:
[[ 714 1792 2322 1728 1736 1764 572 4712 2829]
[2244 3816 1470 3016 2356 2233 2322 5032 2822]
[2516 4452 1352 4464 2867 624 4464 5063 3312]
[1575 3968 5609 6300 5400 2116 1508 612 2128]]
The division of two matrices is:
[[0.61764706 0.57142857 0.7962963 1.6875 1.80645161 1.
0.21153846 1.22580645 0.5942029 ]
[1.15909091 0.73611111 6.53333333 1.11538462 0.61290323 0.37662338
0.31395349 0.91891892 2.44117647]
[0.45945946 0.63095238 2. 0.86111111 1.29787234 1.08333333
1.16129032 0.73493976 0.63888889]
[1.28571429 1.03225806 0.89873418 1.12 0.96 1.
0.44827586 0.47222222 1.47368421]]
The transpose of first matrix is:
[[21 51 34 45]
[32 53 53 64]
[43 98 52 71]
[54 58 62 84]
[56 38 61 72]
[42 29 26 46]
[11 27 72 26]
[76 68 61 17]
[41 83 46 56]]
Ln: 169 Col: 0
```

```
IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
The transpose of first matrix is:
[[21 51 34 45]
[32 53 53 64]
[43 98 52 71]
[54 58 62 84]
[56 38 61 72]
[42 29 26 46]
[11 27 72 26]
[76 68 61 17]
[41 83 46 56]]
The transpose of second matrix is:
[[34 44 74 35]
[56 72 84 62]
[54 15 26 79]
[32 52 72 75]
[31 62 47 75]
[42 77 24 46]
[52 86 62 58]
[62 74 83 36]
[69 34 72 38]]
Mean in row of data1 is :
[11.77777778 56.44444444 54.88888889 52.44444444]
Ln: 169 Col: 0
```

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IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help

Mean in row of data1 is :
[41.77777778 56.11111111 51.88888889 53.44444444]
Mean in column of data2 is :
[46.75 68.5 43.5 57.75 53.75 47.25 64.5 63.75 53.25]
The standard deviation of first matrix is:
19.88832634213744
The variance of first matrix is:
370.0802469135803

Addition :
[[ 26 37 48 59 61 47 16 81 46]
 [ 56 58 103 63 43 34 32 73 88]
 [ 39 58 57 67 66 31 77 66 51]
 [ 50 69 76 89 77 51 31 22 61]]

Minimum in row in data2: [31 15 24 35]

Minimum in column in data1 : [21 32 43 54 38 26 11 17 41]

Maximum in row in data1 : [76 98 72 84]

Maximum in column in data2 : [74 84 79 75 75 77 86 83 72]
```

Ln: 169 Col: 0

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IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help

Minimum in column in data1 : [21 32 43 54 38 26 11 17 41]

Maximum in row in data1 : [76 98 72 84]

Maximum in column in data2 : [74 84 79 75 75 77 86 83 72]

Exponential :
[[1.31881573e+09 7.89629602e+13 4.72783947e+18 2.83075330e+23
 2.09165950e+24 1.73927494e+18 5.98741417e+04 1.01480039e+33
 6.39843494e+17]
 [1.40934908e+22 1.04137594e+23 3.63797095e+42 1.54553894e+25
 3.18559318e+16 3.93133430e+12 5.32048241e+11 3.40427605e+29
 1.11286375e+36]
 [5.83461743e+14 1.04137594e+23 3.83100800e+22 8.43835667e+26
 3.10429794e+26 1.95729609e+11 1.85867175e+31 3.10429794e+26
 9.49611942e+19]
 [3.49342711e+19 6.23514908e+27 6.83767123e+30 3.02507732e+36
 1.85867175e+31 9.49611942e+19 1.95729609e+11 2.41549528e+07
 2.09165950e+24]]

Exponential :
```

Ln: 235 Col: 0

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IDLE Shell 3.11.3
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1.63867175e+31 9.49611942e+19 1.95729609e+11 2.41549528e+07
2.09165950e+24]]

Exponential :
[[5.83461743e+14 2.09165950e+24 2.83075330e+23 7.89629602e+13
 2.90488497e+13 1.73927494e+18 3.83100800e+22 8.43835667e+26
 9.25378173e+29]
 [1.28516001e+19 1.85867175e+31 3.26901737e+06 3.83100800e+22
 8.43835667e+26 2.75851345e+33 2.23524660e+37 1.37338298e+32
 5.83461743e+14]
 [1.37338298e+32 3.02507732e+36 1.95729609e+11 1.85867175e+31
 2.58131289e+20 2.64891221e+10 8.43835667e+26 1.11286375e+36
 1.85867175e+31]
 [1.58601345e+15 8.43835667e+26 2.03828107e+34 3.73324200e+32
 3.73324200e+32 9.49611942e+19 1.54553894e+25 4.31123155e+15
 3.18559318e+16]]

Bitwise :
[[16 0 10 18 24 10 10 72 8]
 [18 16 66 26 2 24 26 64 82]
 [ 2 16 16 26 24 26 72 24 10]
 [ 8 64 66 80 72 10 26 16 24]]
```

Ln: 501 Col: 0



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IDL Shell 3.11.3
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3.1555518e+10]]

Bitwise :
[[16 0 10 18 24 10 10 72 8]
[18 16 66 26 2 24 26 64 82]
[ 2 16 16 26 24 26 72 24 10]
[ 8 64 66 80 72 10 26 16 24]]
The horizontal stacking of two matrices is:
[21 32 43 54 56 42 11 76 41 51 53 98 58 38 29 27 68 83 34 53 52 62 61 26
72 61 46 45 64 71 84 72 46 26 17 56]
The vertical stacking of two matrices is:
[[34 56 54 32 31 42 52 62 69]
[44 72 15 52 62 77 86 74 34]
[74 84 26 72 47 24 62 83 72]
[35 62 79 75 75 46 58 36 38]]
The first sequence is:
[ 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14]
The second sequence is:
[24 26 28 30 32 34 36 38 40 42 44 46 48]
The third sequence is:
[[34 53 52]
[62 61 26]
[72 61 46]]
[62 61 26]
```

```
IDL Shell 3.11.3
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The second sequence is:
[24 26 28 30 32 34 36 38 40 42 44 46 48]
The third sequence is:
[[34 53 52]
[62 61 26]
[72 61 46]]
The fourth sequence is :
[2 3 1 1 6]

Copying arrays :
[[34 56 54 32 31 42 52 62 69]
[44 72 15 52 62 77 86 74 34]
[74 84 26 72 47 24 62 83 72]
[35 62 79 75 75 46 58 36 38]]

Viewing arrays :
[[21 32 43 54 56 42 11 76 41]
[51 53 98 58 38 29 27 68 83]
[34 53 52 62 61 26 72 61 46]
[45 64 71 84 72 46 26 17 56]]
Data stacking : [[[21 51 34 45]
```

```
IDL Shell 3.11.3
File Edit Shell Debug Options Window Help
[34 53 52 62 61 26 72 61 46]
[45 64 71 84 72 46 26 17 56]]

Data stacking : [[[21 51 34 45]
[32 53 53 64]
[43 98 52 71]
[54 58 62 84]
[56 38 61 72]
[42 29 26 46]
[11 27 72 26]
[76 68 61 17]
[41 83 46 56]]]

Searching : ( array ( [1], dtype=int64) , array ( [6], dtype=int64) )

Sorting : [[31 32 34 42 52 54 56 62 69]
[15 34 44 52 62 72 74 77 86]
[24 26 47 62 72 72 74 83 84]
[35 36 38 46 58 62 75 75 79]]

Counting : 1
```

```
IDL Shell 3.11.3
File Edit Shell Debug Options Window Help
[43 98 52 71]
[54 58 62 84]
[56 38 61 72]
[42 29 26 46]
[11 27 72 26]
[76 68 61 17]
[41 83 46 56]]

Searching : ( array ( [1], dtype=int64) , array ( [6], dtype=int64) )

Sorting : [[31 32 34 42 52 54 56 62 69]
[15 34 44 52 62 72 74 77 86]
[24 26 47 62 72 72 74 83 84]
[35 36 38 46 58 62 75 75 79]]

Counting : 1

Broadcasting : [[ 68 112 108 64 62 84 104 124 138]
[ 88 144 30 104 124 154 172 148 68]
[148 168 52 144 94 48 124 166 144]
[ 70 124 158 150 150 92 116 72 76]]
>>>
```