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**DIV : G3**

```
import csv  import numpy as np  array = np.loadtxt('/content/testmarks1.csv',
delimiter=',',dtype=float,skiprows=1)  print(array)
```

[[801. 43.05 27.79 28.7 27.79]

[802. 43.47 28.52 28.98 27.89]

[803. 42.24 28.16 28.16 25.63]

[804. 39.24 26.16 26.16 26.16]

[805. 40.9 26.03 27.27 25.65]

[806. 39.47 26.31 26.31 25.21]

[807. 41.68 25.63 27.79 25.46]

[808. 42.19 27.61 28.13 26.21]

[809. 44.75 28.35 29.83 28.21]

[810. 46.95 28.88 31.3 28.53]]  # Transpose the matrix  transpose_array =
np.transpose(array)  print(transpose_array)

[[801. 802. 803. 804. 805. 806. 807. 808. 809. 810. ]

[ 43.05 43.47 42.24 39.24 40.9 39.47 41.68 42.19 44.75 46.95]

[ 27.79 28.52 28.16 26.16 26.03 26.31 25.63 27.61 28.35 28.88]

[ 28.7 28.98 28.16 26.16 27.27 26.31 27.79 28.13 29.83 31.3 ]

[ 27.79 27.89 25.63 26.16 25.65 25.21 25.46 26.21 28.21 28.53]]

0s

#Random matrix of the same shape as the array  random_matrix

= np.random.random(array[:, 1:].shape)  print("Random

matrix:\n", random_matrix)

Random matrix:

[[0.56631328 0.21551628 0.68454243 0.22818798]

[0.78143198 0.93264469 0.86719966 0.9813187 ]

[0.69833567 0.51174533 0.27634833 0.15864249]

[0.62862734 0.14174014 0.23138864 0.89985346]

[0.98978917 0.19454841 0.30928277 0.82089845]

[0.24945028 0.70438855 0.97138954 0.32778541]

[0.95624127 0.174448 0.98845587 0.79013429]

[0.33147007 0.77828972 0.74201058 0.17613757]

[0.95529652 0.0041208 0.51281124 0.97117346]

[0.09680881 0.81611902 0.59478513 0.81318438]]

#Maximum marks in each subject  max_marks =

np.max(array[:, 1:], axis=0)  print("Maximum marks in

each subject:", max_marks)

Maximum marks in each subject: [46.95 28.88 31.3 28.53]

[8]

0s

```
#Minimum marks in each subject  min_marks =
np.min(array[:, 1:], axis=0)  print("Minimum marks
in each subject:", min_marks)
```

Minimum marks in each subject: [39.24 25.63 26.16
25.21]   #Maximum marks in EDS  max_marks_eds =
np.max(array[:, 0], axis=0)  print("Maximum marks in
EDS:", max_marks_eds)

Maximum marks in EDS: 810.0  #Maximum marks in
SON  max_marks_son = np.max(array[:, 1], axis=0)
print("Maximum marks in SON:", max_marks_son)

Maximum marks in SON: 46.95  #sum of marks in
each row  sum_marks_per_row = np.sum(array[:,
1:], axis=1)  print(sum_marks_per_row)

[127.33 128.86 124.19 117.72 119.85 117.3 120.56 124.14 131.14 135.66]

#element-wise rounding of marks to the nearest integer

rounded_marks = np.round(array[:, 1:])  print("Rounded
marks:\n", rounded_marks)

Rounded marks:

[[43. 28. 29. 28.]

[43. 29. 29. 28.]
```

[42. 28. 28. 26.]

[39. 26. 26. 26.]

[41. 26. 27. 26.]

[39. 26. 26. 25.]

[42. 26. 28. 25.]

[42. 28. 28. 26.]

[45. 28. 30. 28.]

[47. 29. 31. 29.]]

#The exponential of each mark exponential_marks =

np.exp(array[:, 1:]) print("Exponential of each mark:\n",

exponential_marks)

Exponential of each mark:

[[4.97024098e+18 1.17231319e+12 2.91240408e+12 1.17231319e+12]

[7.56451570e+18 2.43264437e+12 3.85348866e+12 1.29560645e+12]

[2.21105179e+18 1.69719839e+12 1.69719839e+12 1.35197161e+11]

[1.10081787e+17 2.29690824e+11 2.29690824e+11 2.29690824e+11]

[5.78954335e+17 2.01690463e+11 6.96964281e+11 1.37928325e+11]

[1.38548938e+17 2.66862665e+11 2.66862665e+11 8.88308645e+10]

[1.26297282e+18 1.35197161e+11 1.17231319e+12 1.14061088e+11]

[2.10321752e+18 9.79198288e+11 1.64703859e+12 2.41467325e+11]

[2.72068377e+19 2.05233647e+12 9.01580262e+12 1.78421561e+12]

[2.45542077e+20 3.48678073e+12 3.92118456e+13 2.45709285e+12]]

# Cumulative sum of marks in each subject   cumulative_sum_subjects =
np.cumsum(array[:, 1:], axis=0)  print("Cumulative sum of marks in each
subject:\n", cumulative_sum_subjects)

Cumulative sum of marks in each subject:

[[ 43.05 27.79 28.7 27.79]

[ 86.52 56.31 57.68 55.68]

[128.76 84.47 85.84 81.31]

[168. 110.63 112. 107.47]

[208.9 136.66 139.27 133.12]

[248.37 162.97 165.58 158.33]

[290.05 188.6 193.37 183.79]

[332.24 216.21 221.5 210. ]

[376.99 244.56 251.33 238.21]

[423.94 273.44 282.63 266.74]]  #square root of each

mark  square_root_marks = np.sqrt(array[:, 1:])

print("Square root of each mark:\n", square_root_marks)

Square root of each mark:

[[6.56124988 5.27162214 5.35723809 5.27162214]

[6.59317829 5.34041197 5.38330753 5.28109837]

[6.49923072 5.30659966 5.30659966 5.06260802]

[6.26418391 5.11468474 5.11468474 5.11468474]

[6.39531078 5.10196041 5.22206856 5.0645829 ]

[6.28251542 5.12932744 5.12932744 5.02095608]

[6.45600496 5.06260802 5.27162214 5.04579032]

[6.49538298 5.25452186 5.30377224 5.11957029]

[6.68954408 5.3244718 5.46168472 5.31130869]

[6.85200701 5.37401154 5.59464029 5.34134814]]   #Maximum marks in DT

max_marks_dt = np.max(array[:, 2], axis=0)  print("Maximum marks in DT:",

max_marks_dt)   Maximum marks in DT: 28.88  #Maximum marks in ET

max_marks_et = np.max(array[:, 3], axis=0)  print("Maximum marks in ET:",

max_marks_et)

Maximum marks in ET: 31.3  #Minimum marks

in DT  min_marks_dt = np.min(array[:, 2],

axis=0)  print("Minimum marks in DT:",

min_marks_dt)

Minimum marks in DT: 25.63  #Minimum

marks in ET  min_marks_et = np.min(array[:,

3], axis=0)  print("Minimum marks in ET:",

min_marks_et)

Minimum marks in ET: 26.16  #Mean of marks in each

subject  mean_subjects = np.mean(array[:, 1:], axis=0)

print("Mean of marks in each subject:", mean_subjects)

Mean of marks in each subject: [42.394 27.344 28.263

26.674]

# Variance of marks in each subject  variance_subjects =

np.var(array[:, 1:], axis=0)  print("Variance of marks in each

subject:", variance_subjects)

Variance of marks in each subject: [4.920064 1.282524 2.185881 1.476324].