GEEELAB4.py - C:\Users\Harsh\AppData\Local\Programs\Python\Python311\GEEELAB4.py (3.11.0)

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                                #GE ASSIGNMENT LAB 4:
import numpy as np



#1 Consider The Following Vectors:
vectorA= [0.5, 0.4, 0.4, 0.5, 0.1, 0.4, 0.1]
vectorB= [-1, -2, 1, -2, 3, 1,-5]
MagA=np.linalg.norm (vectorA)
MagB=np.linalg.norm (vectorB)
print ("The Magnitude of Vector A is: ", MagA)
print ("The Magnitude of Vector B is: ", MagB)
AdotB= np.dot(vectorA,vectorB)
print ("The Dot Product of Vector A and Vector B is : ",AdotB)
if AdotB!=0:
    print ("Vector A and B are Not Orthogonal")
print ("-----------------------------------------------------")
```

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The Magnitude of Vector A is:  1.0
The Magnitude of Vector B is:  6.708203932499369
The Dot Product of Vector A and Vector B is :  -1.6999999999999997
Vector A and B are Not Orthogonal
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```

```
#2 Consider The Following Three Vectors:
vectorV= [1, 2, 5, 2,-3, 1, 2, 6, 2]
vectorU= [-4, 3, -2, 2, 1, -3, 4, 1, -2]
vectorW= [3, 3, 3, -1, 6,-1, 2,-5, -7]
VdotW= np.dot (vectorV, vectorW)
print ("The Dot Product of Vector V and Vector W is : ",VdotW)
VdotU= np.dot(vectorV, vectorU)
print ("The Dot Product of Vector V and Vector U is :",VdotU)
if VdotU==0:
    print ("Vector V and U are Orthogonal")
WdotU= np.dot (vectorW, vectorU)
print ("The Dot Product of Vector U and Vector W is : ",WdotU)
print("-------------------------------------------------------")
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The Dot Product of Vector V and Vector W is :  -37
The Dot Product of Vector V and Vector U is : 0
Vector V and U are Orthogonal
The Dot Product of Vector U and Vector W is :  15
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#3 CONSIDER THE THREE MATRICES:
arr1 = np.array([[2, 2], [-3,1], [5,-3]])
print ("Matrix A is: \n",arr1)
arr2=np.array([[4, 4, 4], [-2, 3, 7], [2,5, -7]])
print ("Matrix B is: \n", arr2)
arr3=np.array([[4,-1,2], [-8,2,-4], [2,1,-4]])
print ("Matrix C is: \n", arr3)
arrl_transpose=arr1.transpose()
arrl_transposedotarr2=np.dot(arrl_transpose, arr2)
print ("The Solution of A Transpose.B is: \n", arrl_transposedotarr2)
SUM=arr2+arr3
print ("The Sum of Matrix B and C is: \n ", SUM)
print(arr1.shape)
print(arr2.shape)
print("Matrix B IS Full Rank")
print(arr3.shape)
print("Matrix C IS Full Rank")
Inverse= np.linalg.inv (arr2)
print ("The Inverse of Matrix B is: \n", Inverse)
print("-----------------------------------------------------")
```

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Matrix A is:
 [[ 2  2]
 [-3  1]
 [ 5 -3]]
Matrix B is:
 [[ 4  4  4]
 [-2  3  7]
 [ 2  5 -7]]
Matrix C is:
 [[ 4 -1  2]
 [-8  2 -4]
 [ 2  1 -4]]
The Solution of A Transpose.B is:
 [[ 24  24 -48]
 [  0  -4  36]]
The Sum of Matrix B and C is:
  [[  8   3   6]
 [-10   5   3]
 [  4   6 -11]]
(3, 2)
(3, 3)
Matrix B IS Full Rank
(3, 3)
Matrix C IS Full Rank
The Inverse of Matrix B is:
 [[ 0.19444444 -0.16666667 -0.05555556]
 [ 0.          0.125       0.125     ]
 [ 0.05555556  0.04166667 -0.06944444]]
```