

Task1

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In [6]: #Importing Necessary Libraries
        """
        re is used for regular expression and numpy is used for speedy calculation and computati
        """
        import re
        import numpy as np

        print("***** Welcome to the Python Matrix Application*****")

        while True:
            #Choosing the option Yes or No
            option_choice=input("Do you want to play the Matrix Game?\nEnter Y for Yes or N for
            if option_choice=="Y":
                while True:
                    phone_number=input("Enter your phone number (XXX-XXX-XXXX:)"
                    #Using Regular expression to check phone number Format
                    if re.match(r"\d{3}-\d{3}-\d{4}",phone_number):
                        break
                    else:
                        print("Your phone number is not in correct format. Please reenter:")

                while True:
                    zip_code=input("Enter your zip code+4 (XXXXX-XXXX):)"
                    #Using Regular expression to check zipcode Format
                    if re.match(r"\d{5}-\d{4}",zip_code):
                        break
                    else:
                        print("Your zip code is not in correct format. Please reenter:")

                #Creating The first Matrix
                print("Enter your first 3x3 matrix:")
                mat1=[]

                #Loop to insert element of matrix
                for i in range(0,3):
                    row=input().split(' ')
                    row=list(map(str ,row))
                    mat1.append(row)

                print("Your first 3x3 matrix is:")

                for r in range(0,3):
                    for c in range(0,3):
                        print(mat1[r][c],end=" ")
                    print()

                #Creating The second Matrix
                print("Enter your second 3x3 matrix:")
                mat2=[]
                #Loop to insert element of matrix
                for i in range(0,3):
                    row=input().split(' ')
                    row=list(map(str,row))
                    mat2.append(row)

                print("Your second 3x3 matrix is:")

                for r in range(0,3):
                    for c in range(0,3):
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        print(mat2[r][c],end=" ")
    print()

#Creating the menu
print("Select a Matrix Operation from the list below:\nna.Addition\nnb.Subtracti
    \nc.Matrix Multiplication\nd.Element by element multiplication")
menu_choice=input()
#converting array into float before performing operations
mat1=np.array(mat1, dtype = float)
mat2=np.array(mat2, dtype = float)
if menu_choice=="a":
    print("You selected Addition. The results are:")

    #converting it into numpy arrays
    mat1=np.array(mat1)
    mat2=np.array(mat2)

    #Adding The matrix
    Addition=mat1+mat2

    #Printing the addition matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Addition[r][c],end=" ")
        print()

    print("The Transpose is:")
    #Creating The Transpose Matrix
    Transpose=np.transpose(Addition)
    #Printing The Transpose Matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Transpose[r][c],end=" ")
        print()

    print("The row and column mean values of the results are:")

    #Finding row mean
    print("Row:", np.mean(Addition,axis=1))

    #Finding Column mean
    print("Column:", np.mean(Addition,axis=0))

elif menu_choice=="b":
    print("You selected Subtraction. The results are:")

    #converting it into numpy arrays
    mat1=np.array(mat1)
    mat2=np.array(mat2)

    #Subtracting The matrix
    Subtraction=mat1-mat2
    #Printing the subtraction matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Subtraction[r][c],end=" ")
        print()

    print("The Transpose is:")
    #Creating The Transpose Matrix
    Transpose=np.transpose(Subtraction)
    #Printing The Transpose Matrix
    for r in range(0,3):

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        for c in range(0,3):
            print(Transpose[r][c],end=" ")
        print()

print("The row and column mean values of the results are:")

#Finding row mean
print("Row:",np.mean(Subtraction,axis=1))

#Finding Column mean
print("Column:",np.mean(Subtraction,axis=0))

elif menu_choice=="c":
    print("You selected Matrix Multiplication. The results are:")

    #converting it into numpy arrays
    mat1=np.array(mat1)
    mat2=np.array(mat2)

    #Multiplying The matrix using matmul function
    Multiplication=np.matmul(mat1,mat2)
    #Printing the subtraction matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Multiplication[r][c],end=" ")
        print()

    print("The Transpose is:")
    #Creating The Transpose Matrix
    Transpose=np.transpose(Multiplication)
    #Printing The Transpose Matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Transpose[r][c],end=" ")
        print()

    print("The row and column mean values of the results are:")

    #Finding row mean
    print("Row:",np.mean(Multiplication,axis=1))

    #Finding Column mean
    print("Column:",np.mean(Multiplication,axis=0))

elif menu_choice=="d":
    print("You selected Element by Element Multiplication. The results are:")
    #converting it into numpy arrays
    mat1=np.array(mat1)
    mat2=np.array(mat2)
    #Multiplying The matrix elementwise
    Element=mat1 * mat2
    #Printing the subtraction matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Element[r][c],end=" ")
        print()

    print("The Transpose is:")
    #Creating The Transpose Matrix
    Transpose=np.transpose(Element)
    #Printing The Transpose Matrix
    for r in range(0,3):
        for c in range(0,3):
            print(Transpose[r][c],end=" ")

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        print()
        print("The row and column mean values of the results are:")

        #Finding row mean
        print("Row:", np.mean(Element,axis=1))

        #Finding Column mean
        print("Column:", np.mean(Element,axis=0))
    else:
        print("***** Thanks for playing Python Numpy *****")
        break

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***** Welcome to the Python Matrix Application*****

Do you want to play the Matrix Game?

Enter Y for Yes or N for No:Y

Enter your phone number (XXX-XXX-XXXX):123-456-7891

Enter your zip code+4 (XXXXX-XXXX):12345-7861

Enter your first 3x3 matrix:

1 2 3

4 5 2

4.4 6 8.1

Your first 3x3 matrix is:

1 2 3

4 5 2

4.4 6 8.1

Enter your second 3x3 matrix:

2 3 4

5.5 6 1

3 5 9

Your second 3x3 matrix is:

2 3 4

5.5 6 1

3 5 9

Select a Matrix Operation from the list below:

a.Addition

b.Subtraction

c.Matrix Multiplication

d.Element by element multiplication

a

You selected Addition. The results are:

3.0 5.0 7.0

9.5 11.0 3.0

7.4 11.0 17.1

The Transpose is:

3.0 9.5 7.4

5.0 11.0 11.0

7.0 3.0 17.1

The row and column mean values of the results are:

Row: [5. 7.83333333 11.83333333]

Column: [6.63333333 9. 9.03333333]

Do you want to play the Matrix Game?

Enter Y for Yes or N for No:N

***** Thanks for playing Python Numpy *****

In []: