ชนัดา เกิดเปี่ยม 65050368

$$A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 3 & 5 \\ 1 & 3 & 6 \end{bmatrix} \qquad B = \begin{bmatrix} 3 & 4 & 1 \\ 8 & 2 & 4 \\ 3 & 8 & 6 \end{bmatrix}$$

$$AB = \begin{bmatrix} (6+24+12) & (8+6+32) & (2+12+24) \\ (9+24+15) & (12+6+40) & (3+12+30) \\ (3+24+18) & (4+6+48) & (1+12+36) \end{bmatrix}$$

$$= \begin{bmatrix} 42 & 46 & 38 \\ 48 & 58 & 45 \\ 45 & 58 & 49 \end{bmatrix}$$

$$AB^T = \begin{bmatrix} 42 & 48 & 45 \\ 46 & 58 & 58 \\ 38 & 45 & 49 \end{bmatrix}$$

$$B^T = \begin{bmatrix} 3 & 8 & 3 \\ 4 & 2 & 8 \\ 1 & 4 & 6 \end{bmatrix} \qquad A^T = \begin{bmatrix} 2 & 3 & 1 \\ 3 & 3 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

$$B^TA^T = \begin{bmatrix} (6+24+12) & (9+24+15) & (3+24+18) \\ (8+6+32) & (12+6+40) & (4+6+48) \\ (2+12+24) & (3+12+30) & (1+12+36) \end{bmatrix}$$

$$= \begin{bmatrix} 42 & 48 & 45 \\ 46 & 58 & 58 \\ 38 & 45 & 49 \end{bmatrix}$$

```
[1] A = [[2, 3, 4], [3, 3, 5], [1, 3, 6]]
    B = [[3, 4, 1], [8, 2, 4], [3, 8, 6]]

[2] def multiplication(A, B):
      AB = [[0] * len(A[0]) for _ in range(len(A))]

      for k in range(len(A)):
        for i in range(len(A[k])):
          AB[k][i] = 0
          for j in range(len(B)):
            AB[k][i] += A[k][j] * B[j][i]

      return AB

    def transpose(A):
      T = [[0] * len(A[0]) for _ in range(len(A))]

      for i in range(len(A)):
        for j in range(len(A[i])):
          T[j][i] = A[i][j]

      return T

[8] AB = multiplication(A, B)
    AB_Transpose = transpose(AB)

    B_Transpose = transpose(B)
    A_Transpose = transpose(A)
    BA_Transpose = multiplication(B_Transpose, A_Transpose)

    print("A*B Transpose")
    for i in AB_Transpose:
      print(i)

    print("--------------\nB_Transpose * A_Transpse")

    for j in BA_Transpose:
      print(j)

A*B Transpose
[42, 48, 45]
[46, 58, 58]
[38, 45, 49]
--------------
B_Transpose * A_Transpse
[42, 48, 45]
[46, 58, 58]
[38, 45, 49]
```

8. กำหนดให้ $A = \begin{bmatrix} 1 & -2 \\ 2 & 1 \end{bmatrix}, B = \begin{bmatrix} -4 & 1 \\ 0 & -1 \end{bmatrix}$ และ $C = \begin{bmatrix} -1 & 2 & 3 \\ 1 & -2 & 0 \end{bmatrix}$
จงหา $AB, BA, (AB)^T, A^TB^T, CA$ และ C^TB

$$AB = \begin{bmatrix} (-4+0) & (1+2) \\ (-8+0) & (2+(-1)) \end{bmatrix} = \begin{bmatrix} -4 & 3 \\ -8 & 1 \end{bmatrix}$$

$$BA = \begin{bmatrix} (-4+2) & (8+1) \\ (0+(-2)) & (0+(-1)) \end{bmatrix} = \begin{bmatrix} -2 & 9 \\ -2 & -1 \end{bmatrix}$$

$$(AB)^T = \begin{bmatrix} -4 & 3 \\ -8 & 1 \end{bmatrix} = \begin{bmatrix} -4 & -8 \\ 3 & 1 \end{bmatrix}$$

$$A^T = \begin{bmatrix} 1 & 2 \\ -2 & 1 \end{bmatrix} \qquad B^T = \begin{bmatrix} -4 & 0 \\ 1 & -1 \end{bmatrix} \qquad C^T = \begin{bmatrix} -1 & 1 \\ 2 & -2 \\ 3 & 0 \end{bmatrix}$$

$$A^TB^T = \begin{bmatrix} (-4+2) & (0+(-2)) \\ (8+1) & (0+(-1)) \end{bmatrix} = \begin{bmatrix} -2 & -2 \\ 9 & -1 \end{bmatrix}$$

CA : คูณกันไม่ได้

$$C^TB = \begin{bmatrix} (4+0) & (-1+(-1) \\ (-8+0) & (2+2) \\ (-12+0) & (3+0) \end{bmatrix} = \begin{bmatrix} 4 & -2 \\ -8 & 4 \\ -12 & 3 \end{bmatrix}$$