<center>**Lab Test 2**</center>

1. Create a folder (directory) **LABT2** in your home directory. Move to the directory **LABT2**.

2. Create a data file **vecu.dat** that contains the dimension of a vector in the first line followed by the vector components in the second line.

3. Create another data file **vecv.dat** that contains the dimension of another vector in the first line followed by the vector components in the second line.

4. Create a C program file **prog2.c** that implements the following: (Use of functions is optional)

   (a) It reads the vector dimension from **vecu.dat** into an integer variable **m** and creates a dynamic 1-D array like variable **u** that can hold its components. Next it reads the **m** components of the vector into **u** and prints the vector using two decimal places in the terminal.

   (b) It reads the vector dimension from **vecv.dat** into an integer variable **n** and creates a dynamic 1-D array like variable **v** that can hold its components. Next it reads the **n** components of the vector into **v** and prints the vector using two decimal places in the terminal.

   (c) It creates a dynamic 2-D array like variable **T** that can hold the outer product of the vectors **u** and **v**. For example, if **m=4** and **n=3**, then the outer product of vectors **u** and **v** is a matrix of order **m×n**, given by

   $$\boldsymbol{u} \otimes \boldsymbol{v} = \begin{bmatrix} u_0 \\ u_1 \\ u_2 \\ u_3 \end{bmatrix} \begin{bmatrix} v_0 & v_1 & v_2 \end{bmatrix} = \begin{bmatrix} u_0 v_0 & u_0 v_1 & u_0 v_2 \\ u_1 v_0 & u_1 v_1 & u_1 v_2 \\ u_2 v_0 & u_2 v_1 & u_2 v_2 \\ u_3 v_0 & u_3 v_1 & u_3 v_2 \end{bmatrix}$$

   (d) It performs the outer product and the components of the outer product are stored in **T**.

   (e) Finally, it prints the outer product (row-wise) using two decimal places in the terminal.

Expected input:

For vecu.dat

```
4
1.0  2.0  3.0  4.0
```

and vecv.dat

```
3
3.0  2.0  1.0
```

Expected output:

```
The vector u is: 1.00  2.00  3.00  4.00
The vector v is: 3.00  2.00  1.00
The outer product of u and v is:
     3.00        2.00        1.00
     6.00        4.00        2.00
     9.00        6.00        3.00
    12.00        8.00        4.00
```