CSE 115 Lab on 2D Array – Ara2

1. C program to find transpose of a 3*3 matrix:

```
#include <stdio.h>

void main()
{
    int A[3][3], B[3][3], row, col;

    printf("Enter elements in matrix of size 3x3: \n");
    for(row=0; row<3; row++)
    {
        for(col=0; col<3; col++)
        {
            scanf("%d", &A[row][col]);
        }
    }

    // Compute matrix B: the transpose of matrix A
    for(row=0; row<3; row++)
    {
        for(col=0; col<3; col++)
        {
            //Store each row of A to each column of matrix B
            B[row][col] = A[col][row];
        }
    }

    // Prints the original matrix A
    printf("\nOriginal matrix: \n");
    for(row=0; row<3; row++)
    {
        for(col=0; col<3; col++)
        {
            printf("%d ", A[row][col]);
        }
        printf("\n");
    }

    // Prints the transpose of matrix A
    printf("Transpose of matrix A: \n");
    for(row=0; row<3; row++)
    {
        for(col=0; col<3; col++)
        {
            printf("%d ", B[row][col]);
        }
        printf("\n");
    }
}
```

Exercise:

1. **Write C program to read a 3*5 matrix A from user and print the elements of the matrix n*A where n is a decimal number read from user.**
2. **Write C program to read a n*n matrix A from user (n is a user input) and print the (i) upper left, (ii) lower right, (iii) upper right, and (iv) lower left triangle, (v) diagonal and (vi) reverse diagonal of A.**
3. **Write C program to read a r*c matrix A from user (r, c are user inputs) and print the sum of even numbers in A.**

Assignment:

1. **Write a C program to find sum of border elements (bold ones) of a matrix**
   Example:
   If the array elements are:
   1 2 3 4
   4 5 6 **7**
   7 8 9 9
   Output should be: Sum of main border elements = 54
   because 1+2+3+4+7+9+9+8+7+4 = 54

2. **Write C program to read two r*c matrices A and B from user (r, c are user inputs) and print the matrix 5A+7B+9 (add 9 with each element of the matrix 5A+7B to get the resultant matrix).**

3. **Write a C program to compute determinant of a 3X3 matrix**

$$A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \quad |A| = a(ei - fh) - b(di - fg) + c(dh - eg)$$

Determinant of 3x3 matrix