In C language, 2 dimensional arrays are declared as follows:

```
datatype arrayname[m][n];
```

where m and n must be integer constants. The elements of the array are addressed as arrayname[i][j].

Example Suppose we want to construct a multiplication table. Study the section of code given below:

```
int MultTable[10][10];
int i, j;
/* FILL THE TABLE */
for ( i = 0; i < 10; i++ )
{
   for ( j = 0; j < 10; j++ )
   {
      MultTable[i][j] = (i+1)*(j+1);
   }
}
/* PRINT THE TABLE */
for ( i = 0; i < 10; i++ )
{
   for ( j = 0; j < 10; j++ )  /* Brackets are missing */
      printf(''%d\t'', MultTable[i][j]); /* Used tabs to separate elements */
   printf(''\n''); /* Put a \n at the end of each row */
}
```

Also note the use of the for loop. The equivalent while loop is given below:

```
for ( j = 0; j < n; j++ )
{
   MultTable[i][j] = (i+1)*(j+1);
}

j = 0;
while ( j < n )
{
   MultTable[i][j] = (i+1)*(j+1);
   j ++;
}
```

Problem 1 *Write a program that inputs two n×n matrices and outputs their sum, difference and product.*

Problem 2 *Write a program that inputs a 3×3 matrix A. The program copies the transpose of the input matrix to another matrix B. Also copy to third matrix C, the cyclic permutation of the rows of A. That is the first row of C contains the third row of A, the second row C contains the first row of A and the third row of C contains the second row of A.*

Problem 3 *Implement a program to calculate the solution of a set of linear equations by Jacobi method.*

Problem 4 *Solve using Gauss elimination method. Calculate the L matrix and the determinant of the coefficient matrix.*

$$x + y + z = 6$$
$$2x - y + 3z = 4$$
$$4x + 5y - 10z = 13$$

Problem 5 *Use Gauss elimination with partial pivoting and solve*

$$x_1 + x_2 - 2x_3 = 3$$
$$4x_1 - 2x_2 + x_3 = 5$$
$$3x_1 - x_2 + 3x_3 = 8$$

Problem 6 *Solve the set of equations by Jacobi method*

$$3x - 6y + 2z = 15$$
$$4x - y + z = 3$$
$$x + 3y - z = 4$$