

Exercise 3– Write a program to read rows & columns of two matrices *A* and *B* in (*r1*, *c1*) and (*r2*, *c2*), respectively. If the number of columns in *A* must be equal the number of rows in *B* i.e., if *A* is an *r1* x *c1* matrix and *B* is an *r2* x *c2* matrix, *c1* = *r2*, then write the following functions to compute it's corresponding job.

| Function | Description |
|--|--|
| <code>read(int [][][10],int,int);</code> | Read data from A & B matrices |
| <code>write(int [][][10],int,int);</code> | Print A, B & resultant matrices |
| <code>multi(int [][][10], int [][][10], int [][][10], int,int,int);</code> | Multiply both A & B matrices and stored it into resultant matrix |

An example would be as follows:

```
Enter no. of rows & columns of matrix A: 2 3
Enter no. of rows & columns of matrix B: 3 2
```

```
Enter data in matrix A
8 1 2 -5 6 7
Enter data in matrix B
-5 1 0 2 -11 7
```

```
Matrix A
8      1      2
-5     6      7
Matrix B
-5     1
0      2
-11    7
Resultant matrix
-62    24
-52    56
```

Program –

```
#include<stdio.h>

//Read data from A & B matrices
void read(int P[][10], int r, int c)
{
    int i,j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            scanf("%d",&P[i][j]);
        }
    }
}
```

```
}

//Print A, B & resultant matrices
void write(int P[][10], int r, int c)
{
    int i,j;
    for(i=0;i<r;i++)
    {
        for(j=0;j<c;j++)
        {
            printf("%d\t",P[i][j]);
        }
        printf("\n");
    }
}

//Multiply both A & B matrices and stored it into
resultant matrix
void multi(int A[][10], int B[][10], int C[][10], int m,
int q, int p)
{
    int i,j,k,sum=0;
    for(i=0;i<m;i++)
    {
        for(j=0;j<q;j++)
        {
            for(k=0;k<p;k++)
            {
                sum += A[i][k] * B[k][j];
            }
            C[i][j] = sum;
            sum = 0;
        }
    }
}

int main()
{
    int m,n,p,q,A[10][10],B[10][10],C[10][10];
    printf("Enter no. of rows & columns of matrix A: ");
    scanf("%d%d",&m,&n);
    printf("Enter no. of rows & columns of matrix B: ");
    scanf("%d%d",&p,&q);
    if(n==p)
    {
        printf("\nEnter data in matrix A\n");
        read(A,m,n);
    }
}
```

```
        printf("Enter data in matrix B\n");
        read(B,p,q);

        printf("\nMatrix A\n");
        write(A,m,n);

        printf("Matrix B\n");
        write(B,p,q);

        printf("Resultant matrix\n");
        multi(A,B,C,m,q,p);
        write(C,m,q);
    }
    else
    {
        printf("Error! Unequal Dimensions (Columns of
Matrix A != Rows of Matrix B)");
    }
    return 0;
}
```

Output –

Enter no. of rows & columns of matrix A: 2 3

Enter no. of rows & columns of matrix B: 3 2

Enter data in matrix A

8 1 2 -5 6 7

Enter data in matrix B

-5 1 0 2 -11 7

Matrix A

| | | |
|---|---|---|
| 8 | 1 | 2 |
|---|---|---|

| | | |
|----|---|---|
| -5 | 6 | 7 |
|----|---|---|

Matrix B

| | |
|----|---|
| -5 | 1 |
|----|---|

| | |
|---|---|
| 0 | 2 |
|---|---|

| | |
|-----|---|
| -11 | 7 |
|-----|---|

Resultant matrix

| | |
|-----|----|
| -62 | 24 |
|-----|----|

| | |
|-----|----|
| -52 | 56 |
|-----|----|