1- The identity matrix is a square matrix in which all the elements of the principal diagonal are ones and all other elements are zeros

Write a program that reads the dimensions of the matrix from the user – make sure it is a square matrix- then reads the numbers and check if it is an identity matrix or not

Sample Input:

Enter the dimensions of the matrix:

2 3

Wrong dimensions

Enter the dimensions of the matrix:

3 3

Enter the numbers:

1 0 0

0 1 0

0 0 1

It's an identity matrix

Do you want to enter another matrix? "y/n"

Y

Enter the dimensions of the matrix:

4 4

Enter the numbers:

1 0 0 0

0 0 1 0

0 0 1 0

0 0 0 1

It's not an identity matrix

Do you want to enter another matrix? "y/n"

N

2- Matrix Multiplication. You can only multiply two matrices if their dimensions are compatible, which means the number of columns in the first matrix is the same as the number of rows in the second matrix.

If A=[aij] is an m×n matrix and B=[bij] is an n×p matrix, the product AB is an m×p matrix.

Write a program that performs matrix multiplication-make sure the dimensions are compatible- multiply the 2 matrices and display the result.

Sample Input:

Enter the dimensions of the first matrix:

2 3

Enter the dimensions of the second matrix:

4 3

Wrong dimensions

Do you want to try another time? “y/n”

y

Enter the dimensions of the first matrix:

2 3

Enter the dimensions of the first matrix:

3 2

Enter the numbers of the first matrix:

1 2 3

4 5 6

Enter the numbers of the second matrix:

7 8

9 10

11 12

The result is:

58 64

139 154

Do you want to try another time? “y/n”

n

3- Matrix Mirror. Write a program that reads two matrices from the user and check if they are mirrors to each other. That means each row in a matrix is in the opposite order of each row in the other matrix.

Sample Run

Enter the dimensions of the two matrices:

3 4

Enter the first matrix:

1 2 3 4

5 6 7 8

9 10 11 12

Enter the second matrix:

4 3 2 1

8 7 6 5

12 11 10 9

Yes, they are mirrors to each other.

Do you want to try another time? “y/n”

y

Enter the dimensions of the matrices:

2 2

Enter the first matrix:

1 2

3 4

Enter the second matrix:

2 1

3 4

No, they are not mirrors to each other.

Do you want to try another time? “y/n”

n

4- Matrix Transpose. Write a program that reads a matrix from the user and then displays it's transpose.

Sample Run

Enter the dimensions of the two matrices:

3 3

Enter the first matrix:

1 4 7

2 5 8

3 6 9

The transpose is:

1 2 3

4 5 6

7 8 9

Do you want to try another time? "y/n"

n