

DAILY ASSESSMENT

Date:	15-July-2020	Name:	Swastik R Gowda
Course:	Course-era	USN:	4AL17EC091
Topic:	Week 3	Semester & Section:	6 th Sem 'B' Sec
Github Repository:	swastik-gowda		

FORENOON SESSION DETAILS

Image of session

The screenshot shows a Coursera video player interface. The top navigation bar includes the Coursera logo, a search icon, and the user's name 'Swastik R Gowda'. The breadcrumb trail indicates the course is 'Mathematics for Machine Learning: Linear Algebra', the current week is 'Week 3', and the specific video is 'How matrices transform space'. The left sidebar lists the course content, including 'Introduction to matrices', 'Matrices in linear algebra: operating on vectors', and 'Matrix Inverses'. The main video frame shows a man in a light blue shirt speaking, with a large white box overlaid on the screen containing the text 'MODULE #3'. An 'Activate Windows' watermark is visible in the bottom right corner of the video frame.

The screenshot shows a Coursera video player interface for a video titled 'Determinants and inverses'. The breadcrumb trail indicates the course is 'Mathematics for Machine Learning: Linear Algebra', the current week is 'Week 3', and the specific video is 'Determinants and inverses'. The left sidebar lists the course content, including 'Introduction to matrices', 'Matrices in linear algebra: operating on vectors', and 'Matrix Inverses'. The main video frame shows a man in a light blue shirt speaking, with a large white box overlaid on the screen containing mathematical content. The content includes the matrix $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$, the determinant $|A| = ad - bc$, and a diagram of a rectangle with dimensions a and d , divided into four smaller rectangles with dimensions a , b , c , and d . The area of the rectangle is labeled as $Area = (a+b)(c+d) = ac + ad + bc + bd$. The diagram also shows the area of the rectangle as $Area = ad - bc$.

Report – Report can be typed or hand written for up to two pages.

- ❖ Matrix is an arrangement of numbers into rows and columns. Make your first introduction with matrices and learn about their dimensions and elements. A matrix is a rectangular arrangement of numbers into rows and columns. For example, matrix A has two rows and three columns.
- ❖ The mathematical concept of a matrix refers to a set of numbers, variables or functions ordered in rows and columns. Such a set then can be defined as a distinct entity, the matrix, and it can be manipulated as a whole according to some basic mathematical rules.
- ❖ Matrices can be used to compactly write and work with multiple linear equations, referred to as a system of linear equations, simultaneously. Matrices and matrix multiplication reveal their essential features when related to linear transformations, also known as linear maps.
- ❖ A matrix is a collection of numbers arranged into a fixed number of rows and columns. Usually the numbers are real numbers. In general, matrices can contain complex numbers but we won't see those here.
- ❖ In geology, matrices are used for making seismic surveys. They are used for plotting graphs, statistics and also to do scientific studies and research in almost different fields. Matrices are also used in representing the real world data's like the population of people, infant mortality rate, etc.

Main point of the Matrix:

The Matrix trilogy suggests that everyone has the individual responsibility to make the choice between the real world and an artificial world. Though Neo is the exemplar of free will, fate plays a large role in his adventure. Neo relies on the Oracle, and everything she says comes true in some way.

Application of Matrices:

Almost every branch of physics, including classical mechanics, optics, electromagnetism, quantum mechanics, and quantum electrodynamics, matrices are used to study physical phenomena, such as the motion of rigid bodies.

Matrices have also come to have important applications in computer graphics, where they have been used to represent rotations and other transformations of images. Is a 2×3 matrix. A matrix with n rows and n columns is called a square matrix of order n

Matrices are classified according to the number of rows and columns, and the specific elements therein. (i) Row Matrix: A matrix which has exactly one row is called a row matrix. The above two matrices are row matrices because each has only one row.

Matrices are a useful way to represent, manipulate and study linear maps between finite dimensional vector spaces (if you have chosen basics). The Matrix (1999) and continuing with two sequels, The Matrix Reloaded and The Matrix Revolutions (both in 2003), all written and directed by the Wachowskis and produced by Joel Silver.

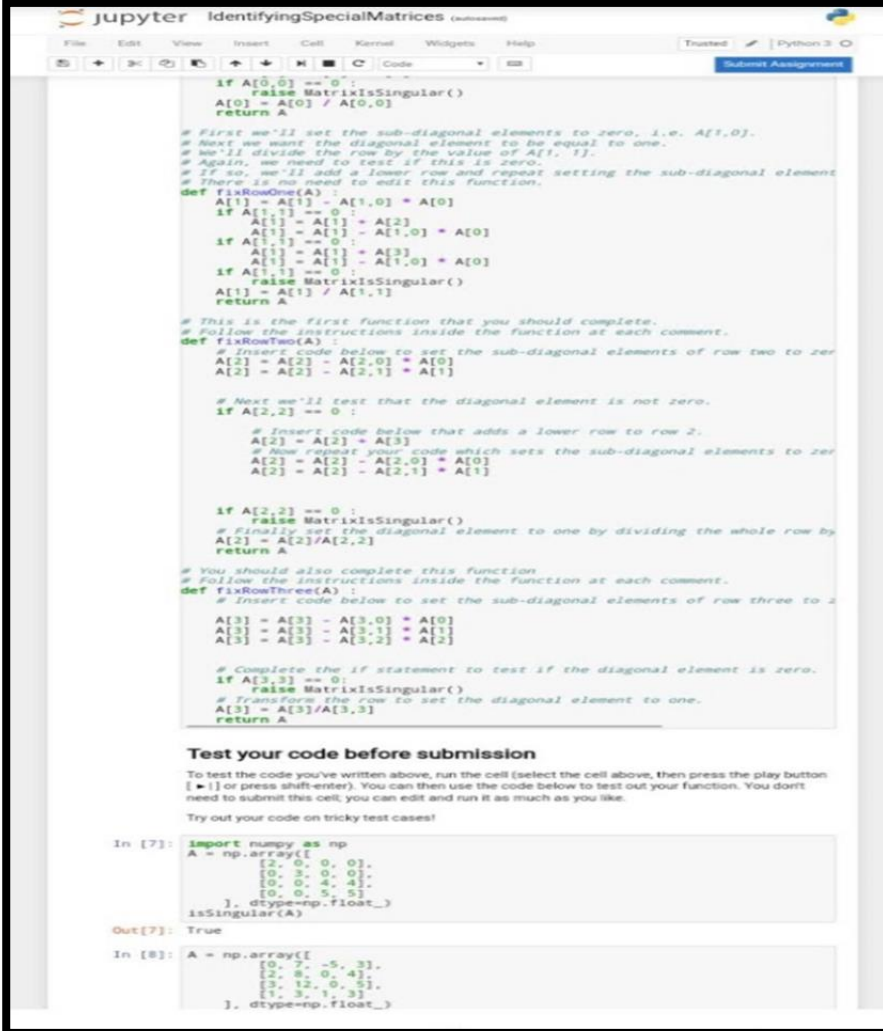
The term matrix was introduced by the 19th-century English mathematician James Sylvester, but it was his friend the mathematician Arthur Cayley who developed the algebraic aspect of matrices in two papers in the 1850s.

In biology, matrix is the material (or tissue) in animal or plant. Structure of connective tissues is an extracellular matrix. It is found in various connective tissues. It is generally used as a jelly like structure instead of cytoplasm in connective tissue.

This matrix just tells us where the basis vectors go. That's the transformation it does. It's not a complicated, multiplying out thing. We don't need to worry about the mechanics of doing the sum. We can just think of it in terms of what it does to vectors in the space.

TYPES OF MATRIX TRANSFORMATION:

1. COMPOSITIONS OR COMBINATION OF MATRIX TRANSFORMATION
2. USING MATRICES TO MAKE TRANSFORMATION



```
jupyter IdentifyingSpecialMatrices (autosaved)
File Edit View Insert Cell Kernel Widgets Help Trusted Python 3
Code

if A[0,0] == 0:
    raise MatrixIsSingular()
A[0] = A[0] / A[0,0]
return A

# First we'll set the sub-diagonal elements to zero, i.e. A[1,0].
# Next we want the diagonal element to be equal to one.
# We'll divide the row by the value of A[1, 1].
# Again, we need to test if this is zero.
# If so, we'll add a lower row and repeat setting the sub-diagonal element
# There is no need to edit this function.
def fixRowOne(A):
    A[1] = A[1] - A[1,0] * A[0]
    if A[1,1] == 0:
        A[1] = A[1] + A[2]
        A[1] = A[1] - A[1,0] * A[0]
    if A[1,1] == 0:
        A[1] = A[1] + A[3]
        A[1] = A[1] - A[1,0] * A[0]
    if A[1,1] == 0:
        raise MatrixIsSingular()
    A[1] = A[1] / A[1,1]
    return A

# This is the first function that you should complete.
# Follow the instructions inside the function at each comment.
def fixRowTwo(A):
    # Insert code below to set the sub-diagonal elements of row two to zero
    A[2] = A[2] - A[2,0] * A[0]
    A[2] = A[2] - A[2,1] * A[1]

    # Next we'll test that the diagonal element is not zero.
    if A[2,2] == 0:
        # Insert code below that adds a lower row to row 2.
        A[2] = A[2] + A[3]
        # Now repeat your code which sets the sub-diagonal elements to zero
        A[2] = A[2] - A[2,0] * A[0]
        A[2] = A[2] - A[2,1] * A[1]

    if A[2,2] == 0:
        raise MatrixIsSingular()
    # Finally, set the diagonal element to one by dividing the whole row by
    A[2] = A[2] / A[2,2]
    return A

# You should also complete this function
# Follow the instructions inside the function at each comment.
def fixRowThree(A):
    # Insert code below to set the sub-diagonal elements of row three to zero
    A[3] = A[3] - A[3,0] * A[0]
    A[3] = A[3] - A[3,1] * A[1]
    A[3] = A[3] - A[3,2] * A[2]

    # Complete the if statement to test if the diagonal element is zero.
    if A[3,3] == 0:
        raise MatrixIsSingular()
    # Transform the row to set the diagonal element to one.
    A[3] = A[3] / A[3,3]
    return A

Test your code before submission
To test the code you've written above, run the cell (select the cell above, then press the play button
[•]) or press shift-enter). You can then use the code below to test out your function. You don't
need to submit this cell; you can edit and run it as much as you like.
Try out your code on tricky test cases!

In [7]: import numpy as np
A = np.array([
    [2, 0, 0, 0],
    [0, 0, 0, 0],
    [0, 0, 0, 0],
    [0, 0, 5, 5]
], dtype=np.float_)
isSingular(A)

Out[7]: True

In [8]: A = np.array([
    [0, 7, -5, 3],
    [2, 8, 0, 4],
    [0, 12, 0, 3],
    [1, 3, -1, 3]
], dtype=np.float_)
```