I MSc (Mathematics and Statistics)   Max. MARKS: 500
SEMESTER II   Submission Date: 21 March 2021

Scientific Project

Write a Python program to implement the following: (**without using numpy libraries**)

1. Get two matrices

2. Check whether the given matrix A is

   (a) row matrix

   (b) column matrix

   (c) square matrix

   (d) rectangular matrix

3. For given two matrices $A_{m \times n}$ and $B_{p \times q}$ do the following

   (a) dimension of matrices

   (b) both dimensions equal $(m = p, n = q)$

   (c) If both dimension are equal, find $A + B, A - B, kA$, where k is a constant

   (d) If $n = p$, find AB

   (e) If $n = p, q = m$, find AB and BA

   (f) If $m = n = p = q$, find AB, BA and check $AB = BA$

4. For the given matrix A

   (a) Find $A^T, A^T A, AA^T$

   (b) Check $A^T A = AA^T$

5. For the given square matrix A, find

   (a) diagonal matrix

   (b) identity matrix

   (c) upper triangular matrix

   (d) lower triangular matrix

   (e) triangular matrix

   (f) Find $A^T, A^T A, AA^T, A^2$

(g) Check symmetric	(j) Inverse(A)
(h) Trace(A)	(k) Orthogonal
(i) Determinant(A)	(l) Cofactor of $(i, j)^{th}$ entry

Gaming Project

Write a Python program for Who wants to be a millionaire?

1. Collect at least 100 questions from the following.

   (a) CSIR Questions on Aptitude (Part A) [20 Questions]

   (b) GATE Questions on Analysis and Linear Algebra [20 Questions]

   (c) IAS Questions General Knowledge [20 Questions]

   (d) Questions about Indian History [20 Questions]

   (e) Questions about Indian Cinema [20 Questions]

2. Inform the rules of the game and time limit to the user

3. Display the questions randomly

4. Provide the choices like, polling, phone a friend and 50-50

5. For polling options, generate 1000 users to poll, then randomly poll for all options and display the results

6. For 50-50, hide 2 options.

7. For more details https://en.wikipedia.org/wiki/Who_Wants_to_Be_a_Millionaire%3F