COEN 140
Lab 2 Report
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Question 1
matrix A:
[[0.5819727 0.92522966 0.14148515 0.01579203 0.64314276]
 [0.75215504 0.57899107 0.8431658 0.64306673 0.14540659]]
rank of A = 2

matrix B:
[[1.6286422 1.19640138]
 [1.19640138 2.04657433]]
rank of B = 2

matrix C:
[[0.90442943 0.97394946 0.7165319 0.49287641 0.48365983]
 [0.97394946 1.19128058 0.61909173 0.38694115 0.67924388]
 [0.7165319 0.61909173 0.73094662 0.54444621 0.21359702]
 [0.49287641 0.38694115 0.54444621 0.41378421 0.10366267]
 [0.48365983 0.67924388 0.21359702 0.10366267 0.43477569]]
rank of C = 2

Question 2
matrix X:
[[2 7 2 2 2]
 [9 7 1 5 4]
 [6 1 1 3 2]]
matrix A:
[[65 87 31]
 [87 172 85]
 [31 85 51]]

column vector w:
[[8]
 [1]
 [4]]
dimension of Aw:
[[731]
 [1208]
 [537]]

dimension of (w^T)A:
[[731 1208 537]]
dimension of (w^T)Aw:
[[9204]]

X(X^T):
[[65 87 31]
 [87 172 85]
 [31 85 51]]
(X(X^T))^T:
[[65 87 31]
 [87 172 85]
 [31 85 51]]
X(X^T) is symmetric

- Output is from a nested for loop that checks if each element of the two matrices is equal to each other

inverse of matrix A:
[[0.20002586 -0.23299716 0.26674425]
 [-0.23299716 0.30437031 -0.36565813]
 [0.26674425 -0.36565813 0.46689941]]
(A^-1)A:
[[1.00000000e+00 -1.06581410e-14 -1.77635684e-15]
 [-1.77635684e-15 1.00000000e+00 0.00000000e+00]
 [0.00000000e+00 7.10542736e-15 1.00000000e+00]]
A(A^-1):
[[1.00000000e+00 -3.55271368e-15 0.00000000e+00]
 [0.00000000e+00 1.00000000e+00 0.00000000e+00]
 [-1.77635684e-15 0.00000000e+00 1.00000000e+00]]

Question 3
column vector x:
[[0.94099133]
 [0.06135804]
 [0.46381378]
 [0.5072112]
 [0.33155979]]
x(x^T):
[[0.88546468 0.05773738 0.43644474 0.47728135 0.31199489]
 [0.05773738 0.00376481 0.0284587 0.03112148 0.02034386]

[0.43644474 0.0284587 0.21512322 0.23525154 0.153782]
[0.47728135 0.03112148 0.23525154 0.25726321 0.16817084]
[0.31199489 0.02034386 0.153782   0.16817084 0.1099319]]
rank of x(x^T) = 1

Question 4

identity matrix I:
[[1. 0. 0. 0. 0.]
[0. 1. 0. 0. 0.]
[0. 0. 1. 0. 0.]
[0. 0. 0. 1. 0.]
[0. 0. 0. 0. 1.]]