Matrix Computation MA423 - Lab 7
Naman Goyal - 180123029

Question 1

Method	Condition Number of Coefficient Matrix	Residual Norm
"MATLAB Command"	5.63485519133985e+13	8.18843884925596e-13
"Cholesky Factorization"	1.04383849489986e+28	1.92516616252966e-09
"Augmented System"	1.96184150942385e+14	8.18382334305398e-13

Question 2

K	Compression Ratio	Error
5.00000000000000e+01	4.06250000000000e-01	1.91885480678119e-02
6.00000000000000e+01	4.87500000000000e-01	1.67039177679806e-02
7.00000000000000e+01	5.68750000000000e-01	1.46840170399507e-02
8.00000000000000e+01	6.50000000000000e-01	1.33151630399957e-02
9.00000000000000e+01	7.31250000000000e-01	1.17489157783297e-02
1.00000000000000e+02	8.12500000000000e-01	1.04338793409767e-02
1.10000000000000e+02	8.93750000000000e-01	9.44388693809909e-03
1.20000000000000e+02	9.75000000000000e-01	8.32263889480670e-03
1.30000000000000e+02	1.05625000000000e+00	7.31954520552514e-03
1.40000000000000e+02	1.13750000000000e+00	6.38434298309193e-03
1.50000000000000e+02	1.21875000000000e+00	5.48229991964691e-03
1.60000000000000e+02	1.30000000000000e+00	4.69850263394768e-03
1.70000000000000e+02	1.38125000000000e+00	3.84965359331322e-03
1.80000000000000e+02	1.46250000000000e+00	3.09100492386449e-03
1.90000000000000e+02	1.54375000000000e+00	2.35216755153417e-03

Question 3

```
Max Diagonal Entry = 1.000000e+00
Min Diagonal Entry = 1.903869e-03


Original Matrix
sigma(1,1) = 8.789335e+00
sigma(89,89) = 2.384233e-03
sigma(90,90) = 3.960651e-15
Rank of Original Matrix: 89


Perturbed Matrix
sigma(1,1) = 8.789335e+00
sigma(89,89) = 2.384233e-03
sigma(90,90) = 3.960644e-15
Rank of Perturbed Matrix: 89


Using QR decomposition
|| I - E||: 0.000000e+00
R(90,90) = 1.903869e-03
```