Aim: Review and practice question set for handling big matrices and images using software platforms.

Note:

1. **Submission Deadline Monday, 7th September, 2020 by 02:00PM, IST.**
2. **Late submission will not be accepted. Please follow the deadline (date and time).**
3. **Submission format is given at the end.**
4. **Submit via Google classroom.**
5. **All values used here are (default) in decimal number system else specified.**
6. **Details about A, B, I and J are given in appendix A1Q2&3.**
7. **You are requested to use only one coding language to solve all problems. Do not use different coding languages for different questions.**

Q2. Perform the following operations on the specified matrices using any software (Matlab/Octave/Python)….

a) Transpose of A and B.
b) Inverse of matrix A and B.
c) Addition (A+B) and (B+A). Comment on the result.
d) Subtraction (A-B) and (B-A). Comment on the result.
e) Multiplication (A*B) and (B*A). Comment on the result.
f) Multiply with a scalar to both matrices A and B. Comment on the result.
    a. C > 1
    b. C < 1
g) Divide with a scalar to both matrices A and B. Comment on the result.
    a. C > 1
    b. C < 1
h) Element by element multiplication (A.*B) and (B.*A). Comment on the result.
i) Find out the location(s) of a specific value….X (Value of X you can select) on both A and B.
j) Find the specific value of X (only first occurrence) using the scan and search mechanism and amplify the value by a factor of 2. (Value of X you can select)
k) Search by scan and search mechanism (may be available multiple times) in the given matrices and replace those values with your birth date. (Value of X you can select). Give the count value i.e. occurrence value. (Do it for both A and B)

Q3. Perform the following operations on the specified images using any software (Matlab/Octave/Python)….

a) Transpose of I and J.
b) Inverse of images I and J.
c) Addition (I+J) and (J+I). Comment on the result.
d) Subtraction (I-J) and (J-I). Comment on the result.
e) Multiplication (I*J) and (J*I). Comment on the result.
f) Multiply with a scalar to both images I and J. Comment on the result.
    a. C > 1
    b. C < 1

g) Divide with a scalar to both images I and J. Comment on the result.
    a. C > 1
    b. C < 1
h) Element by element multiplication (I.*J) and (J.*I). Comment on the result.
i) Find out the location(s) of a specific value….X (Value of X you can select) on both I and J.
j) Find the specific value of X (only first occurrence) using the scan and search mechanism and amplify the value by a factor of 2. (Value of X you can select)
k) Search by scan and search mechanism (may be available multiple times) in the given images and replace those values with your birth date. (Value of X you can select). Give the count value i.e. occurrence value. (Do it for both I and J)
l) Perform following operations on I and J:
    a. Multiply the intensity values with a constant 0.3 if the intensity value is greater than 127.
    b. Multiply the intensity values with a constant 0.3 if the intensity value is less than 127.
    c. Multiply the intensity values with a constant 0.3 if the intensity value is greater than 127 and with a constant 0.7 if it is less than 128.
    d. Multiply the intensity values with a equation E1 if the intensity value is greater than 127 and with a equation E2 if it is less than 128.
    E1= 0.3x+2; x can take value as x=1, 2 and 3. Show and compare the results.
    E1= 0.3x-2; x can take value as x= 1, 2 and 3. Show and compare the results.

Submission format:

1. Write question number and problem statement (such as….Q2(a), Q3(f) and the problem statement, etc.)
2. Your approach of coding in stepwise manner such as what you will do first then next step, etc.
3. Your code (May be Matlab/Octave/Python)
4. Your results for each problem. Copy paste the images obtained from your coding.
5. Your comments wherever asked in question.
6. Execution time required by the software you used for each subpart of the questions.

Appendix A1Q2&3

Matrix A is,

63	134	79	35	152	31	146	72	9	81	105	26	79	35	152	31	146	72	9	81
99	95	61	92	131	163	177	76	10	1	9	173	61	92	131	163	177	76	10	1
111	198	90	96	26	88	77	138	5	136	185	92	90	96	26	88	77	138	5	136
40	8	104	175	132	36	169	66	191	64	7	121	104	175	132	36	169	66	191	64
58	12	43	198	190	77	171	61	130	67	52	165	43	198	190	77	171	61	130	67
89	80	82	159	126	101	58	136	97	7	106	47	82	159	126	101	58	136	97	7
160	81	151	158	106	28	196	100	38	34	174	160	151	158	106	28	196	100	38	34
145	85	146	146	106	74	27	162	41	42	53	45	146	146	106	74	27	162	41	42
149	167	50	93	162	169	121	75	66	136	117	28	50	93	162	169	121	75	66	136
164	197	154	16	134	175	148	124	157	191	5	151	154	16	134	175	148	124	157	191
192	31	74	132	141	65	138	20	167	30	90	160	74	132	141	65	138	20	167	30
174	140	157	127	176	9	91	20	83	103	179	104	157	127	176	9	91	20	83	103
147	53	99	20	87	8	113	136	65	40	196	29	99	20	87	8	113	136	65	40
107	41	8	86	195	43	155	20	160	112	144	97	8	86	195	43	155	20	160	112
18	107	184	139	107	173	110	45	60	89	183	8	184	139	107	173	110	45	60	89
52	115	124	78	2	112	69	76	53	74	190	142	124	78	2	112	69	76	53	74
161	54	136	100	193	126	13	120	99	33	13	134	136	100	193	126	13	120	99	33
179	145	140	25	82	173	78	122	151	187	183	150	140	25	82	173	78	122	151	187
118	130	175	171	52	144	3	64	172	132	153	189	175	171	52	144	3	64	172	132
91	82	58	133	16	59	53	122	60	174	193	64	58	133	16	59	53	122	60	174

Matrix B is,

84	62	175	38	159	123	90	115	142	163	80	82	62	175	38	159	123	90	115	142
58	70	156	44	80	180	53	43	122	4	21	23	70	156	44	80	180	53	43	122
173	0	64	47	155	194	8	32	196	196	96	71	0	64	47	155	194	8	32	196
147	167	49	152	129	167	25	7	110	106	123	79	167	49	152	129	167	25	7	110
142	125	80	168	152	2	194	100	6	56	50	127	125	80	168	152	2	194	100	6
193	129	53	72	103	92	142	23	102	70	104	23	129	53	72	103	92	142	23	102
80	67	77	198	140	60	161	33	150	15	166	192	67	77	198	140	60	161	33	150
25	6	118	132	84	25	187	24	189	161	167	100	6	118	132	84	25	187	24	189
177	5	31	133	3	163	143	128	184	133	167	94	5	31	133	3	163	143	128	184
75	130	67	152	162	74	108	42	97	124	165	102	130	67	152	162	74	108	42	97
182	144	54	145	3	62	51	83	16	79	82	104	144	54	145	3	62	51	83	16
3	97	19	17	127	36	128	32	1	96	199	189	97	19	17	127	36	128	32	1
40	154	186	41	79	151	13	196	75	166	160	104	154	186	41	79	151	13	196	75
91	130	110	164	141	181	193	58	56	98	145	196	130	110	164	141	181	193	58	56
34	55	180	103	118	16	27	95	169	70	198	8	55	180	103	118	16	27	95	169
164	70	164	147	95	195	9	107	155	55	14	159	70	164	147	95	195	9	107	155
52	27	98	180	93	32	146	32	132	123	60	166	27	98	180	93	32	146	32	132
189	134	69	187	42	199	60	26	70	95	186	132	134	69	187	42	199	60	26	70
135	93	94	182	139	46	122	52	74	112	9	188	93	94	182	139	46	122	52	74
62	8	13	146	115	135	29	138	85	133	104	118	8	13	146	115	135	29	138	85

Details regarding I and J:

For I: use cameraman image of size 512 - by - 512 in grayscale.
For J: use Lena image of size 512 - by - 512 in grayscale.