

Assignment # 3

Course Title:

Graph Theory

Submitted To:

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Submitted By:

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FARO-BSM-034

QNO 1: Consider a matrix of order 10×10 and

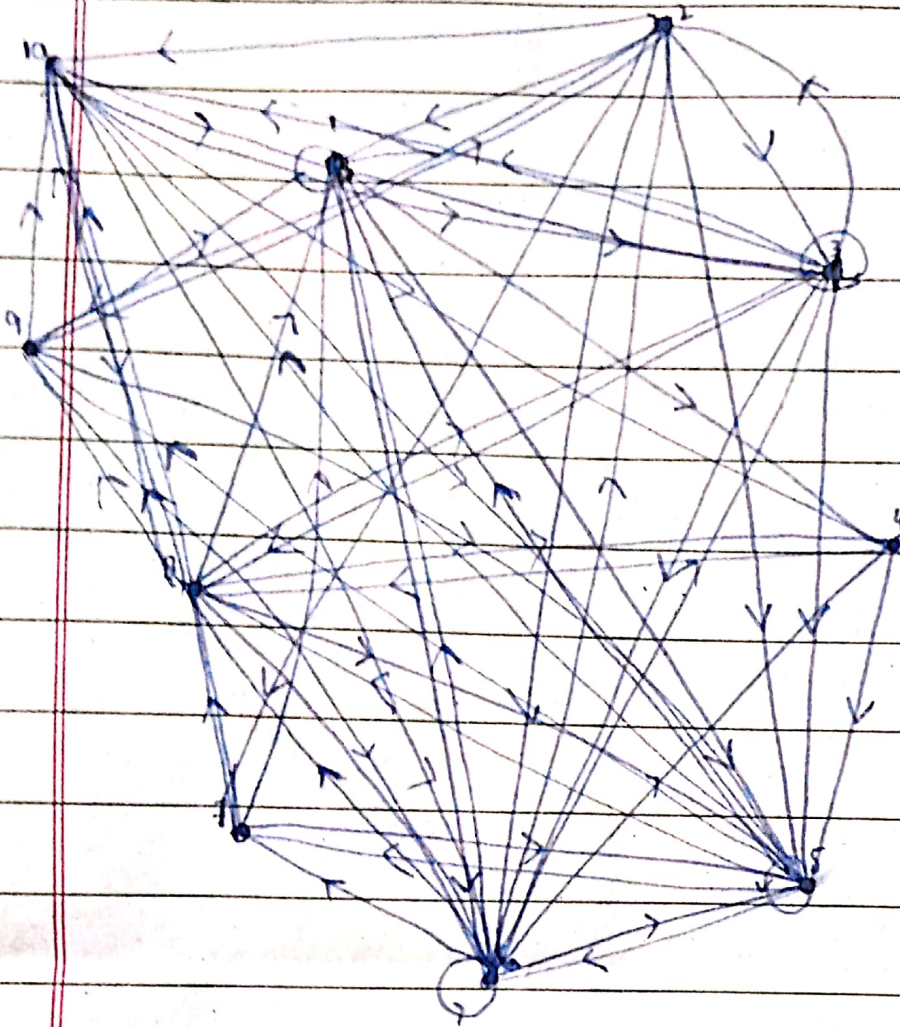
- (i) Draw a digraph for that matrix
- (ii) Check whether the digraph is strongly connected?

let

Date: _____

A=

	1	2	3	4	5	6	7	8	9	10
1	1	0	1	1	1	1	0	1	1	1
2	1	0	1	0	1	1	1	0	1	1
3	1	1	1	0	1	1	0	1	0	1
4	0	0	0	0	1	0	0	1	0	0
5	1	0	0	0	1	1	1	1	1	1
6	1	1	1	1	1	1	1	1	1	0
7	1	0	0	0	1	0	0	1	0	1
8	1	0	1	1	1	1	0	0	1	1
9	1	1	0	0	1	0	0	0	0	1
10	1	0	1	1	1	1	0	1	0	0



(Digraph)

Yes, it is strongly connected graph.

R =

1	0	1	1	1	1	0	1	1	1
1	0	1	0	1	1	1	0	1	1
1	1	1	0	1	1	0	1	0	1
0	0	0	0	1	0	0	1	0	0
1	0	0	0	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	0
1	0	0	0	1	0	0	1	0	1
1	0	1	1	1	1	0	0	1	1
1	1	0	0	1	0	0	0	0	1
1	0	1	1	1	1	0	1	0	0

>> R^2

ans =

7	3	5	4	8	6	2	6	4	5
7	3	4	3	7	5	2	6	3	5
7	2	6	4	7	7	3	5	5	5
2	0	1	1	2	2	1	1	2	2
7	2	4	4	7	5	2	5	4	5
8	3	5	3	9	6	3	6	5	7
4	0	3	3	4	4	1	3	3	3
6	3	4	3	7	5	2	6	3	4

```
4 0 3 2 4 4 2 3 3 3
5 2 4 3 6 5 2 5 4 4
```

```
>> R^3
```

```
ans =
```

```
46 15 32 24 50 40 17 37 30
35
42 12 30 23 45 37 15 33 28
32
47 18 32 24 51 39 16 39 28
35
13 5 8 7 14 10 4 11 7 9
41 13 28 22 45 35 14 34 26
31
52 16 35 27 55 44 18 41 32
39
25 10 17 14 28 21 8 22 15 18
40 12 28 21 43 35 15 31 27
31
26 10 17 14 28 21 8 22 15 19
37 13 25 19 40 31 13 29 23
28
```

```
>> R^4
```

ans =

302 102 205 158 326 255 105 244
188 227

274 95 186 144 297 231 94 224
169 205

305 99 210 160 329 261 108 244
194 231

81 25 56 43 88 70 29 65 53
62

267 89 182 141 289 227 93 216
168 201

332 111 227 176 359 282 115 270
208 249

164 53 113 86 178 141 59 131
106 125

262 90 177 137 283 220 90 213
161 196

166 53 115 88 180 143 59 133
107 126

239 79 163 125 258 203 84 193
150 180

>> R^5

ans =

1954	648	1335	1028	2112
1661	683	1578	1229	1472
1775	586	1215	934	1919
1512	623	1431	1121	1339
1981	665	1350	1041	2141
1679	689	1604	1238	1489
529	179	359	278	572
447	183	429	329	397
1732	577	1182	911	1873
1471	605	1400	1088	1304
2153	717	1471	1133	2329
1830	752	1740	1354	1622
1070	360	727	561	1156
905	372	866	667	804
1692	558	1158	891	1829
1441	593	1365	1068	1276
1082	365	736	568	1170
916	376	877	675	813
1549	516	1057	815	1674
1315	540	1252	972	1166

>> R^6

ans =

12672	4225	8648	6665
13700	10760	4421	10245
7953	9539		
11521	3848	7858	6057
12455	9777	4017	9317
8670			7223
12836	4267	8768	6753
13877	10909	4485	10370
8070	9668		
3424	1135	2340	1802
2912	1198	2765	2156
			2580
11232	3741	7666	5907
12143	9539	3921	9078
8457			7053
13968	4655	9533	7345
15101	11862	4876	11290
8769	10516		
6927	2299	4732	3645
5888	2421	5595	4357
			5218
10980	3667	7490	5774
11871	9319	3828	8880
8263			6885
7010	2327	4789	3688
5959	2451	5661	4410
			5281
10041	3344	6855	5282

10856 8529 3505 8116 6306
7560

>> R^7

ans =

82163	27361	56089	43216
88828	69789	28685	66405
51602	61864		
74686	24858	50991	39285
80743	63446	26080	60355
46918	56239		
83250	27747	56818	43783
90003	70695	29053	67296
52259	62673		
22212	7408	15156	11681
24014	18858	7749	17958
13938	16720		
72830	24258	49713	38306
78737	61856	25423	58865
45733	54834		
90570	30164	61824	47636
97915	76925	31618	73201
56876	68192		
44925	14977	30659	23628
48570	38147	15675	36319

28197	33819		
71183	23694	48599	37442
76957	60470	24857	57525
44717	53601		
45466	15158	31027	23911
49154	38605	15864	36756
28535	34226		
65112	21690	44445	34246
70394	55301	22729	52628
40886	49023		

>> R^8

ans =

532786	177480	363671	280221
576002	452499	185978	430634
334546	401133		
484316	161355	330575	254726
523601	411318	169047	391470
304088	364631		
539794	179772	368479	283914
583577	458482	188445	436275
338991	406426		
144013	47952	98312	75748
155694	122326	50280	116390
90450	108435		

472249	157302	322356	248385
510555	401093	164851	381699
296546	355559		
587285	195625	400876	308888
634921	498791	205004	474680
368775	442168		
291288	97003	198846	153210
314916	247416	101694	235423
182938	219322		
461603	153786	315072	242779
499045	392029	161121	373109
289829	347532		
294791	98167	201238	155053
318702	250392	102917	238253
185139	221960		
422208	140632	288199	222064
456454	358593	147385	341250
265125	317884		

>> R^9

ans =

3454729	1150716	2358203	1817052
3734950	2934205	1205981	2792290
2169401	2601097		
3140401	1045981	2143665	1651735

3395127	2667266	1096274	2538214
1972060	2364452		
3500241	1165952	2389228	1840977
3784155	2972805	1221831	2829117
2197900	2635333		
933852	311088	637428	491164
1009600	793122	325972	754808
586375	703091		
3062210	1019995	2090258	1610600
3310595	2600813	1068950	2475048
1922898	2305558		
3808125	1268442	2599425	2002924
4117013	3234346	1329337	3077933
2391302	2867166		
1888846	629200	1289298	993449
2042056	1604214	659335	1526692
1186046	1422108		
2993126	996930	2043131	1574273
3235905	2542176	1044860	2419181
1879572	2253565		
1911559	636769	1304801	1005396
2066612	1623503	667261	1545053
1200305	1439207		
2737730	911917	1868766	1439935
2959794	2325220	955679	2212787
1719137	2061253		

$$>> \quad B \quad =$$

$$R+R^2+R^3+R^4+R^5+R^6+R^7+R^8+R^9$$

B =

4084660	1360550	2788189	2148369
4415977	3469216	1425872	3301440
2564954	3075373		
3713023	1236738	2534525	1952907
4014195	3153593	1296153	3001050
2331611	2795574		
4138462	1378523	2824892	2176656
4474141	3514878	1444630	3344951
2598685	3115861		
1104126	367792	753660	580724
1193687	937747	385416	892428
693310	831296		
3620569	1205977	2471389	1904276
3914245	3075040	1263860	2926346
2273517	2725950		
4502494	1499734	3073397	2368133
4867703	3824087	1571724	3639162
2827322	3389959		
2233250	743902	1524395	1174596
2414397	1896736	779565	1805052
1402329	1681418		

3538893	1178740	2415660	1861321
3825941	3005696	1235366	2860310
2222263	2664469		
2260105	752850	1542726	1188720
2443429	1919543	788938	1826758
1419189	1701636		
3236922	1078193	2209515	1702490
3499477	2749198	1129937	2616261
2032603	2437098		

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