Assignment#04

Submitted To: Sir Haider Ali
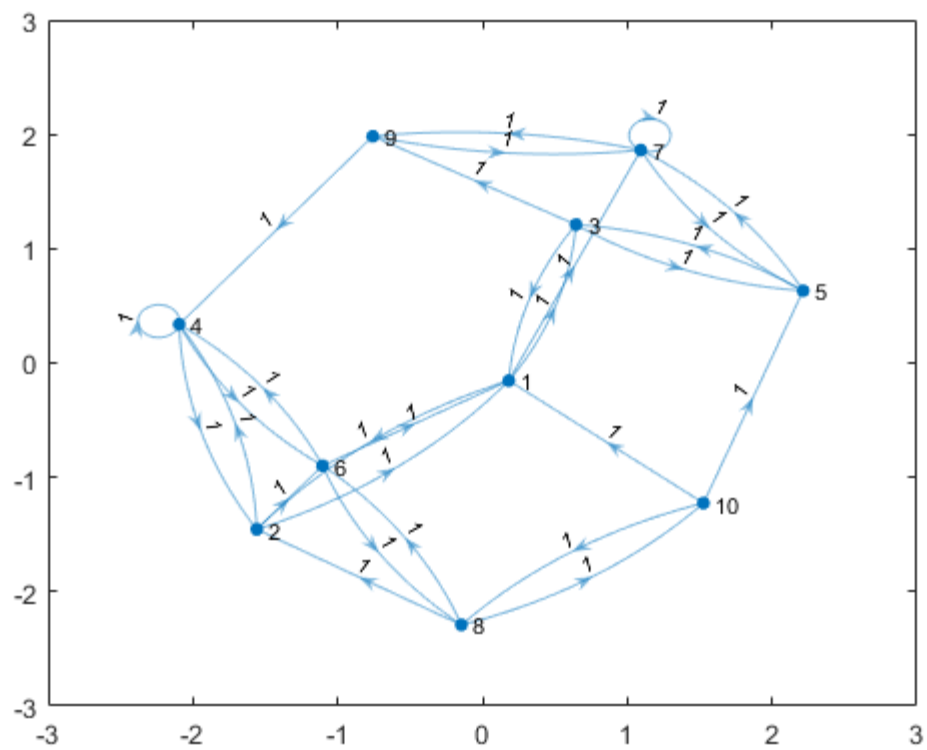

Submitted By: M Abbas

Reg.No: FA20-BSM-049

Subject: Graph Theory

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A =

```
0  1  1  0  0  0  1  0  0  0

1  0  0  1  0  1  0  0  0  0

1  0  0  0  1  0  0  0  1  0

0  1  0  1  0  1  0  0  0  0

0  0  1  0  0  0  1  0  0  0

1  0  0  1  0  0  0  1  0  0

0  0  0  0  1  0  1  0  1  0
```

```
0  1  0  0  0  1  0  0  0  1
0  0  0  1  0  0  1  0  0  0
1  0  0  0  1  0  0  1  0  0
```

$$A^2 = A * A$$

```
2  0  0  1  2  1  1  0  2  0
1  2  1  2  0  1  1  1  0  0
0  1  2  1  0  0  3  0  0  0
2  1  0  3  0  2  0  1  0  0
1  0  0  0  2  0  1  0  2  0
0  3  1  1  0  2  1  0  0  1
0  0  1  1  1  0  3  0  1  0
3  0  0  2  1  1  0  2  0  0
0  1  0  1  1  1  1  0  1  0
0  2  2  0  0  1  2  0  0  1
```

$$A^3 = A^2 * A$$

```
1  3  4  4  1  1  7  1  1  0
4  4  1  5  2  5  2  1  2  1
3  1  0  2  5  2  3  0  5  0
3  6  2  6  0  5  2  2  0  1
0  1  3  2  1  0  6  0  1  0
7  1  0  6  3  4  1  3  2  0
1  1  1  2  4  1  5  0  4  0
```

```
1  7  4  3  0  4  4  1  0  2
2  1  1  4  1  2  3  1  1  0
6  0  0  3  5  2  2  2  4  0
```

$$A^4 = A^3 * A$$

```
 8   6   2   9  11   8  10   1  11   1
11  10   6  16   4  10  10   6   3   1
 3   5   8  10   3   3  16   2   3   0
14  11   3  17   5  14   5   6   4   2
 4   2   1   4   9   3   8   0   9   0
 5  16  10  13   1  10  13   4   1   3
 3   3   5   8   6   3  14   1   6   0
17   5   1  14  10  11   5   6   8   1
 4   7   3   8   4   6   7   2   4   1
 2  11  11   9   2   5  17   2   2   2
```

$$A^5 = A^4 * A$$

```
17  18  19  34  13  16  40   9  12   1
27  33  15  39  17  32  28  11  16   6
16  15   6  21  24  17  25   3  24   2
30  37  19  46  10  34  28  16   8   6
 6   8  13  18   9   6  30   3   9   0
39  22   6  40  26  33  20  13  23   4
11  12   9  20  19  12  29   3  19   1
```

```
18  37  27  38   7  25  40  12   6   6

17  14   8  25  11  17  19   7  10   2

29  13   4  27  30  22  23   7  28   2
```

$$A^6 = A^5 * A$$

```
54  60  30   80  60  61   82  17  59   9

86  77  44  120  49  83   88  38  43  11

40  40  40   77  33  39   89  19  31   3

96  92  40  125  53  99   76  40  47  16

27  27  15   41  43  29   54   6  43   3

65  92  65  118  30  75  108  37  26  13

34  34  30   63  39  35   78  13  38   3

95  68  25  106  73  87   71  31  67  12

41  49  28   66  29  46   57  19  27   7

41  63  59   90  29  47  110  24  27   7
```

$$A^7 = A^6 * A$$

```
160  151  114  260  121  157  255   70  112  17

215  244  135  323  143  235  266   94  132  38

122  136   73  187  132  136  193   42  129  19

247  261  149  363  132  257  272  115  116  40

 74   74   70  140   72   74  167   32   69   6

245  220   95  311  186  247  229   88  173  37

102  110   73  170  111  110  189   38  108  13

192  232  168  328  108  205  306   99   96  31
```

130 126 70 188 92 134 154 53 85 19

176 155 70 227 176 177 207 54 169 24

$$A^8 = A^7 * A$$

439 490 281 680 386 481 648 174 369 70

652 632 358 934 439 661 756 273 401 94

364 351 254 588 285 365 576 155 266 42

707 725 379 997 461 739 767 297 421 115

224 246 146 357 243 246 382 80 237 32

599 644 431 951 361 619 833 284 324 88

306 310 213 498 275 318 510 123 262 38

636 619 300 861 505 659 702 236 474 99

349 371 222 533 243 367 461 153 224 53

426 457 352 728 301 436 728 201 277 54

$$A^9 = A^8 * A$$

1322	1293	825	2020	999	1344	1842	551	929	174
1745	1859	1091	2628	1208	1839	2248	755	1114	273
1012	1107	649	1570	872	1094	1491	407	830	155
1958	2001	1168	2882	1261	2019	2356	854	1146	297
670	661	467	1086	560	683	1086	278	528	80
1782	1834	960	2538	1352	1879	2117	707	1264	284
879	927	581	1388	761	931	1353	356	723	123
1677	1733	1141	2613	1101	1716	2317	758	1002	236
1013	1035	592	1495	736	1057	1277	420	683	153

1299   1355   727   1898   1134   1386   1732   490   1080   201

$$B = A + A^2 + A^3 + A^4 + A^5 + A^6 + A^7 + A^8 + A^9$$

2003	2022	1276	3088	1593	2069	2886	823	1495	272
2742	2861	1651	4068	1862	2867	3399	1179	1711	424
1561	1656	1032	2456	1355	1656	2396	628	1289	221
3057	3135	1760	4440	1922	3170	3506	1331	1742	477
1006	1019	716	1648	939	1041	1735	399	898	121
2743	2832	1568	3979	1959	2869	3322	1137	1813	430
1336	1397	913	2150	1217	1410	2182	534	1162	178
2639	2702	1666	3965	1805	2709	3445	1145	1653	388
1556	1604	924	2321	1117	1630	1980	655	1035	235
1980	2056	1225	2982	1678	2076	2821	781	1587	291