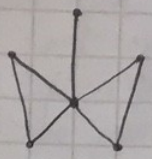
HW 5 CprE 310 Jacob Baicken

1.)

i.) 

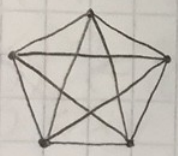
7 edges

ii.) 

7 edges

2.) $\sum_{g \in G} \deg(g) = 2m$ (total # of degrees)

The average number of degrees is $\frac{2m}{n}$.
If c_1 is the minimum vertex degree,
then mathematically the min $\leq$ the average so $c_1 \leq \frac{2m}{n}$.
The reverse goes for the max being $\geq$ the average.
So $c_2 \geq \frac{2m}{n}$.

3.) 

5 vertices

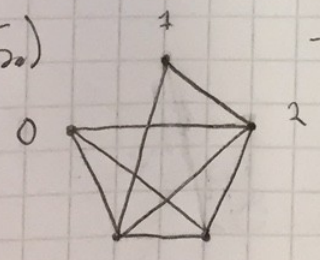
4.) $|G \cup \bar{G}| = 28$ edges

This is half the sum of the degrees in $G \cup \bar{G}$, which is all possible edges in the set of vertices

$= \frac{1}{2}(n-1)n$, where n is the number vertices.

$0 = n^2 - n - 56 = (n+7)(n-8)$ $n = -7, 8$

8 vertices

5.) 

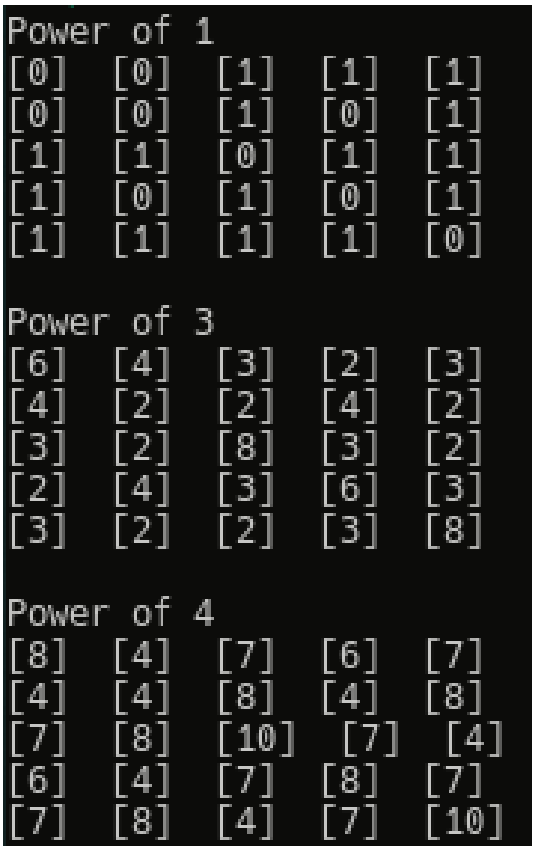
- Generated Graph

Program says 0 → 4 of length 3 has 3 possible
0→2→3→4
0→3→2→4 ✓
0→2→1→4

Programs says 4→0 of len 1 is 1
4→0 ✓

Program says 2→4 of len. 4 is 4 possible
2→0→3→2→4 2→4→0→3→4 ✓
2→3→0→2→4 2→4→3→0→4

Sample output of my program:



I wrote my program in C++ as I have never use Matlab in my life and feel most confident about C programming. I'm not sure about what was said on piazza that all ECPE students have done Matlab. I think only electrical engineering students learn matlab. Hopefully, it compiles. :)

HW 5

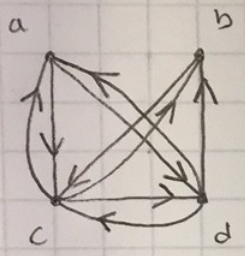
6.) Question 7

	a	b	c	d
a	1	1	1	1
b	0	0	0	1
c	1	1	0	0
d	0	1	1	1

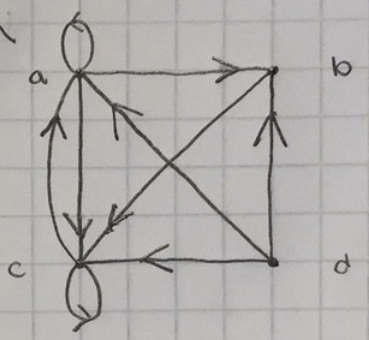
Question 8

	a	b	c	d	e
a	0	1	0	1	0
b	1	0	1	1	1
c	0	1	1	0	0
d	1	0	0	0	1
e	0	0	1	0	1

7.) Question 11



Question 12



8.) For an undirected graph, you get 2 · # of edges

For a directed graph, you get # of edges

9.) a.) Is weakly connected, a to anything only works on undirected.

b.) Is weakly connected, c to anything only works undirected.

c.) Is neither strongly or weakly connected