

# Math 61 HW #8

1. a)  $\{b, m, e, f, g, b, c, h, j, i, d\}$

b)  $\{a, h, g, f, e, m, l, d, c, k, j, o, p, n, i, b, a\}$

2. a)  $\{a, b\}$  and  $\{a, d\}$  must be in HC

$\{i, l\}$  and  $\{l, k\}$  must be

$\{b, c\}$  and  $\{b, e\}$  must be

$\{i, j\}$  and  $\{j, k\}$  must be

either e, f or g, h will be removed


b) X

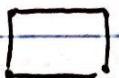
c) X

3. a) X

b) X

c) X

4. a) 

b) 

5. a) Yes, a Hamiltonian cycle visits every vertex once and returns to the starting point, therefore it inherently contains a Hamiltonian path

b) No, it may be impossible to return to the starting vertex

6. a)  $a \rightarrow f$

$\{a, b, c, f\} \rightarrow 7$

b)  $b \rightarrow j$

$\{b, c, f, j\} \rightarrow 7$

c)  $h \rightarrow d$

$\{h, f, c, d\} \rightarrow 10$

7.  $ga, nah$

8.  $L(v)$  will either be the shortest length of a path to  $v$ , or  $\infty$  if  $v$  is disconnected from the starting component

7. a) 

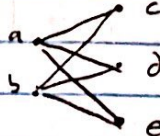
	a	b	c	d	e
a	0	1	1	1	1
b	1	0	0	0	0
c	1	1	0	0	1
d	1	0	1	0	0
e	1	0	1	0	0

b) 

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

c) 

	a	b	c	d	e	f	g
a	0	2	0	0	0	0	0
b	2	0	1	0	1	0	0
c	0	1	1	0	1	0	0
d	0	0	0	1	1	0	1
e	0	1	1	1	0	1	0
f	0	0	0	0	1	0	1
g	0	0	0	1	0	1	0

d) 

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

e) 

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



10. a b c d e

$$a) \begin{bmatrix} 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 \end{bmatrix}$$

b) a b c d e

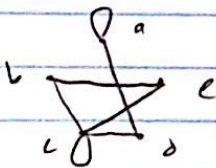
$$\begin{bmatrix} 0 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 \\ 1 & 1 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 & 0 \end{bmatrix}$$

c and d) Same as #7

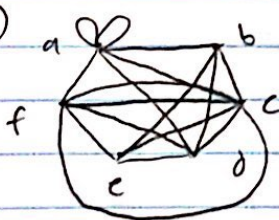
e) a b c d e f g

$$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 0 \end{bmatrix}$$

11. a)



b)



12. It must be a disconnected graph with 2 components at least