

Lecture 26

22 October 2021 11:04

- * Even no. of odd degrees
- * Atleast two vertices with same degree
- * degree $< n$
- * $0, (n-1)$ shouldn't occur simultaneously.

Q13.

Determine whether each of these sequences is graphic. For those that are, draw a graph having the given degree sequence.

- a) 5, 4, 3, 2, 1, 0 b) 6, 5, 4, 3, 2, 1 c) 2, 2, 2, 2, 2, 2
d) 3, 3, 3, 2, 2, 2 e) 3, 3, 2, 2, 2, 2 f) 1, 1, 1, 1, 1, 1
g) 5, 3, 3, 3, 3, 3 h) 5, 5, 4, 3, 2, 1

(a) 5, 4, 3, 2, 1, 0 X

(b) 6, 5, 4, 3, 2, 1 X

(c) 2, 2, 2, 2, 2, 2 ✓ ✓ ✓ ✓

(d) 3, 3, 3, 2, 2, 2 X

(e) 3, 3, 2, 2, 2, 2 ✓ ✓ ✓ ✓

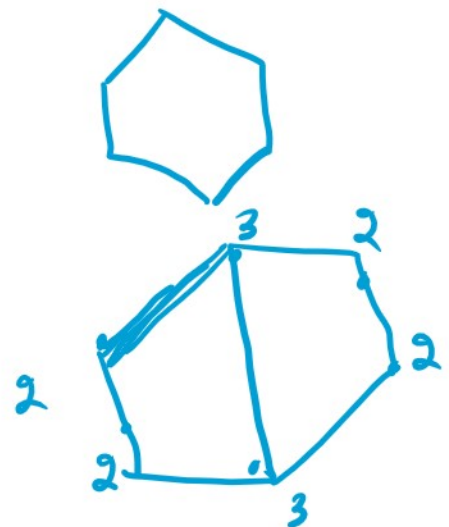
(f) 1, 1, 1, 1, 1, 1 ✓ ✓ ✓ ✓

(g) 5, 3, 3, 3, 3, 3 ✓ ✓ ✓ ✓ W_5

(h) 5, 5, 4, 3, 2, 1 ✓ ✓ ✓ ✓ Not graphic.

↓
Connected to all

Minimum degree = 2

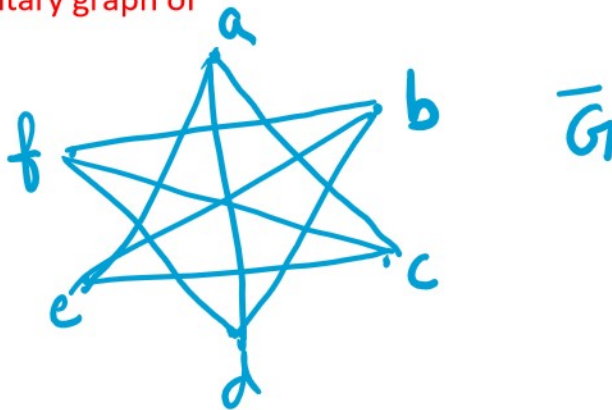
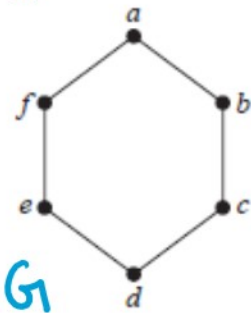




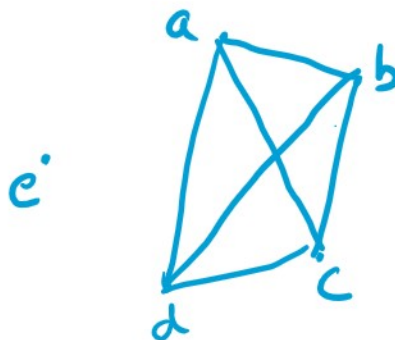
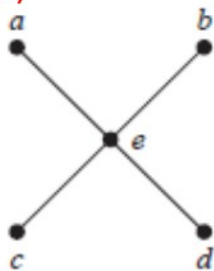
Complementary Graph \bar{G} of a simple graph has the same vertices as G . Two vertices are adjacent in \bar{G} if and only if they are not adjacent in G .

Q14. Draw the complementary graph of

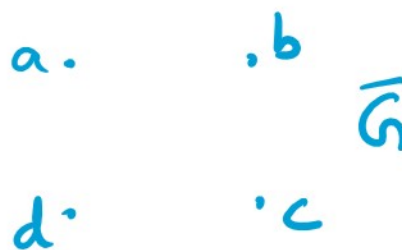
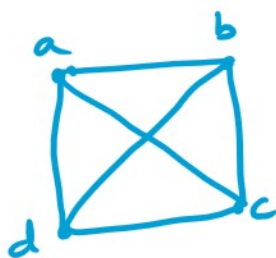
(i)



(ii)



(iii) K_4



(iv) Q_2

Try this.

Q15. If G is a simple graph with 15 edges and \bar{G} has 13 edges. How many vertices does G have?

Q15. If G is a simple graph with 15 edges and \bar{G} has 13 edges. How many vertices does G has?

$$E(G) = 15, E(\bar{G}) = 13$$

$$G \cup \bar{G} = K_n$$

$$G \cap \bar{G} = \emptyset$$

$$E(G) + E(\bar{G}) = E(K_n)$$

$$15 + 13 = \frac{n(n-1)}{2}$$

$$n^2 - n - 56 = 0, n = 8, -7$$

Q16. If the degree sequence of the simple graph G is 4, 3, 3, 2, 2. What is the degree sequence of \bar{G} ?

$$n = 5,$$

G	\bar{G}
a	4
b	3
c	3
d	2
e	2

$$G \cup \bar{G} = K_n$$

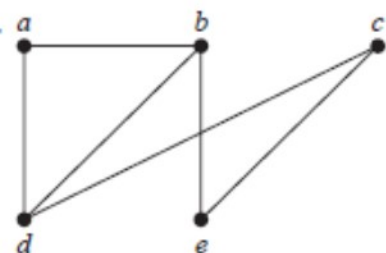
$$K_n \text{ degree}(K_n) = n-1$$

$$\text{max degree} = 4$$

$$\text{deg seq. of } \bar{G} = 2, 2, 1, 1, 0$$

Different ways of representing Graphs

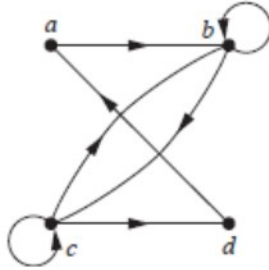
- Adjacency List:** Here we list the vertices that are adjacent to each vertex of graph G without multiple edges.



a	b, d
b	a, d, e, c
c	d, e, b
d	a, b, e
e	b, c, d

a	u,v
e	b,c

For Directed Graph, list all the vertices that are **terminal vertices** of edges starting at each vertex of graph.



Initial vertex	a	b
	b	b,c
	c	b,c,d
	d	a