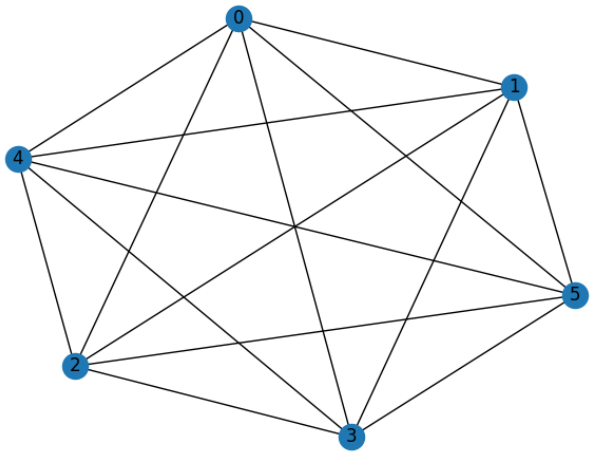
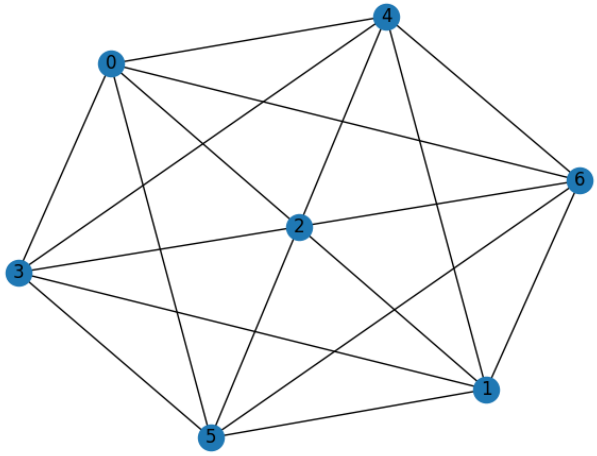
Week 7

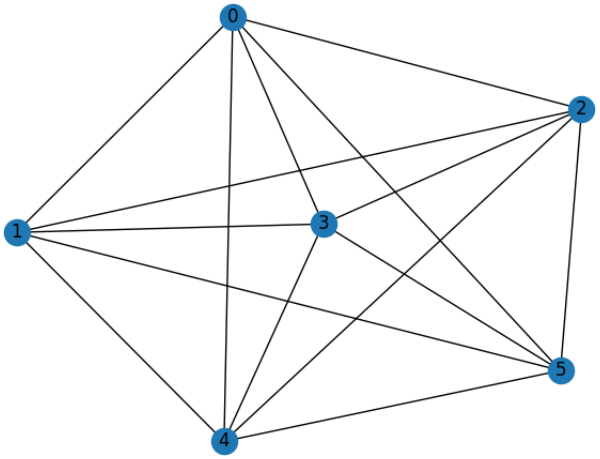
1) Which of the following graphs are not complete graphs? (MSQ)



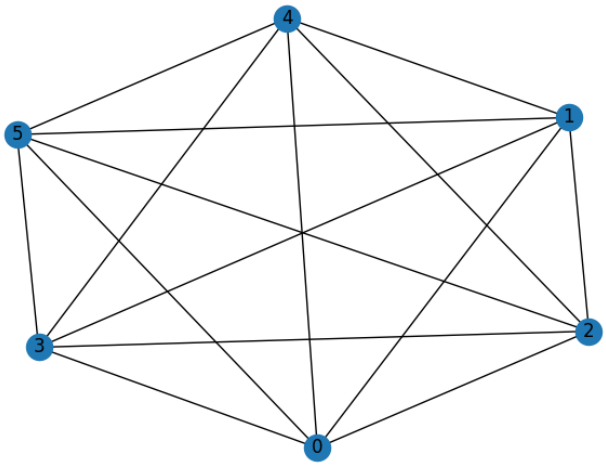
A.



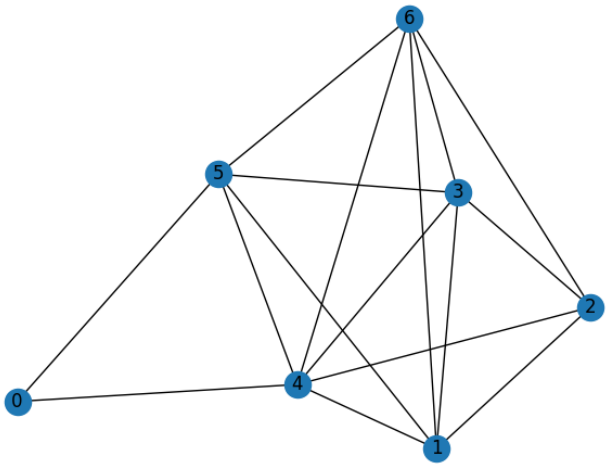
B.



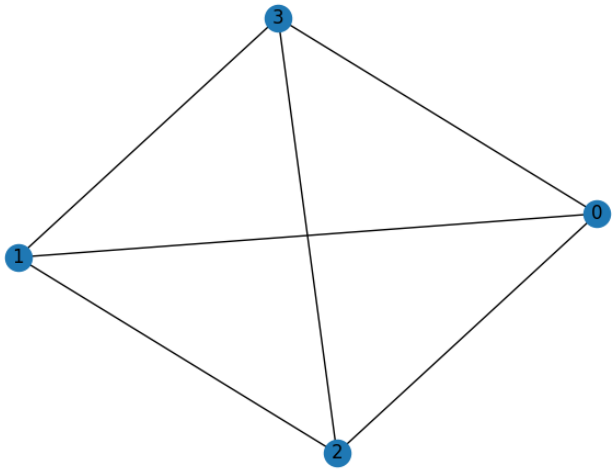
C.



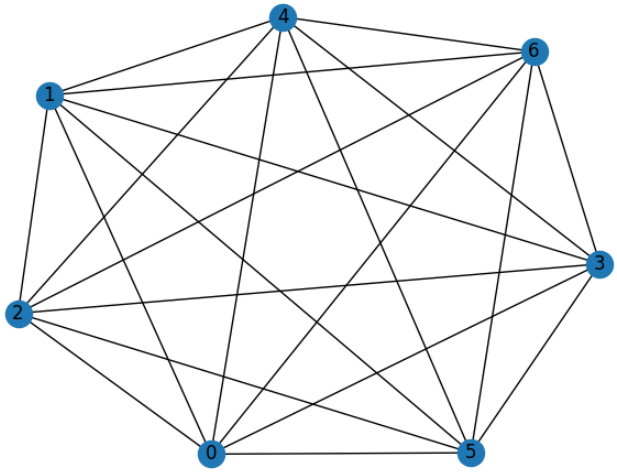
D.



E.



F.



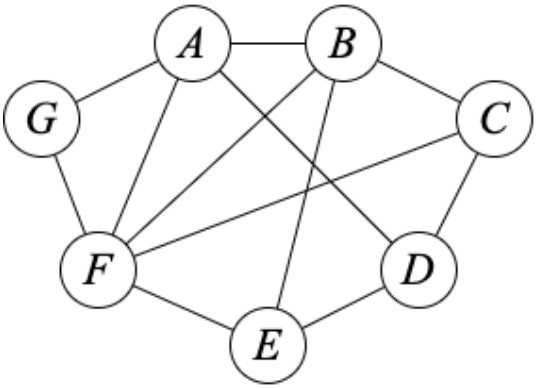
G.

Correct Answer: B E

Solution: In a complete graph having n vertices, all vertices must be connected to every other vertex, i.e., every vertex must have $n-1$ edges.

Lecture 252: Degree and degree sequence.

2) What is the degree sequence of the given graph?



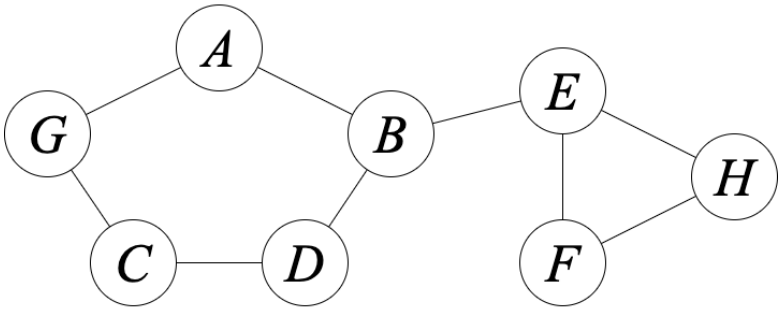
A. ⟨4,3,3,3,3,5,2⟩
B. ⟨4,4,3,3,3,4,2⟩
C. ⟨4,4,3,3,3,5,2⟩
D. ⟨4,3,3,3,3,4,2⟩

Correct Answer: C

Solution: Degree sequence is the sequence of the number of edges of every vertex.

Lecture 252: Degree and degree sequence.

3) What are the cut edge and the cut vertex respectively, in the following graph?



A. (B, D) and B
B. (E, F) and F
C. (B, E) and E
D. (A, B) and A

Correct Answer: C

Solution: Cut vertex is that vertex that disconnects the graph, while the cut edge is that edge that disconnects the graph. Here removal of the edge (B, E) leads to a disconnected graph, also removal of vertex E leads to a disconnected graph.

Lecture 281, 282: Cut vertex, Cut edge.

4) The number of components in a K_n and C_n respectively are?

A. 2,2
B. 2,1
C. 1,2
D. 1,1

Correct Answer: D

Solution: K_n is a complete graph, C_n is a graph with cycle and all the vertices are connected, hence they both have only one component.

Lecture 277, 252: Degree and degree sequence, Property of a cycle.

5) Which of the following is a graphic sequence?

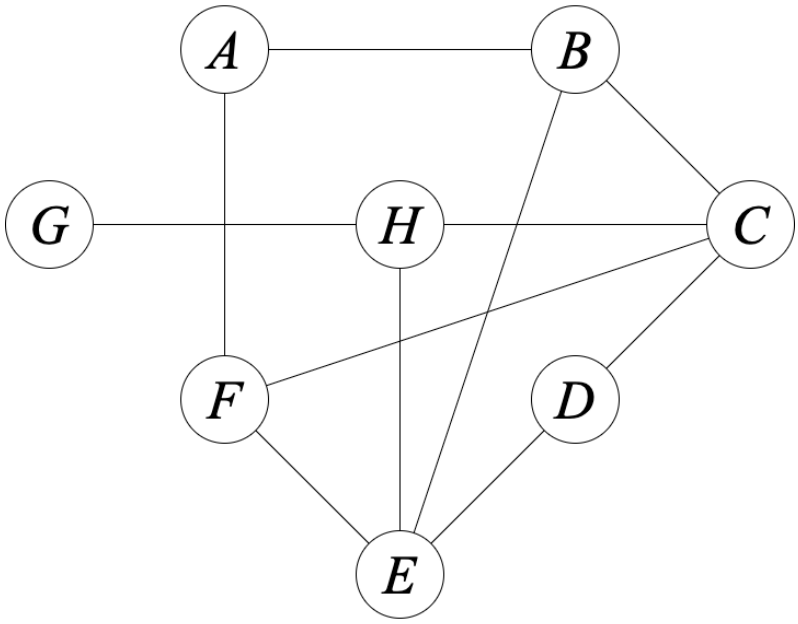
A. 5,3,3,2,2,1
B. 2,1,1,1,1,1
C. 6,5,4,3,2,1
D. 5,5,2,2,1,1

Correct Answer: A

Solution: Using Havel Hakimi theorem.

Lecture 261: Havel Hakimi theorem Part 5

6) Which of the following is not a path from A to H? (MSQ)



A. $\{A-B-E-F-G-H\}$
B. $\{A-B-C-H\}$
C. $\{A-F-E-B-C-H\}$
D. $\{A-F-C-B-E-D-C-H\}$
E. $\{A-F-E-D-C-H\}$
F. $\{A-H\}$
G. $\{A-F-E-H\}$
H. $\{A-B-C-D-E-H\}$

Correct Answer: A D F

Solution: In a path, neither the repetition of vertices is allowed nor the repetition of edges.

Lecture 265: Path and closed path

7) If an edge is removed from a cycle in a graph, then the graph becomes disconnected.

State whether true/false.

A. True
B. False

Correct Answer: B

Solution: In a graph, if there is a cycle and if an edge is removed from the cycle, the graph remains connected.

Lecture 277: Property of a cycle

8) For a simple graph with vertices, how many subgraphs can be constructed, such that the subgraph is an induced subgraph as well as a spanning subgraph?

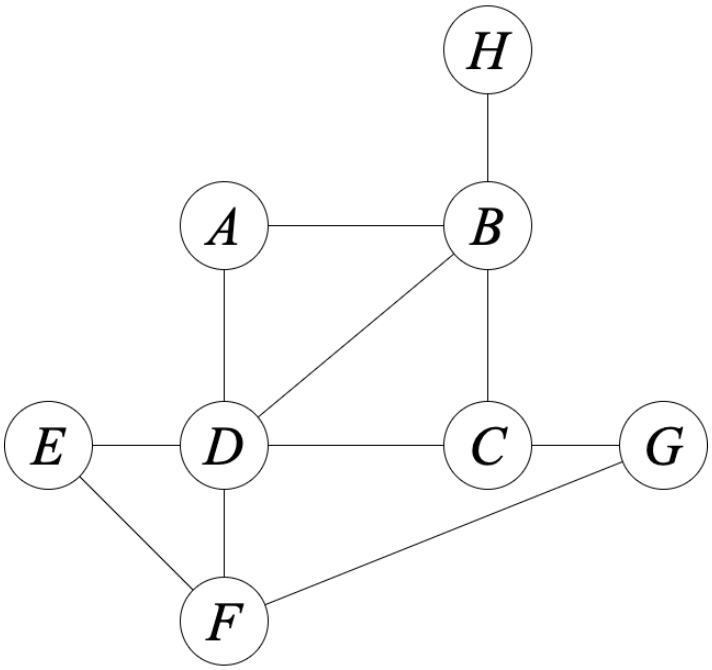
A. 1
B. More than 1
C. 0
D. $n-1$

Correct Answer: A

Solution: A subgraph which is induced as well as spanning, is the graph itself.

Lecture 274: Spanning and induced subgraph A result.

9) Observe the following graph. (MSQ)



Choose the correct option(s) from below.

A. $\{D-E-F-G-C-D\}$ is a cycle
B. $\{H-B-D-C-G-F-D-A\}$ is a trail
C. $\{A-B-D-A\}$ is a not cycle
D. $\{A-B-D-C-D-F\}$ is a trail
E. $\{A-B-D-C-G-F-D-A\}$ is a circuit.

Correct Answer: A B E

Solution: In a trail, repetition of vertices is allowed but repetition of edges is allowed.

Lecture 264, 268: Trail, Cycle and circuit.

10) Which of the following statements is/are true?

I) If there is a walk from P to Q then, there must be a path from P to Q.
II) The number of edges in a tree is equal to one less than the number of vertices.
III) Every graph has an odd number of odd–degree vertices.

A. Only I
B. Only II
C. Only III
D. I and II
E. I and III
F. I, II and III

Correct Answer: D

Solution: Every graph has an even number of even degree vertices OR an even number of odd degree vertices, hence statement III is incorrect.

Lecture 255, 270, 275: Hand shaking lemma Corollary, Relation between walk and path, Introduction to Tree.