CANDIDATE

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TEST

Quiz 3

Subject code	--
Evaluation type	--
Test opening time	28.02.2024 07:00
End time	06.03.2024 07:00
Grade deadline	--
PDF created	13.08.2024 06:33

Question	Status	Marks	Question type
1.1	Correct	1/1	Multiple Choice
1.2	Partially Correct	0.25/1	Multiple Response
1.3	Correct	1/1	Multiple Response
1.4	Correct	1/1	Multiple Response
1.5	Partially Correct	0.2800000011920929/1	Multiple Response
2.1	Correct	1/1	Multiple Response
2.2	Correct	1/1	Multiple Response
2.3	Correct	1/1	Multiple Response
2.4	Correct	1/1	True / False
2.5	Wrong	0/1	True / False

1.1 Consider the graph with:

- vertex set {0,1}×{0,1}×{0,1}
- an edge between two vertices if they differ in exactly two co-ordinates

What is the degree sequence of this graph?
Select one alternative:
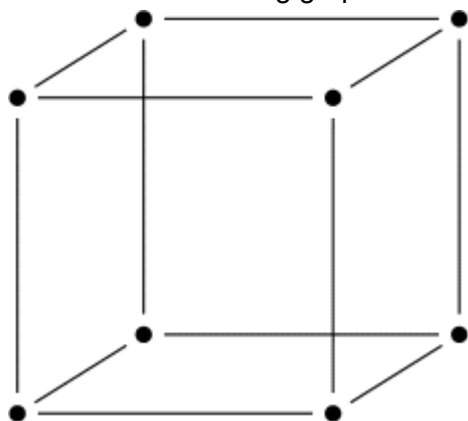
○ 1,1,1,1,1,1,1,1
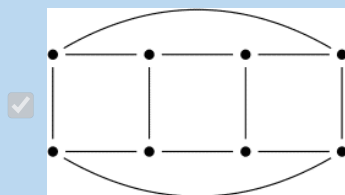
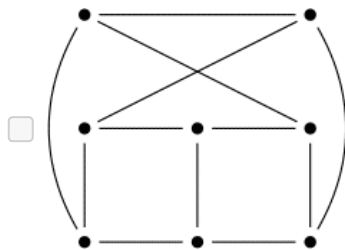○ 0,0,2,2,2,2,0,0

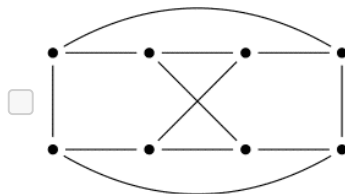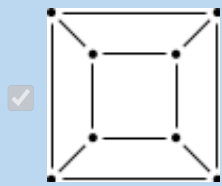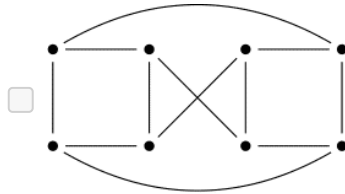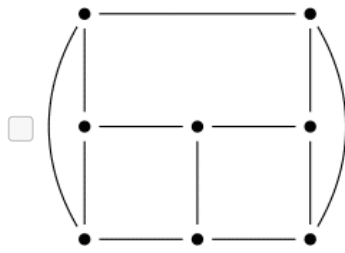○ 0,4,4,0,0,00,0,0

○ 0,0,0,8,0,0,0,0 ✅
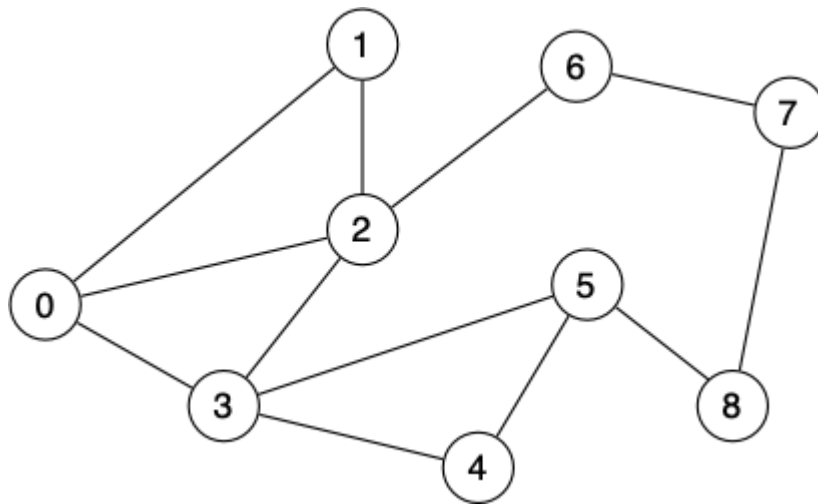
○ None of the above

1.2 Which of the following graphs are isomorphic to this graph:

Select all that apply:

1.3 Consider the following graph:

Starting from Vertex 0, which of the following sequences of vertices *could* arise as a sequence of **explored** vertices when performing a **breadth-first traversal** (according to lectures)?

Select all that apply:

☐ 0,2,1,3,5,4,8,6,7

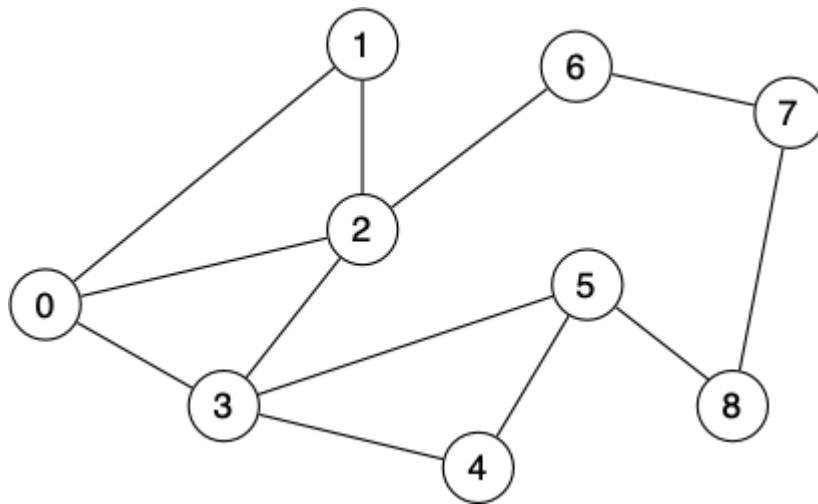☑ 0,1,2,3,6,5,4,7,8 ✔

☐ 0,1,3,4,5,8,7,6,2

☑ 0,3,2,1,4,5,6,8,7 ✔

☐ 0,1,2,3,4,5,6,7,8

☐ 0,3,5,8,7,6,4,2,1

1.4 Consider the following graph:

Starting from Vertex 0, which of the following sequences of vertices could arise as a sequence of **explored** vertices when performing a **depth-first traversal** (according to lectures)?

Select all that apply:

- ☑ 0,1,3,4,5,8,7,6,2 ✔
- ☐ 0,1,2,3,6,5,4,7,8
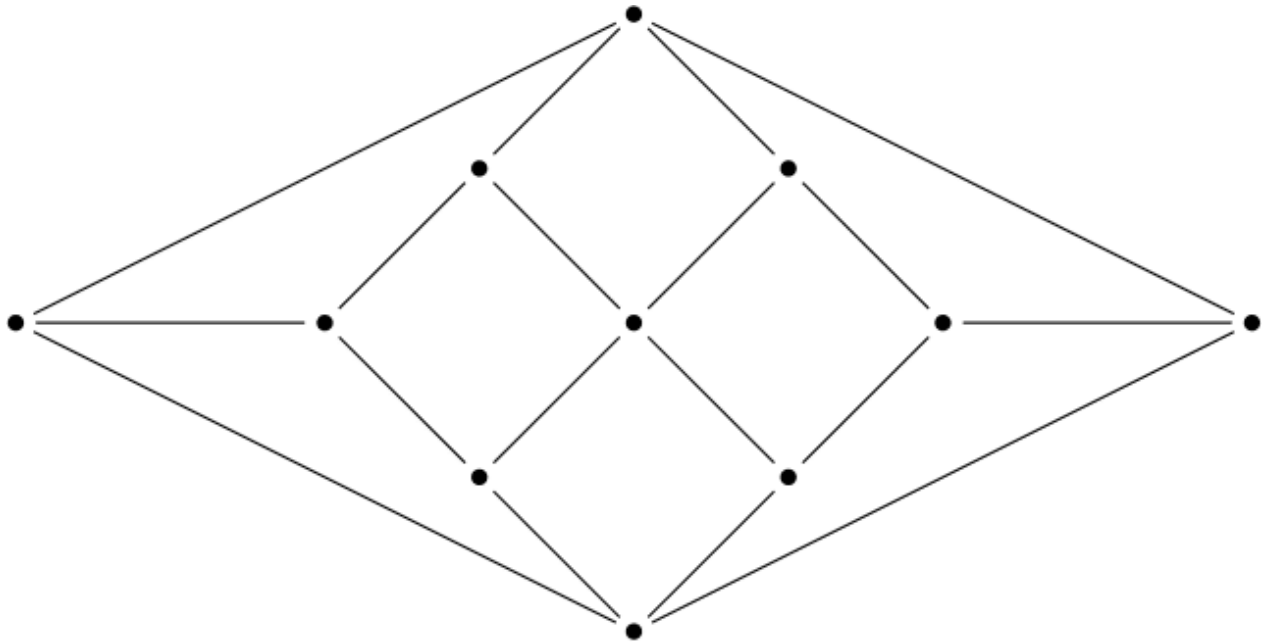- ☐ 0,2,1,3,5,4,8,6,7
- ☐ 0,1,2,3,4,5,6,7,8
- ☐ 0,3,2,1,4,5,6,8,7
- ☑ 0,3,5,8,7,6,4,2,1 ✔

1.5 Consider the following graph:

Which of the following properties does this graph have?

Select all that apply:

- ☑ Clique number 2 ✓
- ☑ Hamiltonian path ✓
- ☑ Planar ✓
- ☑ Eulerian path ✗
- ☑ Bipartite ✓
- ☑ Contains a cycle of length 10 ✓
- ☐ Chromatic number 3
- ☑ Connected ✓

2.1 Which of the following statements are true for any graph with n≥1 vertices and m≥0 edges?
Select all that apply:

☑ If m < n-1 then the graph is not connected ✔

☐ If m < n then the graph is acyclic

☐ If m ≥ n-1 then the graph is connected

☑ If m ≥ n then the graph contains a cycle ✔

2.2 Let D_0, D_1, D_2, D_3 be the degree sequence of a **tree** with n≥2 vertices (assume $D_k = 0$ for k≥4)

Which of the following must necessarily hold:
Select all that apply

☑ $D_0 = 0$ ✔

☐ $D_2 ≥ D_3$

☐ $D_3 ≥ D_2$

☑ $D_1 ≥ 2$ ✔

☐ D_1 is even

☑ $D_1 = 2 + D_3$ ✔

2.3 Which of the following graphs have an Eulerian circuit?
Select all that apply

☐ $K_{5,5}$

☑ $K_{5,5,5}$ ✓

☐ All graphs with degree sequence 0,0,5,0,5

☑ All graphs with degree sequence 0,0,3,0,3,0,3 ✓

☑ All regular graphs with 5 vertices and 10 edges ✓

☑ K_5 ✓

2.4 Let G be a finite directed graph where every vertex has in-degree and out-degree at most 1.

True or false:
G has a vertex of out-degree 0 if and only if G has a vertex of in-degree 0.

○ True ✓

○ False

2.5 True or false:
If a graph has chromatic number at least 3, then it must contain a subdivision of K_3

○ True ✗

○ False ✓