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Homework 7

1.

$$\begin{array}{cc} 0 & 3 \\ \hline 1 & 2 \end{array} \quad \exists vrn = 3$$

$$\begin{array}{cc} 1 & 2 \\ \hline 0 & 3 \end{array} \quad \forall vrn = 3$$

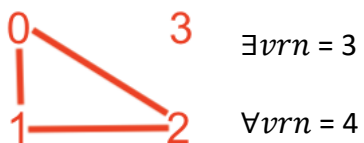
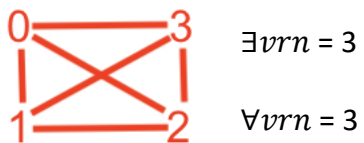
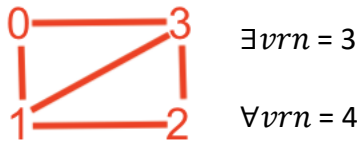
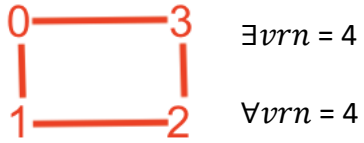
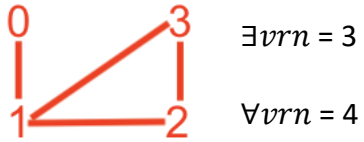
$$\begin{array}{cc} 0 & 3 \\ | & \\ 1 & 2 \end{array} \quad \begin{array}{l} \exists vrn = 3 \\ \forall vrn = 4 \end{array}$$

$$\begin{array}{cc} 0 & 3 \\ | & \\ 1 & \text{---} 2 \end{array} \quad \begin{array}{l} \exists vrn = 3 \\ \forall vrn = 4 \end{array}$$

$$\begin{array}{cc} 0 & 3 \\ | & | \\ 1 & 2 \end{array} \quad \begin{array}{l} \exists vrn = 4 \\ \forall vrn = 4 \end{array}$$

$$\begin{array}{cc} 0 & 3 \\ | & | \\ 1 & \text{---} 2 \end{array} \quad \begin{array}{l} \exists vrn = 4 \\ \forall vrn = 4 \end{array}$$

$$\begin{array}{cc} 0 & 3 \\ | & / \\ 1 & \text{---} 2 \end{array} \quad \begin{array}{l} \exists vrn = 3 \\ \forall vrn = 4 \end{array}$$



2. Matrix proof

	0	1	1	0

	0	1	1	0
	0	1	1	1
	0	1	1	0
	1	1	0	0
	1	0	0	0
	1	0	0	0

There are no rows in this matrix where the first card and 2 others are used, that indicates that using the 1st card with any other 2 will be enough to reconstruct this graph.

3. Matrix proof 1

	1	1	0	0
	1	1	0	0
	1	1	0	0
	1	0	0	0
	1	1	1	0

Given the last row, it is impossible to identify the graph with only 3 cards.

Matrix proof 2

	0	0	1	1
	1	0	1	1
	0	0	1	1
	1	1	0	0
	1	1	1	0

	1	1	0	0
	1	1	0	0
	0	0	1	1

With the rows 2 and 5, we know it is not possible to reconstruct the graph without using all 4 cards.

Matrix proof 3

	1	0	0	0
	1	1	0	0

	1	1	1	0
	1	1	0	0
	1	1	0	0

The third row indicates that it is not possible to reconstruct the graph without using all 4 cards.

4. Matrix proof 1

0 3	0	0	0	0
1 2	1 2	1 2	1 2	1 2
	1	1	0	0
	1	0	0	0

	1	0	0	0
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Any 3 cards can reconstruct the original graph.

Matrix proof 2

	1	0	0	0
	1	1	0	0
	1	0	0	0

Any 3 cards can reconstruct the original graph.

5. Matrix proof

		1	2	2

	0	1	1	0
	0	1	1	0
	0	1	1	1
	0	1	1	0
	1	1	0	0
	1	0	0	0
	1	0	0	0

The third row indicates that choosing the last 3 cards would not reconstruct the original graph. Therefore, we need to be able to pick 4 cards so that any combination reconstructs the original graph.