Unit 9 - Week 08: Connected Components, Vertex Colouring and Interconnection Networks Algorithms

Assessment 8

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-03-27, 23:59 IST.

1) In an undirected graph \( G = (V, E) \) with \( E = \{ AB, AC, BD, BF, CD, DF, HJ, HL, JK, JL, KL \} \), edges AB, AC, DF, HJ and KL are contracted. The number of supervetices in the resultant graph is ________.

- 2
- 3
- 4
- 5

No, the answer is incorrect.
Score: 0
Accepted Answers: 4

2) In an undirected graph \( G = (V, E) \) with \( E = \{ AB, AC, BD, BF, CD, DF, HJ, HL, JK, JL, KL \} \), edges AB, AC, DF, HJ and KL are contracted. The number of self-loops in the resultant graph is ________.

- 2
- 3
- 4
- 5

No, the answer is incorrect.
Score: 0
Accepted Answers: 5

3) In an undirected graph \( G = (V, E) \) with \( E = \{ AB, AC, BD, BF, CD, DF, HJ, HL, JK, JL, KL \} \), edges AB, AC, DF, HJ and KL are contracted. The number of redundant edges in the resultant graph is ________.

- 2
- 3
- 4
- 5

No, the answer is incorrect.
Score: 0
Accepted Answers: 4

4) In an undirected graph \( G = (V, E) \) with \( E = \{ AB, AC, BD, BF, CD, DF, HJ, HL, JK, JL, KL \} \), edges AB, AC, DF, HJ and KL are contracted. Then which of the following is a likely new name for edge BD?

- AF
- BC
- CH
- G

No, the answer is incorrect.
Score: 0
Accepted Answers: 4
5) An undirected graph $G = (V, E)$ has 30 vertices, 38 edges and 12 components. In the star graph that defines the connected components of $G$, the number of edges that are not self-loops is _________.

- [ ] 30
- [ ] 18
- [ ] 12
- [ ] 38

No, the answer is incorrect.
Score: 0
Accepted Answers: AF

6) From an undirected graph $G = (V, E)$ with $E = \{AB, AC, AF, BD, BF, CD, DF, DH, DJ, FJ, HJ, HL, JK, JL, KL\}$, in sets $\{A, D, K\}, \{B, J, C\}, \{F, L\}, \{H\}$ are successively removed and inserted back in the reverse order. Each vertex is given the least colour in $\{1, 2, 3, 4, 5, 6\}$ that is not in its neighbourhood, when it is inserted back. What is the colour that is given to D?

- [ ] 2
- [ ] 3
- [ ] 4
- [ ] 6

No, the answer is incorrect.
Score: 0
Accepted Answers: 4

7) The edge set $E$ of an undirected graph $G = (V, E)$ with $V = \{A, B, C, D, F, H, J\}$ is partitioned into two disjoint sets $E_1$ and $E_2$, and the subgraphs induced by $E_1$ and $E_2$ on $V$ are vertex coloured so that vertices $A, B, C, D, F, H, J$ get colours of $1, 2, 3, 1, 3, 4, 1$ and $1, 2, 1, 3, 1, 1, 2$ respectively in the two colourings. Combining the two colourings gives a vertex colouring of $G$.

- [ ] 6
- [ ] 4
- [ ] 3
- [ ] 7

No, the answer is incorrect.
Score: 0
Accepted Answers: 6

8) For an algorithm that runs on an $N \times N$ mesh, the initial contents of processor (1,1) will not affect the end-of-the-step contents of processor $(N, N)$ for ________ steps.

- [ ] $2N - 4$
- [ ] $2N - 3$
- [ ] $2N - 2$
- [ ] $2N - 1$

No, the answer is incorrect.
Score: 0
Accepted Answers: $2N - 3$

9) On an $N \times N$ mesh, the Shearsort algorithm runs in $\Theta(______)$ time.
10) In an \(N\)-node linear array, in which every processor holds a bit, odd even transposition sort is run. The rightmost 1 occurs at position 8. It will reach its destination in step number \(________\).

- \(\sqrt{N}\) log \(N\)
- \(N^2\)
- \(\sqrt{N}\)
- \(N\) log \(N\)

No, the answer is incorrect.
Score: 0
Accepted Answers:
- \(N\) log \(N\)

11) In a list, the logical order of the vertices is ABCDEFGH. The list is to be ranked from A. The vertices A, B, C, D, E, F, G, H have weights of 4, 6, 2, 3, 1, 2, 4, 9 respectively. Vertices C, E and G are spliced out as is done in the list contraction we studied in Lecture 13. What are the new ranks of A, B, D, F and H?

- 4, 6, 5, 3, 13
- 4, 8, 5, 6, 9
- 4, 6, 3, 3, 1
- 4, 6, 3, 1, 9

No, the answer is incorrect.
Score: 0
Accepted Answers:
4, 6, 5, 3, 13