X

Unit 10 - Week 09: Interconnection Networks Algorithms

Register for Certification exam

Course outline

How to access the portal

Week 01: Models of Computation

Week 02: Performance of parallel algorithms,Basic techniques

Week 03: Basic Techniques

Week 04: Comparator Networks; List Colouring

Week 05: An Optimal List Ranking algorithm

Week 06: Applications of Optimal List Ranking algorithm, Expression Tree Evaluation, Merging and Cole's Merge Sort

Assessment 9

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-04-03, 23:59 IST.**

1) Consider an $\sqrt{N} \times \sqrt{N}$ mesh in which every processor holds a bit. Divide the mesh into $N^{1/4}$ blocks of size $N^{3/8} \times N^{3/8}$. Sort each block in snakelike order. Perform an $N^{1/8}$-way unshuffle of the columns. The number of 1's in a block can differ by at most _____ from the number of 1's in any other block in the same horizontal slice. ***1 point***

- $N^{1/8}$
- $N^{1/4}$
- $N^{1/2}$
- N

No, the answer is incorrect.
Score: 0

Accepted Answers:
$N^{1/8}$

2) In a linear array of size N every processor holds a packet that has a unique destination address. A processor can, in each step, receive (resp., send) a message each from (resp., to) each of its neighbours, in addition to performing a constant amount of computation in its local memory. The packets will be delivered to the destinations in _____ time. ***1 point***

- N

Score: 0

Accepted Answers:

$N-1$

3) Consider a $\sqrt{N} \times \sqrt{N}$ mesh in which every processor holds a bit. Divide the mesh into $N^{1/4}$ blocks of size $N^{3/8} \times N^{3/8}$. Suppose every dirty row in the mesh is within a band of height $N^{1/8}$. The number of dirty horizontal slices is at most _____. ***1 point***

- 1
- 2
- $N^{1/8}$
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

2

4) In a linear array of size N every processor holds an integer. The integers are in sorted order, except for r of them, all of which occur within a window of size $k \geq r$. If we use Odd Even Transposition sort on this linear array, the array will be sorted within _____ number of steps. ***1 point***

- r
- k
- $k+r$
- $k-r$

No, the answer is incorrect.

Score: 0

Accepted Answers:

k

5) In an $N \times N^2$ 2D-mesh, every processor holds a packet that has a unique destination address. A processor can in each step receive (resp., send) a message each from (resp., to) each of its neighbours, in addition to performing a constant amount of computation in its local memory. If the source-destination pairs are known a priori, and any amount of offline computation is allowed, then the packets will be delivered to the destinations in _____ time. ***1 point***

- $\Theta(\log N)$
- $\Theta(N)$
- $\Theta(N^3)$
- $\Theta(N^2)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\Theta(N^2)$

6) Given is a bipartite graph $G = (U, V, E)$ of a maximum vertex degree of 17. A new vertex s is added to G and is made adjacent to every node of odd degree in G to get $G + s$, which is Euler. An Euler circuit of $G + s$ is found, the edges of which are then labelled 0 and 1 alternately. G_0 and G_1 are the subgraphs of G defined respectively by the edges in E of labels 0 and 1 respectively. Select the least of the following numbers that the maximum vertex degree of G_0 and G_1 is guaranteed to not exceed. ***1 point***

- 17
- 16
- 9
- 8

No, the answer is incorrect.
Score: 0

Accepted Answers:
9

7) The bisection width of a network of N nodes is the least number of edges that must be removed to partition it into two networks of at most $\lceil N/2 \rceil$ nodes each. The bisection width of a 5×5 mesh is _____. ***1 point***

- 5
- 6
- 10
- 25

No, the answer is incorrect.
Score: 0

Accepted Answers:
6

8) The diameter of a $5 \times 5 \times 5$ mesh is _____. ***1 point***

- 12
- 15
- 14
- 125

No, the answer is incorrect.
Score: 0

Accepted Answers:
12

9) The bisection width of a network of N nodes is $N^{3/8}$.Sorting of N items on this network will take Ω (_____) steps. (If more than one option is correct, then pick the largest among them.) ***1 point***

- $N^{1/2}$
- $N \log N$
- $N^{3/8}$
- $N^{5/8}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$N^{5/8}$

10) On an $N^{1/3} \times N^{1/3} \times N^{1/3}$ 3D-mesh, in which every processor holds a bit, each zx-plane is sorted in zx order, and then each yz-plane is sorted in yz order. Then the number of dirty xy planes is at most _____. ***1 point***

- 0
- 1
- 2
- $N^{1/3}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
2

Previous Page End