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Courses » Parallel Algorithms

Announcements

Course

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Unit 8 - Week 07: Cole's Merge Sort, Sorting Lower Bound, Connected Components

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 7

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2019-03-20, 23:59 IST.**

1) Which of the following is a 3-cover of $\{1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 15, 17, 18, 20, 22, 24, 26, 28\}$ **1 point**

- 2 5 11 14 18 24 28
- 2 7 11 14 18 22 28
- 1 5 10 14 18 26 28
- 1 5 10 13 17 18 26

No, the answer is incorrect.
Score: 0

Accepted Answers:
2 7 11 14 18 22 28

2) Three consecutive intervals of $S_{t-1}(u)$ contain at most _____ elements **1 point** of $S_t(u)$, for all $t > 0$.
(Pick the smallest of the correct options, if more than one option is correct.)

- 7
- 6
- 5
- 4

No, the answer is incorrect.
Score: 0

Accepted Answers:
7

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Lecture 1:
Cole's Merge
Sort: Details

Lecture 2:
Analysis of
Cole's Merge
Sort; Lower
bound for
sorting

Lecture 3:
Sorting Lower
bound;
Connected
Components

Quiz :
Assessment 7

**Week 08:
Connected
Components,
Vertex Colouring
and
Interconnection
Networks
Algorithms**

**Week 09:
Interconnection
Networks
Algorithms**

**Interaction
Session**

**Week 10:
Interconnection
Networks
Algorithms**

**Week 11:
Interconnection
Networks
Algorithms**

**Week 12:
Parallel
Complexity
Theory**

$C_{t-1}(u)$ is a 3-cover of $S_{t-1}(v)$ and $S_{t-1}(w)$

$C_{t-1}(u)$ is a 3-cover of $S_t(v)$ and $S_t(w)$

$C_t(u)$ is a 3-cover of $S_{t-1}(v)$ and $S_{t-1}(w)$

$C_t(u)$ is a 3-cover of $S_t(v)$ and $S_t(w)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$C_{t-1}(u)$ is a 3-cover of $S_t(v)$ and $S_t(w)$

4) At the end of stage 12, the cache and sample sizes of a level 4 node are _____, respectively. **1 point**

4 and 16

16 and 4

2 and 16

16 and 2

No, the answer is incorrect.

Score: 0

Accepted Answers:

16 and 2

5) When Cole's merge sort is run on an array of n elements, the total size of cache and sample arrays of all live nodes put together is _____ . **1 point**

$\Theta(1)$

$\Theta(n)$

$\Theta(\log n)$

$\Theta(n/\log n)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\Theta(n)$

6) With p processors on a CREW PRAM, $1 \leq p \leq n$, Cole's merge sort sorts an array of n elements in _____ time. **1 point**

$\Theta(1)$

$\Theta(\log n)$

$\Theta(n \log n/p)$



$\Theta(n/p + \log n)$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\Theta(n \log n/p)$

7) If the number of comparisons that any algorithm that sorts n items in t comparison steps must necessarily perform is at least $tn^{1+1/t}/e - tn$, then which of the following is the strongest implied lower bound on the time complexity of any algorithm that sorts n items using $n^{4/3}$ processors? **1 point**



$\Omega(\log n)$



$\Omega(\log \log n)$



$\Omega(1)$



$\Omega(n^{1/3})$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$\Omega(1)$

8) In a rooted tree with node r as the root, nodes a , b and c as the children of the root, nodes d and e as the children of b , and nodes f and g as the children of d , every node checks if its grandparent and parent are the same and marks the grandparent if the check fails. Then _____ are exactly the nodes that do not yet know that they are in a non-star graph. **1 point**



a and c



a , b and c



r , a , b and c



d , e , f , and g

No, the answer is incorrect.

Score: 0

Accepted Answers:

a and c

9) When a rooted tree of height $2x-1$ is subjected to one step of pointer jumping, the height of the resultant tree would be _____. **1 point**



$x - 1$



$x + 1$



$x/2$



x

No, the answer is incorrect.

Score: 0

Accepted Answers:

x

10) When a star graph hooks on to a tree of height h , as in the ARBITRARY **1 point** CRCW PRAM connected components algorithm, the height of the resultant tree would be _____.

- $h-1$
- h
- $h+1$
- $h+2$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$h+2$

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