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

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
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

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

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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.

- 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 ____________.

- $\Theta(1)$
- $\Theta(n)$
- $\Theta(\log n)$
- $\Theta(n/\log n)$

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.

- $\Theta(1)$
- $\Theta(\log n)$
- $\Theta(n \log n / p)$
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?

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

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.

- $a$ 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 _______________.

- $x - 1$
- $x + 1$
- $x/2$
- $x$
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:
- $h+2$