

CSE 332: Data Structures and Parallelism

QuickCheck: Parallelism (due Thursday, July 27)

Name:

0. Work it Out [the Span]

Consider the following sequential code which returns the average value in a perfect binary tree:

```
1  int findAverage (Node n) {
2      if(n != null) {
3          if (n.left == null && n.right == null) {
4              return n.value;
5          } else {
6              return (n.value + (findAverage(n.left) + findAverage(n.right)) *
7                  (2 ^ (n.height - 1) - 1)) / 2 ^ n.height - 1;
8          }
9      }
10     return 0;
11 }
```

- What's the asymptotic big- \mathcal{O} runtime of this function?
- Now suppose we parallelized this function. What are the work and span of this function if it were run in parallel?
- What's the speedup of this function when we implement it in parallel?