Interview Questions: Union–Find (ungraded)
Practice Assignment

Back

English

Menu

Graded Assignment

Interview Questions: Union–Find (ungraded)

Assignment details

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Attempts Unlimited

Resume

Your grade

100%

To pass you need at least 1%. We keep your highest score.

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1. **Social network connectivity.** Given a social network containing n members and a log file containing m timestamps at which times pairs of members formed friendships, design an algorithm to determine the earliest time at which all members are connected (i.e., every member is a friend of a friend of a friend ... of a friend). Assume that the log file is sorted by timestamp and that friendship is an equivalence relation. The running time of your algorithm should be $m \log n$ or better and use extra space proportional to n.

1 point

Note: these interview questions are ungraded and purely for your own enrichment. To get a hint, submit a solution.

What do you think?

Your answer cannot be more than 10000 characters.

2. **Union-find with specific canonical element.** Add a method `find()` to the union-find data type so that `find(i)` returns the largest element in the connected component containing i. The operations, `union()`, `connected()`, and `find()`, should all take logarithmic time or better.

1 point

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For example, if one of the connected components is $\{1, 2, 6, 9\}$, then the `find()` method should return 9 for each of the four elements in the connected components.

What do you think?

Your answer cannot be more than 10000 characters.