

Interview Questions: Union-Find (ungraded)

Practice Quiz, 3 questions

1
point

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 .

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.

1
point

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.

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.

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3.

Successor with delete. Given a set of n integers $S = \{0, 1, \dots, n - 1\}$ and a sequence of requests of the following form:

- Remove x from S
- Find the *successor* of x : the smallest y in S such that $y \geq x$.

design a data type so that all operations (except construction) take logarithmic time or better in the worst case.

What do you think?

Your answer cannot be more than 10000 characters.

Submit Quiz

