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Section 4: Disjoint Sets (2 questions)

Question 1

0/1 point (graded)

Consider the program:

```
for i from 1 to 12:
    MakeSet(i)
Union(2, 10)
Union(1, 11)
Union(6, 7)
Union(9, 4)
Union(11, 5)
Union(1, 8)
Union(1, 9)
Union(12, 2)
```

Assume that the disjoint sets data structure is implemented as disjoint trees with union by rank heuristic.

Compute the sum of the heights of the resulting trees after executing the code. For example, for a forest consisting of four trees of height 1, 2, 3, 1 the answer would be 7.

Recall that the height of a tree is the number of edges on a longest path from the root to a leaf. In particular, the height of a tree consisting of just one node is equal to 0.

✗ Answer: 4

Submit

You have used 1 of 1 attempt

i Answers are displayed within the problem

Question 2

1/1 point (graded)

Consider the following program:

```
for i from 1 to 100:
    MakeSet(i)
for i from 1 to 50:
    Union(i, i+1)
```

Assume that the disjoint sets data structure is implemented as disjoint trees with union by rank heuristic.

What is the number of trees in the forest and the maximum height of a tree in this forest after executing this code?

Recall that the height of a tree is the number of edges on a longest path from the root to a leaf. In particular, the height of a tree consisting of just one node is equal to 0.

- ☐ One tree of height 100
- ☒ One tree of height 1 and 49 trees of height 0 ✓
- ☐ One tree of height 50 and 49 trees of height 0
- ☐ One tree of height 49 and 49 trees of height 0
- ☐ One tree of height 1
- ☐ One tree of height 0 and 49 trees of height 1

You have used 1 of 1 attempt

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