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Program Structures & Algorithms

Spring 2021

Assignment No. 3

**Task:** To implement height-weighted quick union with path compression by completing methods and then determine the relationship between the number of objects(n) and the number of pairs(m).

**Output:**

**Graphical user interface, text, application

Description automatically generated**

**Graphical user interface, text, application

Description automatically generated**

**Graphical user interface, text, application

Description automatically generated**

**Graphical user interface, text, application

Description automatically generated**

**Graphical user interface, text, application

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**Relationship Conclusion:** The relationship between the number of connections(m) and the number of sites (n) is shown in the formula: **m(n)= 0.5n \* ln(n)**

This is based on the code experiments using 6 different values for number of sites (n), doubling the value of n every time. From the results, I created a table with the output, number of connections(m), based on n. From the graph, we can see there is a linear relationship. This relationship is shown in the formula. I then applied the formula and compared the resulting m values to the experimental m values. The values were approximately equal proving my formula to be accurate for this relationship.

**Evidence:**

**Graphical user interface, chart

Description automatically generated**

**Unit Tests Results:**

**Graphical user interface, text, application

Description automatically generated**