**Program Structures & Algorithms**

**Spring 2022**

**Assignment No. 3**

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* **Task**

**To find out the relationship between number of objects and number of pairs generated through Union Find Path Compression.**

* **Output screenshot**

**A screenshot of a computer

Description automatically generated**

* **Relationship Conclusion**
* The number of objects (n) and the number of pairs generated (m) have a linearithmic relationship which can be observed from the graph as well.
* The linearithmic relationship between n and m can be approximately defined as m is approximately equal to n log n. We can observe this evidence from the graph, where n log n and m is plotted, and the values are similar.
* m ≈ n log n.
* **Evidence / Graph**

**Table data for the graph with nlogn calculations:**

|  |  |  |
| --- | --- | --- |
| **Objects (n)** | **Pairs (m)** | **nlogn** |
| 10 | 25 | 10 |
| 50 | 88 | 84.948 |
| 100 | 169 | 200 |
| 350 | 1402 | 890.423 |
| 500 | 2260 | 1349.485 |
| 2000 | 7806 | 6602.059 |
| 4000 | 16803 | 14408.239 |
| 10000 | 53452 | 40000 |
| 50000 | 250483 | 234948.5 |

**Chart, line chart

Description automatically generated**

* **Unit tests result**

Graphical user interface, text

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