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CSCI 4270

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01 Knapsack Using Branch And Bound

The purpose of this test is to compare the number of operations for 0-1 Knapsack using the three different branch and bound approaches. The first test is using breadth-first, the second test is using depth-first and the final test is using best-first.

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| --- | --- |
| Breadth-First |  |
| Minimum Operations | 5 |
| Maximum Operations | 35 |
| Average Operations | 17 |
| Standard Deviation | 6 |

|  |  |
| --- | --- |
| Depth-First |  |
| Minimum Operations | 9 |
| Maximum Operations | 19 |
| Average Operations | 10 |
| Standard Deviation | 3 |

|  |  |
| --- | --- |
| Best-First |  |
| Minimum Operations | 3 |
| Maximum Operations | 14 |
| Average Operations | 10 |
| Standard Deviation | 2 |

As expected, best-first performed better than both depth-first and breadth-first minimum, maximum, and average number of operations. Breadth-first was able to outperform depth-first in some cases, but generally depth-first outperformed breadth-first. Best-first had the tighter bound with a standard deviation of two. Breadth-first had a higher standard deviation than depth-first. Ordered from best to worst: best-first, depth-first, breadth-first.