Optimisation

# Exercise 1. Tutorial Exercises

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Compass | Map | Drink | Kendal Mint Cake |
| Weight | 3 | 4 | 5 | 2 |
| Value | 4 | 4 | 7 | 4 |

For this scenario, the solution space for a brute-force approach is 24 – 1.  
Maximum capacity = 10.

|  |  |  |  |
| --- | --- | --- | --- |
| Iteration | Binary (0 means leave the item, 1 means take) | Weight | Value |
| 1 | 0001 | 2 | 4 |
| 2 | 0010 | 5 | 7 |
| 3 | 0011 | 7 | 11 |
| 4 | 0100 | 4 | 4 |
| 5 | 0101 | 6 | 8 |
| 6 | 0110 | 9 | 11 |
| 7 | 0111 | 11 | 15 |
| 8 | 1000 | 3 | 4 |
| 9 | 1001 | 5 | 8 |
| 10 | 1010 | 8 | 11 |
| 11 | 1011 | 10 | 15 |
| 12 | 1100 | 7 | 8 |
| 13 | 1101 | 9 | 12 |
| 14 | 1110 | 12 | 15 |
| 15 | 1111 | 14 | 19 |

Optimal solution = 1011 = Take Compass, Drink and Kendal Mint Cake.

Best Case: 2n - 1

Average Case: 2n - 1

Worst Case: 2n – 1

For this approach, the cases are the same as all solutions need to be evaluated before the best one is chosen.