**Exercise cpc-09: Example 5: Optimize Configuration**

Graphical user interface, text, application, email

Description automatically generated

Text

Description automatically generated

Objective Function for minimal cost:

array[Type] of int: costs = [1, 2, 3, 4];

var int: c = sum(i in Sections)(costs[indicators[i]]);

solve minimize c;

output [*"indicators=\(indicators) c=\(c)\n"*];

Output:

|  |  |  |
| --- | --- | --- |
|  | Running tracks\_opt.mzn, sample8\_1.dzn | 233msec |

|  |
| --- |
| indicators=[A, B, A, A, B, B, A, B] c=12  ----------  ==========  %%%mzn-stat: failures=4  %%%mzn-stat: initTime=0.013798  %%%mzn-stat: nodes=9  %%%mzn-stat: peakDepth=4  %%%mzn-stat: propagations=262  %%%mzn-stat: propagators=24  %%%mzn-stat: restarts=0  %%%mzn-stat: solutions=1  %%%mzn-stat: solveTime=0.004617  %%%mzn-stat: variables=23  %%%mzn-stat-end  Finished in 233msec. |

Objective Function for equal distribution:

var int: d = max(i in Type)(count(indicators, i)) - min(i in Type)(count(indicators, i));

solve minimize d;

output [*"indicators=\(indicators) d=\(d)\n"*];

Output:

|  |  |  |
| --- | --- | --- |
|  | Running tracks\_opt.mzn, sample8\_1.dzn | 189msec |

|  |
| --- |
| indicators=[A, B, A, A, B, B, A, B] d=4  ----------  indicators=[C, D, C, C, B, B, A, B] d=2  ----------  indicators=[D, C, B, D, C, A, B, A] d=0  ----------  ==========  %%%mzn-stat: failures=8  %%%mzn-stat: initTime=0.000472  %%%mzn-stat: nodes=22  %%%mzn-stat: peakDepth=8  %%%mzn-stat: propagations=438  %%%mzn-stat: propagators=16  %%%mzn-stat: restarts=0  %%%mzn-stat: solutions=3  %%%mzn-stat: solveTime=0.000232  %%%mzn-stat: variables=15  %%%mzn-stat-end  Finished in 189msec. |

Pareto Front for both:

solve satisfy;

output [*"c=\(c) d=\(d)\n"*];

Chart, line chart

Description automatically generated