Configuration Systems

716.130 - WS 2018/19

Homework

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Exercise 8b: Car configuration

A car is defined by following properties:

• Type: 3.2, 3.3, 5.3, 5.4, 7.4, 7.4C

• Engine: 2, 3, 4 (liter)

  – constraint: 2 for 3.2, 3 for *.3, 4 for *.4 and 7.4C

• Hook (4 alternatives): no, for 3.*, for 5.*, for 7.*

  – constraint: match type

• Bikerack: no, yes – constraint: requires a hook

• Trailer: no, yes – constraint: requires a hook

• Caravan: no, yes – constraint: requires hook for 7.*

• Skibox (3 alternatives): no, for 5.*, for 7.4

  – constraint: match type

• Skibox-Lock: no, yes – constraint: required if and only if any skibox is selected

• Two of bikerack, trailer, caravan must be = no

1. Model this product line in your favorite configurator
   • how many different configurations?
2. Set some properties and check which alternatives are filtered away
   • e.g. Caravan and Skibox
3. Define and run sufficient test cases to achieve high quality
   • positive
   • negative

1. How many different configurations?

We modeled the example using MiniZinc 2.2.3
Without any further constraints as described in the exercise, we get 39 different valid configurations (see file „output_all.txt“).

2. Set properties and check which alternatives are filtered out

We set some properties in code and checked the resulting configurations.

Property set	**Number of configurations**
caravan = yes	3
skibox = for 5.*	8
skibox = for 7.*	5
trailer = yes	9
bikerack = yes	9

The detailed results are included in the specific output_*.txt files.

3. Define and run sufficient test cases to achieve high quality

- For positive test cases we manually checked and verified the results from point 2.
- For negative test cases we tried some impossible combinations and verified that now solution was found by MiniZinc.
  e.g. set more than one of caravan/trailer/bikerack to yes.