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An Abstract Machine Model for MiniZinc

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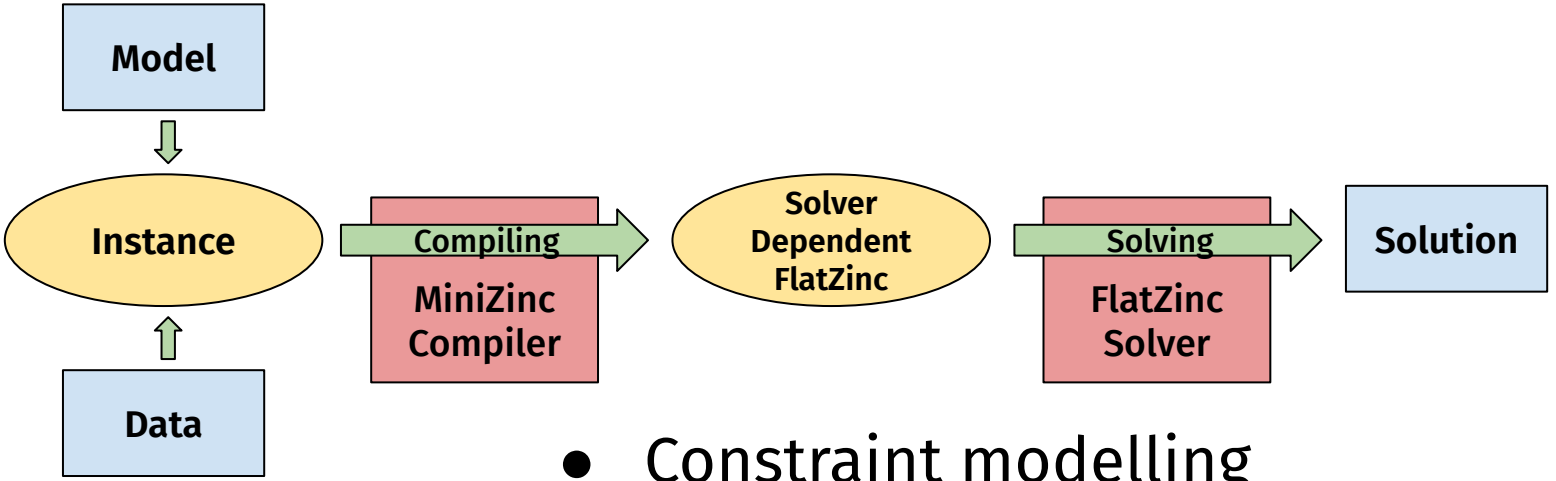
Introducing MiniZinc



- Constraint modelling
- Solver independent
- Solvers based on:
  CP, LCG, MIP, SAT, etc.

Term rewriting

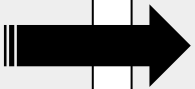
```
predicate two_apart(var int:i,
var int: j) =
  (i+2 = j) \/ (j+2 = i);
```

MiniZinc Library

```
var 1..5: x;
var 3..6: y;

constraint two_apart(x,y);
```

MiniZinc Model



```
var 1..5: x;
var 3..6: y;

constraint b1= (x+2 = y);
constraint b2= (y+2 = x);
constraint b1 \/ b2;
```

1 Step

Compiling MiniZinc

Compiling to **efficient FlatZinc** is complex:

- Compute all fixed expressions
- Avoid duplicate constraints
- Eliminate duplicate variables
- Remove unconnected constraints
- Provide tight variable domains

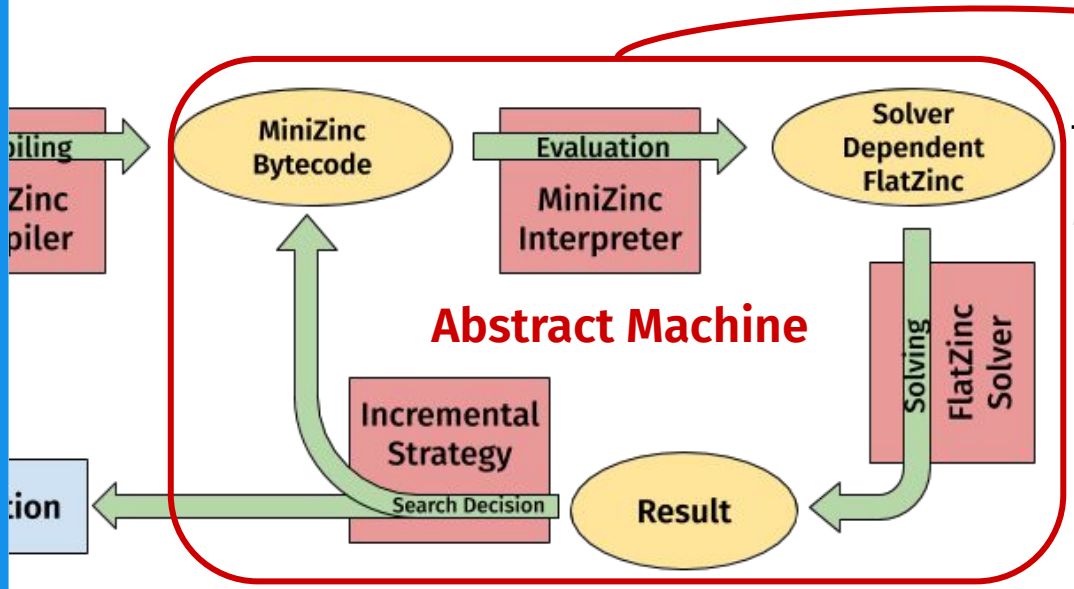
Incremental Search

Increased need for Incremental Search:

- Meta-Heuristics (LNS, Pareto, etc.)
- Interactive Optimisation
- Partial Evaluation

How can we introduce Incremental Search into MiniZinc?

In this paper



The incremental evaluation of MiniZinc without giving up:

- Tight variable domains
- Common Subexpression Elimination (CSE)
- Perfect Dependency Tracking

Thank you!

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Incremental Search in MiniZinc

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