LINGI2132 Languages and translators
Assignment 3
Selling our DSL

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Semantic

Variables

$$"Name- > (Range)"$$

Constraints

$$"SumDsl[>== | <== |equal|dif]SumDsl[Sum|RangeVal]"$$

Sum of variables

"S(Range, Pas default =1, implicit param Name)"

Example : MagicSquare

```
1     val magicNumber = 3 // number of lines/columns
2     val items = magicNumber * magicNumber
3     val magicSum = 15
4     val zero = 0
5     val possibilities = zero.to(magicSum).toArray
6     implicit val v = "item_%"
7
8     var s = SolverDSL
9
10     for (i <- 0 until items) {
11       "item_" + i -> (0 to magicSum)
12     }
13
14     s.E(0 to 6, 3, i => {
15      S(i to (2 + i), 1) equal magicSum
16     })
17
18     S(0 to 8, 4) equal magicSum
19     S(2 to 6, 2) equal magicSum
20
21     s.E(0 to 2, 1, i => {
22       S(i to 6 + i, 3) equal magicSum
23     })
24
25     s.allVariables !== s.allVariables
26
27     if (s.solve) println(s.solution)
28     else println("infeasible")
```

Example : Sudoku

```
1     val sudoku = Array(...) #standary size
2     val maxVal = 9
3     val checkSum = 45
4     implicit val v = "item_%"
5     var s = SolverDSL
6     for (i <- 0 until sudoku.length) {
7       val value = sudoku(i)
8       if (value == 0)
9         "item_" + i -> (1 to maxVal)
10       else
11        "item_" + i -> (value to value)
12    }
13     s.E(0 to 72, 9, i => {
14       val line = s.getSetVariables(i to (i + 8), 1)
15       line !== line
16     })
17     s.E(0 to 8, 1, i => {
18       val col = s.getSetVariables(i to (72 + i), 9)
19       col !== col
20     })
21     //carre
22     for (i <- Array(0, 3, 6, 27, 30, 33, 54, 57, 60)) {
23       val l = Array(0 + i, 1 + i, 2 + i, 9 + i, 10 + i, 11 + i,
     18 + i, 19 + i, 20 + i)
24       val square = s.getSetVariable(l)
25       square !== square
26     }
```

Tests

Problems solved :

- Knapsack
- Coloring
- MagicSquare
- NQueens
- Sudoku