Supplement to Chapter 7: NeurASP

Supplement to Chapter 7 from Neuro Symbolic Reasoning and Learning - Current Advances and Future Directions

Appendix: Executable Clingo Code

In the earlier sections of this chapter, the given ASP code was cleaned up for succinctness. Here we give related ASP code that one can run using Clingo [1].

Recognizing 16 digits

The following program outputs 16 stable models, each representing a unique number from 1 to 16.

```
num1to9(1..9).
numr0to9(0..9).
{p(1,blank); p(1,1)} = 1.
{p(2,Y) : Y <= 9, num1to9(Y)} = 1 :- p(1,blank).
{p(2,Y) : Y <= 6, numr0to9(Y)} = 1 :- p(1,1).
#show p/2.
```

Kubok-16

The following program solves a specfic instance of the Kubok-16 puzzle.

```
val(1,0,39). val(2,0,23). val(3,0,28). val(4,0,46).
val(0,1,23). val(0,2,25). val(0,3,53). val(0,4,35).
```

```
val(1,1,12). val(4,1,8). val(2,2,3). val(3,2,9).
val(2,3,13). val(3,3,14). val(1,4,11). val(4,4,15).

num4(1..4).  num16(1..16).
{val(X,Y,Z): Z <=16, num16(Z)} = 1 :- X <=4, Y <=4, num4(X), num4(Y).
{val(X,Y,Z): X <=4, Y <=4, num4(X), num4(Y)} = 1 :- Z <=16, num16(Z).

result(X,0, S) :- S = #sum{ Z : val(X,Y,Z) , num4(Y) }, num4(X).
result(0,Y, S) :- S = #sum{ Z : val(X,Y,Z) , num4(X) }, num4(Y).
:- result(0,Y,Z), val(0,Y,ZZ), Z != ZZ.
:- result(X,0,Z), val(X,0,ZZ), Z != ZZ.
#show val/3.
```

References

1. Gebser, M., Kaminski, R., Kaufmann, B., Ostrowski, M., Schaub, T., Thiele, S.: A user's guide to gringo, clasp, clingo, and iclingo (2008)