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Tutorials for "Automated Reasoning II"
Exercise sheet 8

Exercise 8.1:
Show that Lemma 3.10 holds only for term-generated interpretations. Give a signature Σ, a set of clauses N and a non-term-generated interpretation $\mathcal{A}$, such that $\mathcal{A}$ is a model of $G_\Sigma(N)$, but not a model of N.

Exercise 8.2:
How would you redefine the fairness of a run if saturation if defined using redundant inferences? Try to find the easiest possible definition. Reprove Lemma 3.16 for the new definitions of saturation and fairness.

Exercise 8.3:
Use the theorem prover SPASS to show that

$$\forall x\ f(f(x)) \approx x \lor f(x) \approx a$$

implies

$$\exists x\ f(f(f(x))) \approx a$$

You can either download the prover from http://www.spass-prover.org/ or use the web interface on that site.

Notes: A unary function f and a constant a are declared in the following way:

```
list_of_symbols.
  functions[(f,1),(a,0)].
end_of_list.
```

The equality predicate is `equal(_,_)`, the connective $\lor$ is `or(_,_)`. To get a proof, rather than just a yes/no answer, use the `-DocProof` flag.

Bring your solution (or solution attempt) to the tutorial on Jan. 30.