

Logical reasoning and programming, task IV

(December 18, 2017)

Problem

Your task is to create a Prolog program that verifies/checks an input tableau proof.

Tableau Proof Format

The tableau proof format is a Prolog representation of Semantic Tableau tree that is similar to the previous task. The structure is following:

```
proof(NNF formula, proof of the NNF formula)
```

where *NNF formula* is some formula that we want to check (it corresponds to top) and *proof of the NNF formula* is its proof in exactly the same format as output proof format of the previous task.

Program

You are supposed to upload a program `verifytap.pl`, in an archive, containing a predicate `verify/1`.

if `verify/1` is called with a correct tableau proof, then succeeds. Otherwise it fails.

Example 1

```
?- Formula = (fact,-fact),
   Proof = [node(a, fact, and_rule(top),
                [node(b, -fact, and_rule(top),
                    [node(c, false, closed_by(a, top), []])
                ]
            )],
   verify(proof(Formula,Proof)).
no
```

Example 2

```
?- Formula = (all(X,p(X)) , (-p(c);-p(d))),
   Proof = [node(0, all(B, p(B)), and_rule(top), [node(2, p(c), all_rule(0), [
        node(3, (-p(c);-p(d)), and_rule(top), [node(4, -p(c), or_rule(3), [
        node(5, false, closed_by(4, 2), []])], node(6, -p(d), or_rule(3), [
        node(7, p(d), all_rule(0), [node(8, false, closed_by(7, 6), []
        ])])))]))],
   verify(proof(Formula,Proof)).
yes
```