HW4

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1. Assumptions and goal

Assumptions:
(1) Only one boy stole the Mars bar.
(2) Two boys are lying.
(3) Rex said that he did not steal it and Earl did not steal it.
(4) Peter said Rex is lying and Jack is lying.
(5) Dan said Peter is lying and either Rex or Peter, but not both, is lying.
(6) Earl said Dan is lying.
Goal:
Find the boy who took the Mars bar.

2. The input and output of prover9.

Input:

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Rex!=Jack&Rex!=Peter&Rex!=Dan&Rex!=Earl.
Jack!=Peter&Jack!=Dan&Jack!=Earl.
Peter!=Dan&Peter!=Earl.
Dan!=Earl.

Said(Rex) -> -Steal(Earl)&-Steal(Rex).
Said(Jack) -> Steal(Rex)|Steal(Peter).
Said(Peter) -> -Said(Rex)&-Said(Jack).
Said(Dan) ->
(-Said(Peter)&Said(Rex)&-Said(Jack))|(-Said(Peter)&-Said(
Rex)&Said(Jack)).
Said(Earl) -> -Said(Dan).

%Said(Rex)&Said(Jack)&Said(Earl)&-Said(Dan)&-Said(Peter).
exists x (Steal(x)& all y ((y!=x) -> -Steal(y))).
exists x exists y (-Said(x)&-Said(y)&x!=y & all z
(z!=x&z!=y->Said(z))).
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Output:

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Steal(Peter).
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3. Conclusion

Input Steal(Rex), Steal(Jack), Steal(Peter), Steal(Dan), Steal(Earl) one by one. Only Steal(Peter) can be proved. So we have the conclusion that Peter stole the Mars bar.