**Exercises Predicate Resolution**

**Exercise 1**

Transform the following formulas into prenex, Skolem and clausal normal forms.

1. ;
2. ;
3. ;
4. ;
5. ;
6. ;
7. ;
8. .

**Exercise 2**

Are the literals from the following pairs unifiable? If yes, find their most general unifier.

, 

|  |  |
| --- | --- |
| 1. and ;   and ;  and | 1. and ;   and ;  and ; |
| 1. and ;   and ;  and ; | 1. and ;   and ;  and ; |
| 1. and ;   and ;  and ; | 1. and ;   and ;  and ; |
| 1. and ;   and ;  and ; | 1. and ;   and ;  and |

**Exercise 3**

Prove the inconsistency of the following set of clauses using lock resolution.

Try two different indexings for the literals.

1. ;
2. ;
3. ;
4. ;
5. ;
6. ;
7. 
8. .

**Exercise 4**

Using a refinement of predicate resolution prove:

|  |  |
| --- | --- |
| 1. the semidistributivity of ‘’ over ‘’: | 1. the semidistributivity of ‘’ over ‘’: |
|  | 1. the semidistributivity of ‘’ over ‘’: |
| 1. the distributivity of ‘’ over ‘’:   . |  |
| 7. the distributivity of ‘’ over ‘’:  ; | 8. |

**Exercise 5**

Check whether the following formulas are theorems or not using predicate resolution.

|  |  |
| --- | --- |
| 2. ; 3. ; 4. ; | 1. ; 2. ; 3. ; 4. . |

Exercise 6. Succession to the British throne

*Hypotheses*:

. If  is the king and  is his oldest son, then  can become the king.

. If  is the king and  defeats , then  will become the king.

.  is the king.

. defeated .

.  is ’s oldest son.

*Conclusion*:

. Can  become the king?

Check whether the conclusion  is derivable from the set of hypotheses {}

using linear predicate resolution. .

Exercise 7.

Hypotheses:

: All hummingbirds are richly colored.

: No large birds live on honey.

: Birds that do not live on honey are dull in color.

: *Piky* is a hummingbird.

Conclusion:

C: *Piky* is a small bird and lives on honey.

Using linear predicate resolution check whether the following deduction holds:

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