Artificial Intelligence

Assignment #6

Practice with LISP

Common LISP can be downloaded for FREE at http://www.cormanlisp.com/download.html

1. Decide whether each of the following sentences is **valid**, **satisfiable** or **unsatisfiable**:

   a) Smoke → Smoke
   Valid
   b) Smoke → Fire
   Satisfiable
   c) (Smoke → Fire) → (ØSmoke → ØFire)
   Unsatisfiable
   d) Smoke ∨ Fire ∨ ØFire
   Valid
   e) ((Smoke ∧ Heat) → Fire) → ((Smoke → Fire) ∨ (Heat → Fire)
   Satisfiable
   f) (Smoke → Fire) → ((Smoke ∧ Heat) → Fire)
   Unsatisfiable
   g) Big ∧ Dumb ∨ (Big → Dumb)
   Unsatisfiable
   h) (Big ∧ Dumb) ∨ ØDumb
   Unsatisfiable

2. Using logical entailment, prove the distributivity of ∧ over ∨.

3. Write the following LISP function: (circle-space r)
   Calculate the area of a circle with radius r

4. Write the following LISP function: (temp-change f)
   Convert temperatures in Fahrenheit degrees f to temperatures in Celsius

5. Write the following LISP function: (front-or-back l)
   Return the first item of a list if it contains an even number of elements
   Return the last item of a list if it contains an odd number of elements