Homework 3, AI course

This homework covers chapter 7, 8 and 9 in AIMA.

The homework is due before midnight Friday October 5. You report it by emailing your written report (either as a PDF file or as a MS Word file) to the examiner (TR).

Each homework assignment handed in on time gives one bonus-point for the oral exam. Homework handed in too late gives no bonus-points but each student must hand in all homework before the oral exam (or else he/she will not be allowed to take the oral exam).

Read Chapter 7, 8 and 9 (not circuit-based agents) in AIMA.

1. Exercise 7.2 AIMA
2. Exercise 7.4 AIMA
3. Exercise 7.7 AIMA
4. Exercise 7.10 AIMA
5. Are the following statements true or false (motivate your answer):

   (a) $((P \Rightarrow Q) \Rightarrow P) \Rightarrow P$ is valid
   (b) A non-valid sentence is unsatisfiable
6. Consider the Wumpus world in Figure 1 below (the location of the Wumpus or pits is not shown). The agent detects nothing in square (1,1), moves on to (2,1) and detects nothing, and moves on to (3,1) where it detects a breeze.
   What does the agent know about the location of any pits at this point in the game? Use resolution refutation to get the answer and show all steps.
7. Convert the following sentence to conjunctive normal form (CNF):

   $(\neg P \vee Q) \Rightarrow (S \vee R)$

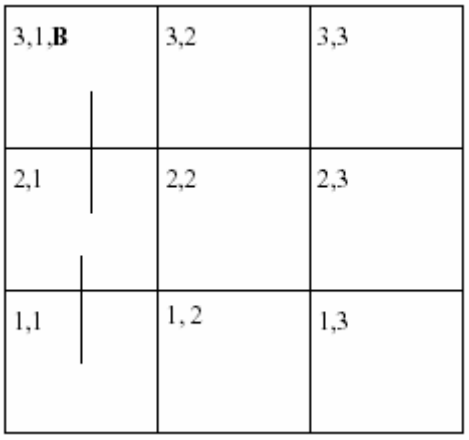

Figure 1 ***Wumpus world.***

8. Go to http://20q.net/ and play the game. It's artificial intelligence applied (also check out http://sithsense.com/flash.htm)
9. Exercise 8.3 AIMA
10. Exercise 8.8 AIMA
11. Exercise 8.9 AIMA
12. Exercise 9.3 AIMA
13. Exercise 9.9 AIMA
14. Exercise 9.10 AIMA
15. Consider the following sentences:
    "If it rains, Joe brings his umbrella"
    "If Joe has his umbrella, he doesn't get wet"
    "If it doesn't rain, Joe doesn't get wet"
    (a) Write propositional logic sentences for these sentences. Use R for "it rains", U for "Joe brings his umbrella", and W for "Joe gets wet".
    (b) Convert these sentences to CNF
    (c) Use resolution with refutation to prove that Joe doesn't get wet.
16. Read the introductory article on creating your own ontology
    http://protege.stanford.edu/publications/ontology_development/ontology101-noy-mcguinness.html