Assignment 2

Total marks: 85.

Out: November 3
Due: November 17 at the beginning of class

Note: Your report for this assignment should be the result of your own individual work. Take care to avoid plagiarism (“copying”). You may discuss the problems with other students, but do not take written notes during these discussions, and do not share your written solutions.

1. Exercise 3 of Chapter 6 in the textbook. [40 points]

2. Exercise 2 of Chapter 9 in the textbook. [20 points]

3. Exercise 4 of Chapter 9 in the textbook. For part (a), give your algorithm in English/pseudocode [10 points] and write and test a SWI Prolog program that implements it [10 points]. The main predicate should be called difference(D1,D2,D3) and should succeed when D1 subsumes D2, binding D3 to the difference between D2 and D1 (if D1 does not subsume D2, it should fail). Represent concepts as lists in the obvious way. Note that computing the difference becomes easy if you first normalize D1 and D2, as discussed in exercise 6 of chapter 9. Test your program on the following examples as well as your own:

D1 = [and p [and q u]]
D2 = [and [and q t] [and p s] u]

D1 = [and [all r1 p] [and [all r1 q] [all r1 u]]]
D2 = [and [all r1 [and q t]] [all r1 [and p s]] [all r1 u]]

D1 = [and [all r1 p] [all r2 p]
[and [all r1 q] [all r2 q] [all r1 u]]]
D2 = [and [all r1 [and q t]] [all r2 p] [all r1 [and p s]]
[all r1 u] [all r2 [and q s]]]

D1 = [and p [and q u]]
D2 = [and [and q t] [and p s] v]

Part (b) is worth [5 points].