An Exercise on the Use of Prolog as a logic programming tool

Learning Objective: To reinforce the understanding on the use of Prolog as a tool of logic programming and the specification of declarative knowledge – semantic information.

Learning Outcome:
a) Understand the separation of Knowledge from the inference mechanism in Knowledge-Based System (KBS).
b) Understand that the proof procedure is based on the refutational proof using resolution on Horn Clauses.
c) Appreciate the ordering of the clauses of the same class affects the proof sequence.

Tools: SWI-Prolog - http://www.swi-prolog.org/

Deliverables: This assignment consists of two problems to be specified as a declarative knowledge in Prolog. The submission of the prolog knowledge base and traces of queries to the laboratory has to be made within one week after your 2nd scheduled example class. Submission is to the **Software Project Lab (N4-B1b-11).**

Exercise 1: **The Smart Phone Rivalry**

SumSum, a competitor of Appy, developed some nice smart phone technology called Galactica-S3, all of which was stolen by Stevey, who is a Boss. It is unethical for a Boss to steal business from rival companies. A competitor of Appy is a rival. Smart phone technology is a business.

1. Translate the natural language statements above describing the dealing within the Smart Phone industry in to First Order Logic, (FOL).

2. Write these FOL statements as Prolog clauses.

3. Using the prolog search engine, prove that Stevey is unethical. Show a trace of your proof.

Exercise 2: **The Royal Family**

The old Royal succession rule states that the throne is passed down along the male line according to the order of birth before the consideration along the female line – similarly according to the order of birth. Queen Elizabeth, the monarch of United Kingdom, has four offsprings; namely:- Prince Charles, Princess Ann, Prince Andrew and Prince Edward – listed in the order of birth.

1.   Define their relations and rules in a prolog rule base. Hence, define the old Royal succession rule. Using this old succession rule determine the line of succession based on the information given. Do a trace to show your results.

2.   Recently, the Royal succession rule has been modified. The throne is now passed down according to the order of birth irrespective of gender. Modify your rules and prolog knowledge base to handle the new succession rule. Explain the necessary changes to the knowledge needed to represent the new information. Use this new succession rule to determine the new line of succession based on the same knowledge given. Show your results using a trace.