National Taipei University of Technology
Artificial Intelligence (spring, 2014)

Homework #2

(Due: Wednesday, March 26)

1. (30%) Which of the following are syntactically correct Prolog object? What kinds of object are they (atom, number, variable, structure)?

(1) Hello	(2) hello	(3) 'Hello'	(4) 'hello'
(5) Hello_ai	(6) hello_AI	(7) 1+2	(8) +(1, 2)
(9) _hello	(10) ++	(11) 20140229	(12) 2014(2, 29)
(13) -32768	(14) Black(dark)	(15) black(Dark)	

2. (30%) Will the following matching operation succeed or fail? If they succeed, what are the resulting instantiations of variables?
   (1) gorilla = gorilla
   (2) 'gorilla' = gorilla
   (3) Gorilla = gorilla
   (4) gorilla = monkey
   (5) gorilla(john, Gender) = gorilla(Name, male)
   (6) gorilla(male) = gorilla(Name, Gender)
   (7) line(point(-1, Y), point(X, -1)) = line(point(Y, X), P1)
   (8) letter(C) = word(letter)
   (9) point(X, X) = point(a, b)
   (10) a(b(c,D),C,f(G,h))=a(B,c(d,e,f,G),H)

3. (40%) There is a monkey at the door into a room and a key in the middle of room. At the window of the room there is a banana locked in the box. The monkey should use the key to unlock the box to get banana. The monkey can perform the following action: walk, pick the key, unlock the box and get the banana. Write a prolog program to answer whether the monkey can get banana.
   The query is ?- canget(state(atdoor, lock, hasnot, hasnot)).
        canget(state(S1, S2, S3, S4))
          S1: monkey location
          S2: box is lock or not
          S3: monkey has the key or not
          S4: monkey has the banana or not

Note:
- The programs must be runnable in SWI-Prolog.
- You must package your programs in a single zip file named XXX_hw2.zip, where XXX is your student identity number.
  Submit the whole file to open cyber classroom. The first-time Login ID and password are student number.
- If the answer is not a program, you must answer the question in a single text file (txt, doc, etc.).
- A penalty will be applied if predicate name, program name or zip file name is not defined as above.