Exercises for November 21, 2009

LOGIC PROBLEMS

An island of Vaal is inhabited by humans and apes. Apes can speak human language, and quite well. Every ape and every human is either a knight (and, in particular, always tells the truth), or a liar (always lies)

1. For each of the items below, explain who could make such a statement:

   a) I am a liar and an ape.
   b) I am either a liar or an ape
   c) It is not true that I am an ape and a knight.

2. Now you need to identify who is A and who is B

   a) A: At least one of us is an ape. B: At least one of us is a liar.
   b) A: We are both apes. B: We are both liars.
   c) A: B is a liar and an ape. I am human. B: A is a knight

IMPLICATIONS and EQUIVALENCE

3. It is known that each of the two people A and B is either a knight or a liar. Suppose that A makes the following statement: “If I am a knight then B is also a knight”. Can you tell who are A and B: who is a knight and who is a liar?

4. Those who get A on the test, study a lot. Johnny has studied a lot. Does it mean that he will get an A on the test?

5. A certain country is inhabited by magicians, sorcerers and wizards. The following facts are known: firstly, not all magicians are sorcerers and, secondly, if a wizard is not a sorcerer then he is also not a magician. Is it true that not all magicians are wizards?

6. Each of the two people A and B is either a knight or a liar. A says: “If B is a knight then I am a liar.” Who is A and who is B?

7. The person A says: “The treasure on this island can be found if and only if I am a knight”.
   a) Can you tell who A is: a knight or a liar?
   b) Can you tell whether the treasure can be found on this island?

8. If the room 1 has a princess in it, then the statement on its door is true, if the room has a tiger then the statement is false. If the room 2 has a princess then the statement is false, while if it has a tiger then it is true. The doors have the following sings on them:
   a) Room 1: both rooms have princesses.
   b) Room 2: both rooms have princesses.

     Which of the rooms has a princess?