Chapter-1

Section-2

Problem no. 20

Inhabitants of the island of knights and knaves created by Smullyan, where knights always tell the truth and knaves always lie. You encounter two people, A and B. Determine, if possible, what A and B are if they address you in the ways described. If you cannot determine what these two people are, can you draw any conclusions?

A says, "The two of us are both knights," and B says, "A is a knave."

soln 20

Given, Knight: always tells the truth

knave: always lies

A = "The two of us are both knights."

B = "A is a knave."

Let us first assume that A is a knight, then A speaks the truth and thus B has to be a knight as well. B then

also has to speak the truth and thus A has to be a knave. However, A cannot be a knave and a knight at the same time, thus we obtained a contradiction and thus the initial assumption of A being a knight is wrong. In other words, we then know that A is a knave.

Next we note that B's statement is correct (since A is known to be a knave) and thus B is telling the truth, which means that B has to be a knight.

Result: A is a knave,
B is a knight.