Assignment – Discrete Mathematics

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Chapter: 1, Section: 2

Problem No 25

Question

For the inhabitants of an island on which there are three kinds of people: knights who always tell the truth, knaves who always lie, and spies (called normals by Smullyan [Sm78]) who can either lie or tell the truth. You encounter three people, A, B, and C. You know one of these people is a knight, one is a knave, and one is a spy. Each of the three people knows the type of person each of other two is. For each of these situations, if possible, determine whether there is a unique solution and determine who the knave, knight, and spy are. When there is no unique solution, list all possible solutions or state that there are no solutions

A says “I am the knight,” B says “I am the knave,” and C says “B is the knight.”

Answer

If B says “I am the knave”, he can’t logically be a knave (in which case he has to lie) or a knight (in which case he has to tell the truth). So he must be a spy.

Since B is a spy and C knows it. Therefore he is lying. Thus he is a knave.

A is therefore the knight.

A is a knight, B is a spy and C is a knave.