



Chapel Hill Math Circle

Intermediate Group

In the Land of Logic¹, Part 2

October 15, 2016

A very special island is inhabited only by knights and knaves. Knights always tell the truth and knaves always lie. You meet several inhabitants and they make certain statements. Can you determine what they are?

1. Homer: Zed and Betty are not the same.
Joe: Zed could claim that Betty is a knave.
Zed: Joe is a knight or Homer is a knave.
Betty: Homer and I are different.
2. Zeke: Only a knave would say that Zoey is a knave.
Zippy: I am a knight or Abe is a knight.
Zoey: Abe is a knave.
Abe: Zeke and I are not the same.
3. Zed: Carl could claim that Zoey is a knight.
Sue: Joe could claim that Carl is a knave.
Joe: Carl is a knave.
Zoey: I would tell you that Zed is a knight.
Carl: I know that Zoey is a knave and that I am a knight.
4. Carl: Alice is a knave.
Bob: Alice is a knave or Betty is a knave.
Marge: I know that Carl is a knight and that Alice is a knave.
Alice: Between Betty and Marge, exactly one is a knight.
Betty: It's false that Alice is a knave.
5. Peggy: It's not the case that Joe is a knave.
Zippy: Joe is a knight or Bozo is a knight.
Joe: It's not the case that Zippy is a knave.
Carl: Bozo is a knight and Joe is a knave.
Bozo: Joe is a knave.
6. Joe: I am a knight or Alice is a knave.
Bob: I could say that Zippy is a knight.
Ted: Zippy is a knight and Alice is a knave.
Zippy: It's false that Bob is a knave.
Alice: Zippy is a knave or Zoey is a knight.
Zoey: It's not the case that Joe is a knave.

¹ <http://www0.hku.hk/cgi-bin/philodep/knight/puzzle>

7. Betty: Bob is a knight or Dave is a knight.
 Zippy: Both Dave is a knave and Bob is a knight.
 Zed: Zippy and Dave are not the same.
 Bob: Dave is a knave or Alice is a knight.
 Dave: Alice and I are not the same.
 Alice: Dave is a knave and Betty is a knight.
8. Ted: Alice is a knave.
 Alice: Sally is a knight or Zed is a knight.
 Zed: Alice could claim that Betty is a knight.
 Marge: It's false that Betty is a knave.
 Zippy: Only a knave would say that Ted is a knave.
 Sally: I am a knight and Betty is a knave.
 Betty: Zippy is a knave or Ted is a knave.
9. Sue: Carl is a knight or Zeke is a knight.
 Bob: Ted is a knight or Zeke is a knight.
 Mel: Marge is a knave.
 Ted: Carl and Alice are both knights or both knaves.
 Alice: Only a knave would say that Bob is a knave.
 Marge: Carl could claim that Alice is a knave.
 Zeke: Marge is a knave or Ted is a knave.
 Carl: I and Marge are not the same.
10. Bozo: It's false that Dave is a knave.
 Zoey: Marge is a knave and Sue is a knight.
 Marge: Bozo is a knave.
 Bart: Zed could claim that I am a knight.
 Zed: Only a knave would say that Dave is a knave.
 Joe: It's not the case that Bart is a knave.
 Dave: Mel and Joe are both knights or both knaves.
 Sue: Zed is a knave.
 Mel: Neither Bozo nor Zoey are knaves.

A second look at one of last week's problems: If-Then

The next home visited by McGregor proved more of a puzzler. The door was opened timidly by a rather shy man. After McGregor asked him to say something about himself and his wife, all the husband said was: "If I am a knight, then so is my wife."

McGregor walked away none too pleased. "How can I tell anything about either of them from such a noncommittal response?" he thought. He was about to write down "Husband and wife both unknown," when he suddenly recalled an old logic lesson from his Oxford undergraduate days. "Of course," he realized, "I can tell both their types!"

What type is the husband and what type is the wife?