Exercise 5: To Market to Market (Logical Thinking)

A farmer is taking a wolf, a goat, and a head of cabbage to the market. To do this, the farmer must cross a river. He has a boat, but it is only big enough to carry him and at most one of the wolf, goat, or cabbage (the farmer can also choose to cross the river alone). If the farmer leaves the wolf and the goat alone together, the wolf will eat the goat. If the farmer leaves the goat and the cabbage alone together, the goat will eat the cabbage.

Work with a partner to find an algorithm that gets the farmer, the wolf, the goat, and the cabbage across the river without anything getting eaten. Write a flowchart for the algorithm that looks like this:

where each step says who the farmer takes across the river. You may find it helpful to keep track of who is on which side of the river by drawing state diagrams before and after each step of the algorithm as shown below.

There are two solutions to this problem. See if two groups found the two solutions; if not, everyone try to find the second solution.