Homework #4

Chapter 3

1. Give the complete state space representation of the farmer, wolf, goat and cabbage problem:

   A farmer with his wolf, goat, and cabbage come to the edge of a river they wish to cross. There is a boat at the river's edge, but, of course, only the farmer can row. The boat also can carry only two things (including the rower) at a time. If the wolf is ever left alone with the goat, the wolf will eat the goat; similarly, if the goat is left alone with the cabbage, the goat will eat the cabbage. Devise a sequence of crossings of the river so that all four characters arrive safely on the other side of the river.

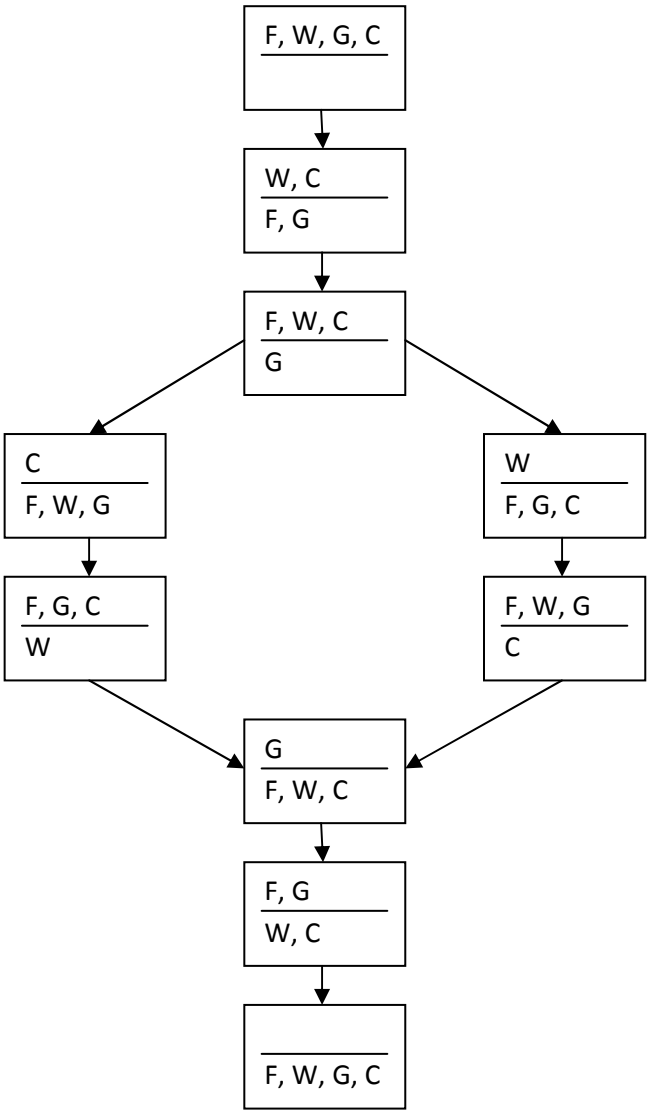
   Let nodes represent states of the world; e.g., the farmer and the goat are on the west bank and the wolf and cabbage on the east. There will be a start state and a goal state.

   a) Solve the above problem by finding a path from the start state to the goal state.

      There are two paths that lead from the start state (root) to the goal state (bottom node).

   b) Discuss the advantage of breadth-first and depth-first search for this problem.

      Since the goal node (_____ F, W, G, C) is at the bottom of the tree, it is faster for the depth-first search to reach it. The breath-first search will have to search more nodes before it reaches the goal node.


F, W, G, C
W, C
F, G
F, W, C
G
C
F, W, G
W
F, G, C
F, G, C
W
F, W, G
C
G
F, W, C
F, G
W, C
F, W, G, C

2. Draw an **and/or** graph searched by the financial advisor (Example 3.3.5, p-115 of the book) for the case of an individual with four dependents, $18,000 in the bank, and a steady income of $25,000 per year. (You do not need to draw the complete state space.) What is the investment decision?

   Answer: The decision is to invest on savings account.