CSCI/PHIL 4550/6550 Artificial Intelligence

Problem Set Number 1: Due 9/3/2009 **(in class)**

1. **[30 points] Missionaries and cannibals** The missionaries and cannibals problem is stated as follows. Three missionaries and three cannibals are on one side of a river, along with a boat that can hold one or two people. Find a way to get everyone to the other side, without ever leaving a group of missionaries in one place outnumbered by the cannibals in that place.

   (a) Formulate the missionaries and cannibals problem in terms of State Space Search. Include an informal description of each of the following:

   - A representation for states.
   - A set of actions(operators).
   - An applicability condition for each action.
   - A state transformation function for each action.
   - A goal test.

   (b) Solve the problem as you have formulated it and find the **fastest** way to get every one to the other side of the river. Show your search tree including all states expanded prior to and including the goal state. **Hint:** you may assume that a boat trip takes the same amount of time regardless of whether one or two people are in it, what kind of people and which direction its going.

2. **[10 points]** Solve problem 3.7 [parts a,d only] page 90 in Russell and Norvig.

3. **[10 points]** Solve problem 3.8 page 90 in Russell and Norvig.