

CSCI/PHIL 4550/6550 Artificial Intelligence

Problem Set Number 1: Due 9/6/2007 (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 operators.
 - An applicability condition for each operator.
 - A state transformation function for each operator.
 - 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.