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CS 590 – Artificial Intelligence
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10/17/2011

Cannibals and Missionaries design document

I created a program in Java to solve the missionaries and cannibals problem.

Main Classes:

Main:

The main class that provides either an application interface (text Only) or an applet interface (nice animating GUI). Only the application interface will be described in this document.

Functions: None

Node:

The State class holds one possible state of the problem, Including the Location of missionaries and cannibals and also the boat placement.

Functions:

Validate:
Checks node state to see if it is a valid state based on the problem description.

Check:
Checks if a node is present in a given array.

Expand:
Expands a node and creates the successors.

Search:
Calls the expand on all the nodes of the array.

Find path:
Find outs the parent of a node, replaces the node with the parent and calls the function again until the parent node is null.

Design diagram:

Main ---Uses-→[expand & Search]
Search –Uses→ [expand]
Expand—Uses→[Validate,check,findpath]

State Diagram:

With invalid moves and repeated states removed.

Why people have hard time solving this possible?

- They do not keep track of the moves they made, So they end up repeating steps and getting into loops
- They try to move them randomly without checking if it’s a valid state.