

Laboratory Record

**Semester : Fall Sem 2021-22**

**Course Name : Artificial Intelligence**

**Course Code : CBS3004**

**Slot : L7 + L8**

**Student RegNo : 19BBS0152**

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**List of Experiments**

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| **SNO** | **Experiment** |
| 1 | Missionaries And Cannibals |
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**General Instructions**

1. Can use any langugae for implementation but use the same for all eperiments.
2. Can implement at least one search for each problem.

**Challenging Experiments**

Try to build the software which can simulate the behaviour of various searches for a particular problem. The interface should contain the provision to choose problem and method of search. Once choosen, it can play step-by-step with detailed procedure (similar to paper and pen approach).

**[Extra Credit]**

**Challenging Experiment 1: Missionaires and Cannibals**

*one problem , many searches*

1. **Problem Statement:**
   1. *On one bank of a river are three missionaries and three cannibals. There is one boat available that can hold up to two people and that they would like to use to cross the river. If the cannibals ever outnumber the missionaries on either of the river’s banks, the missionaries will get eaten.   
      How can the boat be used to safely carry all the missionaries and cannibals across the river?*
2. **State Space Representation:**
   1. **intial State**
      1. missionariesLeft : 3
      2. cannibalsLeft:3
      3. boatPosition: L
      4. cannibalsRight:0
      5. missionariesRight:0
   2. **goal State** 
      1. missionariesLeft : 0
      2. cannibalsLeft:0
      3. boatPosition: R
      4. cannibalsRight:3
      5. missionariesRight:3
   3. **Actions/Succesors Function**
      1. if boatPosition === LEFT
         1. two missionaries cross left to right
         2. two cannibals cross left to right
         3. one missionary and one cannibal cross left to right
         4. one missionary crosses left to right
         5. one cannibal croses left to right
      2. if boatPosition === RIGHT
         1. two missionaries cross right to left
         2. two cannibals cross right to left
         3. One missionary and one cannibal cross right to left
         4. One missionary crosses right to left
         5. One cannibal crosses right to left
   4. **Performance Metric**
      1. heurestic functions:
         1. total number of people on the left bank(number of missionaries + number of cannibals)
      2. path cost function
         1. depth of node
   5. **Control Search Strategy**
      1. Breadth Firsth Search
      2. A\* Search
      3. Iterative Deepening
      4. Hill Climbing
3. **Search Algorithm Preferred:**
   1. Bfs,iterative deepeening search ,A\* search, hill climbing
4. **Apply Search Algorithm Theoritically:**
5. **Implement the Algorithm for the Problem:**
6. **Output:**
7. **Remarks:**