

Missionaries & Cannibals Problem.

1. 3 Missionaries, 3 Cannibals are on side of the river.
- The goal is to move all 3M & 3C to other side of the river using single boat such that -
- i) No. of cannibals should not be more than missionaries (or they will eat missionaries).

2) Boat cannot return empty.

- Boat can carry min. 1 & max 2 people. So (1M, 1C, 2M, 2C, 1M1C) are valid moves.

Solution -

man 0) Initial State (3M, 3C, 2, 0M, 0C)

2M ✓
2C ✓

1) Two cannibals from left to right.

(3M, 1C, R, 2M, 2C).

2C - initial
1C - ✓

2) One Cannibal from right to left.

(3M, 2C, 2, 0M, 1C).

2M - X
2C - ✓

3) Two cannibals from left to right.

(3M, 0C, R, 0M, 3C).

1C ✓
2C ✓ min

4) One cannibal from right to left.

(3M, 1C, 2, 0M, 2C).

2M ✓
2C X

5) Two missionaries L → R.

(1M, 1C, R, 2M, 2C).

2C X
2M - previous state
1M1C

6.) 1m 1c crosses $R \rightarrow L$.

(2m, 2c, 1, 1m, 1c).

1m 1c ✓ 2m ✓
RCX

7.) Two missionaries crosses $L \rightarrow R$.

(0m, 2c, R, 3m, 1c).

1m X
1c ✓
1m 1c

8.) One cannibal crosses $R \rightarrow L$.

(0m, 3c, 1, 3m, 0c)

2c ✓

9.) Two cannibals crosses $L \rightarrow R$.

(0m, 1c, R, 3m, 2c).

1m ✓
1c ✓

10.) 1 Cannibal $R \rightarrow L$.

(0m, 2c, 1, 3m, 1c).

2m X
2c ✓

11.) 2 cannibals $L \rightarrow R$.

(0m, 0c, R, 3m, 3c)



solution. / Goal state.