The missionaries and cannibals problem

- N missionaries and N cannibals are at the left bank of a river

- There is a boat that can hold K people

- Find a way to get everyone to the right bank

- So that at any time, at any place (on either bank, or in the boat), #missionaries $\geq$ #cannibals or #missionaries $=0$

Formulation of the MC problem

- States (M, C, B) where M – #missionaries, C – #cannibals at the left bank, $B = 1$ indicates the boat is at the left bank

- Actions (m, c) where m – #missionaries, c – #cannibals on the boat

- Precondition: #missionaries and #cannibals satisfy the constraint

- Effects: $(M, C, 1) \overset{(m,c)}{\Rightarrow} (M - m, C - c, 0)$ and $(M, C, 0) \overset{(m,c)}{\Rightarrow} (M + m, C + c, 1)$

Running breadth-first with cycle-checking for $M = 3$ and $K = 2$