CS 302
Artificial Intelligence
Assignment - 1

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1ans) a) Let 'M' be represent the missionaries and 'C' be the cannibals. (none)
Let the boat be 'B'.
Here, each state can be represented by the no. of items on each sides of the river.
Let the S_1 {M, M, C, C} and S_2 {M, C, B}.

b) Initial state -
S_1 {M, M, M, C, C, C, B}, S_2 { }. (none)

Goal state -
S_1 { }, S_2 {M, M, M, C, C, C, B}

c) A set of missionaries (or) cannibals (call them move) can be moved from S_1 to S_2 if: (none)
i) The boat 'B' is on S_1.
ii) The set Move consists of 1 (or) 2 people that are on S_1.
iii) The no. of missionaries in the set formed by subtracting. i.e Move from S_1 is '0' or it is greater than or equall to the cannibals.
iv) The no. of missionaries in the set formed by adding i.e Move from S_2 is '0' or it is greater than or equal to cannibals.

d) The cost function in my successor function is each move has unit cost. (none)

e) The total no. of reachable states are 16. They are- (none)

S_1 {M, M, M, C, C, C, B} , S_2 { }
S_1 { } , S_2 {M, M, M, C, C, C, B}
S_1 {C, C, B} , S_2 {M, M, M, C}
S_1 {C, C, M} , S_2 {M, M, B, C}
S_1 {M, M, M} , S_2 {C, C, C, B}
S_1 {C, B} , S_2 {M, M, M, C, C}
S_1 {M, C} , S_2 {M, M, C, C, B}
S_1 {C, C, C, B} , S_2 {M, M, M}
S_1 {M, C, B} , S_2 {M, M, C, C}
S_1 {M, M, C, C} , S_2 {M, C, B}
S_1 {M, M, M, C, C, B} , S_2 {C}
S_1 {M, M, M, C, C} , S_2 {C, B}
S_1 {C} , S_2 {M, M, M, C, C, B}
S_1 {M, M, M, C, B} , S_2 {C, C}
S_1 {M, M, M, C} , S_2 {C, C, B}
S_1 {M, M, C, C, B} , S_2 {M, C}

2 Ans) a) Level 1 - 1 (none)
Level 2 - 2, 3
Level 3 - 4 5 6 7
Level 4 - 8 9 10 11 12 13 14 15

b) Breadth-first search - (none)
1 2 3 4 5 6 7 8 9 10 11 12 13
Depth-limited search -
1 2 4 8 9 5 10 11 3 6 12 13
Iterative-deepening search -
1 1 2 3 1 2 4 5 3 6 7 1 2 4 8 9 5 10 11 -
- 3 6 12 13

3 Ans) i) Breadth-first search is blind search (uninformed), it just keeps expanding all the leaves and cheeks if one of them is the goal.

ii) Best-first search is informed search, i.e it has some information (heuristics) about the goal.

For example -

If the information is about the distance from the current to state to the goal state, the best-first search will choose the state with will reduce the distance by the maximum amount.

Best-first search can get stuck in an infinite loop. So, if you think the agent might stuck in an infinite loop or if you don't have any heuristics

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FEBRUARY
2020

Saturday

(information). then go with breadth-first search
else go for best-first search.
- A better comparision would be between best-first
and hill climbing search.

4 Ans)

16 SUNDAY

ASIA BOOK HOUSE

JANUARY - 2020

S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27	28	29	30	31								