KING SAUD UNIVERSITY
COLLEGE OF COMPUTER SCIENCE AND INFORMATION
COMPUTER SCIENCE DEPARTMENT

CSC 361 **Model Answer Mid1** **2nd Semester 1428/1429**

Question 1.

1. Prove that the time and space complexity of BFS is $O(b^d)$.
2. Prove that the time and space complexity of UCS is $O(b^d)$.
3. Knowing that DFS has a time complexity $O(b^m)$, prove that IDS has a time complexity $O(b^d)$

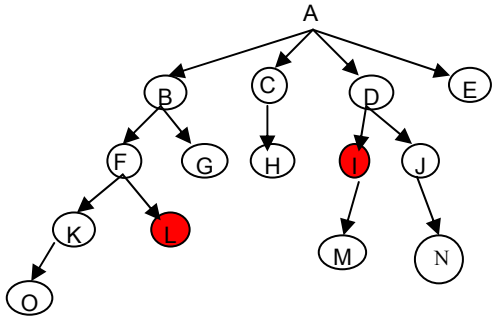
Answer:

1. In the worst case the time complexity = $b^0+b^1+ \ldots + b^d = O(b^d)$ and the maximum size of the queue is b^d which implies a space complexity of $O(b^d)$.

2. In the worst case UCS has the same complexity as BFS …

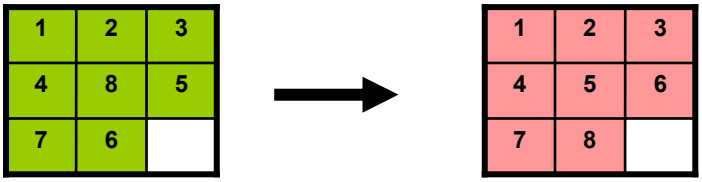
3. The biggest subtree explored by IDS has a depth-limit d. As IDS uses DFS search for tree traversal so the time complexity is $O(b^d)$ because m=d.

Question 2:



Answer: BFS: A, B, C, D, E, F, G, H, **I**
DFS: A, B, F, K, O, **L**

Question 3: Solve the following 8-puzzle problem using A* with $h_2()$



Answer:

Path solution: Left, Up, Right, Down
Path Cost = 4

Question 4 – Answer: Path Solution: Up, Up, Left, Down, Right; Cost = 5 Steps.