COLLEGE OF COMPUTER AND INFORMATION SCIENCES
COMPUTER SCIENCE DEPARTMENT

CSC 361: Artificial Intelligence | Midterm 1: First Semester 1431/1432H
Instructor: Dr. Yousef Al-Ohali | Time: 1-2:30 (1 hour and 30 minutes)

Question 1) (15 Marks)

a) Artificial intelligence is the study of systems that act in a way that to any observer would appear to be _Intelligent_

b) A problem formulation includes specification of the initial state, goal state and _Successor Function_

c) Iterative deepening search is an example of _Blind_ search.

d) A* search is an example of _Informed_ search.

e) A search strategy is said to be _optimal_ if it can find a path with minimum cost.

f) Time complexity of BFS is _$O(b^d)$_.

g) Space complexity of DFS is _$b*d$_.

h) A search technique is _Complete_ if it is guaranteed to find a solution (if exist).

i) BFS is implemented by using a _FIFO/Queue_ data structure.

j) DFS is implemented by using a _LIFO/stack_ data structure.

Question 2) (Search Strategies: 6*5*1.5=45 Marks)

Consider the following search tree. Goal states are marked with double borders. Find (a) the search cost (exact number of states generated), (b) the space cost, (c) the path cost, (d) the goal state that will be detected and (e) the order of goal-test application, using each of the following strategies:

Heuristic values
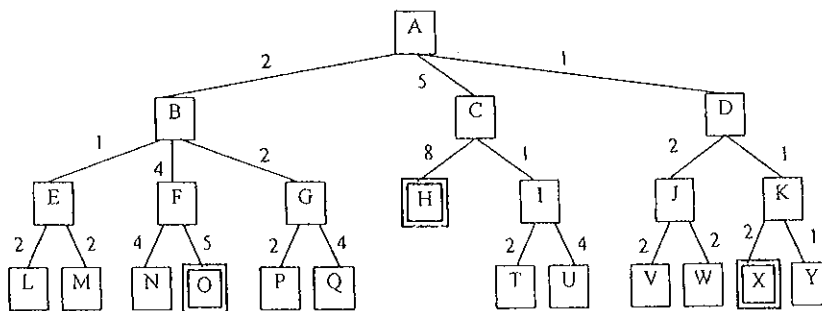
S	$h_1(S)$
A	3
B	5
C	3
D	2
E	15
K	1
Others except goal states	20

Strategy	Search Cost	Space Cost	Path Cost	Goal State	Goal Test Application (first 7 states)
i) Breadth First Search	17	10	13	H	A, B, C, D, E, F, G, H
ii) Uniform Cost Search	17	9	4	X	A, B, D, K, J, E, Y, G, X
iii) Depth First Search	11	6	11	O	A, B, E, L, F, N, O.
iv) Iterative deepening DFS	11	5	13	H	A, A, B, C, D, A, B, E, F, G, C, H.
v) Greedy search (using h_1 as heuristic function)	8	5	4	X	A, D, K, X.
vi) A* (using h_1 as heuristic function)	8	5	4	X	A, D, K, X.