**Cairo University**
**Faculty of science**
**Mathematics Department**

**Mid Term Exam(Spring 2018)**
**Artificial Intelligence**
**(Comp 408)**
**45 mins.**

**Name:---------- ID: ----------**

**Q(1) True or false questions:**

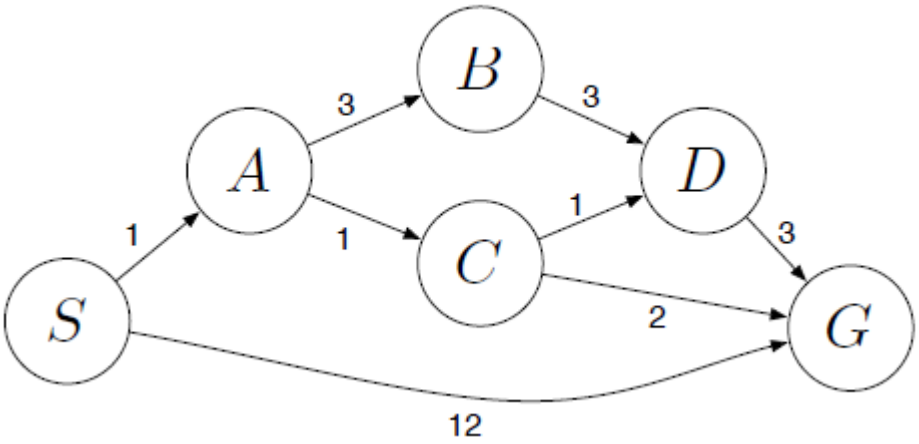
a. ( T / F) Greedy graph search is guaranteed to return an optimal solution.
b. (T/ F) A* graph search is guaranteed to return an optimal solution.

Let $h_1(n)$ be an admissible A* heuristic. Let $h_2(n) = 2h_1(n)$. Then:

c. (T / F) The solution found by A* tree search with $h_2$ is guaranteed to be an optimal solution.
d. (T / F) The solution found by A* tree search with $h_2$ is guaranteed to have a cost at most twice as much as $h_1$

**Q(2)** Iterative deepening is sometimes used as an alternative to breadth first search. Give one advantage and one disadvantage of iterative deepening as compared with BFS.

**Q(4)** Consider the following search space where S is the start state and G is the goal state:




- Each edge is labeled by the cost to traverse that edge.
- An estimate to the goal is given by

| Node | S | A | B | C | D | G |
|---|---|---|---|---|---|---|
| h | 4 | 2 | 6 | 1 | 3 | 0 |

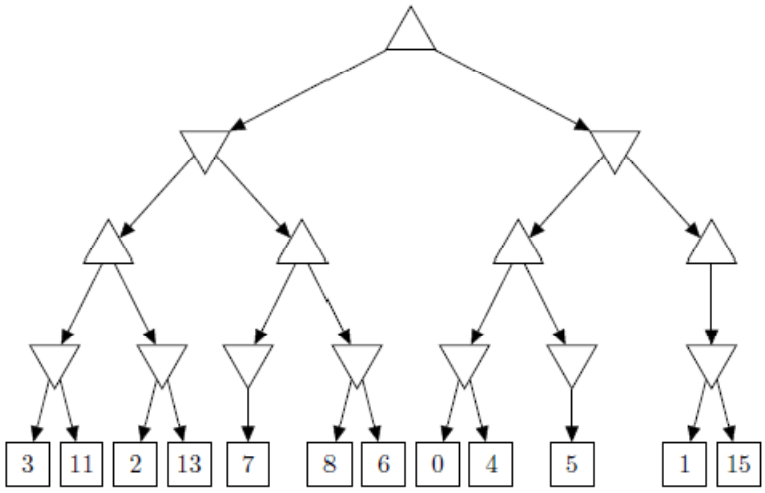
- For nodes on the same level assume alphabetical order in blind search.
- Show the order of the states visited (include the repeated) and the path to the goad by:

a. The Breadth First algorithm.
   Visited states:
   Path to Goal:
b. The Depth First algorithm.
   Visited states:
   Path to Goal:

c. A*
   Visited states:
   Path to Goal:
d. Is the *h* used above admissible or not? Why?

**Q(3)** Develop a PEAS description of the automated taxi-driver.

**Q(5)** On the minimax game tree below, assuming its **max's** turn to play. Cross out the branches removed by alpha-beta pruning assuming left to right traversal.




**Best Wishes**
**Areeg Abdalla**