

CS-271P, Intro to A.I., Winter Quarter, 2018—Quiz # 1—20 minutes

NAME: _____

YOUR ID: _____ ID TO RIGHT: _____ ROW: _____ NO. FROM RIGHT: _____

1. (12 pts total, 3 pts each) TASK ENVIRONMENT. Your book defines a task environment as a set of four things, with the acronym PEAS. Fill in the blanks with the names of the PEAS components.

P _____ E _____ A _____ S _____

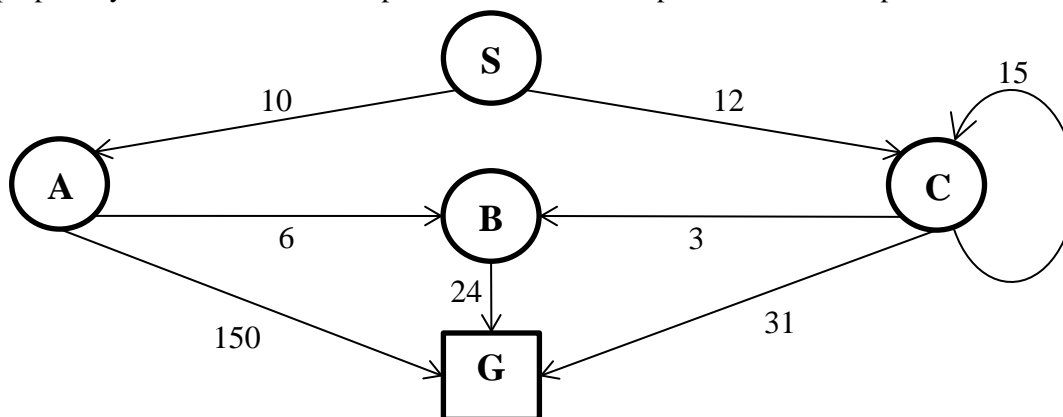
2. (48 pts total, 2 pts each) PROPERTIES OF TASK ENVIRONMENT. Your textbook (Fig. 2.6) gives several examples of task environments and their characteristics. Fill in the blanks with one of the underlined terms in the heading. The first one is done for you as an example.

Task Environment	<u>Fully</u> <u>Observable</u> or <u>Partially</u> <u>Observable</u>	<u>Single</u> Agent or <u>Multi</u> Agent	<u>Deterministic</u> or <u>Stochastic</u>	<u>Episodic</u> or <u>Sequential</u>	<u>Static,</u> <u>Semi,</u> or <u>Dynamic</u>	<u>Discrete</u> or <u>Continuous</u>
Taxi driving robot	Partially	Multi	Stochastic	Sequential	Dynamic	Continuous
Crossword Puzzle						
Chess or Go with a clock						
Poker, bridge, blackjack etc						
Part-picking robot						

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2. (40 pts total, 8 pts each) STATE-SPACE SEARCH STRATEGIES. Execute Tree Search through this graph (i.e., do not remember visited nodes). Step costs are given next to each arc. The successors of each node are indicated by the directed arrows out of that node. **Successors are returned in left-to-right order, i.e., successors of S are (A, C), successors of A are (G, B), and successors of C are (B, G, C), in that order.** S is the only initial node, and G is the only goal node.

For each search strategy below, show the order in which nodes are expanded (i.e., to expand a node means that its children are generated), optionally ending with the goal node that is found, or indicate the repeating cycle if the search gets stuck in a loop. Show the path from start to goal, or write "None." Give the cost of the path that is found, or write "None." Do check for duplicate nodes in the Fringe/Frontier, and treat them appropriately. Do not check for loops. Do not check for duplicate nodes in Expanded.



2.a. (8 pts total) DEPTH FIRST SEARCH.

(6 pts) Order of node expansion: _____

(1 pt) Path found: _____ (1 pt) Cost of path found: _____

2.b. (8 pts total) BREADTH FIRST SEARCH.

(6 pts) Order of node expansion: _____

(1 pt) Path found: _____ (1 pt) Cost of path found: _____

2.c. (8 pts total) UNIFORM COST SEARCH.

(6 pts) Order of node expansion: _____

(1 pt) Path found: _____ (1 pt) Cost of path found: _____

2.d. (8 pts total) ITERATED DEEPENING SEARCH.

(6 pts) Order of node expansion: _____

(1 pt) Path found: _____ (1 pt) Cost of path found: _____

2.e. (8 pts total) BIDIRECTIONAL SEARCH. Use Breadth First Search. First expand S, then expand G (invert the steps), then expand a node from Fringe(S), then expand a node from Fringe(G) (invert the steps), then expand a node from Fringe(S), then expand a node from Fringe(G) (invert the steps), and so on. **On the backward search from G, nodes are returned in right-to-left order (which is left-to-right if you stand on your head); i.e., successors of G are (C, B, A), successors of C are (C, S), successors of B are (C, A), and successors of A are (S, A), in that order on the backward search.**

(6 pts) Order of node expansion: _____

(1 pt) Path found: _____ (1 pt) Cost of path found: _____

Scratch Paper (1) Please Do Not Detach From Test

Scratch Paper (2) Please Do Not Detach From Test