ICS 171 — Quiz #1 — FIFTEEN (15) minutes

1. (5 pts) NAME AND EMAIL ADDRESS:_____

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

2. (30 pts total, -5 each wrong answer, but not negative) For each of the following terms on the left, write in the letter corresponding to the correct definition on the right. The first one is done for you as an example.

G	State	**A.**	Predicate for solution node.
B	Operator	**B.**	Action that maps one state into another state.
K	Initial State	**C.**	Sequence of operators.
A	Goal Test	**D.**	Apply all of the operators to some node.
N	Node	**E.**	Obtained by applying operators to a node.
C	Path	**F.**	Average number of operators per node.
M	Search Strategy	**G.**	A possible situation.
F	Branching Factor	**H.**	Cost of path from root to node.
E	Children	**I.**	All nodes waiting to be expanded.
H	Path Cost	**J.**	Always finds the best solution if one exists.
I	Frontier	**K.**	Root of search tree.
D	Expand	**L.**	Always finds a solution if one exists.
L	Complete	**M.**	How to choose the next node and operator.
J	Optimal	**N.**	Represents a state in search tree.

3. (5 pts each, 25 pts total) Assume that node cost is a function only of node depth, and that the cost function never decreases.

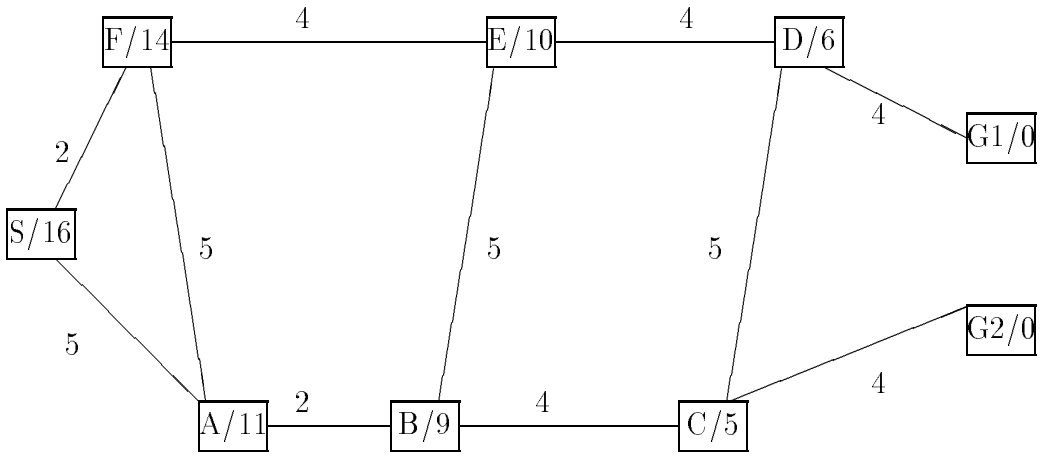
3a. Is depth-first search optimal? ("Y" = yes, "N" = no) **N**

3b. Is breadth-first search optimal? ("Y" = yes, "N" = no) **Y**

3c. Is uniform-cost search optimal? ("Y" = yes, "N" = no) **Y**

3d. Is depth-limited search optimal? ("Y" = yes, "N" = no) **N**

3d. Is iterated-deepening search optimal? ("Y" = yes, "N" = no) **Y**



Problems 4 and 5 ask about this graph. Assume that ALL children of a node are returned in alphabetical order whenever the node is expanded, but that nodes are never expanded twice (= no cycles). "S" is the start node, and either "G1" or "G2" are goal nodes. The number inside each node is an estimate of the remaining distance to any goal from that node. The number next to each arc is the operator cost for that arc.

EXAMPLE: Write the order in which depth first search expands nodes:

S **A** **B** **C** **D** **E** **F** **G1**

4. (15 pts, -5 each wrong answer, but not negative)
Write the order in which uniform cost search expands nodes:

S **F** **A** **E** **B** **D** **C** **G1**

5. (25 pts total)

5a. (5 pts) Is the estimate of remaining distance to a goal (the number inside each node) an admissable heuristic for the graph above? ("Y" = yes, "N" = no). **N**

5b. (10 pts total, -5 each wrong answer, but not negative)
Which of these search algorithms is always OPTIMAL on graph search such as this ("Y" = yes, "N" = no)?

Breadth first **N** Depth first **N** Uniform Cost **Y**

Depth Limited (Limit = 3) **N** Iterative Deepening **N**

5c. (10 pts total, -5 each wrong answer, but not negative)
Which of these search algorithms is always COMPLETE on graph search such as this ("Y" = yes, "N" = no)?

Breadth first **Y** Depth first **Y** Uniform Cost **Y**

Depth Limited (Limit = 3) **N** Iterative Deepening **Y**