CS171, Intro to AI **Fall 2016 Quiz # 2** **Time: 20 minutes**

Name:_____

ID #:_____ **Seat (Row, #):**_____

Problem 1: (16 points; 2 points each)

Mark the following statements as True (T) or False (F).

	Hill-climbing algorithm without random-restart wrapper is complete for 8-Queens problem.
	Simulated annealing search can escape local optima by allowing some bad moves, and gradually increases their frequency.
	Beam search uses O(bd) space and O(bd) time, where b is the branching factor and d is the depth of the optimal solution.
	Simulated annealing uses O(constant) space and can escape from local optima.
	Genetic algorithms use O(constant) space and can escape from local optima.
	Gradient descent uses O(constant) space and can escape from local optima.
	Because mini-max search assumes optimal play, it may perform less well against an unpredictable opponent.
	Alpha-Beta pruning may return a better move than MiniMax search if it prunes many branches.

Problem 2: (24 points; 3 points each)

For each of the following terms on the left, write in the letter corresponding to the best answer or the correct definition on the right.

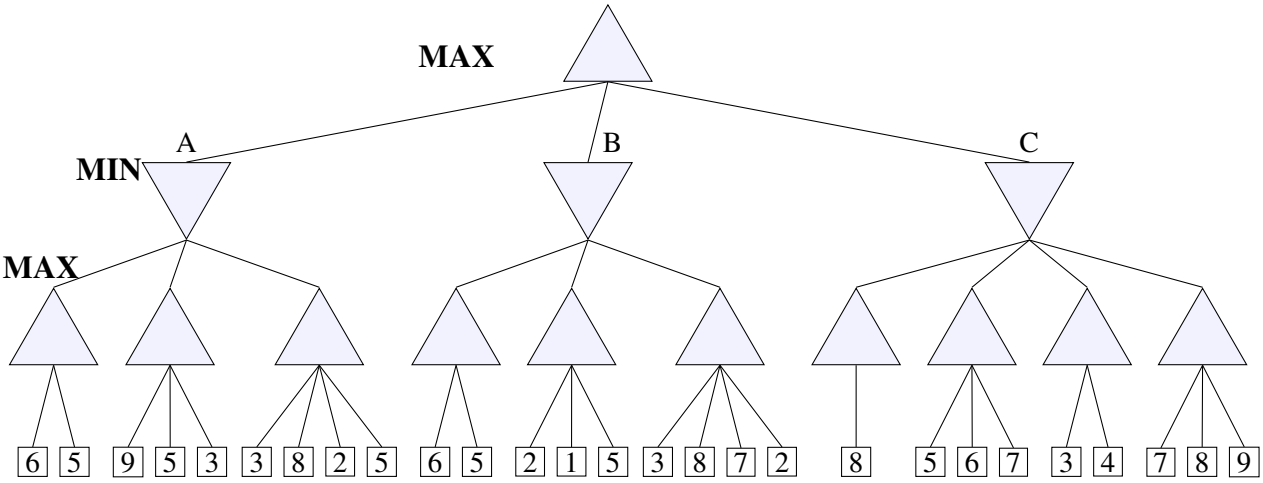
	Beta	A	Function that decides when to stop exploring this search branch.
	Game strategy	B	Function that specifies a player's move in every possible game state.
	Battleship	C	The highest value found so far at any choice point for MAX along the current path (ancestors of the current search node).
	Alpha	D	Function that says when the game is over.
	Heuristic evaluation function	E	Deterministic and perfect information game.
	Cutoff test	F	Deterministic and imperfect information game.
	Connect-K	G	Approximates the value of a game state (i.e., of a game position).
	Terminal test	H	The lowest value found at any choice point for MIN along the current path (ancestors of the current search node).

Problem 3: Mini-Max Search (30 points)

The game tree below illustrates a position reached in the game. Process the tree left-to-right. It is Max's turn to move. At each leaf node is the estimated score returned by the heuristic static evaluator.

3.a (28 points; 2 point each box) Fill in each blank triangle with the proper mini-max search value.

3.b (2 points) What is MAX's best move (write A or B or C)? : _____



Problem 4: Alpha-Beta Pruning Search (30 points)

This is the same tree as above. You do not need to indicate the branch node values again. Cross out each leaf node that will be pruned by Alpha-Beta Pruning.

4.a (27 points; 1 point each box at leaf) Mark **"X"** in each box corresponding to a *pruned* leaf node.

4.b (3 points) What score does Max expect to achieve? : _____