CS-171, Intro to A.I. — Quiz#2 — Fall Quarter, 2014 — 20 minutes

YOUR NAME AND EMAIL ADDRESS:

YOUR ID: _____ ID TO RIGHT: _____ ROW: _____ SEAT: _____

1. (25 pts total, -5 pts for each error, but not negative) MINI-MAX SEARCH IN GAME TREES.
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.

1.a. Fill in each blank square with the proper mini-max search value.

1.b. What is the best move for Max? (write A, B, or C) _____

(Max)

(Min)   (A)   (B)   (C)

(Max)

6 4 3 8 2 9 2 7 4 8 4 8 2 4 1 5 9 8 1 7 4 2 1 1 9 6 2
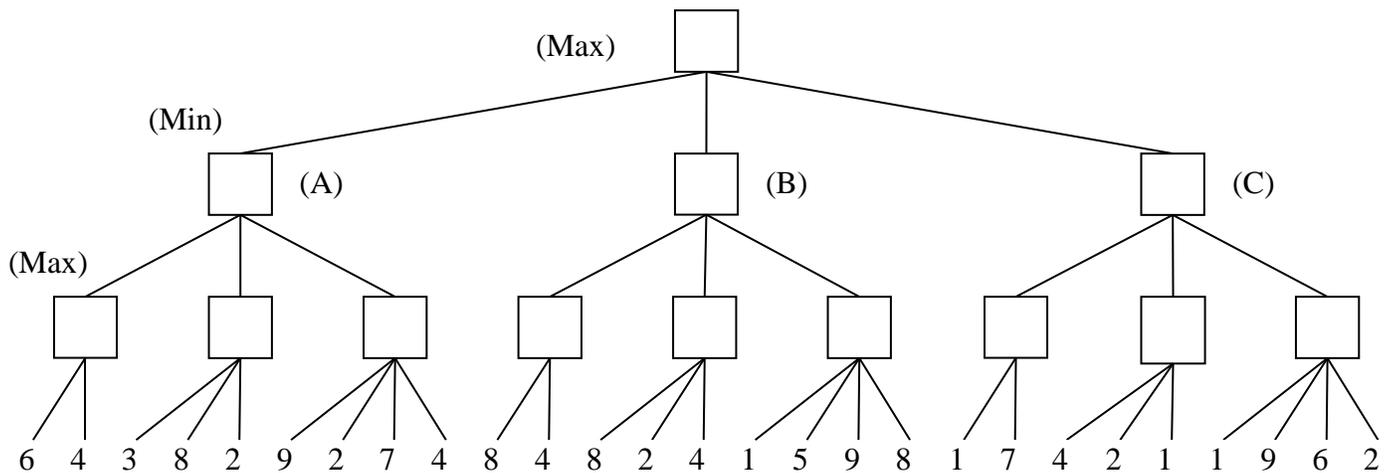
2. (25 pts total, -5 for each error, but not negative) ALPHA-BETA PRUNING. Process the tree left-to-right. This is the same tree as above (1.a). You do not need to indicate the branch node values again.

Cross out each leaf node that will be pruned by Alpha-Beta Pruning.

(Max)

(Min)   (A)   (B)   (C)

(Max)

6 4 3 8 2 9 2 7 4 8 4 8 2 4 1 5 9 8 1 7 4 2 1 1 9 6 2
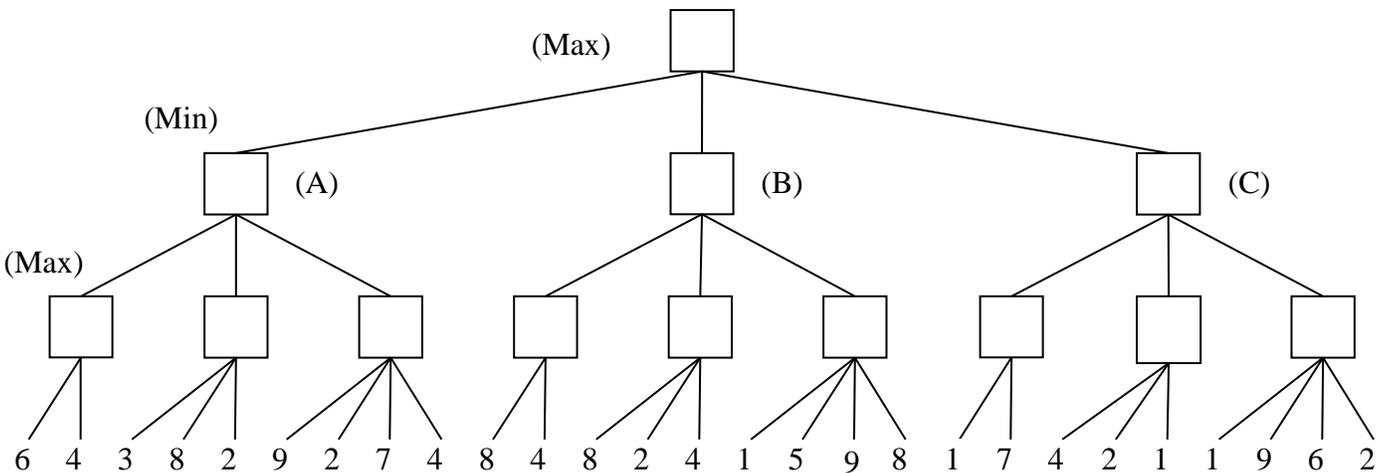
**** TURN PAGE OVER AND CONTINUE ON THE OTHER SIDE ****

3. (50 points each, 10 pts each) Constraint Satisfaction Problems
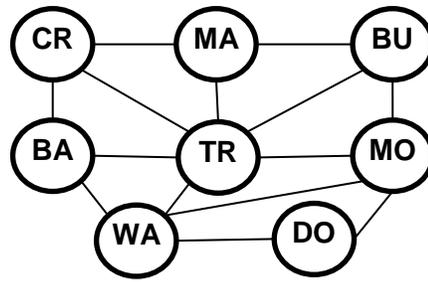
BA = Banat
BU = Bucovina
CR = Crisana
DO = Dobrogea
MA = Maramures
MO = Moldova
TR = Transilvania
WA = Walachia

You are a map-coloring robot assigned to color this map of Romania regions. Adjacent regions must be colored a different color (R=Red, B=Blue, G=Green). The constraint graph is shown.

3a. (10 pts total, -5 each wrong answer, but not negative) FORWARD CHECKING. TR has been assigned value R, as shown. Cross out all values that would be eliminated by Forward Checking:

BA	BU	CR	DO	MA	MO	TR	WA
R G B	R G B	R G B	R G B	R G B	R G B	R	R G B

3b. (10 pts total, -5 each wrong answer, but not negative) ARC CONSISTENCY.
BA has been assigned R and TR has been assigned B, as shown; but no constraint propagation has been done. Cross out all values that would be eliminated by Arc Consistency (AC-3 in your book).

BA	BU	CR	DO	MA	MO	TR	WA
R	R G B	R G B	R G B	R G B	R G B	B	R G B

3c. (10 pts total, -5 each wrong answer, but not negative) MINIMUM-REMAINING-VALUES HEURISTIC. Consider the assignment below. WA has been assigned B and constraint propagation has been done, as shown. List all unassigned variables that might be selected by the Minimum-Remaining-Values (MRV) Heuristic:_____.

BA	BU	CR	DO	MA	MO	TR	WA
R G	R G B	R G B	R G	R G B	R G	R G	B

3d. (10 pts total, -5 each wrong answer, but not negative) DEGREE HEURISTIC. Consider the assignment below. (It is the same assignment as in problem 3c above.) WA has been assigned B and constraint propagation has been done, as shown. List all unassigned variables that might be selected by the Degree Heuristic:._____.

BA	BU	CR	DO	MA	MO	TR	WA
R G	R G B	R G B	R G	R G B	R G	R G	B

3e. (10 pts total) MIN-CONFLICTS HEURISTIC. Consider the complete but inconsistent assignment below. TR has been selected to be assigned a new value. What new value would be chosen below for TR by the Min-Conflicts Heuristic?._____.

BA	BU	CR	DO	MA	MO	TR	WA
R	G	R	R	G	G	?	B