

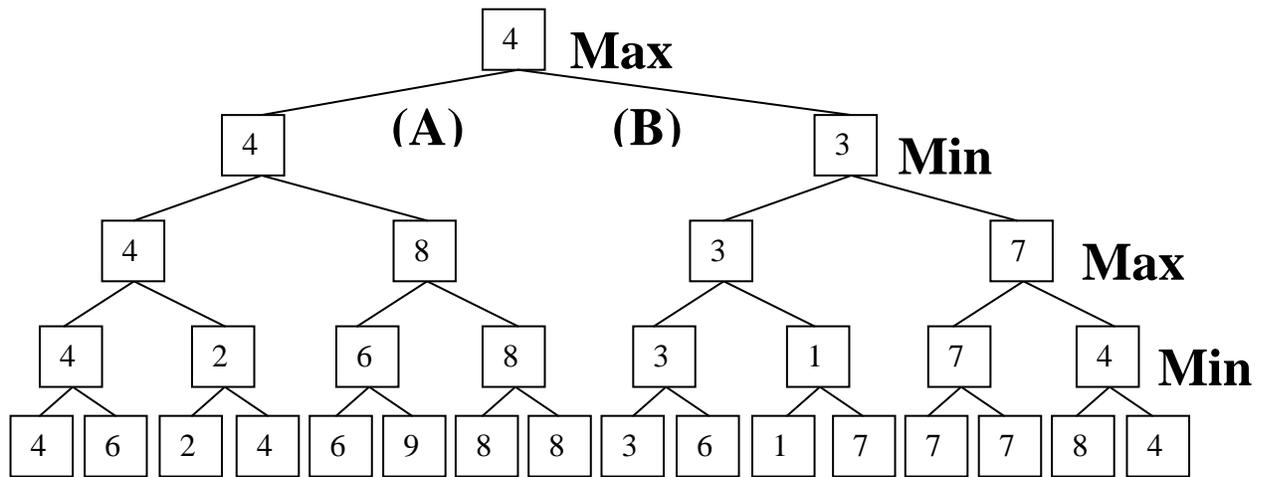
CS-171, Intro to A.I. — Quiz#2 — Spring Quarter, 2011 — 20 minutes

YOUR NAME AND EMAIL ADDRESS: _____

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

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

1.a. The game tree below illustrates a position reached in the game. It is **Max**'s turn to move. Inside each leaf node is the estimated score of that resulting position returned by the heuristic static evaluator. FILL IN EACH BLANK SQUARE WITH THE PROPER VALUE ACCORDING TO MINI-MAX SEARCH.



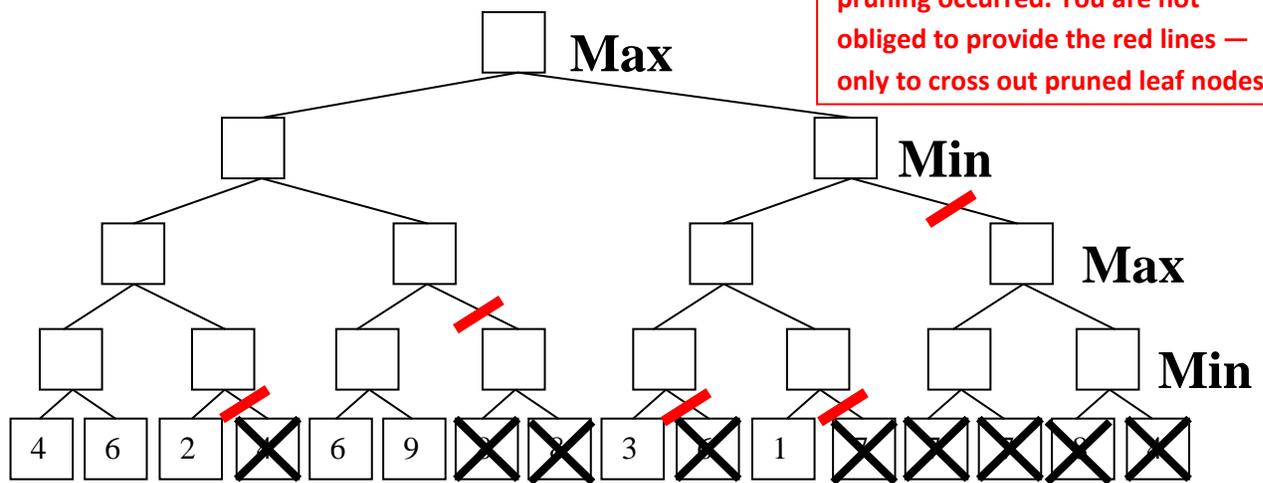
1.b. What is the best move for Max? (write A or B) A

2. (25 pts max, -5 for each error, but not negative) **ALPHA-BETA PRUNING.**

This is the same tree and conditions as above. CROSS OUT EACH LEAF NODE THAT WILL NOT BE EXAMINED BECAUSE IT IS PRUNED BY ALPHA-BETA PRUNING.

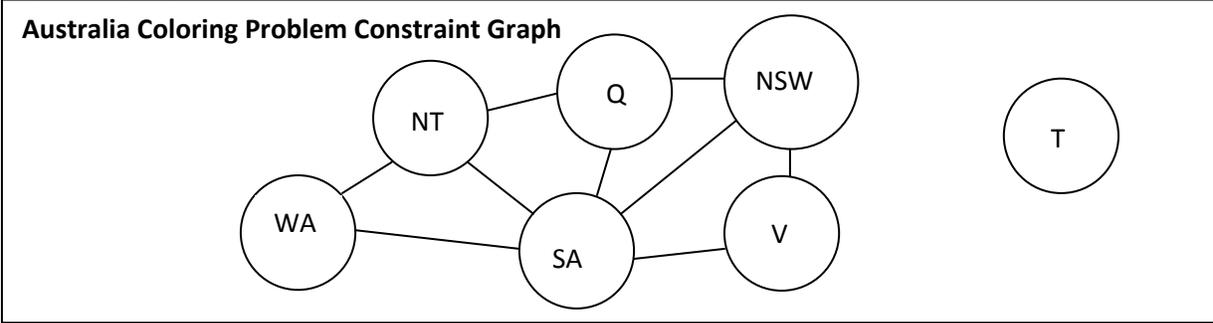
You do not need to indicate the branch node values again.

Red lines indicate where in the tree pruning occurred. You are not obliged to provide the red lines — only to cross out pruned leaf nodes.



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3. (50 pts total, 10 pts each) **CONSTRAINT SATISFACTION PROBLEMS.** This problem asks about the Australia Coloring Problem. Each region must be colored one of Red (R), Green (G), or Blue (B). Neighboring regions must be a different color.



3a. (10 pts total, -5 for each error, but not negative) **FORWARD CHECKING.** Consider the partial assignment below. Variable Q has been assigned value R as shown. Cross out all values that would be eliminated by Forward Checking (FC) after the assignment to variable Q.

WA	NT	Q	NSW	V	SA	T
R G B	X G B	R	X G B	R G B	X G B	R G B

3b. (10 pts total, -5 for each error, but not negative) **ARC CONSISTENCY.** Consider the partial assignment below. Variables WA and SA have been assigned values as shown. Cross out all other values that would be eliminated by Arc Consistency (AC, also called AC-3 in your book).

WA	NT	Q	NSW	V	SA	T
R	XX B	R XX	XX B	R XX	G	R G B

3c. (10 pts total, -5 for each error, but not negative) **MINIMUM-REMAINING-VALUES HEURISTIC.** Consider the partial assignment below. Variable WA is already assigned value R, and Arc Consistency is already done. List all unassigned variables that might possibly be selected by the Minimum-Remaining-Values (MRV) Heuristic: NT, SA.

WA	NT	Q	NSW	V	SA	T
R	G B	R G B	R G B	R G B	G B	R G B

3d. (10pts total, -5 for each error, but not negative) **DEGREE HEURISTIC.** Consider the partial assignment below. (It is the same assignment as in problem 3c above.) List all unassigned variables that might possibly be selected by the Degree Heuristic: SA.

WA	NT	Q	NSW	V	SA	T
R	G B	R G B	R G B	R G B	G B	R G B

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

WA	NT	Q	NSW	V	SA	T
R	G	B	R	G	?	B