

CS347 SP2005 Exam 3

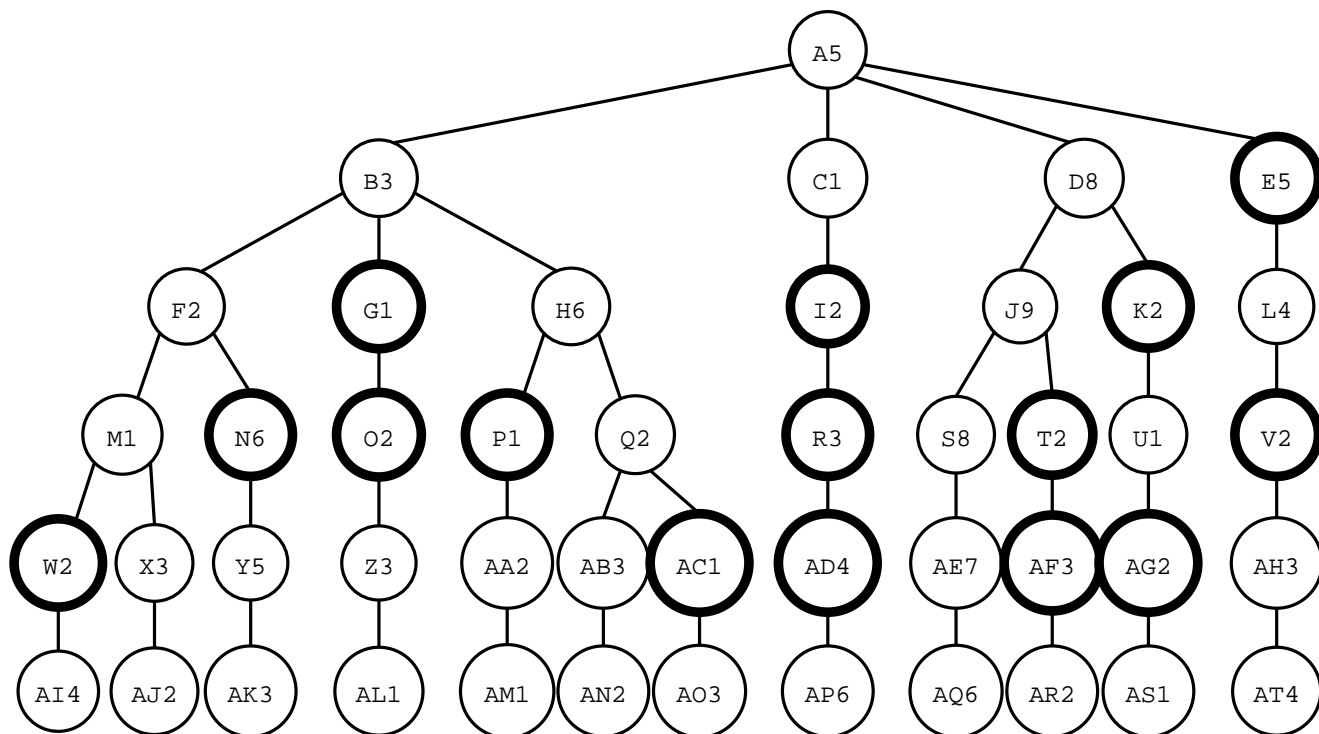
This is a closed-book closed-notes exam. The *only* items you are permitted to bring are writing implements. Mark every sheet of paper you use with your name and the string “cs347sp2005 exam3” (omittance, even if it is partial, will be penalized at 1 point per sheet). If you are caught cheating, you will receive a zero grade for this exam. The max number of points per question is indicated in square brackets after each question. The sum of the max points is 75. You have 75 minutes to complete this exam. Good luck!

1. Give two advantages of Iterative Deepening Minimax algorithms over Depth Limited Minimax algorithms. [6]
2. In the context of Iterative Deepening Minimax for a given search depth, on the provided copy of below table, put check marks in cells to indicate agreement, otherwise leave cells blank. [5]

| | Typically speeds up search | Does not influence search result |
|---------------------------------------|----------------------------|----------------------------------|
| Alpha-Beta Pruning | | |
| Quiescence Search | | |
| Forward Pruning | | |
| History Table Move Ordering Heuristic | | |
| Transposition Table | | |

3. (a) Explain what a transposition table is and what its use is in adversarial search. [5]
(b) What is different between a transposition table used for ABIDM and one used for IDMTDf? [4]
4. Explain briefly the idea behind the null-move pruning heuristic. [5]
5. The null-move pruning heuristic is an example of forward pruning, while $\alpha - \beta$ pruning is an example of backward pruning.
 - (a) What is the advantage of forward pruning over backward pruning? [4]
 - (b) What is the advantage of backward pruning over forward pruning? [4]
 - (c) Is it beneficial to combine forward and backward pruning in a single search? Explain your answer! [3]
6. Explain briefly how the idea of $\alpha - \beta$ pruning can be applied to game trees with chance nodes. [4]

7. The last three questions are about the following adversarial search tree. State evaluation heuristic values for the max player are provided in the form of numbers following the letter labels of the states (e.g., A5 indicates that the heuristic value of state A for the max player is 5). The order in which successors are generated is from left to right. Example: A generates first B, then C, then D, and finally E. Non-quietent states are indicated by bold circled states.



A pre-initialized history table is provided as follows: all entries are zero except for those specified in the following table:

| Move | AC | AE | BG | BH |
|----------|----|----|----|----|
| HT value | 1 | 2 | 2 | 2 |

- Give the execution trace for $\text{HTQSABIDM}(A,3,2,-\infty, \infty)$. [30]
- Which nodes, if any, get pruned by $\text{HTQSABIDM}(A,3,2,-\infty, \infty)$? [3]
- What is the Principal Variant (PV) found by $\text{HTQSABIDM}(A,3,2,-\infty, \infty)$? [2]

cs347sp2005 exam3 - table for question 2 - name:

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