CSE 332: Data Structures and Parallelism

Section 8: P3 and Search Solutions

0. Cutoffs

Provide a short diagram or description to explain the following parameters from P3:

(a) `ply`

Solution:

The total number of levels ahead looked (so, the height of your search tree).

(b) `cutoff`

Solution:

The number of levels remaining in the tree when your search switches to a non-parallel algorithm.

(c) `divideCutoff`

Solution:

The maximum number of threads which should be forked sequentially when dividing-and-conquering a list of moves. Similar to the `sequentialCutoff` parameter from exercises.

(d) `PERCENTAGE_SEQUENTIAL`

Solution:

The maximum percentage of a list of moves which should be forked sequentially in order to determine reasonable values for `alpha` and `beta`.

1. Efficiency

Circle the **most efficient** option from each pair of possible implementation strategies for P3:

(a) To create threads for each move in a `List<M>` during Parallel Minimax:

Create threads in a `for` loop **OR** Create threads with divide-and-conquer

Solution:

Create threads with divide-and-conquer.

(b) To pass copies of boards to these threads:

Copy the board *inside* the thread **OR** Copy the board *before* passing it to the thread

Solution:

Copy the board *inside* the thread.

(c) To evaluate a list of moves using Alpha-Beta pruning:

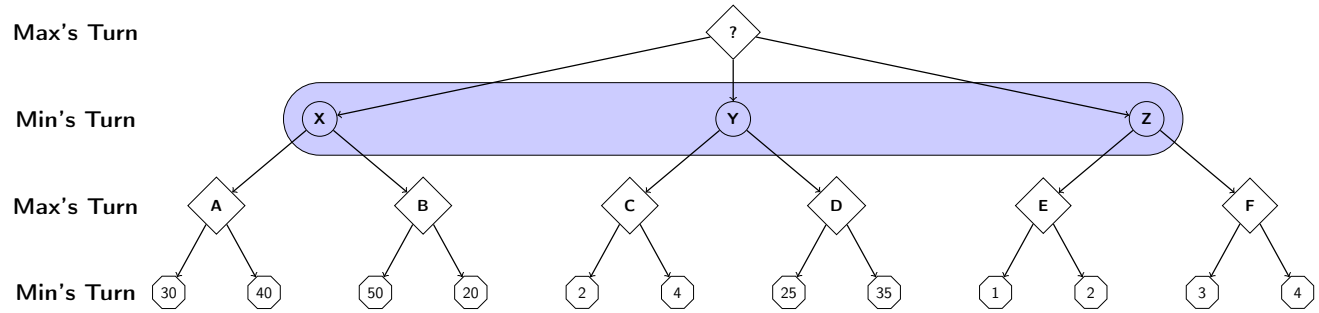
Evaluate the moves in the order provided **OR** Sort the moves best-first, then evaluate in sorted order

Solution:

Sort the moves. Sorting is fast, and allows us to prune more effectively by establishing tight Alpha/Beta bounds.

2. Alpha-Beta

Determine the value of the root node after running Alpha-Beta on the following tree (and cross out pruned branches/nodes):



Solution: