Enhancing the Chess AI with a “First Blood” Approach to an Alphabeta Algorithm
Lina Pulgarín-Duque1, Steven Brandt2, Patrick Mancuso3
1Carnegie Mellon University, Pittsburgh PA 15289 2Louisiana State University, Baton Rouge, LA 70803

Abstract
Chess algorithms concentrate on finding the best score within a given number of plies (i.e. moves by one side). First Blood does not look for the best move within a given ply, instead it looks for the best move at the given ply. The rapidity of First Blood allows it to be able to search deeper into the future and therefore come out with overall better results.

Alpha–beta pruning
Alpha–beta is a search algorithm that maximizes the low score for a board (alpha) while minimizing the opponents possible score on their next move (beta).

“First Blood” cutoffs
First blood is worked into the MTD(f) call as a cutoff. Once the search finds a better scored move than the current board at our deepest chosen depth it returns that move, even if it isn’t the best scored move in the whole search tree.

Results
The graph shows that having a database in an alpha–beta search is beneficial for white. Around fifty games though the size of the database starts to act against white. Using First Blood counteracts this disadvantage and after fifty games white wins consistently.

Discussion
The chess ai has been a benchmark for man vs machine in the information age. The First Blood enhancement allows the chess ai to learn in a clever, human and more intuitive way. By making deep but understandable cutoffs First Blood was able to search at a deeper ply with considerable time gains over a regular alpha–beta routine. Using First Blood, white showed significant learning in it’s move choice regardless of its opponent.

The next step in this project would be to see how First Blood fares against more complex algorithms.

References

Acknowledgements
I would like to thank Frank Loeffler for advising on certain components of our code.
This material is based upon work supported by the National Science Foundation under award OCI-1263236 with additional support from the Center for Computation & Technology at Louisiana State University.