AIND-Isolation, Research Review: **Deep Blue**

Summary of Goals / Techniques used in Deep Blue:
The Deep Blue chess machine is a product that evolved over time. There were two versions of Deep Blue, the first of which lost to World Chess Champion Garry Kasparov. After this loss problems were identified and resolved in part by use of a new chess chip.

The new chip included new additional features to resolve some of the problems previously identified, among other problems identified in test runs with other talented players.

Additional features included improvements to checking and check evasion moves, and new attack moves. These moves were implemented in a move generator consisting of an 8 x 8 array (size of a physical chess board) of combinatorial logic.

The evaluation function of Deep Blue used both a slow evaluation and fast evaluation. This permitted the machine to approximations that were "good enough". It allowed the machine to skip computing an expensive full evaluation.

Improvements were made in the updated version of Deep Blue for better search control. The new version included a repetition detector that was used during traversal of the search tree of the moves stack.

An FPGA could also be optionally used to provide Deep Blue with more complicated search control and better support for the evaluation function.

Search was further honed to incorporate an updated software search which resulted in limiting oscillating searches and re-searches.

Hardware search consisted of "fixed-depth null-window search" which was fast and efficient but only effective in limited complexity unlike with the software approach.

Summary of Results:
The success of the 1997 version of Deep Blue was not because of a single factor. To make the necessary improvements to win, a number of vast improvements were needed but in the end resulted in a much better performing machine.

The quality improvements in the technologies outlined above attributed to better search efficiency along with a better tuned evaluation function. Although these improvements were made, it also highlighted just how much more potential it could have and all of these improvements could be further honed.