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a) What were the engineering advances that led to Deep Blue's success? Which of them can be transferred to other problems, and which are specific to chess?

Some engineering advances that led to Deep Blue's success were: a single-chip chess search engine, a massively parallel system with multiple levels of parallelism, a strong emphasis on search extensions, a complex evaluation function, and effective use of a Grandmaster game database. Almost all of these can be extended to other problems, for example, many other problems could have an innumerable number of states which could require real time massive parallel systems with multiple levels of parallelism. The things that aren't really extendable and are more specific to chess are the grandmaster game database and the single chip chess search engine.

b) AlphaZero is compared to a number of modern game-playing programs, such as StockFish, which work similarly to Deep Blue. The paper shows that AlphaZero is able to defeat StockFish even when it is given only 1/100 of the computing time. Why is that? Please frame your answer in terms of search and the number of nodes evaluated.

Stockfish uses a traditional brute-force search algorithm compared to AlphaZero which uses a neural network combined with Monte Carlo Tree Search. It essentially "learned chess strategy from self-play". AlphaZero evaluates significantly fewer nodes since it just focuses on high potential moves. AlphaZero makes better choices because it looks at better choices, Stockfish tries to look at all the options and just chooses the best it can find.