Question 1

Algorithm	Time Complexity	Space Complexity	Complete ?	Optimal?
BFS	$O(b^{d+1})$	$O(b^{d+1})$	✔	✔
UCS	$O(b^{1 + [C*/\varepsilon]})$	$O(b^{1 + [C*/\varepsilon]})$	Finite graph: ✔ Infinite: ✖	✔
DFS	$O(b^n)$	$O(bn)$	Finite graph: ✔ Infinite: ✖	✖
DLS	$O(bn)$	$O(bn)$	✖	✖
IDS	$O(b^d)$	$O(bn)$	Finite graph: ✔ Infinite: ✖	✔
A*	$O(b^m)$	$O(b^m)$	✔	✔

Question 2:

6. In theory the number of states generated from the problem decomposition would be lower than the number without doing problem decomposition.

Question 5:

Some engineering advances that led to the success of Big Blue were its large search capabilities, non-uniform search, and evaluation function. Big Blue uses a massively parallel system designed for doing game tree searching, having large search capabilities helps to solve problems that have innumerable amounts of data, such as a search engine. The evaluation function may be more specific to chess because the algorithm has to evaluate which move is best based on the moves of the human player, which are dynamic values.

Even though AlphaZero grew faster with smaller values, as the values grew larger, AlphaZero grew at a slower rate compared to Stockfish. Due to its fast and large search capabilities, it can evaluate nodes at higher values.