5.11.c

Q) Compare the effect of increasing search depth, improving move ordering, and improving the heuristic function. How close does your effective branching factor come to the ideal case of perfect move ordering.

Effect of increasing depth:

For depth of 4, with no move ordering and the heuristic being the number of Black pieces on the board: count value is:935 this is the number of nodes explored (input 5,3)

For depth of 5, with no move ordering and the heuristic being the number of Black pieces on the board: count value is:7136 this is the number of nodes explored (input 5,3)

For depth of 5, with no move ordering and the heuristic being the number of Black pieces on the board: count value is:68126 this is the number of nodes explored (input 5,3)

Effect of move ordering:

For depth of 4, with no move ordering and the heuristic being the number of Black pieces on the board: count value is:935 this is the number of nodes explored (input 5,3)

For depth of 4, with move ordering and the heuristic being Number of black pieces+(64- number of white pieces) on the board: count value is:797 this is the number of nodes explored (input 5,3)

Heuristic function:

1. Number of black pieces on the board
2. Number of black pieces+(64- number of white pieces)

The second heuristic is better as it takes care that the agent should not capture opponents pieces if it risks losing many of its own. It becomes significantly difficult to beat the agent

Effective branching factor:

For A depth of 4 the nodes explored are 797. Therefore

797=1+b+b^2+b^3+b^4

Thus b=5

The branching factor tends to increase as the user plays more moves and keeps more pieces on the board. It reaches to an average of 10.