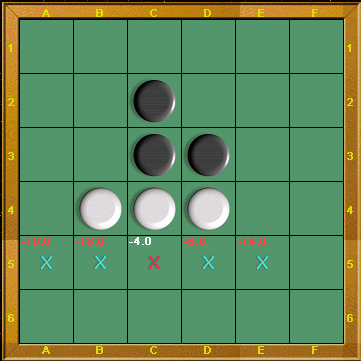
CI-5437: Inteligencia Artificial I

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# Modelo de arboles de juego y algoritmos basicos de solucion



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**ALGORITMOS DE BUSQUEDA**

Se utilizó la función de valoración de estados de Othello para evaluar los nodos terminales a lo largo de la búsqueda. La forma en que funciona el algoritmo es que se expanden los nodos y se evalúan los nodos terminales. La funcion de valoracionde estados de Othello se encuentra en el archivo othello\_cut.cc. Esta funcion de state value se encarga de evaluar el estado del tablero y devolver un valor que representa la calidad del estado.

Se muestran a continuacion los resultados con los siguientes algoritmos,

**Negamax**

34. White moves: value= -4, #expanded= 0, #generated= 1, seconds= 0.00, #generated/second= inf

33. Black moves: value= -4, #expanded= 1, #generated= 2, seconds= 0.00, #generated/second= inf

32. White moves: value= -4, #expanded= 3, #generated= 5, seconds= 0.00, #generated/second= inf

31. Black moves: value= -4, #expanded= 4, #generated= 6, seconds= 0.00, #generated/second= inf

30. White moves: value= -4, #expanded= 9, #generated= 13, seconds= 0.00, #generated/second= inf

29. Black moves: value= -4, #expanded= 10, #generated= 14, seconds= 0.00, #generated/second= inf

28. White moves: value= -4, #expanded= 64, #generated= 91, seconds= 0.00, #generated/second= inf

27. Black moves: value= -4, #expanded= 125, #generated= 177, seconds= 0.00, #generated/second= inf

26. White moves: value= -4, #expanded= 744, #generated= 1049, seconds= 0.00, #generated/second= inf

25. Black moves: value= -4, #expanded= 3168, #generated= 4498, seconds= 0.00, #generated/second= inf

24. White moves: value= -4, #expanded= 8597, #generated= 11978, seconds= 0.00, #generated/second= inf

23. Black moves: value= -4, #expanded= 55127, #generated= 76826, seconds= 0.02, #generated/second= 5117640

22. White moves: value= -4, #expanded=308479, #generated=428402, seconds= 0.10, #generated/second= 4505796

21. Black moves: value= -4, #expanded=2525249, #generated=3478735, seconds= 0.77, #generated/second= 4525949

20. White moves: value= -4, #expanded=9459570, #generated=13078933, seconds= 2.80, #generated/second= 4670076

19. Black moves: value= -4, #expanded=65121519, #generated=90647895, seconds= 19.12, #generated/second= 4741670

18. White moves: value= -4, #expanded=625084814, #generated=876269598, seconds= 187.74, #generated/second= 4667350

17. Black moves: value= -4, #expanded=3999381161, #generated=1305006091, seconds= 1192.55, #generated/second= 1094298

16. White moves: value= -4, #expanded=2656726010, #generated=1382288009, seconds=14806.12, #generated/second= 93359

**Negamax con poda alpha-beta**

34. White moves: value= -4, #expanded= 0, #generated= 1, seconds=0.000002, #generated/second= 499996

33. Black moves: value= -4, #expanded= 1, #generated= 2, seconds=0.000002, #generated/second= 1000051

32. White moves: value= -4, #expanded= 2, #generated= 5, seconds=0.000003, #generated/second= 1666719

31. Black moves: value= -4, #expanded= 3, #generated= 6, seconds=0.000001, #generated/second= 5999954

30. White moves: value= -4, #expanded= 8, #generated= 13, seconds=0.000004, #generated/second= 3249975

29. Black moves: value= -4, #expanded= 9, #generated= 14, seconds=0.000003, #generated/second= 4666812

28. White moves: value= -4, #expanded= 15, #generated= 27, seconds=0.000007, #generated/second= 3857114

27. Black moves: value= -4, #expanded= 41, #generated= 82, seconds=0.000021, #generated/second= 3904776

26. White moves: value= -4, #expanded= 113, #generated= 238, seconds=0.000074, #generated/second= 3216217

25. Black moves: value= -4, #expanded= 448, #generated= 1003, seconds=0.000274, #generated/second= 3660582

24. White moves: value= -4, #expanded= 665, #generated= 1502, seconds=0.000455, #generated/second= 3301099

23. Black moves: value= -4, #expanded= 1786, #generated= 4068, seconds=0.001229, #generated/second= 3310009

22. White moves: value= -4, #expanded= 3912, #generated= 9130, seconds=0.002699, #generated/second= 3382734

21. Black moves: value= -4, #expanded= 41278, #generated= 98755, seconds=0.026673, #generated/second= 3702433

20. White moves: value= -4, #expanded= 53906, #generated=127644, seconds=0.038567, #generated/second= 3309669

19. Black moves: value= -4, #expanded=113911, #generated=267604, seconds=0.073617, #generated/second= 3635084

18. White moves: value= -4, #expanded=491602, #generated=1259430, seconds=0.350954, #generated/second= 3588590

17. Black moves: value= -4, #expanded=797961, #generated=2031924, seconds=0.569766, #generated/second= 3566243

16. White moves: value= -4, #expanded=11257114, #generated=29501798, seconds=7.850831, #generated/second= 3757793

15. Black moves: value= -4, #expanded=15817418, #generated=43574643, seconds=11.840880, #generated/second= 3680017

14. White moves: value= -4, #expanded=38780371, #generated=107642871, seconds=29.028841, #generated/second= 3708135

13. Black moves: value= -4, #expanded=146559062, #generated=415909956, seconds=108.252106, #generated/second= 3842050

12. White moves: value= -4, #expanded=1044780477, #generated=2931981147, seconds=740.575623, #generated/second= 3959057

11. Black moves: value= -4, #expanded=2194335079, #generated=2042502265, seconds=1746.509766, #generated/second= 1169477

**Scout**

**Negascout**

34. White moves: value= -4, #expanded= 0, #generated= 1, seconds=0.000001, #generated/second= 999992

33. Black moves: value= -4, #expanded= 1, #generated= 2, seconds=0.000002, #generated/second= 1000109

32. White moves: value= -4, #expanded= 2, #generated= 5, seconds=0.000003, #generated/second= 1666654

31. Black moves: value= -4, #expanded= 3, #generated= 6, seconds=0.000002, #generated/second= 2999977

30. White moves: value= -4, #expanded= 11, #generated= 20, seconds=0.000006, #generated/second= 3333308

29. Black moves: value= -4, #expanded= 12, #generated= 21, seconds=0.000005, #generated/second= 4199968

28. White moves: value= -4, #expanded= 18, #generated= 34, seconds=0.000057, #generated/second= 596489

27. Black moves: value= -4, #expanded= 36, #generated= 84, seconds=0.000027, #generated/second= 3111114

26. White moves: value= -4, #expanded= 171, #generated= 398, seconds=0.000095, #generated/second= 4189472

25. Black moves: value= -4, #expanded= 657, #generated= 1668, seconds=0.000377, #generated/second= 4424402

24. White moves: value= -4, #expanded= 982, #generated= 2465, seconds=0.000591, #generated/second= 4170898

23. Black moves: value= -4, #expanded= 1522, #generated= 3898, seconds=0.000995, #generated/second= 3917588

22. White moves: value= -4, #expanded= 4798, #generated= 12085, seconds=0.003035, #generated/second= 3981878

21. Black moves: value= -4, #expanded= 18364, #generated= 48716, seconds=0.012816, #generated/second= 3801186

20. White moves: value= -4, #expanded= 30785, #generated= 81896, seconds=0.022857, #generated/second= 3582972

19. Black moves: value= -4, #expanded= 74462, #generated=184434, seconds=0.048864, #generated/second= 3774435

18. White moves: value= -4, #expanded=231020, #generated=606535, seconds=0.163965, #generated/second= 3699174

17. Black moves: value= -4, #expanded=450827, #generated=1134974, seconds=0.306091, #generated/second= 3707962

16. White moves: value= -4, #expanded=2502968, #generated=7224096, seconds=1.943609, #generated/second= 3716846

15. Black moves: value= -4, #expanded=9149025, #generated=25834398, seconds=7.024307, #generated/second= 3677857

14. White moves: value= -4, #expanded=21291264, #generated=62054622, seconds=16.468189, #generated/second= 3768151

13. Black moves: value= -4, #expanded=81197521, #generated=242590597, seconds=61.438774, #generated/second= 3948493

12. White moves: value= -4, #expanded=210782272, #generated=623022874, seconds=160.997314, #generated/second= 3869772

11. Black moves: value= -4, #expanded=1166248430, #generated=3362315471, seconds=898.908081, #generated/second= 3740444

10. White moves: value= -4, #expanded=1906779147, #generated=1324725319, seconds=1526.652832, #generated/second= 867732

9. Black moves: value= -4, #expanded=2152074101, #generated=2070991109, seconds=1756.509766, #generated/second= 1179038

**Concluciones**