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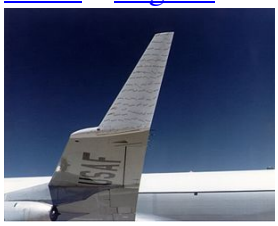

Winglet [5]

Winglet,
a didactic open source chess engines by Stef Luijten written in C++, licensed under the GNU General Public License. The development of Winglet was documented on the website tutorial *Winglet, Writing a Chess Program in 99 Steps*, started in 2011, now hosted by the Wayback Machine [1] . Winglet is intended as bitboard version of TSCP with WinBoard support [2], and is loosely derived from Wing, Stef Luijten's former private engine [3], in the meantime also open source [4].

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Description

Board Representation

Winglet applies a mixture of Kindergarten Bitboards and Magic Bitboards [6] to determine sliding piece attacks with 32 KiB precalculated lookup tables[64][64] each on ranks, files, diagonals and anti-diagonals, indexed by square and hashed line occupancy - the inner six bits multiplied by a magic factor and shifted right by the strange looking 57, while 58 is more natural to ensure a six bit index range, using a constant factor (b-File) for all squares of a diagonal or anti-diagonal, ...

```
U64 arrDiagonalAttacks[64][64]] /* requires initialization */

U64 diagonalKindergartenAttacks(U64 occ, enumSquare sq) {
   occ = (diagonalMaskEx[sq] & occ) * C64(0x0202020202020202) >> 58;
   return arrDiagonalAttacks[sq][occ];
}
```

... but "magic" Winglet factors are designed such that the most significant bit of the 64-bit product will always be clear, that is positive if interpreted as signed 64-bit integer. It seems, Winglet's occupied index calculations emulate Wing's rotated bitboard indices for same attack table layout:

```
/*                 Winglet's occupancy state             ==
 Wing's occupancy state */
(occ & MG_DIAGA8H1MASK[sq]) * MG_DIAGA8H1MAGIC[sq] >> 57 == (
occ045 >> DIAGA8H1_ATTACK_SHIFT[sq]) & 63
(occ & MG_DIAGA1H8MASK[sq]) * MG_DIAGA1H8MAGIC[sq] >> 57 == (
occ315 >> DIAGA1H8_ATTACK_SHIFT[sq]) & 63
(occ & MG_FILEMASK[sq])     * MG_FILEMAGIC[sq])    >> 57 == (
occ090 >> FILE_ATTACK_SHIFT[sq])     & 63
```

Search

- Iterative Deepening
- Alpha-Beta
- Principal Variation Search
- Quiescence Search
- MVV-LVA
- Static Exchange Evaluation
- Null Move Pruning

Evaluation

- Material Balance
- Piece-Square Tables
- Pawn Structure
  Passed Pawn
  Backward Pawn
  Doubled Pawn
  Isolated Pawn
- Bishop Pair
- Rook on Open File
- Rook behind Passers
- King Safety in Opening, Middlegame
  Pawn Shield
  King Tropism
- King Centralization in Endgame

See also

- Chesser by Syed Fahad [7]
- Godot by Ulysse Carion [8]
- Kenny by Kenshin Himura [9] [10]
- Vajolet by Marco Belli [11]
- Wing by Stef Luijten

Postings

- writing a chess engine in xx steps by wing, Winboard Forum, April 18, 2011
- Writing a chess program in xx steps by Stef Luijten, CCC, April 18, 2011
- Chess Programming/Concepts for Beginners by MoldyJacket, OpenChess Forum, April 18, 2011
- Winglet Chess Engine; Revived! by PortugalTheMan, Chess.com, Septermber 24, 2014 [12]

External Links

Chess Engine

- Index of /chess/engines/Jim Ablett/WINGLET by Jim Ablett, hosted by Kirill Kryukov
- PortugalTheMan/winglet · GitHub [13]
- winglet, writing a chess program in 99 steps by Stef Luijten, hosted by Abdullah Al-Ghaznawi [14]

Tutorial Archive

- Winglet, Writing a Chess Program in 99 Steps by Stef Luijten, hosted by the Wayback Machine
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Misc

- Winglet from Wingtip device - Wikipedia
- Winglets and Sharklets | The Flying Engineer
- Boeing 737 Winglets
- Winglets | Airbus, a leading aircraft manufacturer

References

1. ^ Winglet, Writing a Chess Program in 99 Steps by Stef Luijten, hosted by the Wayback Machine
2. ^ Writing a chess program in xx steps by Stef Luijten, CCC, April 18, 2011
3. ^ Winglet, Writing a Chess Program in 99 Steps by Stef Luijten, hosted by the Wayback Machine
4. ^ Index of /chess/engines/Jim Ablett/WING by Jim Ablett, hosted by Kirill Kryukov
5. ^ Winglet with attached tufts of an KC-135A during NASA Winglet stu dy 1979. The tufts are needed to measure the airflow, Winglet from Wingtip device - Wikipedia, KC-135 EC79-11481: KC-135A in flight - closeup of winglet with attached tufts, August 20, 1979
6. ^ Writing a chess program in 99 steps - Move generation for sliding pieces by Stef Luijten, Wayback Machine
7. ^ Chesser: A Chess Engine derived from wingletx by Syed Fahad, CCC, December 24, 2014
8. ^ ucarion/godot · GitHub
9. ^ kenshinthebattosai/Kenny · GitHub
10. ^ New Winboard Engine 'Kenny' - JA builds available by Jim Ablett, CCC, January 08, 2013
11. ^ Re: where to start chess programming? by Marco Belli, CCC, June 22, 2014
12. ^ PortugalTheMan/winglet · GitHub
13. ^ Winglet Chess Engine; Revived! by PortugalTheMan, Chess.com, Septermber 24, 2014
14. ^ copy was taken in March 07, 2013, images and archives included

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