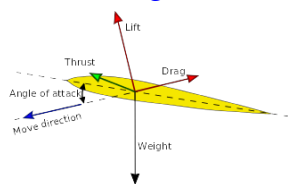


[Home](#) * [Engines](#) * **Wing**



Forces acting on a wing ^[5]

Wing,

a [WinBoard](#) compliant chess engine by [Stef Luijten](#) written in [C++](#), first released in October 2004 ^[1]. Initially influenced by [Crafty](#) ^[2], Wing was released as [open source](#) in December 2010 to demonstrate the basics of chess programming ^[3], shortly before Stef Luijten started his [Winglet](#) tutorial *Writing a Chess Program in 99 Steps* ^[4].

Table of Contents

[Description](#)

[Board Representation](#)

[Search](#)

[Selectivity](#)

[Move Ordering](#)

[Evaluation](#)

[See also](#)

[Forum Posts](#)

[External Links](#)

[Chess Engine](#)

[Chess](#)

[Misc](#)

[References](#)

[What links here?](#)

Description

Board Representation

Wing is a [bitboard](#) engine and determines [sliding piece attacks](#) using [rotated bitboards](#). The [inner six bits](#) optimization yields to four lookup tables of 64x64x8 bytes, that is 32-KiB each or 1/8 MiB in total for [ranks](#), [files](#), [diagonals](#) and [anti-diagonals](#). Interestingly, this attack table layout was preserved in [Winglet](#), when line-wise occupied states were [rotated](#) on the fly by [magic multiplication](#) and shift right.

Search

Wing performs a [negamax alpha-beta search](#) with conditional compiled (default on) [PVS](#) inside the [iterative deepening](#) framework without [aspiration windows](#). The recent version has a [always replace transposition table](#) using [Zobrist keys](#), while earlier versions used an additional [depth-preferred replacement table](#) ^[6]. As stated by its author in 2006, Wing has gained over 100 ELO points from adding [history pruning](#) ^[7], while the published sources lack LMR.

[Selectivity](#)

- [Check Extensions](#)
- [Null Move Pruning](#)
- [Quiescence Search](#)
- [Recapture Extensions](#)
- [Passed Pawn Extensions](#)
- [Threat Extensions](#)
- [Futility Pruning](#)
- [Extended Futility Pruning](#)
- [Razoring](#)

[Move Ordering](#)

- [Principal Variation Extraction from TT](#)
- [Killer Heuristic](#)
- [History Heuristic](#)
- [MVV-LVA](#)

[Evaluation](#)

- [Material Balance](#)

- [Piece-Square Tables](#)
- [Development](#)
- [Mobility](#)
- [Pawn Structure](#)
 - [Backward Pawn](#)
 - [Doubled Pawn](#)
 - [Isolated Pawn](#)
 - [Passed Pawn](#)
 - [Connected Passed Pawns](#)
- [Pawn Hash Table](#)
- [Bishop Pair](#)
- [Rook on Open File](#)
- [King Safety](#) in [Opening](#), [Middlegame](#)
 - [Pawn Shield](#)
 - [King Tropism](#)
- [King Centralization](#) in [Endgame](#)

See also

- [Crafty](#)
- [Little Wing](#)
- [Winglet](#)

Forum Posts

- [Wing exit from Winboard!](#) by Pablo, [Winboard Forum](#), October 25, 2004
- [wing engine files](#) by Adam Wilks, [CCC](#)], November 01, 2005
- [Hash table hit rate](#) by [Stef Luijten](#), [Winboard Forum](#), November 16, 2005 » [Transposition Table](#)
- [Re: history pruning/ late move pruning](#) by [Stef Luijten](#), [Winboard Forum](#), March 02, 2006

External Links

Chess Engine

- [Wing](#) from [WBEC Ridderkerk](#)
- [Index of /chess/engines/Jim Ablett/WING](#) by [Jim Ablett](#), hosted by [Kirill Kryukov](#)

Chess

- [Wing Gambit from Wikipedia](#)

Misc

- [Wing from Wikipedia](#)
- [Wing \(disambiguation\) from Wikipedia](#)
- [Wing \(building\) from Wikipedia](#)
- [Focus - Angle Wings](#), Live at [Old Grey Whistle Test](#) 1976, [YouTube](#) Video
Line-up: [Thijs van Leer](#), [Philip Catherine](#), [Bert Ruiter](#), [David Kemper](#)

References

1. [^] [Wing](#) from [WBEC Ridderkerk](#)
2. [^] [Chess Engine List](#) from [Ron Murawski's Computer-Chess Wiki](#)
3. [^] [Index of /chess/engines/Jim Ablett/WING](#) by [Jim Ablett](#), hosted by [Kirill Kryukov](#)
4. [^] [Winglet, Writing a Chess Program in 99 Steps](#) by [Stef Luijten](#), hosted by the [Wayback Machine](#)
5. [^] [Forces](#) acting on a [wing](#), [thrust](#), [lift](#), [drag](#), and [weight](#), Image by Bartosz Kosiorek, [Bird flight from Wikipedia](#), [Wikimedia Commons](#)
6. [^] [Hash table hit rate](#) by [Stef Luijten](#), [Winboard Forum](#), November 16, 2005
7. [^] [Re: history pruning/ late move pruning](#) by [Stef Luijten](#), [Winboard Forum](#), March 02, 2006

What links here?

Page	Date Edited
Engines	Mar 10, 2018
Little Wing	Oct 26, 2017
Stef Luijten	Apr 26, 2015
Wing	Oct 26, 2017
Winglet	Apr 26, 2015

[Up one Level](#)