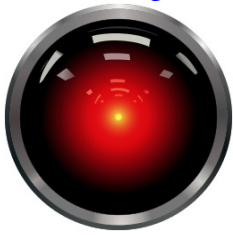


[Home](#) * [Engines](#) * **HAL**



HAL 9000 ^[5]

HAL, (Heuristic Associative Linear-algorithm, HAL-9000, HAL9000)
an [open source chess program](#) by [Stephen F. Wheeler](#), also dubbed HAL-9000 as pun of [HAL 9000](#), the fictional character in [Arthur C. Clarke's Space Odyssey series](#), first appearing in [2001: A Space Odyssey](#) ^[1] ^[2]. HAL was written in [Turbo Pascal](#) to run under the [MS-DOS command line](#), and was part of Wheeler's Ph.D. research during the late 80s and early 90s ^[3], specifically on [linear symbolic problem-solving](#) systems and [natural language processing](#). A slightly modified and bug fixed version was published with source in December 2015 at [Chess.com](#) ^[4]

.

Table of Contents

[Description](#)

[User Interface](#)

[Board Representation](#)

[Search](#)

[Evaluation](#)

[See also](#)

[Postings](#)

[External Links](#)

[Chess Program](#)

[Fictional Character](#)

[References](#)

[What links here?](#)

Description

User Interface

HAL has a [command line interface](#), and supports an interactive English dialogue between the opponent and itself to [receive](#) and report its moves and to receive directives, such as skill level. The directives are given to HAL in the form of English sentences, which can be rather free-form in structure, and will even allow for slight misspellings in certain situations. HAL utilizes the [long algebraic notation](#) ^[6] ^[7].

Board Representation

HAL's [board is represented](#) by an [incremental updated 8x8 board](#), a two-dimensional [array](#) of board cells, and a [piece-list](#) as array of piece cells indexed by side (1..2) and man index 1..16.

Search

The [search](#) algorithm is pure [alpha-beta](#) implemented as [recursive negamax](#) with [fail-soft](#) bounds inside the [iterative deepening](#) framework with [aspiration windows](#). [Move ordering](#) is improved by the [refutation table](#) based on the [triangular PV-table](#), and a sophisticated [killer heuristic](#) with up to four [killers](#) per [ply](#). [Selectivity](#) is due to [check extensions](#) and depth limited [quiescence search](#).

Evaluation

[Evaluation](#) considers [material balance](#), a material exchange heuristic, and positional heuristic terms for [development](#), [king attack](#), [defence](#), threats, [mobility](#), advancement, [captures](#) and [checks](#).

See also

- [Marvin Minsky | HAL 9000](#)

- [SAL](#)

Postings

- [Off-topic: HAL](#) by [Dave Gomboc](#), [CCC](#), July 19, 2000
- [Frank Poole v HAL 9000 -- or is it CM9000?](#) by [John Merlino](#), [CCC](#), July 10, 2002 » [Chessmaster](#)
- [HAL9000 Levels of Play](#) by [Stephen F. Wheeler](#), [Chess.com](#), May 22, 2010
- [HAL9000 Chess Rating?](#) by [Stephen F. Wheeler](#), [Chess.com](#), May 28, 2010

External Links

Chess Program

- [HAL-9000](#) by [sfwheeler](#), [Chess.com](#)

Fictional Character

- [HAL 9000 from Wikipedia](#)
- [Poole versus HAL 9000 from Wikipedia](#)
- [Category:HAL 9000 from Wikimedia Commons](#)
- [2001: A Space Odyssey | HAL 9000 - Wikiquote](#)

References

1. [^] [Murray Campbell](#) (1997). *"An Enjoyable Game": How HAL Plays Chess*. in [David G. Stork](#) (ed.), [Hal's Legacy - 2001's Computer as Dream and Reality](#). MIT-Press, pdf
2. [^] [An interesting link](#) by [Steven Edwards](#), [CCC](#), March 29, 2004
3. [^] [Stephen F. Wheeler, Senior Professor, College of Engineering & Information Sciences, Irving, TX Campus | DeVry University Newsroom](#)
4. [^] [HAL-9000](#) by [sfwheeler](#), [Chess.com](#)
5. [^] The famous red eye of [HAL 9000](#), the fictional character in [Arthur C. Clarke's Space Odyssey](#) series. [Image](#) by Cryteria, October 1, 2010, [Wikimedia Commons](#)
6. [^] [HAL-9000](#), HAL-9000.zip/HALDOC.DOC
7. [^] [HAL-9000](#), HAL-9000.zip/CP3.pas

What links here?

Page	Date Edited
Chessmaster	Jan 21, 2018
Engines	Mar 10, 2018
HAL	Jun 14, 2016
SAL	Dec 7, 2017
Stephen F. Wheeler	Jun 13, 2016

[Up one level](#)