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Amundsen at wheel of the [Maud](#) ^[5]

Amundsen, (Jonte)
a [Chess Engine Communication Protocol](#) compliant [open source chess engine](#) under the [GNU General Public License](#), written in [C](#) by [John Bergbom](#). Started as college course project at the Department of Numerical Analysis and Computing Science, [Royal Institute of Technology, Stockholm](#) ^[1], a name change from Jonte to Amundsen took place between version 0.25 and 0.3, since the initial name was already used at [FICS](#) ^[2]. Amundsen was first released in May 2004, as announced by [Dann Corbit](#) in [Winboard Forum](#) ^[3].

Victory awaits him, who has
everything in order.
Luck we call it.
Defeat is definitely due for him,
who has neglected to take the
necessary precautions.
Bad luck we call it.

◦ *Roald Amundsen* ^[4]

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Description

Bitboard Infrastructure

Rotated Bitboards

Amundsen uses [rotated bitboards](#) with 1/2 MiB lookup tables, indexed by [8-bit line occupancy](#), to determine [sliding piece attacks](#), ignoring the possible fourfold reduction excluding the redundant [outer squares](#).

BitScan & PopCount

The [memory](#) bacchanal is attended by [population count](#), [bitscan forward](#) and [reverse](#) with three 16-bit indexed, 64K lookup tables of [double word](#) integers, which is another 3/4 MiB ^[6].

```
int bits_in_16bits[65536];
int first_bit_in_16bits[65536];
int last_bit_in_16bits[65536];
```

```
/* This function returns the number of the first set bit in an int64.
   The search is done from LSB to MSB. */
```

```
int get_first_bitpos(int64 n) {
    if (first_bit_in_16bits[n & 0xffff] >= 0)
        return first_bit_in_16bits[n & 0xffff];
    if (first_bit_in_16bits[(n >> 16) & 0xffff] >= 0)
        return first_bit_in_16bits[(n >> 16) & 0xffff] + 16;
    if (first_bit_in_16bits[(n >> 32) & 0xffff] >= 0)
        return first_bit_in_16bits[(n >> 32) & 0xffff] + 32;
    if (first_bit_in_16bits[(n >> 48) & 0xffff] >= 0)
        return first_bit_in_16bits[(n >> 48) & 0xffff] + 48;
    return -1;
}
```

Search

The [search](#) is [PVS alpha-beta](#) with [transposition](#) and [refutation table](#) inside an [iterative deepening](#) framework with [aspiration windows](#), further using [AEL-pruning](#) à la [Heinz](#), as well as [LMR](#) and [IID](#) in case of a missing [hash move](#) at [PV-nodes](#). [Checks](#), [pawn moves to the 7th rank](#), and [mate threatening moves](#) are [extended](#), [killer-](#) and [history heuristic](#) help to [order moves](#), and a [SEE swap routine](#) is used to determine winning [captures](#).

Evaluation

Amundsen's [evaluation](#) with a [pawn structure cache](#) features [piece-square tables](#), and further considers [mobility](#), [passed pawns](#) and [hidden passed pawns](#), [king safety](#) through [king piece tropism](#), and various features and defects such as [outposts](#), [rook on open file](#), [seventh rank](#) and [behind passers](#), and [bad bishop](#) to name a few, and knows to trade pieces when ahead, but pawns when behind.

See also

- [Explorer](#)
- [PolarChess](#)
- [Siberian Chess](#)

Publications

- [John Bergbom](#) (2004). *Schackprogrammet Amundsen*. (2D1464 Större avancerad individuell kurs i datalogi) [pdf](#) (Swedish) ^[7]

Forum Posts

- [A new chess program](#) by [Dann Corbit](#), [Winboard Forum](#), May 22, 2004
- [Amundsen 0.3 and his book : problem ?](#) by [Claude Dubois](#), [Winboard Forum](#), May 24, 2004
- [Amundsen 0.35 exe](#) by [Jim Ablett](#), [Winboard Forum](#), August 25, 2004
- [Amundsen 05 Windows binaries](#) by [Jim Ablett](#), [Winboard Forum](#), September 14, 2005
- [Amundsen 0.65 \(released on January 11th 2008\)](#) by [Denis P. Mendoza](#), [Winboard Forum](#), January 15, 2008
- [Amundsen 0.65.1 Windows builds available](#) by [Jim Ablett](#), [Winboard Forum](#), February 23, 2008
- [Amundsen_075JA with illegal moves](#) by [Günther Simon](#), [Winboard Forum](#), January 18, 2009

External Links

Chess Engine

- [Amundsen chess program](#)
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- [Amundsen](#) from [WBEC Ridderkerk](#)
- [Amundsen 0.80 32-bit](#) in [CCRL 40/40](#)

Misc

- [Roald Amundsen from Wikipedia](#)
- [Amundsen \(disambiguation\) from Wikipedia](#)

References

1. [^](#) [Master of Science - Nada, KTH](#)
2. [^](#) [Amundsen chess program](#)
3. [^](#) [A new chess program](#) by [Dann Corbit](#), [Winboard Forum](#), May 22, 2004
4. [^](#) [Fram Museum - Polar Expeditions](#)
5. [^](#) Captain Roald Amundsen at wheel leaving [Nome](#) for [North Pole](#), 1920, Source:[Roald Amundsen from Wikipedia](#), [Library of Congress | digital ID cph 3c21515](#), Lomen Bros
6. [^](#) [amundsen-0.80.tar.gz](#), [bitboards.c](#)
7. [^](#) [Amundsen chess program](#) (old page)

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