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[Zurich German monophthongs](#) <sup>[4]</sup>

**Zurichess**,  
an [UCI](#) compliant [open source](#)  
[chess engine](#) and chess library by  
[Alexandru Moşoi](#), written in the  
[Go](#) programming language <sup>[1]</sup>, first  
released in January 2015. The  
name Zurichess is in dependence  
on [Züritüütsch](#), the [High](#)  
[Alemannic dialect](#) spoken in the  
[Canton of Zurich, Switzerland](#) <sup>[2]</sup>.  
Versions are named after [Swiss](#)  
[Cantons](#) in alphabetical order <sup>[3]</sup>.

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## Description

### A-B

Zurichess uses [bitboards](#) with [De Bruijn bitscan](#) for [serialization](#), and [fancy magic bitboards](#) to determine [sliding piece attacks](#). The [search](#) applies [fail soft negamax alpha-beta](#) plus [transposition table](#) inside the [iterative deepening](#) loop with [aspiration windows](#) <sup>[5]</sup>. [Move ordering](#) is improved by the [killer heuristic](#) and considers [MVV/LVA](#) for [captures](#). [Evaluation](#) relies on the [simplified evaluation function](#) using a [tapered eval](#) interpolating between [opening](#) and [endgame scores](#) of [material](#) and [piece-square tables](#). While the first

public release **Aargau** lacked all kinds of [forward pruning](#), [reductions](#) and [extensions](#), subsequent versions, **Appenzeller** and **Basel** improved on various search and evaluation topics, now addressing [null move pruning](#) and [mobility](#) beside a lot of other things and optimizations, not to mention fixing bugs <sup>[6]</sup>. **Bern** release in June 2015 is about 130 Elo stronger than Basel <sup>[7]</sup>.

## Fribourg

Zurichess **Fribourg**, released on August 30, 2015, now has [passed pawn](#) evaluation, considering [connected](#) and [isolated](#) pawns. [Tuning](#) was done using [Texel's tuning method](#) implemented by **txt** <sup>[8] [9]</sup>. [LMR](#) was added, as well as [static exchange evaluation](#) (SEE) to sort [captures](#), to [prune](#) bad captures (SEE quiescence search and to aggressively [reduce](#) bad [quiet moves](#) (SEE staged move generation and [pondering](#) were added, and [two-fold repetitions](#) at non-root nodes pruned. Zurichess Fribourg is about 200 Elo stronger than Bern <sup>[10]</sup>.

## Geneva

Zurichess **Geneva**, released on November 29, 2015, and now aware of the [fifty-move draw rule](#), has added basic [futility pruning](#) and relaxed [null move conditions](#) allowing [double null moves](#). In eval, [tuning](#) switched from **txt** to [TensorFlow](#) <sup>[11]</sup> - a two layers [neural network](#) is used, where the second layer is responsible for a [tapered eval](#) to phase [endgame](#) and [middlegame scores](#) <sup>[12]</sup>. Rooks were evaluated on [open and half-open files](#), and [mobility](#) calculation was improved. Zurichess Geneva is about 100 Elo stronger than Fribourg <sup>[13]</sup>.

## Glarus

Announced and released on April 17, 2016, Zurichess **Glarus** has improved [futility conditions](#) and added [history leaf pruning](#), further improving [pawn hash table](#) utilization by caching [pawn shelter](#), [king safety](#) by considering number of simultaneous attackers, and [time control](#). Glarus is about 80 Elo stronger than Geneva in self-play <sup>[14]</sup>.

## Graubuenden

Zurichess **Graubuenden** was released on August 16, 2016 with various tweaks, search and evaluation improvements such as [hashing](#) in [quiescence search](#), and new features like skill levels and [multi-PV](#). Further, a new version of the Go compiler yields in increased search speed. In self-play Graubuenden is about 110 Elo stronger than Glarus <sup>[15]</sup>.

## Jura

Zurichess **Jura** appeared on February 18, 2017 with improved [selectivity](#), [move ordering](#) and evaluation, introducing [razoring](#), [countermove heuristic](#), [king-queen tropism](#) and [rook-square tables](#) plus various tweaks and re-tuning. In self play at fast time controls Jura is about 85 Elo stronger than Graubunden <sup>[16]</sup>.

## Luzern

Zurichess **Luzern**, released on May 08, 2017, further enhanced its search and evaluation, in particular a 16% faster search and considering defended minors, [pawn attacks](#) an potential pawn attacks. In self play Luzern is about 64 Elo stronger than Jura <sup>[17]</sup>.

## Neuchâtel

Zurichess **Neuchâtel** became a stable release in September 2017 <sup>[18]</sup> with an expected gain of 50 Elo <sup>[19]</sup>.

## See also

- [ETH Zurich](#)
- [Geography](#)

## Forum Posts

### 2015

- [zurichess - new chess engine](#) by [Alexandru Mosoi](#), [CCC](#), January 16, 2015
- [zurichess appenzeller - new version](#) by [Alexandru Mosoi](#), [CCC](#), February 21, 2015
- [Re: txt: automated chess engine tuning](#) by [Alexandru Mosoi](#), [CCC](#), April 11, 2015 » [Automated Tuning](#)
- [zurichess basel released](#) by [Alexandru Mosoi](#), [CCC](#), April 27, 2015
- [zurichess bern released](#) by [Alexandru Mosoi](#), [CCC](#), June 07, 2015
- [zurichess fribourg released](#) by [Alexandru Mosoi](#), [CCC](#), August 30, 2015
- [zurichess geneva released](#) by [Alexandru Mosoi](#), [CCC](#), November 29, 2015

### 2016

- [hacking on zurichess](#) by [Alexandru Mosoi](#), [CCC](#), January 06, 2016
- [trivia: ELO boost from a better compiler](#) by [Alexandru Mosoi](#), [CCC](#), March 22, 2016 » [Go \(Programming Language\)](#)
- [king safety: hard positions for zurichess](#) by [Alexandru Mosoi](#), [CCC](#), March 27, 2016 » [King Safety](#), [Test-Positions](#)
- [zurichess glarus released](#) by [Alexandru Mosoi](#), [CCC](#), April 17, 2016
- [Re: Deep Learning Chess Engine ?](#) by [Alexandru Mosoi](#), [CCC](#), July 21, 2016
- [Re: Deep Learning Chess Engine ?](#) by [Alexandru Mosoi](#), [CCC](#), July 21, 2016
- [zurichess graubuenden released](#) by [Alexandru Mosoi](#), [CCC](#), August 16, 2016

## 2017

- [zurichess jura - preview release](#) by [Alexandru Mosoi](#), [CCC](#), January 19, 2017
- [zurichess jura released](#) by [Alexandru Mosoi](#), [CCC](#), February 18, 2017
- [improved evaluation function](#) by [Alexandru Mosoi](#), [CCC](#), March 11, 2017 » [Texel's Tuning Method](#)
- [speed up or avoiding move sorting](#) by [Alexandru Mosoi](#), [CCC](#), March 19, 2017 » [Move Ordering](#)
- [zurichess - new version release](#) by [Alexandru Mosoi](#), [CCC](#), May 08, 2017
- [zurichess neuchatel - preview release](#) by [Alexandru Mosoi](#), [CCC](#), August 29, 2017
- [need some help assessing the evaluation](#) by [Alexandru Mosoi](#), [CCC](#), December 02, 2017

## External Links

### Chess Engine

- [brtznr / zurichess](#) — Bitbucket
- [zurichess / zurichess](#) — Bitbucket
- [Zurichess](#) in [CCRL 40/40](#)

### Misc

#### Aargau

- [Aargau from Wikipedia](#)

#### Appenzell

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- [Appenzeller cheese from Wikipedia](#)

#### Basel

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## Glarus

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- [Glarus Alps from Wikipedia](#)
- [Glarus thrust from Wikipedia](#)

## Graubünden

- [Graubünden \(Grisons\) from Wikipedia](#)
- [Three Leagues from Wikipedia](#)

## Jura

- [Canton of Jura from Wikipedia](#)
- [Jura Mountains from Wikipedia](#)

## Luzern

- [Lucerne from Wikipedia](#)
- [Canton of Lucerne from Wikipedia](#)

## Neuchâtel

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- [Neuchâtel from Wikipedia](#)
- [Canton of Neuchâtel from Wikipedia](#)

## Zurich

- [Zurich \(disambiguation\) from Wikipedia](#)
- [Zürich from Wikipedia](#)
- [Canton of Zürich from Wikipedia](#)

## References

1. [^ brtznr / zurichess — Bitbucket](#)
2. [^ Re: Mr.Ruxy versus Zurichess](#) by [Alexandru Mosoi](#), [CCC](#), January 17, 2015
3. [^ zurichess / zurichess / source / CHANGELOG.md — Bitbucket](#)
4. [^ Jürg Fleischer, Stephan Schmid \(2006\). Illustrations of the IPA: Zurich German. Journal of the International Phonetic Association](#), Vol. 36, No. 2, page 256; doi:10.1017/S0025100306002441, [Wikimedia Commons](#), [Zurich German from Wikipedia](#)
5. [^ Re: Aspiration window - effect? Issue with hashtables?! LONG POST](#) by [Matthew R. Brades](#), [CCC](#), December 29, 2012
6. [^ zurichess basel released](#) by [Alexandru Mosoi](#), [CCC](#), April 27, 2015
7. [^ zurichess bern released](#) by [Alexandru Mosoi](#), [CCC](#), June 07, 2015
8. [^ txt: automated chess engine tuning](#) by [Alexandru Mosoi](#), [CCC](#), March 18, 2015
9. [^ zurichess / txt — Bitbucket](#)
10. [^ zurichess fribourg released](#) by [Alexandru Mosoi](#), [CCC](#), August 30, 2015
11. [^ tensorflow](#) by [Alexandru Mosoi](#), [CCC](#), November 10, 2015
12. [^ Re: Deep Learning Chess Engine ?](#) by [Alexandru Mosoi](#), [CCC](#), July 21, 2016
13. [^ zurichess geneva released](#) by [Alexandru Mosoi](#), [CCC](#), November 29, 2015
14. [^ zurichess glarus released](#) by [Alexandru Mosoi](#), [CCC](#), April 17, 2016
15. [^ zurichess graubuenden released](#) by [Alexandru Mosoi](#), [CCC](#), August 16, 2016
16. [^ zurichess jura released](#) by [Alexandru Mosoi](#), [CCC](#), February 18, 2017
17. [^ zurichess - new version release](#) by [Alexandru Mosoi](#), [CCC](#), May 08, 2017
18. [^ zurichess / zurichess / commit / f5f1b02de174 — Bitbucket](#)
19. [^ zurichess neuchatel - preview release](#) by [Alexandru Mosoi](#), [CCC](#), August 29, 2017

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