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American Bison <sup>[4]</sup>

**Bison**,  
an [UCI](#) compliant [open source](#)  
[chess engine](#) by [Ivan Bonkin](#),  
written in [C++](#) and licensed under  
[GPLv3](#). Bison played the  
[CCCCISC 2008](#) over the board.  
Whether Bison is merely a rewrite  
of the [Fruit](#) concepts, using  
[bitboards](#) instead of [vector attack](#)  
[arrays](#), as suggested by [Dann](#)  
[Corbit](#) <sup>[1]</sup>, might be subject of  
scientific research - opposed to the  
[Rybka Controversy](#), both sources  
are freely available <sup>[2] [3]</sup>.

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## Description

### Board Representation

Bison is a [bitboard](#) engine and uses [rotated bitboards](#) to determine [sliding piece attacks](#). It performs the 2x32-bit [SWAR-implementation](#) to [count populations](#), and [De Bruijn multiplication](#) to [scan bits forward](#) in [bitboard serialization](#).

### Search

Bison applies [PVS alpha-beta](#) with [transposition table](#), [null move pruning](#) with [zugzwang verification search](#), [razoring](#), [IID](#), [futility-](#), [history-](#), [delta-](#) and [mate distance pruning](#), [LMR](#) and various [extensions](#) inside an [iterative deepening](#) framework with [aspiration windows](#) and [floating point fractional ply depths](#). [SEE](#) is used in [move ordering](#) and to determine winning [tactical moves](#) in [quiescence](#).

### Evaluation

[Evaluation](#) is sped up by pre-initialized [material-tables](#) indexed à la [Strelka](#) and a [pawn hash table](#) and might be [lazy](#). It otherwise takes [pawn structure](#), [mobility](#) considering [pinned pieces](#) and [king piece tropism](#) and various [pattern and attacks](#) under account with focus on [king safety](#) and [passed pawns](#), speculatively aggregating [middle-](#) and [endgame](#) scores, which were [tapered](#) by a range of 24 [game phases](#).

### Selected Games

[CCCCISC 2008](#), round 3, [Bison](#) - [Counter](#) <sup>[5]</sup>

```
[Event "CIS 2008"]
[Site "Moscow SDCHESS RGSU"]
[Date "2008.03.01"]
[Round "3"]
```

[White "Bison 8.2.4r"]

[Black "Counter 0.8"]

[Result "1/2-1/2"]

1.Nf3 d5 2.d4 Nf6 3.c4 e6 4.Nc3 Be7 5.Bg5 h6 6.Bh4 O-  
O 7.e3 b6 8.Rb1 c6  
9.cxd5 exd5 10.Bd3 Bg4 11.O-  
O Ne4 12.Bxe7 Qxe7 13.Qc2 Bxf3 14.gxf3 Nxc3  
15.Qxc3 a5 16.Rbc1 Rc8 17.Kh1 Qf6 18.Be2 Nd7 19.Qb3 a4 20.Qa3 c5 21.dx  
c5  
Rxc5 22.b4 Rxc1 23.Qxc1 Qe6 24.Qc2 Ne5 25.Rc1 a3 26.Qd2 Nc6 27.b5 Ne7  
28.Rc3 Qd6 29.Qd4 Rc8 30.Rxc8+ Nxc8 31.Bd3 Qc5 32.Qh4 Ne7 33.Kg2 f6 34  
.Qa4  
Kf7 35.Be2 Qc3 36.Bd1 g6 37.Qa7 Qc4 38.Bb3 Qxb5 39.e4 Qc5 40.Bxd5+ Kg7  
41.Qd7 h5 42.Be6 Qg5+ 43.Kh3 Qc5 44.f4 g5 45.fxg5 fxg5 46.Bd5 g4+ 47.K  
g2  
Kh6 48.Qe6+ Ng6 49.Qf6 h4 50.h3 gxh3+ 51.Kxh3 Qc1 52.Qf3 Qg5 53.Bb3 Nf  
4+  
54.Kh2 b5 55.Kh1 Kg6 56.Bc2 Kf6 57.Qc3+ 1/2-1/2

## See also

- [Mammal](#)

## Forum Posts

### 2008 ...

- [Is Bison kosher ?](#) by [Olivier Deville](#), [CCC](#), February 05, 2008
- [Bison 8.2.4r : 2152](#) by [Patrick Buchmann](#), [CCC](#), February 07, 2008
- [Bison 9.6 is released...](#) by [Dr.Wael Deeb](#), [CCC](#), June 10, 2009
- [Bison 9.6 : 2507](#) by [Patrick Buchmann](#), [CCC](#), June 12, 2009
- [Bison Info](#) by [Ted Summers](#), [CCC](#), June 19, 2009
- [Bison 9.8 : 2528](#) by [Patrick Buchmann](#), [CCC](#), August 02, 2009
- [Bison 9.11 is released...](#) by [Dr.Wael Deeb](#), [CCC](#), November 22, 2009
- [Bison 9.11 : 2585](#) by [Patrick Buchmann](#), [CCC](#), November 23, 2009

### 2010 ...

- [Bison](#) by [Graham Banks](#), [Winboard Forum](#), March 04, 2010
- [About derivatives](#) by [Olivier Deville](#), [OpenChess Forum](#), August 11, 2011

## External Links

## Chess Engine

- [SourceForge.net: Bison](#)
- [Bison at SourceForge.net](#)
- [Bison by Иван Бонькин \(Ivan Bonkin\), Russia!](#) from [sdchess.ru](#)
- [Bison 9.11 64-bit](#) in [CCRL 40/40](#)

## Misc

- [Bison from Wikipedia](#)
- [Bison \(disambiguation\) from Wikipedia](#)
- [Bison - Wikispecies](#)
- [GNU bison from Wikipedia](#)
- [Bison - GNU parser generator](#)

## Extant Bison

- [American bison from Wikipedia](#)  
[Plains bison from Wikipedia](#)  
[Wood bison from Wikipedia](#)
- [European bison from Wikipedia](#)

## Extinct Bison

- [Bison antiquus from Wikipedia](#)
- [Bison latifrons from Wikipedia](#)
- [Bison occidentalis from Wikipedia](#)
- [Steppe bison from Wikipedia](#)

## References

1. [^](#) [Re: Bison](#) by [Dann Corbit](#), [Winboard Forum](#), March 04, 2010
2. [^](#) [Bison at SourceForge.net](#)
3. [^](#) [Fruit Chess Engine by Fabien Letouzey - Fruit 2.1 source](#)
4. [^](#) [Animated sequence of a buffalo \(American bison\) galloping](#). Photos taken by [Eadweard Muybridge](#) (died 1904), first published in 1887 at [Philadelphia](#) (Animal Locomotion). Animation by [Waugenberg](#), July 16, 2006, [American bison from Wikipedia](#)
5. [^](#) [The The First championship of the CIS \(Первый официальный чемпионат СНГ\)](#) from [sdchess.ru](#)

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