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Celebrating Peasants ^[2]

Peasant,

a [pawn endgame](#) chess program written by [Monroe Newborn](#) as research project started in 1973 at [Technion](#), [Haifa](#), Israel, where the author had a visiting appointment. The goal was to examine whether the poor endgame play of the chess programs of that time was due to a basic weakness of [minimax](#) as suggested by [Larry Harris](#) ^[1], or simply because of [evaluation functions](#) used were not intended for those endings.

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Description

Supported by [Israel Gold](#) at Technion, and later by [International Master Leon Piasetski](#) at [McGill University](#), Peasant was implemented as conventional fixed [depth alpha-beta](#) searcher with evaluation and [pruning](#) heuristics tailored for pawn endings, using an [8x8 board](#) array as internal representation. [Moves](#)

were [sorted](#) so that [captures](#) and promotions came first - the [killer heuristic](#) was used to further improve the effectiveness of alpha-beta. The ONEPAWN algorithm by Newborn and Piasetski evaluated [KPK](#) positions, TWOPAWN by Piasetski, KPPK. Peasant employed forward pruning of many king moves near the tips, reaching a search depth of around 10 [ply](#) with 3 or 4 pawns. Written in [Fortran IV](#) for the [IBM 360/370](#), it searched around 18,000 [terminal positions](#) per minute on a 370/158 ^[3].

In his 1978 B.Sc. thesis on [co-ordinate squares](#) in pawn endings, reprinted 1988 in [David Levy's Computer Chess Compendium](#), [Kenneth W. Church](#) mentions the [Lasker-Reichhelm Position](#) (Fine #70) and Newborn's assessment solving it with Peasant would require 25,000 hours, and further gives a description of Peasant in a leading footnote ^[4]. Following list of terminal node conditions and static [evaluation](#) features are based on Church's note.

Terminal Nodes

A position is defined to be a [terminal node](#) if one of the following conditions holds:

1. The maximum preset [depth](#) is met
2. One side has one or two pawns and the other has none (special static evaluator).
3. There is a queen on the board and the last move was not a promotion.
4. There is a [passed pawn](#) which [cannot be caught by the enemy king](#) and can [outrace](#) all enemy pawns with a move to spare.
5. The depth is equal to that of a node where a win can be guaranteed. (This appears to be a special case of alpha-beta.)
6. The same position has occurred previously at the same depth in the [tree](#) ^[5].
7. [Stalemate](#)
8. The position is equivalent to a parent position which occurs four plies higher in the tree.
9. The winning side allows [draw](#) by [repetition](#)

Evaluator

The static Evaluator is:

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with

- $MAT \equiv$ the difference between the number of white pieces and the number of black pieces
- $PP \equiv$ the difference between the number of white [passed pawns](#) and the number of black passed pawns

- PRO \equiv the number of moves the most advanced white pawn must take before promotion minus the number of moves for the most advanced black pawn
- K₁ \equiv factor measuring [king distance from the pawns](#): five points deducted for every space that separates the king from the "center of gravity" of the pawns
- K₂ \equiv three points if the king has [opposition](#)
- R \equiv ten points times the rank of each pawn that is passed and [cannot be stopped](#) by the defending king

Modified Rules

The [rules of chess](#) were modified in a way, that only [promotions](#) to a [queen](#) were possible, and to avoid later queen moves, the [side to move](#) had a win if one queen ahead and a draw if both sides had same number of queens (> 0), and no queening actually possible.

See also

- [Chunker](#)
- [PawnKing](#)

Publications

- [Monroe Newborn](#) (1977). *PEASANT: An endgame program for kings and pawns*. [Chess Skill in Man and Machine](#)
- [Monroe Newborn](#), [Robert Hyatt](#) (2014). *Computer Chess Endgame Play with Pawns: Then and Now*. [ICGA Journal, Vol. 37, No. 4](#) » [Crafty](#)

External Links

- [Peasant from Wikipedia](#)
- [Peasant \(disambiguation\) from Wikipedia](#)
- [Peasant movement from Wikipedia](#)
- [Peasants' Party from Wikipedia](#)
- [Via Campesina from Wikipedia](#)
- [Peasants' Revolt from Wikipedia](#)
- [List of peasant revoltst from Wikipedia](#)
- [Theodosii Spassov](#) Jazz Orchestra - Peasant Dance, [Plovdiv](#), October 02, 2013, [YouTube](#) Video feat.: [Diana Mladenova](#), [Miroslav Turiyski](#), [Nikolai Karageorgiev](#), [Aleksandar Lekov](#), [Nacho Gospodinov](#)

References

1. [^] [Larry Harris](#) (1977). *The heuristic search: An alternative to the alpha-beta minimax procedure.* [Chess Skill in Man and Machine](#)
2. [^] [Celebrating Peasants](#), artist unknown, 18th or 19th century, [Duesseldorfer Auktionshaus](#), [Wikimedia Commons](#)
3. [^] [Monroe Newborn](#) (1977). *PEASANT: An endgame program for kings and pawns.* [Chess Skill in Man and Machine](#)
4. [^] [Kenneth W. Church](#) (1978). [Co-ordinate Squares: A Solution to Many Chess Pawn Endgames](#). B.Sc. thesis, [Massachusetts Institute of Technology](#), advisor [Richard Greenblatt](#), reprinted 1988 in [Computer Chess Compendium](#)
5. [^] [Kenneth W. Church](#) in his Co-ordinate Squares footnote on Peasant: "most serious design error is that rule six is too weak. A better condition is to terminate if the position has been reached in the tree search at any depth. Especially in these endgames, this is a very serious error"

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