

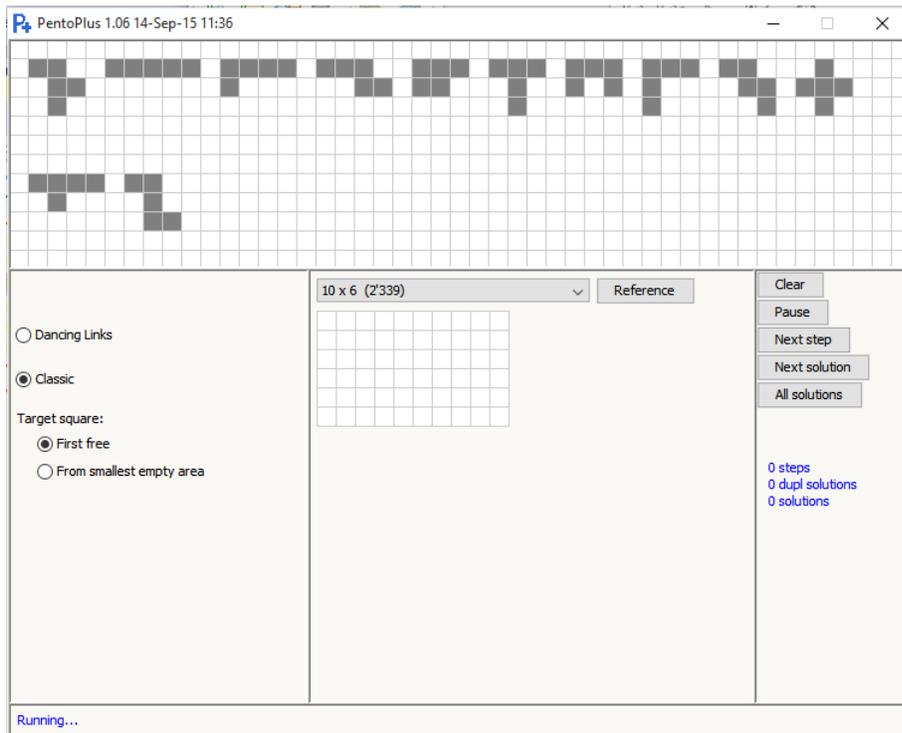
PentoPlus User Guide

Hartmut Braun, 27-Sep-2018

Running PentoPlus

To start PentoPlus, double-click the PentoPlus.jar file.

At startup, the default game (10 x 6 board with 12 pentos) is loaded.



Editing the pieces

To black/white invert a square, click it in the piece panel (top) or on the board panel (center).

Currently you can draw up to 17 pieces. If you need more pieces, ask a programmer to extend the size of the color palette.

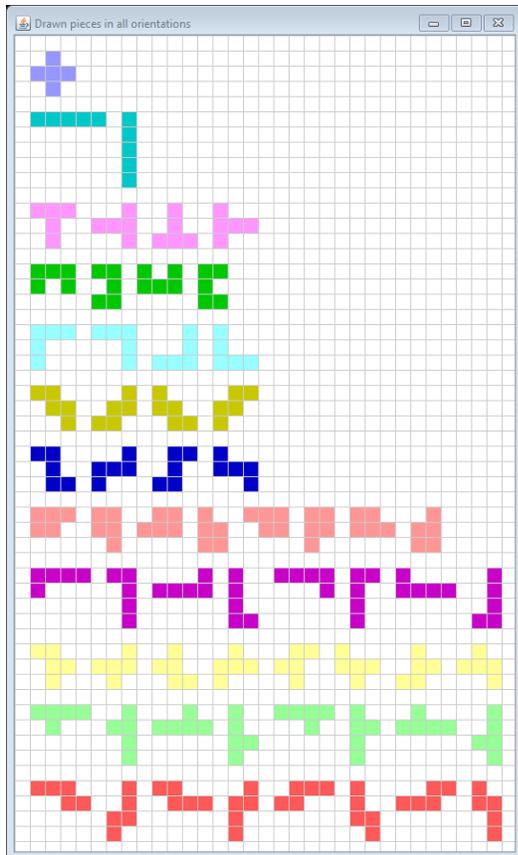
Two squares sharing only a corner are considered to be separate. In other words: two squares sharing an edge belong to the same piece.

You can draw any piece shape: a single square, a domino, trominoes, tetrominoes, pentominoes, hexominoes, and so forth.

You may use duplicate pieces for the game.

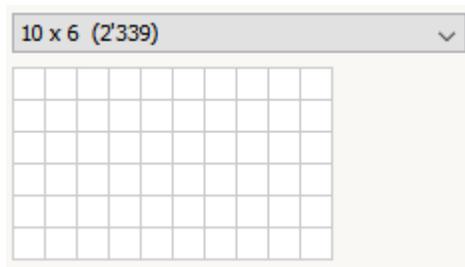
To move a piece, grab one of its squares.

To view all unique orientations of each piece, right-click a free square on the piece editor. For example:



Selecting a game

To load a predefined game (board and pieces), use the game selector.



Editing the playboard

You can block any square on the (initially rectangular) board by clicking it. Clicking the square again frees it.

This way you can easily derive a great variety of board patterns: parallelograms, crosses, perforated structures, and more.

When playing the game, the total number of piece squares must equal the number of free board squares. (Remember, we are dealing with a complete-covering problem.)

Play modes

There are two play modes:

- Knuth's **Algorithm X** ("dancing links"). Very fast.
- **Classical mode**. Executes a systematic, exhaustive search. Simulates naïve (?) human behaviour. You may view every single step. Further, you can choose from two simple tactical options.

Each piece is tried in all rotation and all inversion (flip) orientations.

Starting to play

To start the game, click Next Step, Next Solution, or All Solutions.

To interrupt the game, click Pause or Next Step.

To continue the game, click Next Step, Next Solution, or All Solutions.

You can click the Next Step, Next Solution or All Solution buttons while the game is running.

Duplicate solutions

The final set of solutions is unique. PentoPlus recognizes and eliminates duplicates, although not necessarily at the earliest possible stage.

A duplicate solution may arise from piece symmetry, board symmetry, or duplicate pieces. Eliminating all redundancy from the beginning while retaining exhaustiveness is a non-trivial task.

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