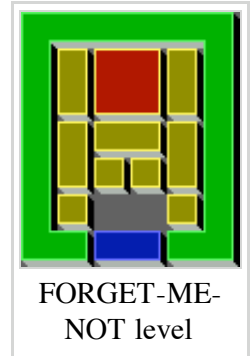


Klotski

From Wikipedia, the free encyclopedia

Klotski (from Polish *klocki* -- wooden blocks) is a sliding block puzzle. Sometimes it only refers to the block arrangement in the right hand side diagram, where the largest block (in red) must move to the bottom middle location (marked in blue). In more global sense, Klotski refers to a whole group of similar sliding block puzzles where the aim is to move a specific block to some predefined location. For more information, please refer to the Block arrangement variation section below.



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Rules

Like other sliding block puzzles, several different sized block pieces are placed inside a box, which is generally in 4x5 size. Among the blocks, there is a special one (usually the largest) which must be moved to a special area designated by the game board. The player is not allowed to remove blocks; he may only slide blocks horizontally and vertically. Common goals are to solve the puzzle with a minimum number of moves or in a minimum amount of time.

History

- Lewis W. Hardy obtained copyright for a game named **Pennant Puzzle** in 1909, and it is manufactured

by OK Novelty Co., Chicago. The aim of this puzzle is completely identical to Klotski, just that default blocks and arrangement are different. (cited in document on g4g4.com (<http://www.g4g4.com/MyCD5/SOURCES/SOURCE2.DOC>) , see below)

- He also filed U.S. Patent 1,017,752 (<http://patft.uspto.gov/netacgi/nph-Parser?patentnumber=1017752>) on 1907-12-14, which is about sliding block puzzle similar to Pennant Puzzle, but with a slightly different combination of blocks, and a different goal -- not only moving the largest block to specific location, but all of the other blocks must achieve specific configuration as well. The patent is granted on 1912-02-20. (Also cited in document mentioned above)
- According to webpage of Chosi (<http://members.cox.net/chosi/puzzles/oldpuz.htm>) , who is a puzzle fan, there are many Pennant Puzzle manufactured, some as early as 1926. They are marketed under many different names. **Dad's Puzzler** is one of them.
- J. H. Fleming obtained patent for **Dad's Puzzler** in 1932 in England (unverified, cited here (<http://www.mrpuzzle.com.au/prod526.htm>)).
- Children are seen in Chinese villages playing Klotski with pieces of paper in 1938. (unverified, cited here (<http://baike.baidu.com/lemma-php/dispose/view.php/167513.htm>) and here (<http://baike.baidu.com/view/62732.htm>) , in Chinese)
- It is known in France as **L'âne rouge** (red donkey) at that time.
- It is said to trace back to Thai game called **Khun Chang Khun Phaen**. (unverified)
- It is said that the game is popular among Japanese during World War II (unverified, cited here (<http://www.mrpuzzle.com.au/prod526.htm>)).
- One of the earliest books about standard Klotski is written by Chinese professor 姜长英 on 1949, in his book 《科学消遣》. (translation: Science Pastime)

It is still unknown which one is the origin, or (in turn) is evolved from some other sliding block puzzle, say, the 15 puzzle which enjoyed immense popularity in western countries during late 19th century. There are many confusing and conflicting claims, and several countries are claiming to be the ultimate origin of this game.

Solving

The currently known minimum number of moves is 81, which is verified by computer to be the absolute minimum.

The first published 81-step solution is by **Martin Gardner**, in Feb 1964 issue of Scientific American. In the article he discussed the following puzzles (with Hordern classification code in parenthesis): Pennant Puzzle (C19), L'Âne Rouge (C27d), Line Up the Quinties (C4), Ma's Puzzle (D1) and a form of Stotts' Baby Tiger Puzzle (F10).

For earliest published solutions (not optimal solution), currently known is from Chinese educator 許蘊舫, in his book 《數學漫談》. (Hwa Yi Publication, March 1952) His solution involves 100 steps.

Variation

There are several variations of this game, some with names specific to the culture of certain countries, some with different arrangement of blocks.

It is still unknown whether these variations affected each other and how.

Block name variation

The following variations basically have the same layout and block arrangement, varying only in name (human, animal, or others), usually with some sort of story behind the names. It is completely unknown whether they share the same origin, though this is highly possible as they are identical to each other.

Hua Rong Dao

Image:華容道.jpg

Hua Rong Dao with names of characters on blocks

- **Hua Rong Dao** (alternatively named **Hua Rong Path**, Chinese name: 華容道) is the Chinese variation, featuring an old legendary during Battle of Red Cliffs in the 13th year of Jian An in the East Han Dynasty 208AD-- a well-known battle in Chinese history. The legendary: Cao Cao was defeated in this battle, and escaped to Hua Rong Dao, in which he encountered Guan Yu.

Because Guan Yu remembered Cao Cao treated him well during old days despite he was a general of enemy of Cao Cao, Guan Yu spared Cao Cao's life. The largest block is named Cao Cao.

Daughter in the box

The **daughter in the box** (Japanese name: hakoiri musume) wood puzzle depicts an "innocent young girl, who knows nothing of the world" trapped in a building. The largest piece is named "daughter", and other blocks are given names of other family members (like father, mother and so on).

Yet another variation in Japan uses name of pieces from Shogi.

L'âne rouge

In France it is well known as **L'âne rouge**. It features a red donkey (largest piece) trying to escape a maze of fences and pens to get to its carrots.

Khun Chang Khun Phaen

This is the variation for Thailand. Description taken from University of Cambridge (http://nrich.maths.org/public/viewer.php?obj_id=1261&part=index&refpage=monthindex.php) :

Khun Phaen is a famous character in Thai Legend. This game was originally known as 'Khun Chang Khun Phaen' and refers to Khun Phaen being imprisoned. He breaks out of jail by escaping the cordon of



Daughter In The Box
(箱入り娘) board

nine sentries who are guarding him.

There is a slight difference between Khun Chang Khun Phaen and the standard layout -- the middle 2 1x1 blocks are moved to bottom. Other than that, all other blocks are the same. The origin of this variation is unknown in Thailand.

Block arrangement variation

In this context, the "basic" arrangement is assumed to be the one on top of this page, which is used globally as the "basic" game of Klotski. It is coded C27d in Hordern classification of sliding puzzle games.

Pennant Puzzle

Coded as C19 in Hordern classification, it is first copyrighted in 1909 by Lewis. W. Hardy in United States. Standard Trailer Co. has it copyrighted under the name **Dad's Puzzler** on 1926 (also in US). Its arrangement is different:

1. The default location of all blocks are different from Klotski. For example, the largest square block is in upper left corner.
2. It is in 4x5 area, with one 2x2, two 1x2, four 2x1, two 1x1 pieces.
3. The exit of block is not at the bottom middle, but bottom left.

Other than these, the game rule is completely the same as Klotski. The minimum number of moves currently known is 59.

Ma's Puzzle

Ma's Puzzle is copyrighted by Standard Trailer Co. at 1927. It is the first sliding puzzle to use non-rectangular shape. Its goal is to join its 2 L-shaped pieces together, either anywhere or top right corner of the board.

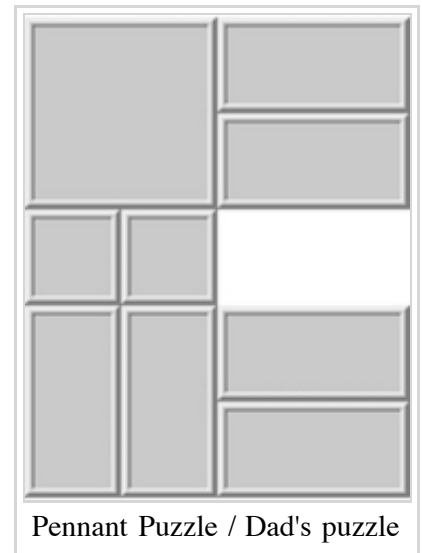
Computerized version

For computer versions, the first one seen is in a Microsoft Windows 3.1 Game Pack.

Several versions of Klotski exist now; one is included in the GNOME desktop environment.

See also

- N-puzzle
- Rush Hour (board game)
- Mechanical puzzles



Pennant Puzzle / Dad's puzzle

- Combination puzzles

External links

- Nice easy to follow gif animation (<http://www.stavanger-guide.com/klotski.htm>) . A visual hint of the 'Forget-me-not' (L'Âne Rouge) solution.
- Solving Dad's Puzzle (<http://www.jawed.com/programs/puzzle.html>)
- The record of Pennant Puzzle in International Game Database (IGDB) (<http://www.gamecatalog.org/games/game.asp?gameid=9039>)

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Categories: Articles needing additional references from July 2007 | Puzzles | Mechanical puzzles | Combination puzzles | Puzzle video games

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