

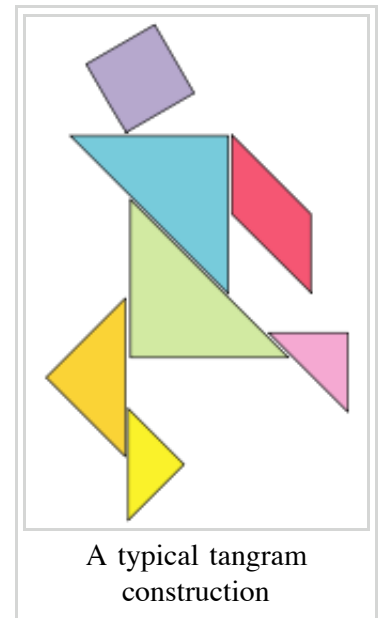
Tangram

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Tangram (Chinese: 七巧板; pinyin: qī qiǎo bǎn; literally "seven boards of skill") is a dissection puzzle. It consists of seven pieces, called *tans*, which fit together to form a shape of some sort. The objective is to form a specific shape with seven pieces. The shape has to contain all the pieces, which may not overlap.

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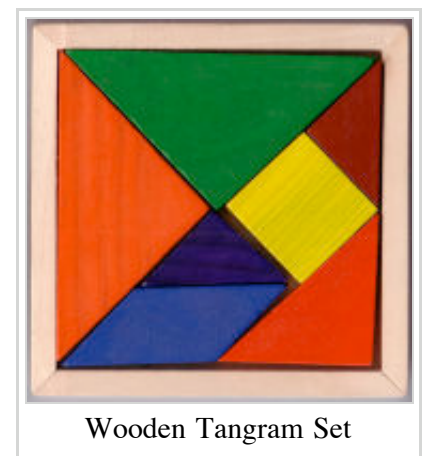
History

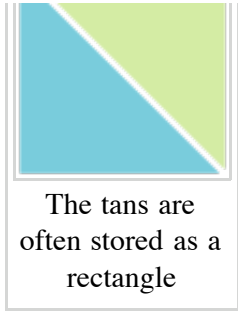
The Tangram very possibly originated from the *yanjitu* (燕几圖) furniture set during the Song Dynasty. According to historical Chinese records, the furniture set was originally a set of 6 rectangular tables. Later, an additional triangular table was added to the set, and people can arrange the 7 tables into a big square table. There is some variation to such furniture set during the Ming Dynasty, and later became a set of wooden blocks for playing.

According to other authors, the earliest reference to tangram appears in a Chinese book dated 1813, which was probably written during the reign of the Emperor Jiajing.^[1]



Another legend states that a servant of a Chinese emperor was carrying a ceramic tile, extremely expensive and extremely fragile. The servant tripped, shattering the tile. In a panic, the servant desperately tried to reassemble the tile into a square, but could not. He spent many days trying to reassemble the pieces into a square again, but could not, and instead created thousands of patterns and pictures during his attempts.





While the tangram is often said to be ancient, its existence in the Western world has been verified no earlier than 1800. Tangrams were brought to America by Chinese and American ships during the first part of the nineteenth century. The earliest example known is made of ivory in a silk box and was given to the son of an American ship owner in 1802.

The word "tangram" is built from TANG + GRAM. The word "Tangram" was first used by Thomas Hill, later President of Harvard, in his book *Geometrical Puzzle for the Youth* in 1848.

The author and mathematician Lewis Carroll reputedly was a great enthusiast of tangrams and possessed a Chinese book with tissue-thin leaves containing 323 tangram designs. Napoleon owned a Tangram set and Chinese problem and solution books while he was imprisoned on the island of St. Helena. Photos are shown in "The Tangram Book" by Jerry Slocum.

In 1903, Sam Loyd wrote a spoof of tangram history, *The Eighth Book Of Tan* convincing many people that the game was invented 4,000 years ago by a god named Tan. The book included 700 patterns some of which are not possible. ^[2]

Traditional tangrams were made from stone, bone, clay or other easy to get materials. Nowadays they can be made from plastic, wood or other modern materials.

Mathematical proofs

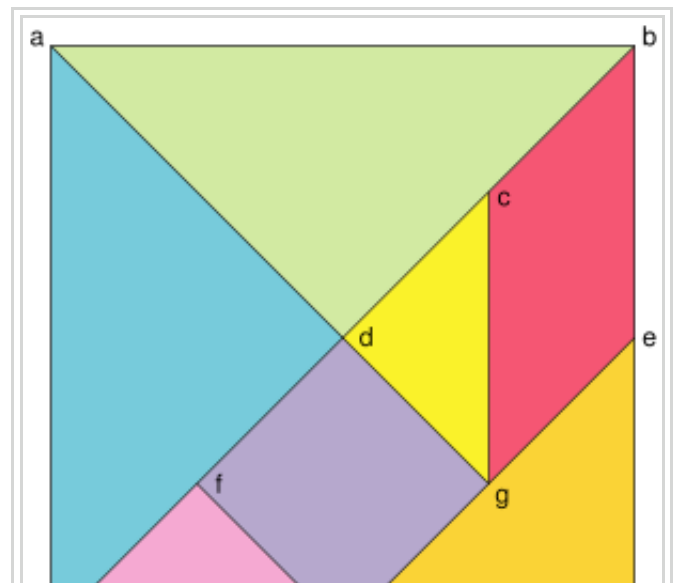
Fu Tsiang Wang and Chuan-chin Hsiung proved in 1942 that there only existed 13 convex patterns (i.e. patterns with no recesses in the outline).^[3]

The pieces

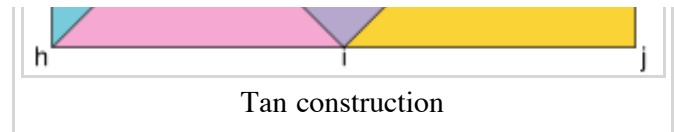
Sizes are relative to the big abjh square, which is defined as being of width, height and area equal to 1.

- 5 right isosceles triangles
 - 2 small (hypotenuse of $1/2$ and sides of $1/2\sqrt{2}$)
 - 1 medium size (hypotenuse of $1/\sqrt{2}$ and sides of $1/2$)
 - 2 large size (hypotenuse of 1 and sides of $1/\sqrt{2}$)
- 1 square (side of $1/2\sqrt{2}$)
- 1 parallelogram (sides of $1/2$ and $1/2\sqrt{2}$)

Of these 7 pieces, the parallelogram is unique in that its mirror image cannot be obtained by rotation. Thus, it is the only piece that needs to be flipped when forming some silhouettes. Since there is only one such piece, every



possible silhouette or its mirror image can be formed with a set of one-sided tangrams (for example, tangrams with a magnetic back that slide on a magnetic board).

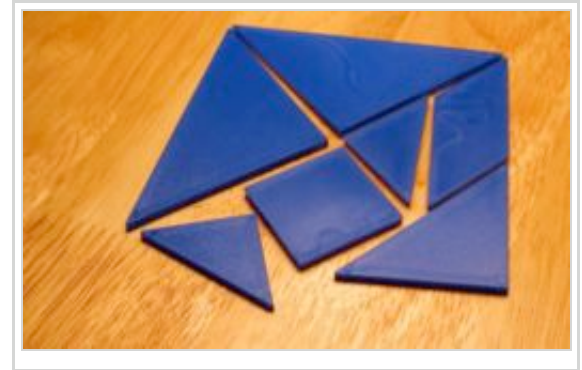


See also

- Tiling puzzle
- Mathematical puzzle
- One Billion Silhouettes Project

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External links

- Tazzzle (<http://www.tazzzle.com/progetto.html>) link to the 1,000,000,000 Tangram shapes Project
- Pieces Tangram's game (<http://www.geocities.com/peces20/index.htm>) A game program whit 13 tangram's

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