The "T" Puzzle

History

The earliest known example of a T puzzle was an advertisement for White Rose Ceylon Tea dating back to 1903 [1]. A picture of this early puzzle can be found on the Historical Folk Toys web page [2] see Figure 1. A little later, Amour's in Chicago used it to promote sausages [3] see Figure 2.

Over time many variations of the puzzle have been created to allow other shapes beyond just the T to be made with the pieces.

Martin Gardner described a version in his famous puzzle column in the Scientific American magazine [4] which allowed the pieces to form the "classical T" as well as the "Fat T" and the "Teezer" shape (Figure 8) .

Figure 1: White Rose Tea

Figure 2:
Armour's Dry Sausage

Problem:

Using the 4 pieces (Figure 3), create a capital letter 'T' without gaps or overlaps (Figure 4). Then try some others shapes you can make - either invent your own or see a selection on the following pages.

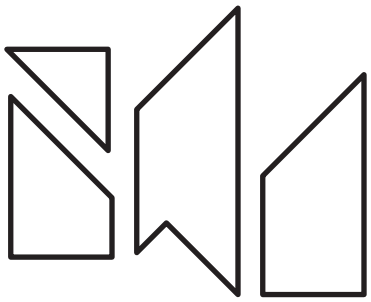


Figure 3: The 4 pieces

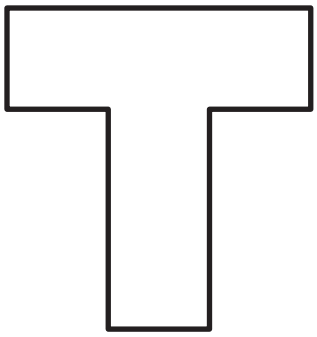


Figure 4: The classical T shape

References:

[1] "New Book of Puzzles", Jerry Slocum and Jack Botermans, 1992, p 12., W.H. Freeman, NY, ISBN 0-7167-2356-6

[2] http://www.historicalfolktoys.com/catcont/2102.html

[3] http://www.wood-puzzle.com/uk/historien.htm

[4] http://www.puzzles.com/PuzzlePlayground/TheTPuzzle/TheTPuzzle.htm

Sources of some of the many other shapes:

[5] http://www.wood-puzzle.com/uk/theT.htm

[6] http://www.nuuanu.k12.hi.us/nuuanuweb/Nuuanu%20Class%20pages/tpuzzle/tpuzzle.html

 http://www.woodpuzzles.com

Plans to make your own:

There are a number of variations of the T puzzle around. In making your own, you will have some of the key decisions to make such as the width and height of the puzzle. We chose the width to be 3a (where "a" is the length of the unit square). The next question is how to select "x" and "y" for a satisfying puzzle (see Figure 5). In this plan the central shape was made with the same width "a" as the unit square uses. This fixes the size of "y". For "x" an appropriate size was selected such that the "Teezer" shape in Figure 6 can be made (same as published in [4]). But you will also often find "x" to be selected as "a" which allows the building of the Fat Arrow (see Figure 7) and many other shapes [5]&[6]. Finally, a good to play with size uses a side length of about 25 to 30mm or 1 to 1¼ inch for the side "a".

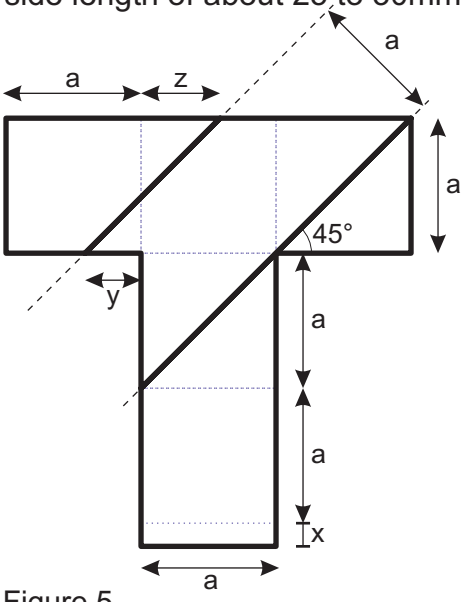


Figure 5

From Figure 5 we can see that:

$z = 2a - a\sqrt{2} = a(2 - \sqrt{2})$

$y = a - z = a - 2a + a\sqrt{2} = a(\sqrt{2} - 1)$

From Figure 6 follows:

$a + z = a + x + y$

$z = x + y$

$x = z - y$

$x = 2a - a\sqrt{2} - a\sqrt{2} + a$

$x = 3a - 2a\sqrt{2}$

$x = a(3-2\sqrt{2}) \sim a * 0.172$

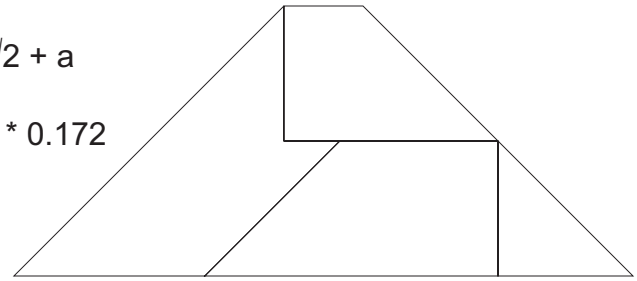


Figure 6: "Teezer" shape

For the second set of pieces we can see from Figure 7 that only one piece changes by having a larger x. From the figure you can see that:

$a + z + a\sqrt{2} = 2a + x$

$x = z + a\sqrt{2} - a$

$x = 2a - a\sqrt{2} + a\sqrt{2} - a$

$x = a$

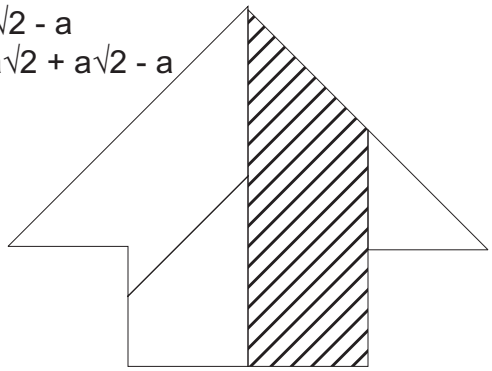


Figure 7: "Fat Arrow" shape

Laser Files:

To laser-cut your own very nice pieces with rounded over corners and a hole to string up all the pieces (Figure 8), you can get Corel Draw files from the woodpuzzles website.

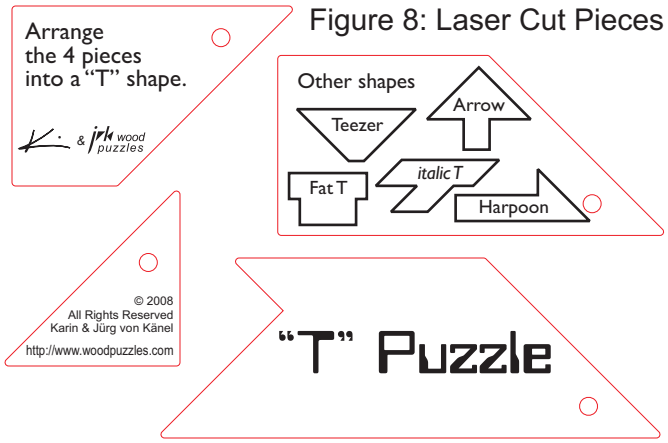
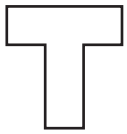
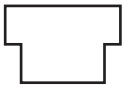
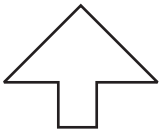
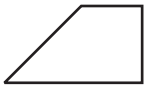
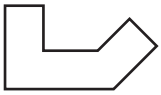
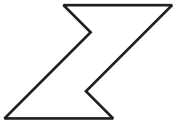
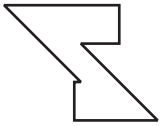
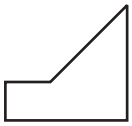
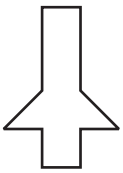
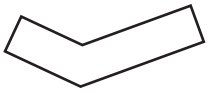
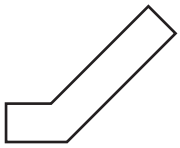
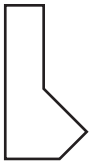
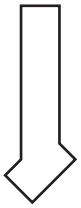
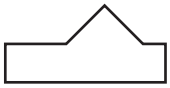
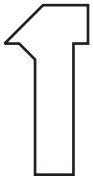
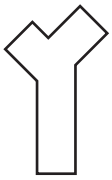
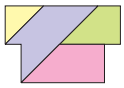
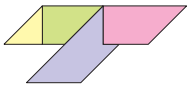
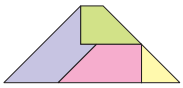
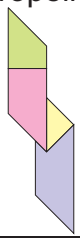
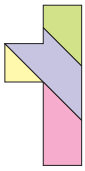
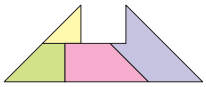
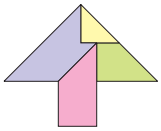
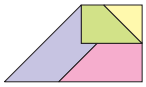
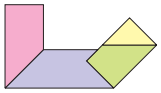
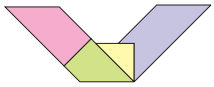
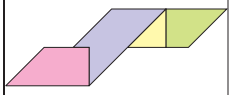
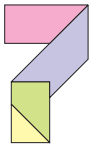
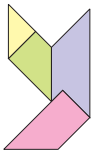
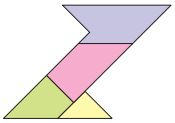
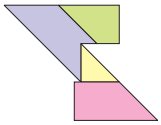
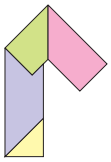
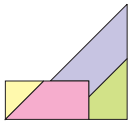
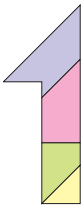
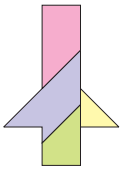
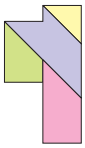
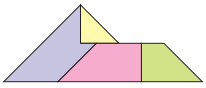
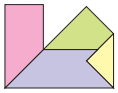
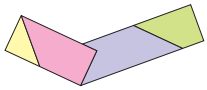
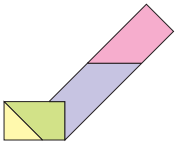
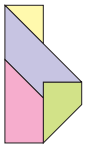
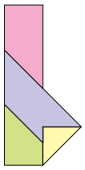
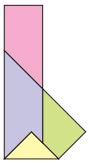
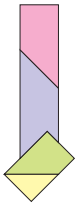
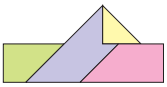
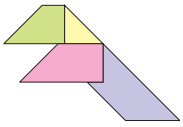
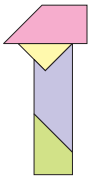
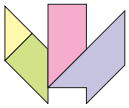


Figure 8: Laser Cut Pieces

Shapes you can make:

The "T" 	Fat T 	italic T 	Teezer 	Propeller 	Y Pentomino 
Caldera 	Arrow 	Ramp 	Happy Baby 	Bowl 	Stairs 
7 	y 	Z 	Lefty Z 	Cane 	Funiculaire 
Halberd 	Harpoon 	Sword 	Tomahawk 	Villa 	Factory 
Boomerang 	Hockey stick 	Golf bag 	Medium Golf bag 	Tall Golf bag 	Putter 
Hand plane 	Adjustable Spanner 	Hammer 	Anchor 	Paperweight 	Mounted L 

Solutions:

The "T" 	Fat T 	italic T 	Teezer 	Propeller 	Y Pentomino 
Caldera 	Arrow 	Ramp 	Happy Baby 	Bowl 	Stairs 
7 	y 	Z 	Lefty Z 	Cane 	Funiculaire 
Halberd 	Harpoon 	Sword 	Tomahawk 	Villa 	Factory 
Boomerang 	Hockey stick 	Golf bag 	Medium Golf bag 	Tall Golf bag 	Putter 
Hand plane 	Adjustable Spanner 	Hammer 	Anchor 	Paperweight 	Mounted L