



Klarner's Pentacube Puzzle



rbid

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Summary

Interesting puzzle from the 70's, looks easy but can be challenging to solve.

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1.- Introduction

This puzzle was introduced by **David A. Klarner** in the early 70s. The legend says that he gave a Christmas quest to students when he was visiting professor at Utrecht University.

His quest consisted in writing a computer program that could solve the problem to pack 25 Y-shaped pentacubes in a 5 x 5 x 5 box.

A pentacube is a solid made of five equal cubes joined face to face, Devid Klarner used one of the 29 possible figures, the one that has a Y-shape.

I was introduced to this puzzle in the early 90's, when I got a wooden puzzle containing the 25 pentacubes in a box, with time I lost some of its pieces and part of the puzzle got its way into my basement, until I found it again, therefore I decided to design a replica.

The number of solutions is quite large (1264 unique solutions) but because of the nature of the y-shaped identical pentacubes, there are a lot of symmetric solutions (Up to 60672 packing solutions)

Can you solve it? (Level: Hard)

2.- Printing the Model

There are two versions of the puzzle

- **Normal size** model, that is nicer to play (each y-shaped pentacube with 64x32x16mm, and the storing box with 96x96x96mm).
- **Slim size** model, is slightly smaller, with the each pentacube size of 48x24x12mm and a box of 70x70x70mm.

Both versions can be printed without any special care. (No support, default settings).

You need 25 pentacube pieces. They can be printed together with the same color, or printed one piece at a time, or in groups for having different colors for making it more attractive. (In short, it is up to you)

2.1.- Normal Size Model

For the normal version, you have 3 different boxes, from them, select the one that is suitable for you. That is:

- 25 copies of the file pentacube-piece.stl..
- One of the 3 provided boxes. (slotted_box.stl or stairs_box.stl or replicated_box.stl).

A word about tolerances:

- Box replicated_box.stl has less tolerance than others, it works well on my Prusa MINI+, but it may be tight for some other printers, I'm not sure how this will go out if you resize.
- Box stairs_box.stl has better tolerance, but it also not suitable for resizing.
- Box slotted_box.stl has larger tolerance.

2.2- Slim Size Model

The files are:

- 25 copies of the file slim_pentacube_piece.
- 1 copy of the file slim_box.

3.- References

- Pentacubes in a box - <http://www.recmath.org/PolyCur/c5box/index.html>
- David A. Klarner - https://en.wikipedia.org/wiki/David_A._Klarner
- The Story behind - <http://www.harmjschoonhoven.com/puzzle.html>

4.- Other Puzzles I have designed:

- Quints Dozen Puzzle
- Octagonal Pillars Puzzle.
- The Haberdasher's Puzzle.
- Jewish Calendar - Puzzle a day.
- Escher's Star Puzzle.
- Mayer's Puzzle - Printed in pieces.
- Mayer's Puzzle - Print in place.

5.- Change Log:

- **Upload: 2023-08-02:** Initial Version.

6.- Last Words



Please don't forget to ★ Rate and ♥ Like

Post your Makes to earn Prusameters!

Do not hesitate to ask questions, feedback is essential to making better models.

You are kindly invited to follow me to get updated when upload new models.

Happy printing & Greetings from the Galilee.

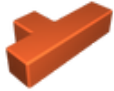
Hope it was not TL;DR

Model files



Full Size

4 files



pentacube_piece.stl

☐ You need 25 pentacube pieces



slotted_box.stl

☐ Larger tolerance box.



stairs_box.stl

☐ Fine tolerance, but it may be tight for some printers.



replicated_box.stl

☐ Tight tolerance, it was the initial version.



Slim Size

2 files



slim_pentacube_piece.stl

☐ You need 25 pentacube pieces



slim_box.stl

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