

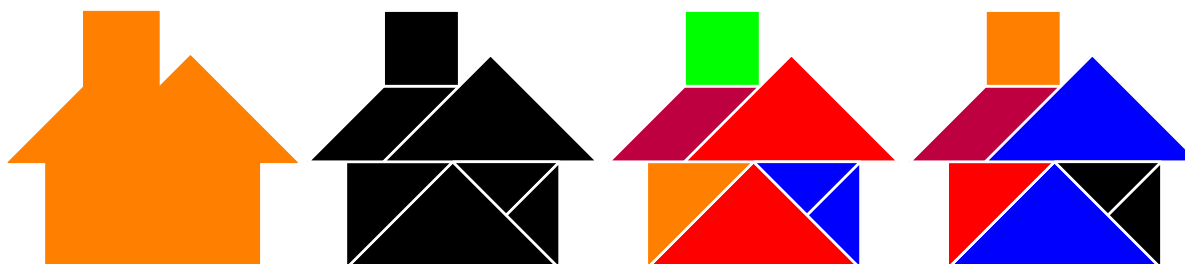
# TangramTikz [en]

Tangrams, with TikZ,  
with solution and/or color.

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<https://github.com/cpierquet/TangramTikz>

- Some commands to display existing Tangrams.
- Create tangram, with postionning manually the pieces.
- Idea(s) from <https://tex.stackexchange.com/questions/407449/typesetting-tangram-figures-in-latex>



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LaTeX

pdfLaTeX

LuaLaTeX

TikZ

TeXLive

MiKTeX

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# Contents

|            |                                                 |           |
|------------|-------------------------------------------------|-----------|
| <b>I</b>   | <b>Introduction</b>                             | <b>3</b>  |
| <b>1</b>   | <b>The package <code>TangramTikz</code></b>     | <b>3</b>  |
| 1.1        | Source . . . . .                                | 3         |
| 1.2        | Loading of the package, used packages . . . . . | 3         |
| 1.3        | The package itself . . . . .                    | 3         |
| <b>II</b>  | <b>Usage of the package</b>                     | <b>4</b>  |
| <b>2</b>   | <b>Manually</b>                                 | <b>4</b>  |
| 2.1        | The pieces of the Tangram . . . . .             | 4         |
| 2.2        | Positionning of the pieces . . . . .            | 5         |
| <b>3</b>   | <b>Automatic Method</b>                         | <b>6</b>  |
| 3.1        | Command . . . . .                               | 6         |
| 3.2        | Keys, options and arguments . . . . .           | 6         |
| <b>III</b> | <b>Gallery of Tangrams</b>                      | <b>8</b>  |
| <b>IV</b>  | <b>History</b>                                  | <b>13</b> |

# Part I

## Introduction

### 1 The package TangramTikz

#### 1.1 Source

Some of the ideas are coming from <https://tex.stackexchange.com/questions/407449/typesetting-tangram-figures-in-latex>, specially from Andrew Stacey.

The package has been *built* around the ideas from Andrew Stacey.

#### 1.2 Loading of the package, used packages

The package TangramTikz loads into the preamble by :

```
\usepackage{TangramTikz}
```

Code  $\LaTeX$

It's fully copatible with usuals compilations, such as latex, pdflatex, lualatex or xelatex.

It loads the packages and libraries :

- tikz awith libraries `\calc` ans `\shapes.geometric` ;
- xstring, xparse, simplekv and listofitems.

#### 1.3 The package itself

The idea is to, thanks to TikZ, propose commands to display a Tangram Puzzle :

- with *full* pieces ;
- by puzzle with *border* pieces ;
- by puzzle with *border colored* pieces.

```
%independant command to display a Tangram  
\TangramTikz[keys]<options tikz>{tangram_name}
```

Code  $\LaTeX$

There's also an environment and a special command to build the puzzle, by positionning the pieces.

```
%environment, with keys, and positionning the pieces  
\begin{EnvTangramTikz}[keys]<options tikz>  
  %positionning the pieces  
  \PieceTangram[keys]<options pic>(offsetH,offsetV){TangBigTri}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangBigTri}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangMedTri}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangSmalTri}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangSmalTri}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangSqua}  
  \PieceTangram[keys]<options pic>(offsetH,offsetH){TangPara}  
  %\filldraw[black] (0,0) circle[radius=4pt] ; %help for positionning  
\end{EnvTangramTikz}
```

Code  $\LaTeX$

## Part II

# Usage of the package

## 2 Manually

### 2.1 The pieces of the Tangram

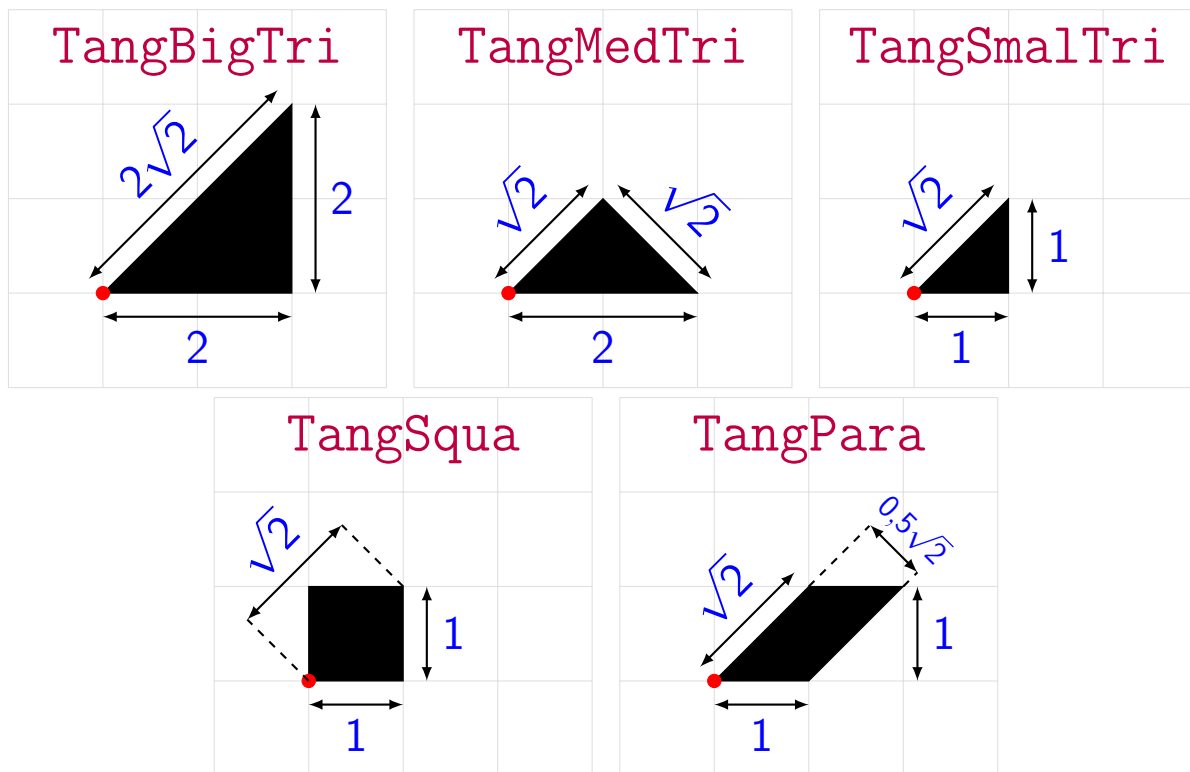
A Tangram is composed by 7 pieces :

- 2 big triangles ; 1 medium triangle ; 2 small triangles ;
- 1 square ;
- 1 parallelogram.

Each piece of the Tangram is defined in TikZ, by an independent `pic`.

A figure to show the 5 pieces :

- with the **name** of the `pic` ;
- with the initial *orientation* ;
- with thier initial *origin* ;
- with their common *dimensions* (given in *unit*).



Each *piece* can :

- rotated, thanks to TikZ' option `rotate=...` ;
- flipped vertically or horizontally, thanks to TikZ' option `xscale=-1` and `yscale=-1` ;
- moved, by placing it at point (x,y).

Each piece comes with a TikZ' style :

- `TangPuzz` : piece of Tangram, *full*, with a color (**(black)** by default) ;
- `TangSol` : piece of tangram, *with white border*, with a color (**(black)** by default).

## 2.2 Positionning of the pieces

A first method is to use `pic` syntax in `TikZ` :

```
%environment or tikz command
\pic[style,rotate=...,xscale=...,yscale=...] at (x,y) {piece_name} ;
```

Code  $\LaTeX$

The package `TangramTikz` proposes a specific command to place the pieces :

```
%environment or tikz command
\PieceTangram[style={color}]<xscale=...,yscale=...,rotate=...>(x,y){piece_name}
```

Code  $\LaTeX$

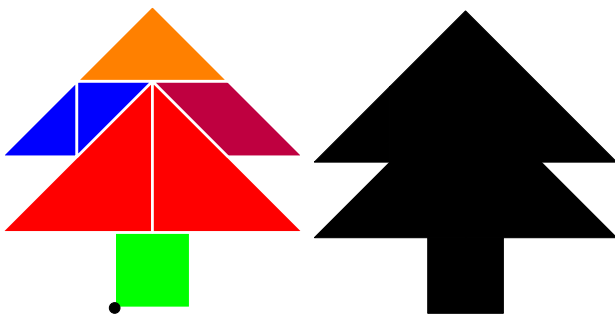
A Tangram is built from the 7 pieces, by :

- *putting* pieces at origin ;
- *rotating/flipping* for the correct orientation ;
- *translating* for the correct position.

```
%Correction colored version, initial size
\begin{EnvTangramTikz}
  \PieceTangram[TangSol={green}]({0},{0}){TangSqua}
  \PieceTangram[TangSol={red}]({-1.5},{1}){TangBigTri}
  \PieceTangram[TangSol={red}]<rotate=-90>({0.5},{3}){TangBigTri}
  \PieceTangram[TangSol={purple}]<xscale=-1,rotate=0>({2.5},{2}){TangPara}
  \PieceTangram[TangSol={blue}]({-1.5},{2}){TangSmaTri}
  \PieceTangram[TangSol={blue}]<xscale=-1,rotate=90>({-0.5},{2}){TangSmaTri}
  \PieceTangram[TangSol={orange}]({-0.5},{3}){TangMedTri}
  \filldraw[black] (0,0) circle[radius=2pt] ; %help
\end{EnvTangramTikz}

%Normal version, initial size
\begin{EnvTangramTikz}
  \PieceTangram[TangPuzz]({0},{0}){TangSqua}
  \PieceTangram[TangPuzz]({-1.5},{1}){TangBigTri}
  \PieceTangram[TangPuzz]<rotate=-90>({0.5},{3}){TangBigTri}
  \PieceTangram[TangPuzz]<xscale=-1,rotate=0>({2.5},{2}){TangPara}
  \PieceTangram[TangPuzz]({-1.5},{2}){TangSmaTri}
  \PieceTangram[TangPuzz]<xscale=-1,rotate=90>({-0.5},{2}){TangSmaTri}
  \PieceTangram[TangPuzz]({-0.5},{3}){TangMedTri}
\end{EnvTangramTikz}
```

Code  $\LaTeX$



## 3 Automatic Method

### 3.1 Command

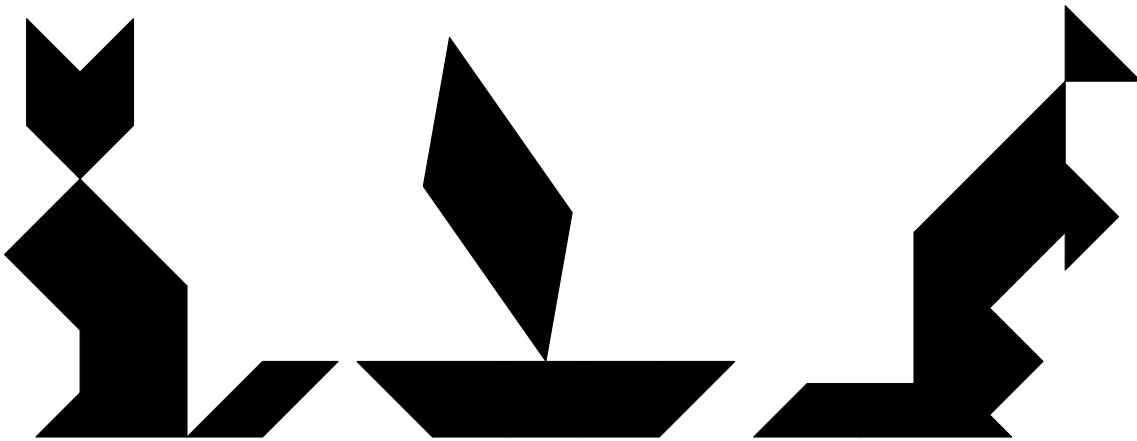
Some predefined tangrams are present in the package `TangramTikz`, and there's an independent command to "call" them :

```
%independent command to display a Tangram
\TangramTikz[keys]<options tikz>{tangram_name}
```

Code *MT<sub>X</sub>*

```
%independent command to display Cat/Boat/Kangaroo, with options by default
\TangramTikz{Cat}~~\TangramTikz{Boat}~~\TangramTikz{Kangaroo}
```

Code *MT<sub>X</sub>*



### 3.2 Keys, options and arguments

The first argument, *optional* and between [...], give the keys :

- the boolean **<Puzzle>** to display *uni*-color pieces, without border ; default : **<true>**
- the boolean **<Correction>** to display *uni*-color pieces, with border ; default : **<false>**
- **<Color>** to configure the *uni*-color with the above booleans ; default : **<black>**
- the boolean **<ColorCorrection>** to display colored pieces with border ; default : **<false>**
- **<ColorList>** which are the colors of the pieces (BT,MT,ST,SQUA,PARA) ; default : **<red,orange,blue,green,purple>**
- **<Sep>**, the width of the border in **<Correction>** mode. default : **<1pt>**

The second argument, *optional* and between <...>, give options to the TikZ environment, for example :

- unit(s) change, scale change ;
- rotation, vertical alignment ;
- etc

The third argument, *mandatory* and between {...} is the name of the predefined tangram :

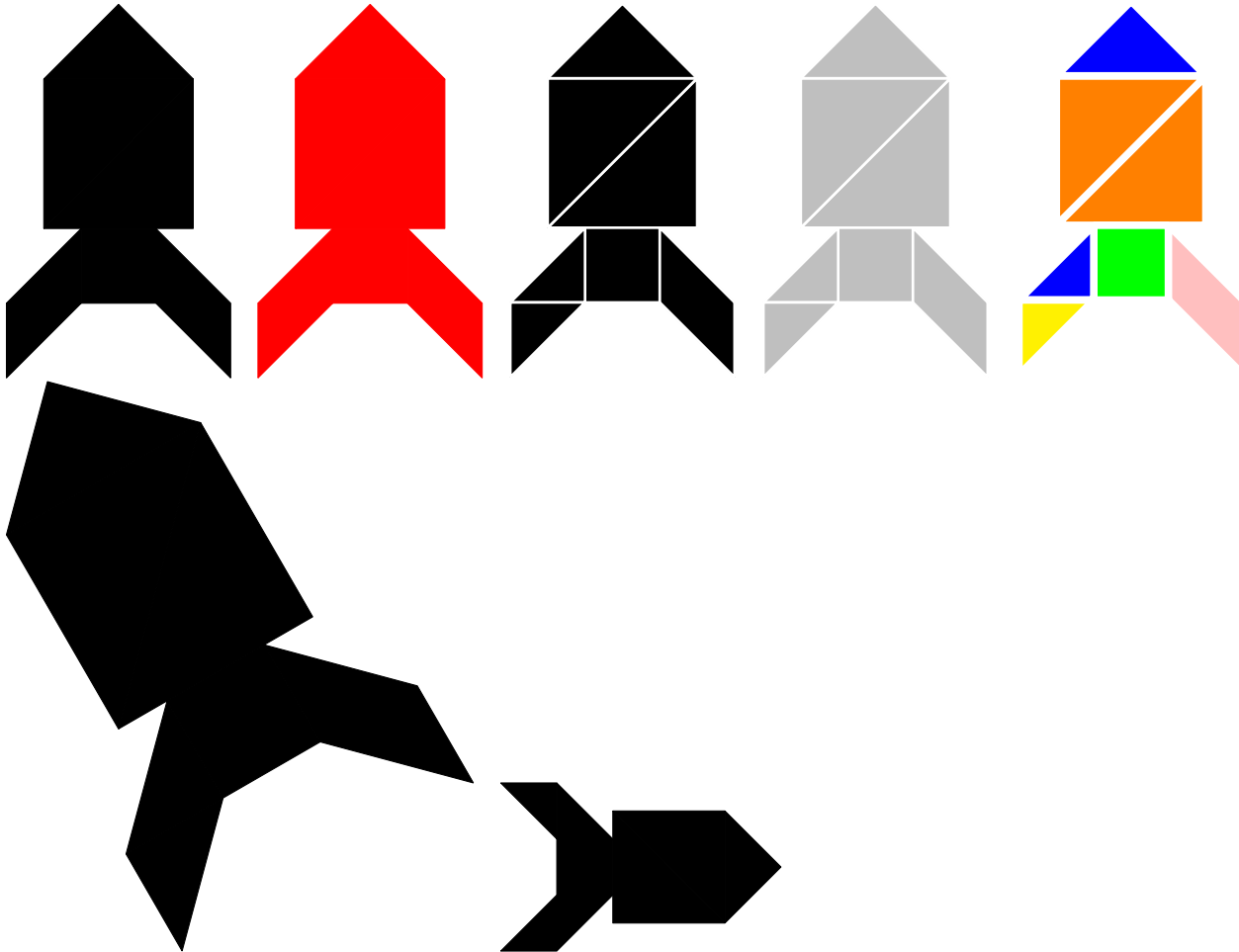
- |           |           |          |            |
|-----------|-----------|----------|------------|
| • Square  | • FirTree | • Duck   | • Fish     |
| • Penguin | • Cat     | • Rocket | • Sailboat |
| • Boat    | • Swan    | • Candle | • Kangaroo |
| • Home    | • Pyramid | • Shirt  | • Dog      |

```

\TangramTikz{Rocket}~~
\TangramTikz[Color=red]{Rocket}~~
\TangramTikz[Correction]{Rocket}~~
\TangramTikz[Correction,Color=lightgray]{Rocket}~~
\TangramTikz[ColorCorrection,ColorList={orange,blue,yellow,green,pink},Sep=1mm]{Rocket}

\TangramTikz<scale=1.5,rotate=30>{Rocket}~~
\TangramTikz<scale=0.75,rotate=-90>{Rocket}

```

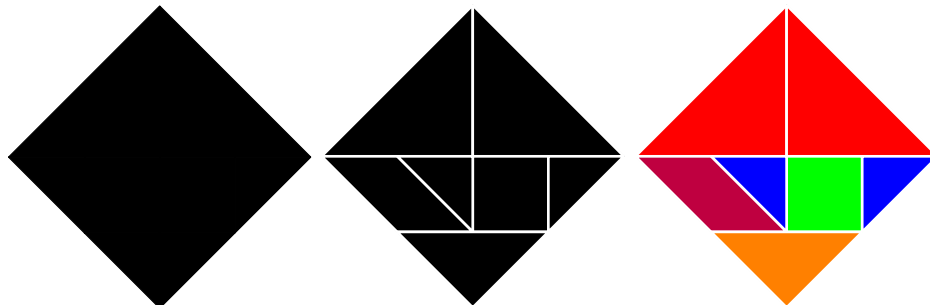


## Part III

# Gallery of Tangrams

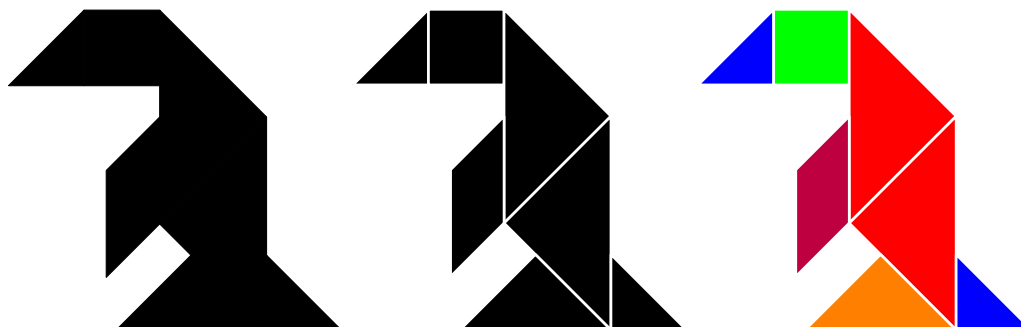
Code  $\LaTeX$

```
\TangramTikz{Square}
\TangramTikz[Correction]{Square}
\TangramTikz[ColorCorrection]{Square}
```



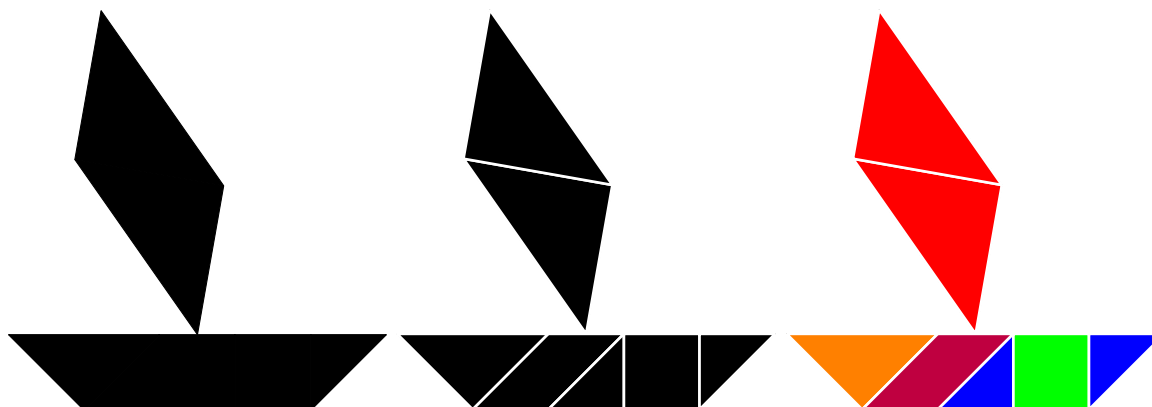
Code  $\LaTeX$

```
\TangramTikz{Pinguin}
\TangramTikz[Correction]{Pinguin}
\TangramTikz[ColorCorrection]{Pinguin}
```



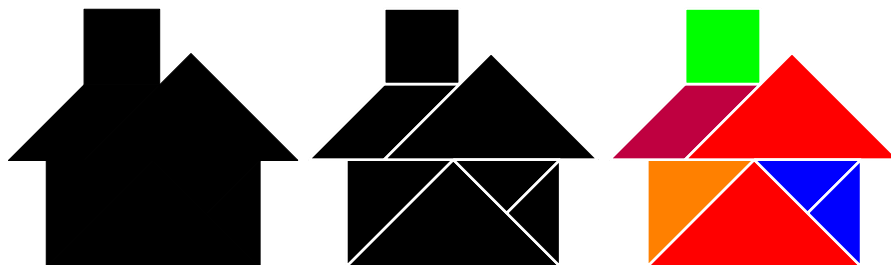
Code  $\LaTeX$

```
\TangramTikz{Boat}
\TangramTikz[Correction]{Boat}
\TangramTikz[ColorCorrection]{Boat}
```

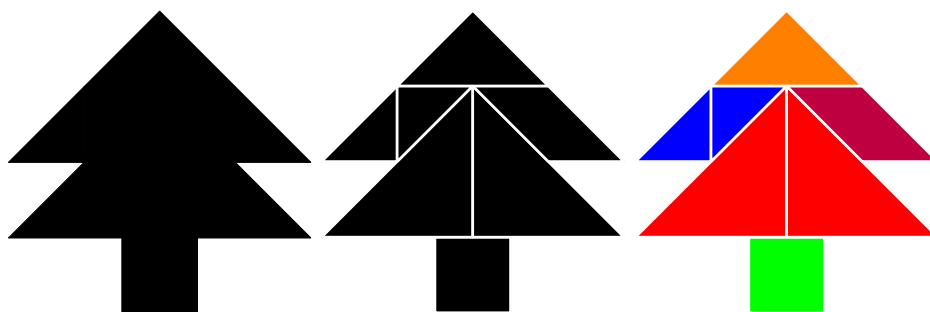




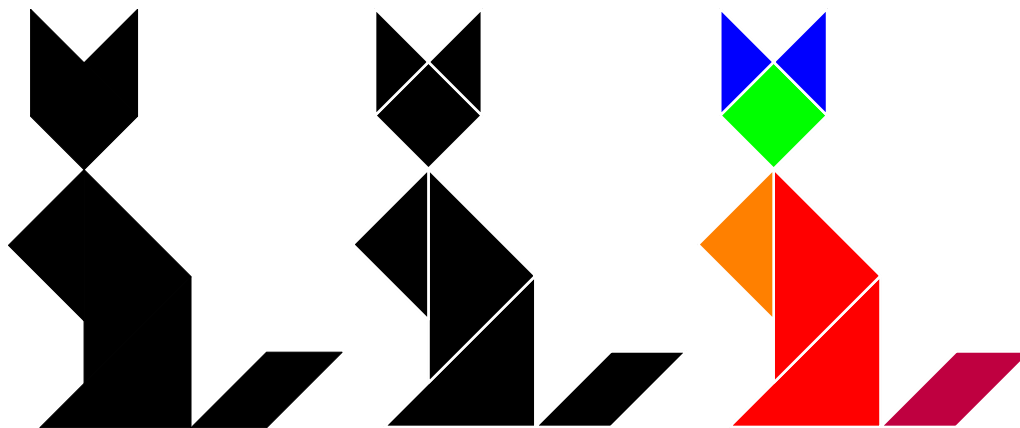
```
\TangramTikz{Home}
\TangramTikz[Correction]{Home}
\TangramTikz[ColorCorrection]{Home}
```



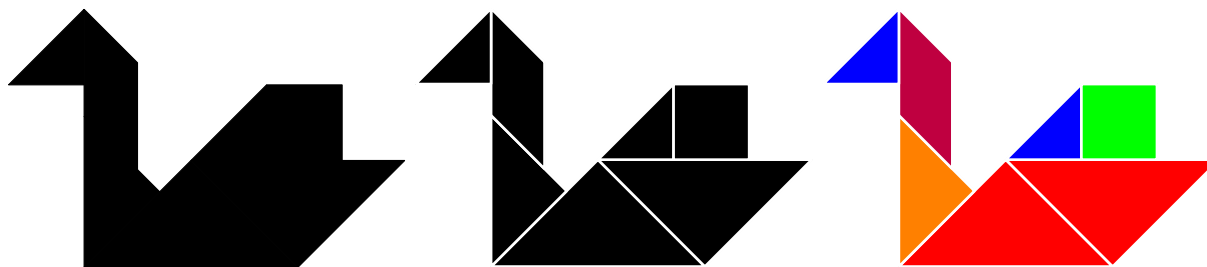
```
\TangramTikz{FirTree}
\TangramTikz[Correction]{FirTree}
\TangramTikz[ColorCorrection]{FirTree}
```



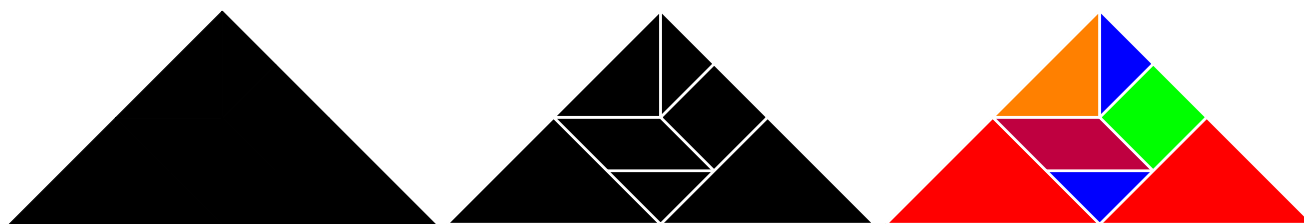
```
\TangramTikz{Cat}
\TangramTikz[Correction]{Cat}
\TangramTikz[ColorCorrection]{Cat}
```



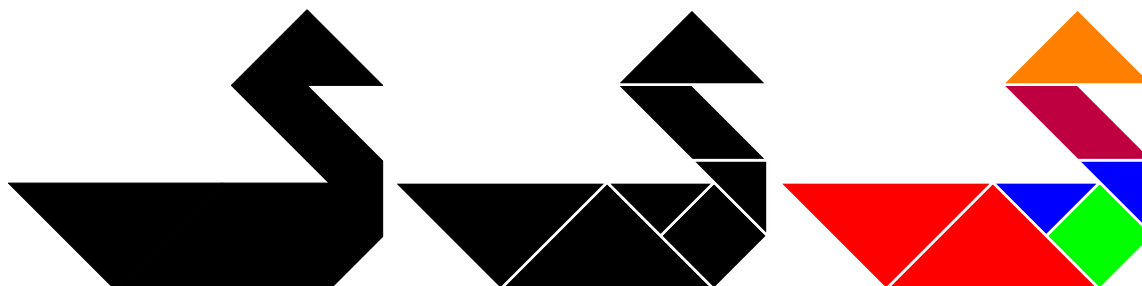
```
\TangramTikz{Swan}
\TangramTikz[Correction]{Swan}
\TangramTikz[ColorCorrection]{Swan}
```



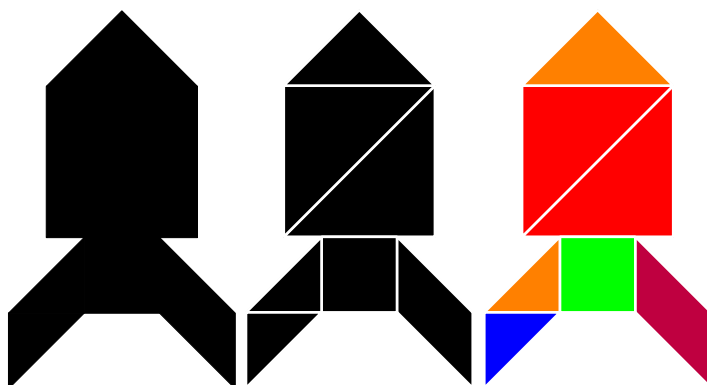
```
\TangramTikz{Pyramid}
\TangramTikz[Correction]{Pyramid}
\TangramTikz[ColorCorrection]{Pyramid}
```



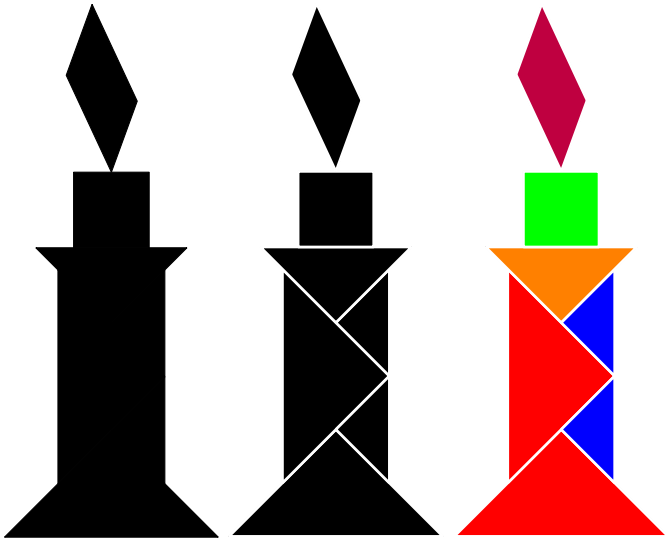
```
\TangramTikz{Duck}
\TangramTikz[Correction]{Duck}
\TangramTikz[ColorCorrection]{Duck}
```



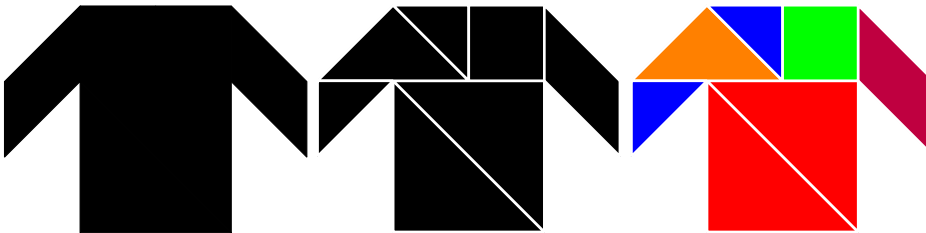
```
\TangramTikz{Rocket}
\TangramTikz[Correction]{Rocket}
\TangramTikz[ColorCorrection]{Rocket}
```



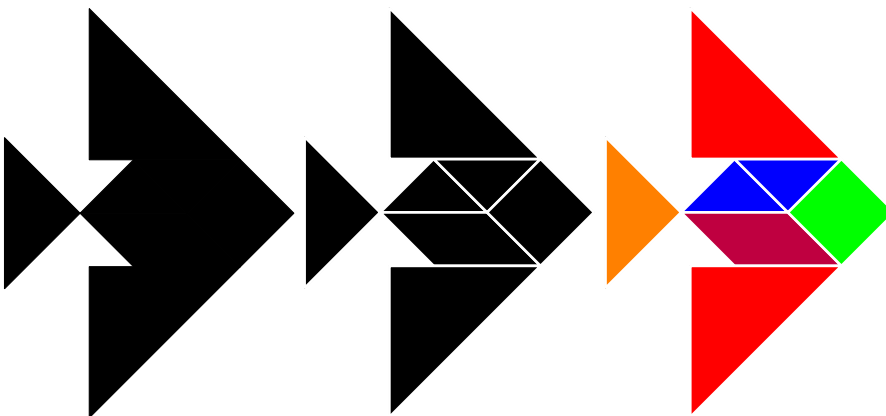
```
\TangramTikz{Candle}
\TangramTikz[Correction]{Candle}
\TangramTikz[ColorCorrection]{Candle}
```



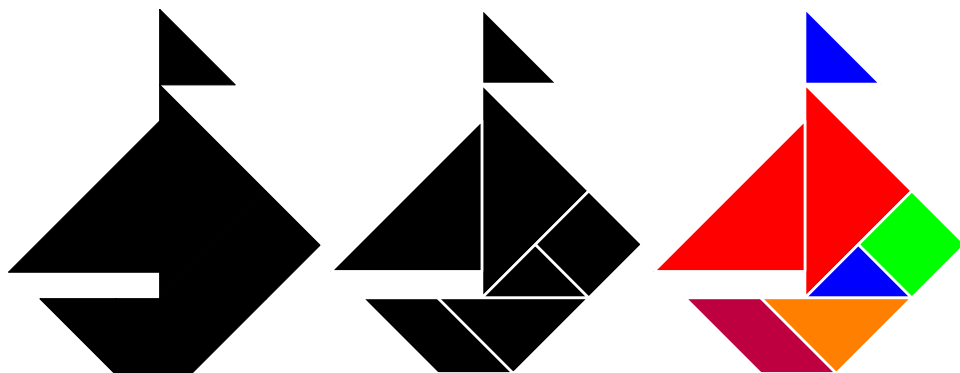
```
\TangramTikz{Shirt}
\TangramTikz[Correction]{Shirt}
\TangramTikz[ColorCorrection]{Shirt}
```



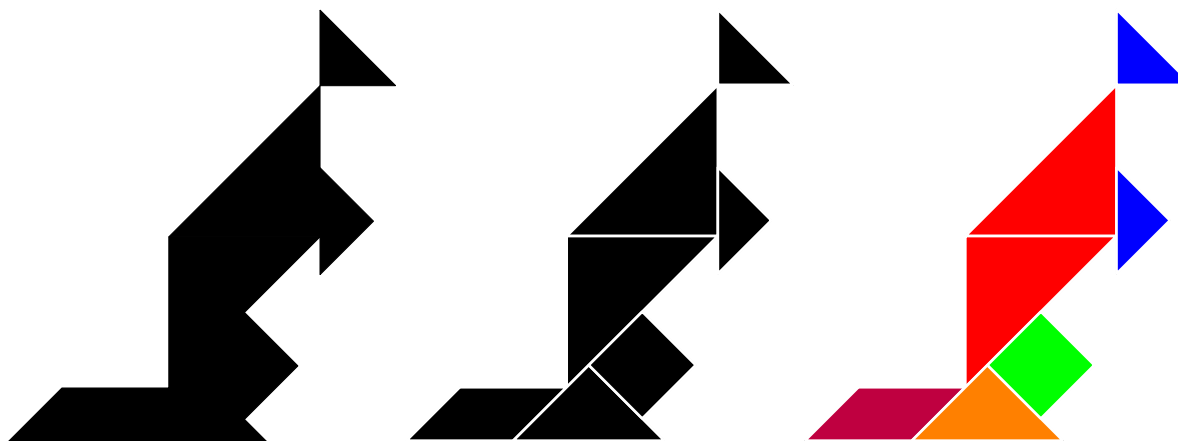
```
\TangramTikz{Fish}
\TangramTikz[Correction]{Fish}
\TangramTikz[ColorCorrection]{Fish}
```



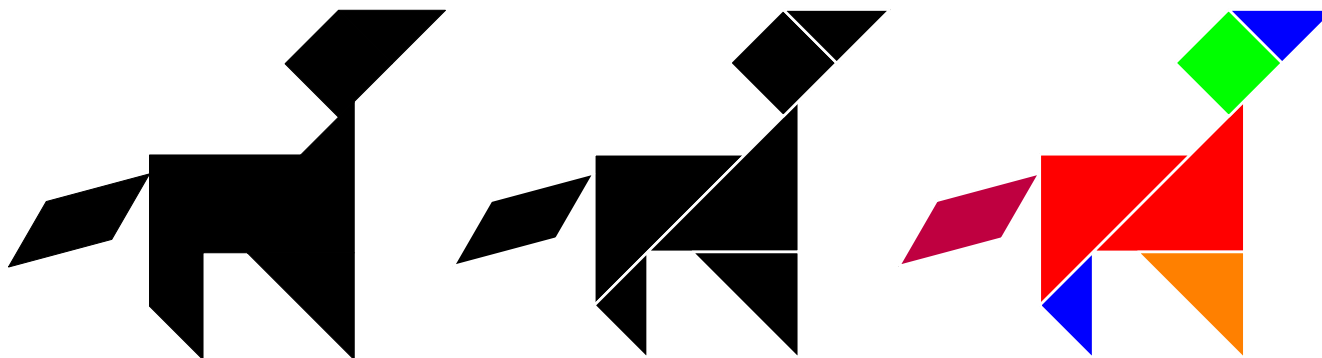
```
\TangramTikz{Sailboat}
\TangramTikz[Correction]{Sailboat}
\TangramTikz[ColorCorrection]{Sailboat}
```



```
\TangramTikz{Kangaroo}
\TangramTikz[Correction]{Kangaroo}
\TangramTikz[ColorCorrection]{Kangaroo}
```



```
\TangramTikz{Dog}
\TangramTikz[Correction]{Dog}
\TangramTikz[ColorCorrection]{Dog}
```



## Part IV

# History

v0.1.0 : Initial version