

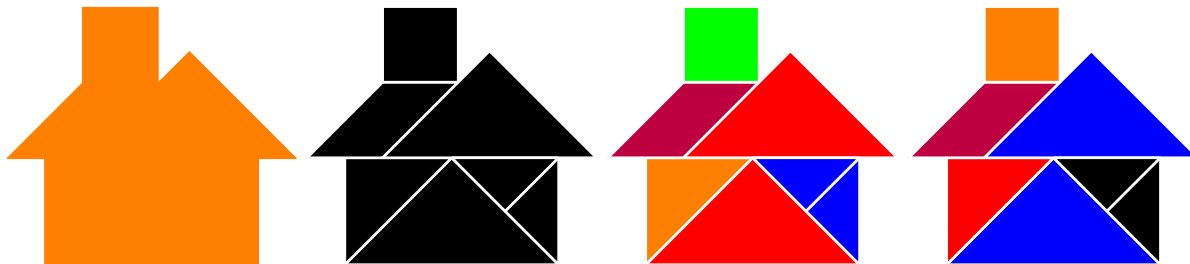
TangramTikz [en]

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>



LaTeX

pdfLaTeX

LuaLaTeX

TikZ

TeXLive

MiKTeX

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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

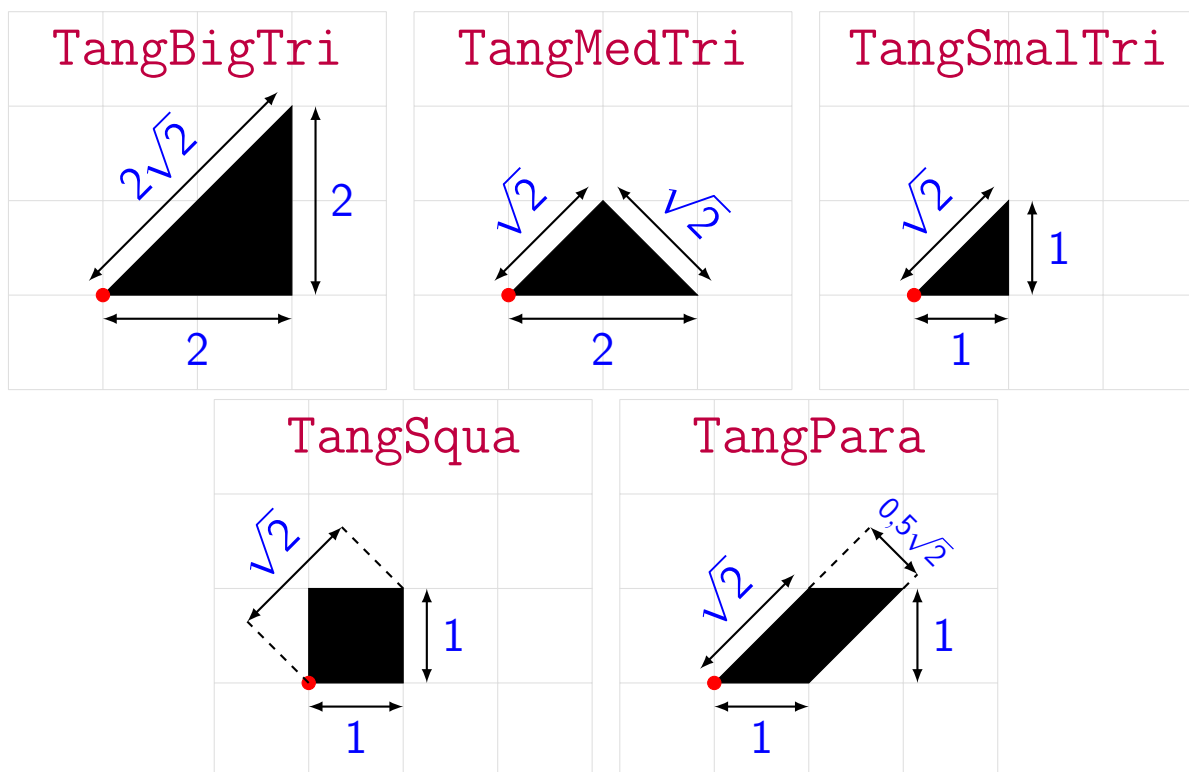
A Tangram is composed by 7 pieces :

- 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

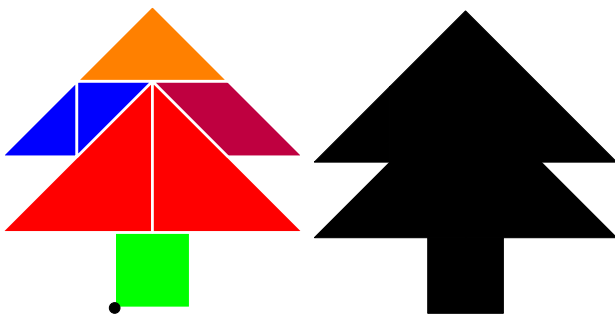
A Tangram is built from the 7 pieces, by :

- *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

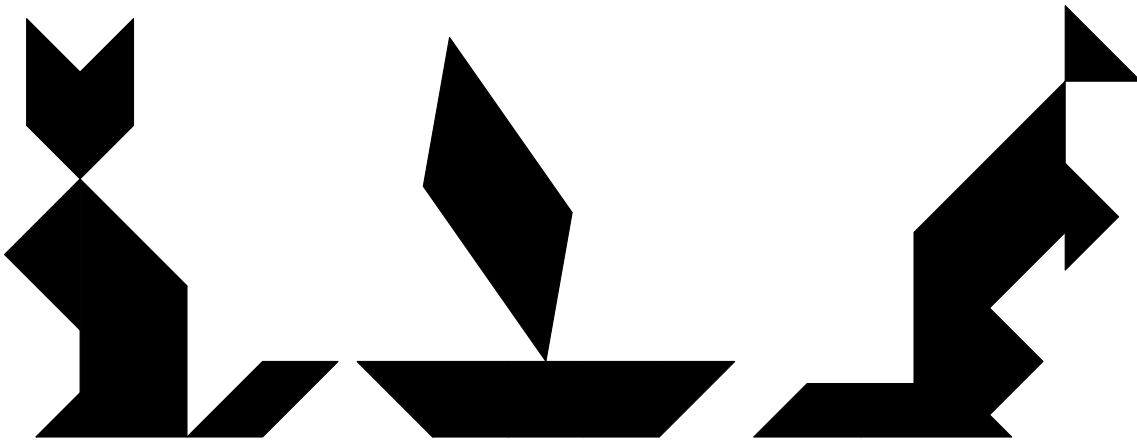
Some predefined tangrams are present in the package `TangramTikz`, and there's an independent command to "call" them :

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

Code \LaTeX

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

Code \LaTeX



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 :

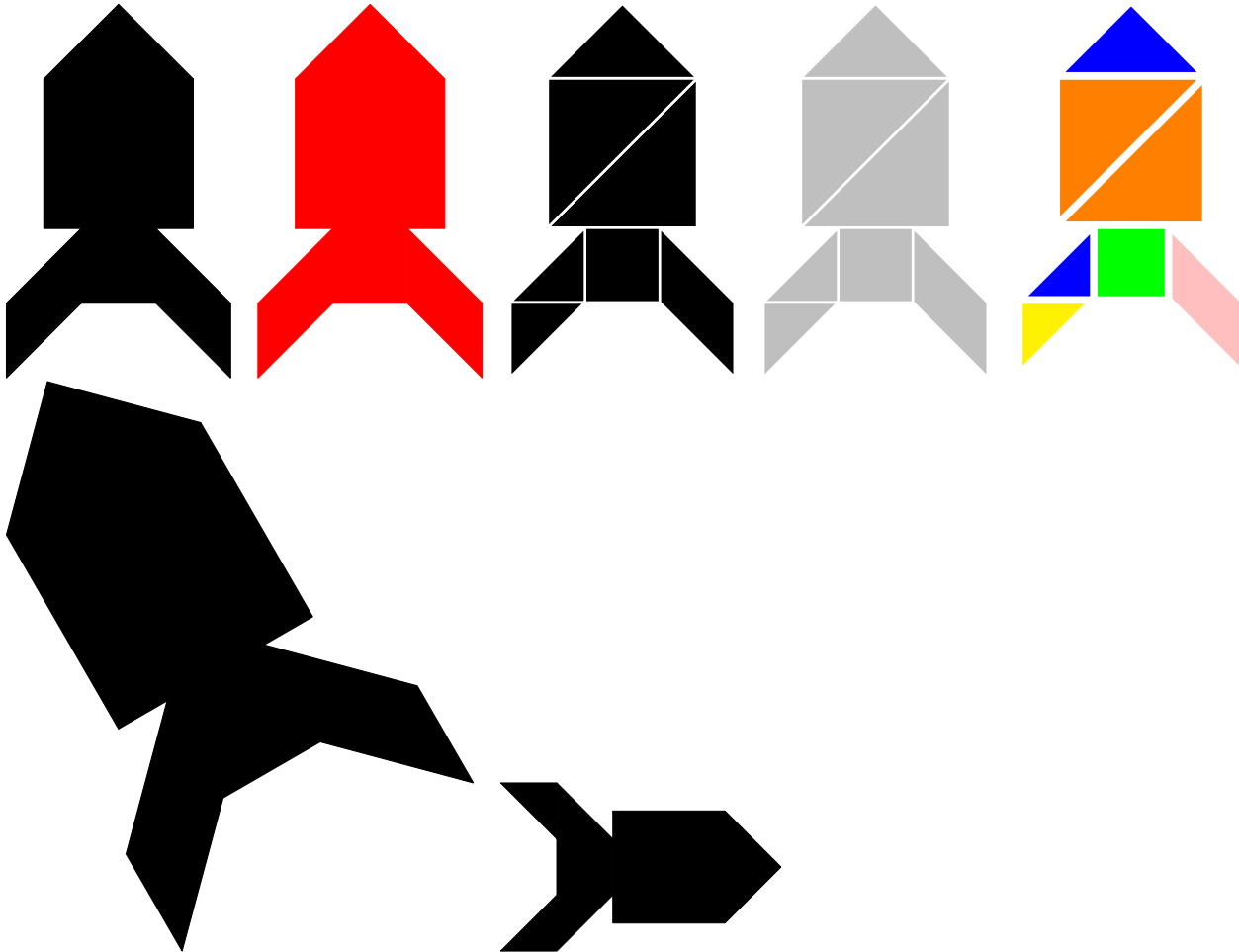
- | | | | | |
|-----------|-----------|------------|-----------|----------|
| • Square | • Cat | • Candle | • Dog | • Dancer |
| • Pinguin | • Swan | • Shirt | • Plane | • Camel |
| • Boat | • Pyramid | • Fish | • Rabbit | |
| • Home | • Duck | • Sailboat | • Rooster | |
| • FirTree | • Rocket | • Kangaroo | • Jogger | |

```

\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}

```

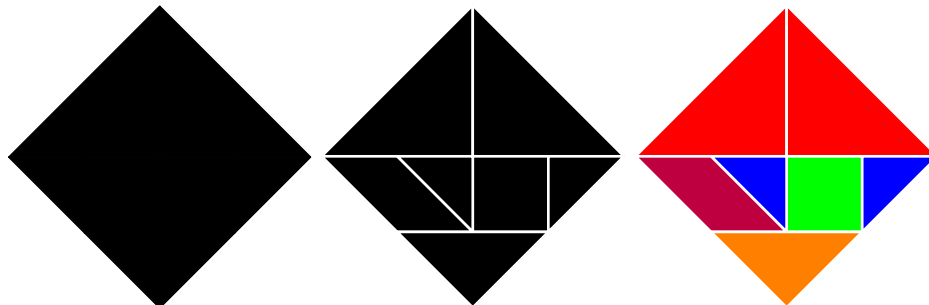


Part III

Gallery of Tangrams

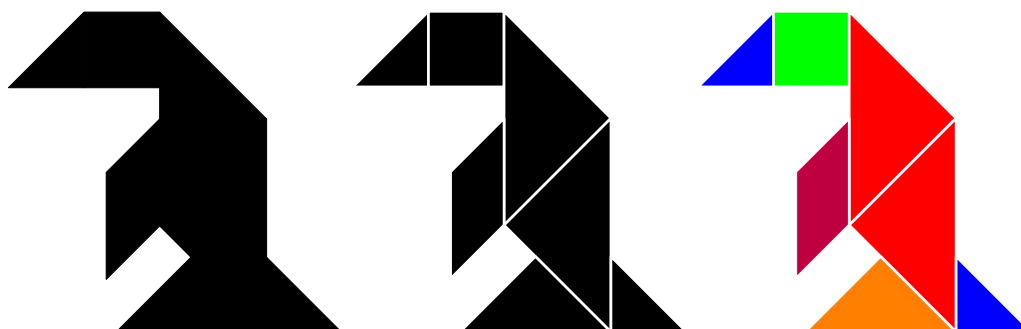
```
\TangramTikz{Square}
\TangramTikz[Correction]{Square}
\TangramTikz[ColorCorrection]{Square}
```

Code \LaTeX



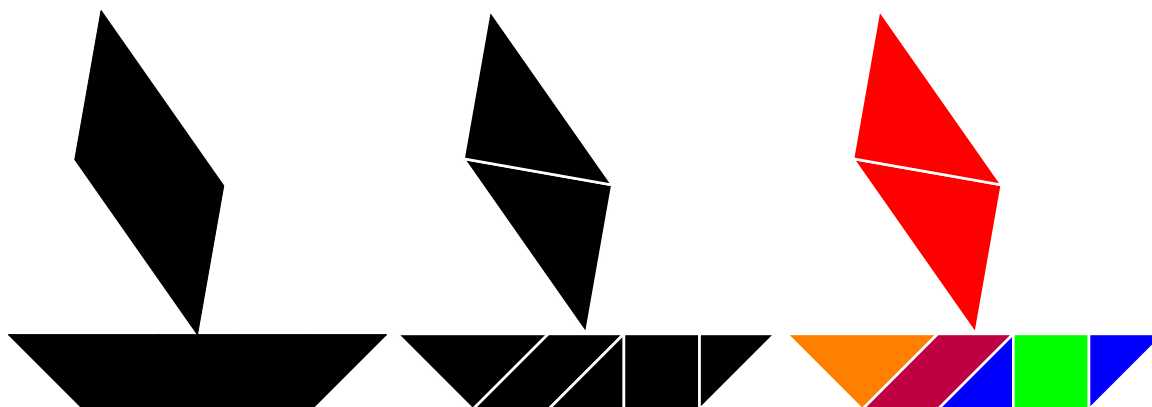
```
\TangramTikz{Penguin}
\TangramTikz[Correction]{Penguin}
\TangramTikz[ColorCorrection]{Penguin}
```

Code \LaTeX

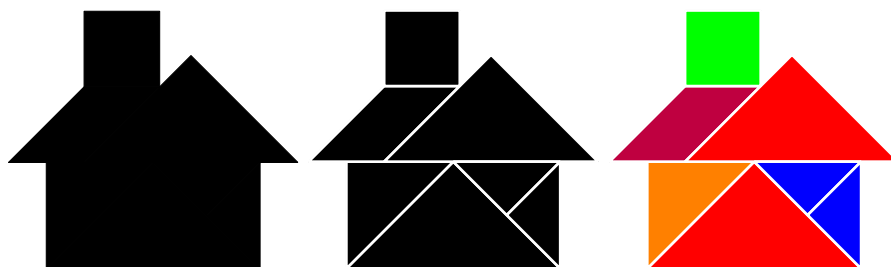


```
\TangramTikz{Boat}
\TangramTikz[Correction]{Boat}
\TangramTikz[ColorCorrection]{Boat}
```

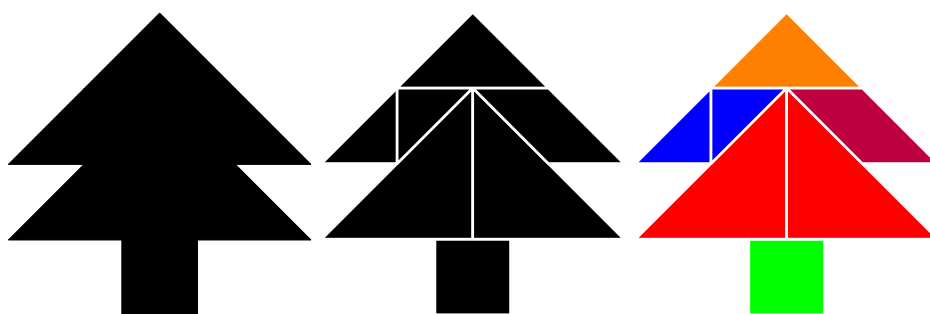
Code \LaTeX



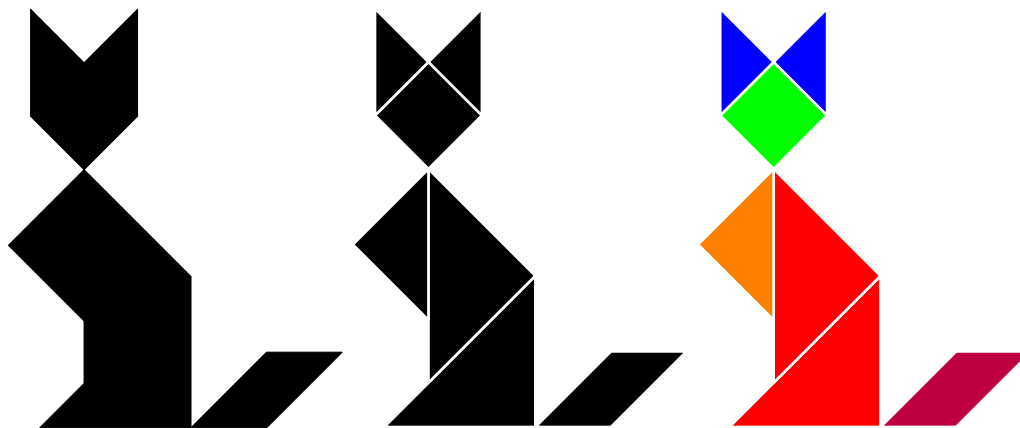

```
\TangramTikz{Home}
\TangramTikz[Correction]{Home}
\TangramTikz[ColorCorrection]{Home}
```



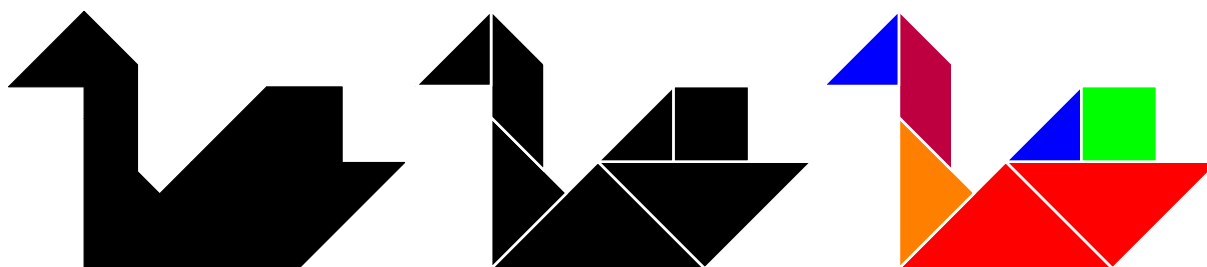
```
\TangramTikz{FirTree}
\TangramTikz[Correction]{FirTree}
\TangramTikz[ColorCorrection]{FirTree}
```



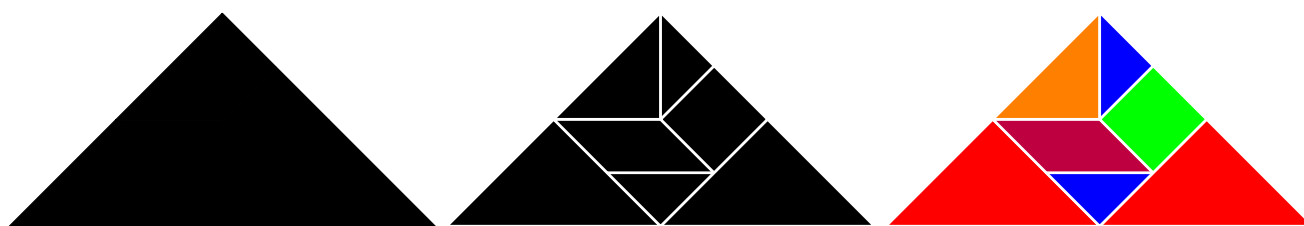
```
\TangramTikz{Cat}
\TangramTikz[Correction]{Cat}
\TangramTikz[ColorCorrection]{Cat}
```



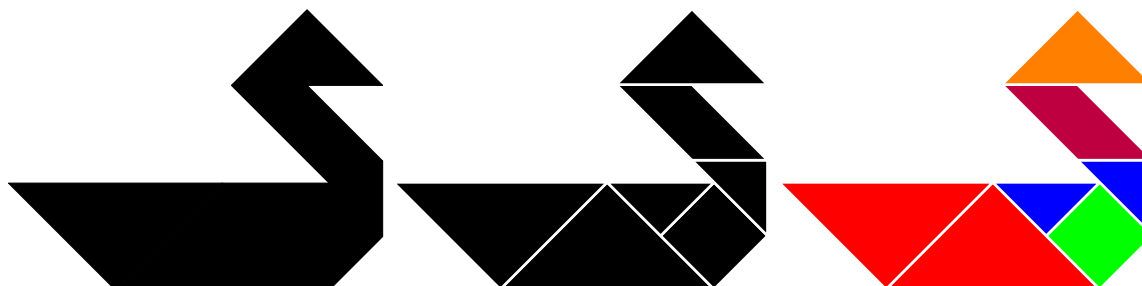
```
\TangramTikz{Swan}
\TangramTikz[Correction]{Swan}
\TangramTikz[ColorCorrection]{Swan}
```



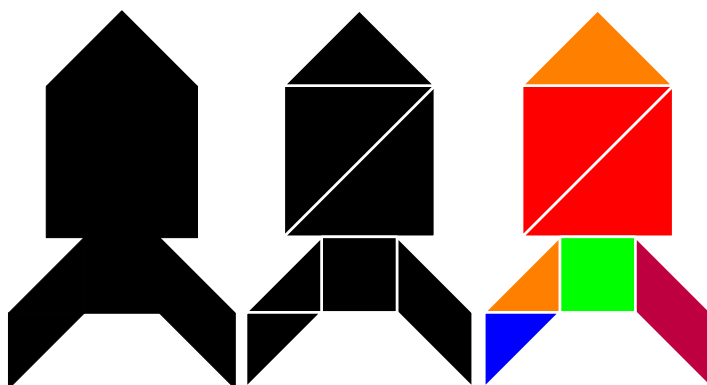
```
\TangramTikz{Pyramid}
\TangramTikz[Correction]{Pyramid}
\TangramTikz[ColorCorrection]{Pyramid}
```



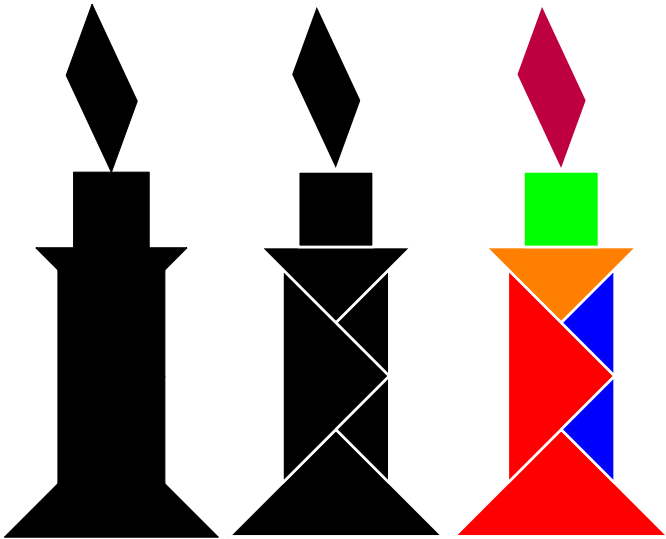
```
\TangramTikz{Duck}
\TangramTikz[Correction]{Duck}
\TangramTikz[ColorCorrection]{Duck}
```



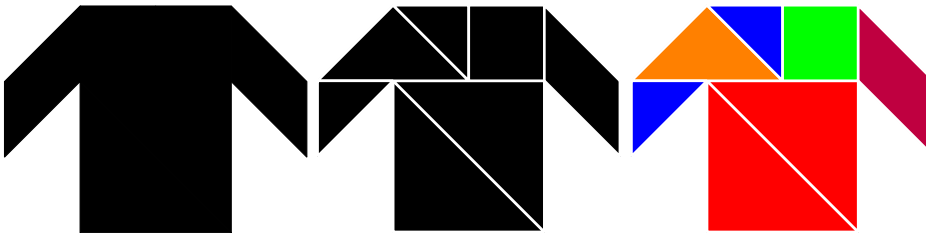
```
\TangramTikz{Rocket}
\TangramTikz[Correction]{Rocket}
\TangramTikz[ColorCorrection]{Rocket}
```



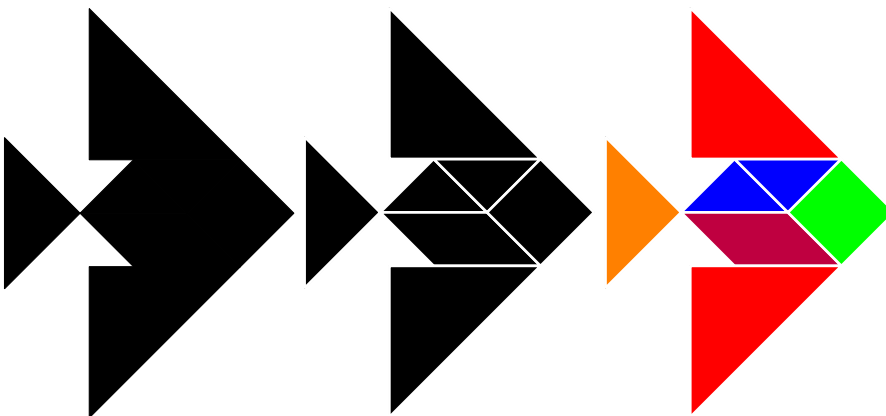
```
\TangramTikz{Candle}
\TangramTikz[Correction]{Candle}
\TangramTikz[ColorCorrection]{Candle}
```



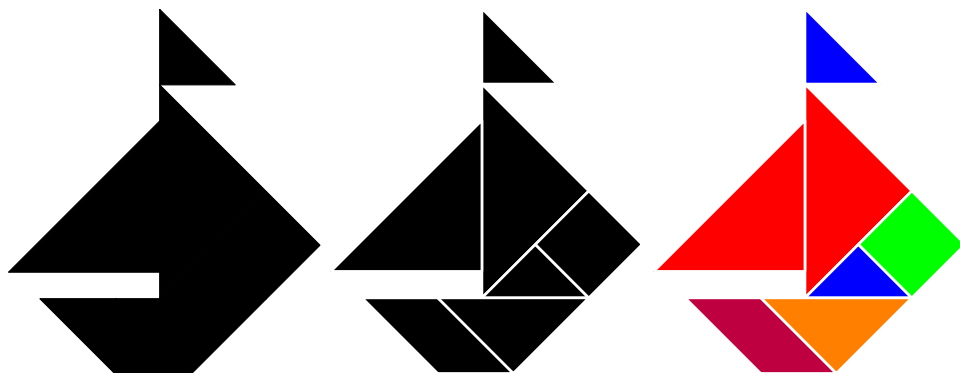
```
\TangramTikz{Shirt}
\TangramTikz[Correction]{Shirt}
\TangramTikz[ColorCorrection]{Shirt}
```



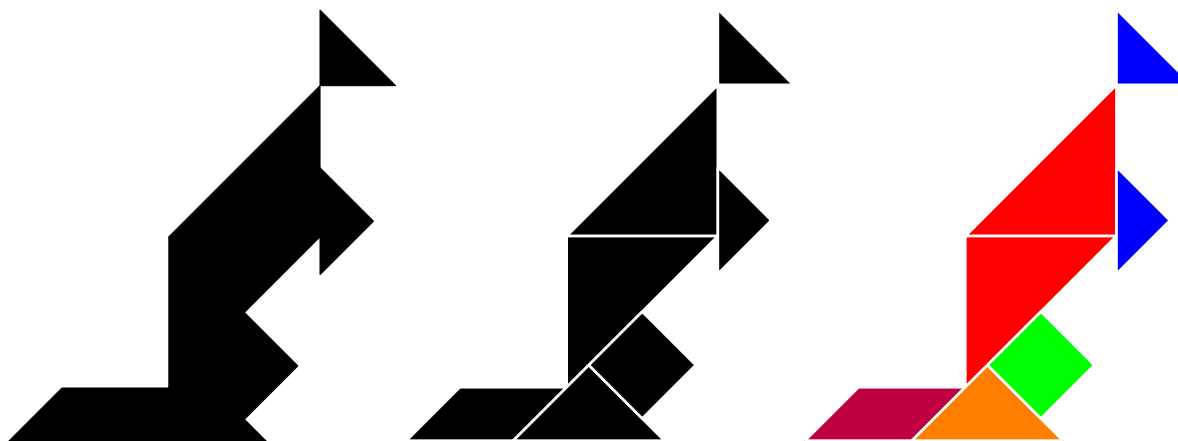
```
\TangramTikz{Fish}
\TangramTikz[Correction]{Fish}
\TangramTikz[ColorCorrection]{Fish}
```



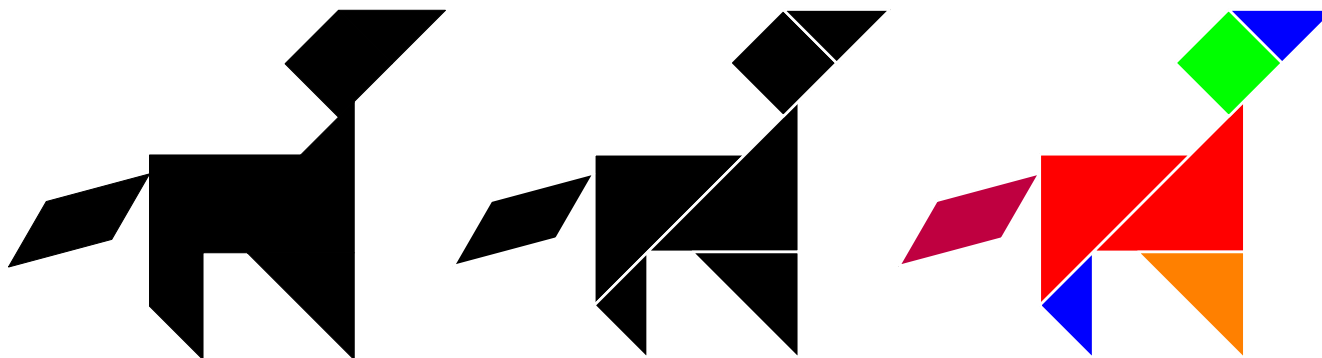
```
\TangramTikz{Sailboat}
\TangramTikz[Correction]{Sailboat}
\TangramTikz[ColorCorrection]{Sailboat}
```



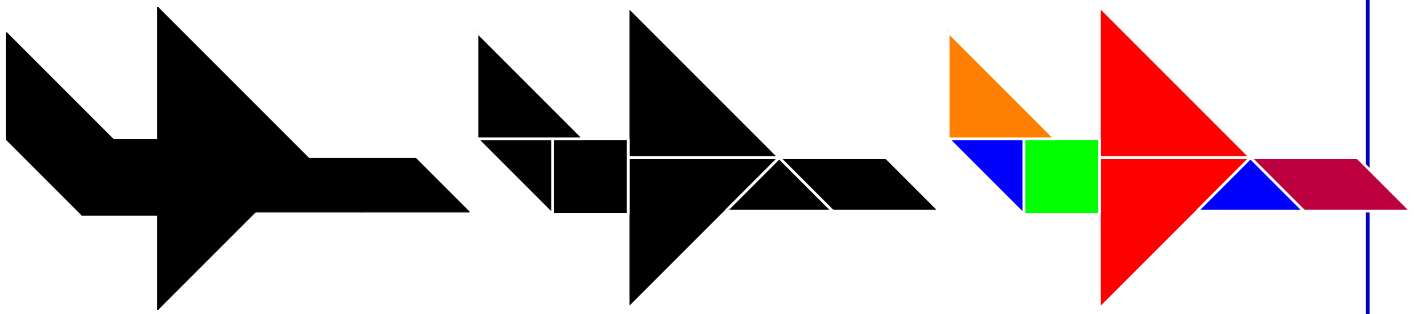
```
\TangramTikz{Kangaroo}
\TangramTikz[Correction]{Kangaroo}
\TangramTikz[ColorCorrection]{Kangaroo}
```



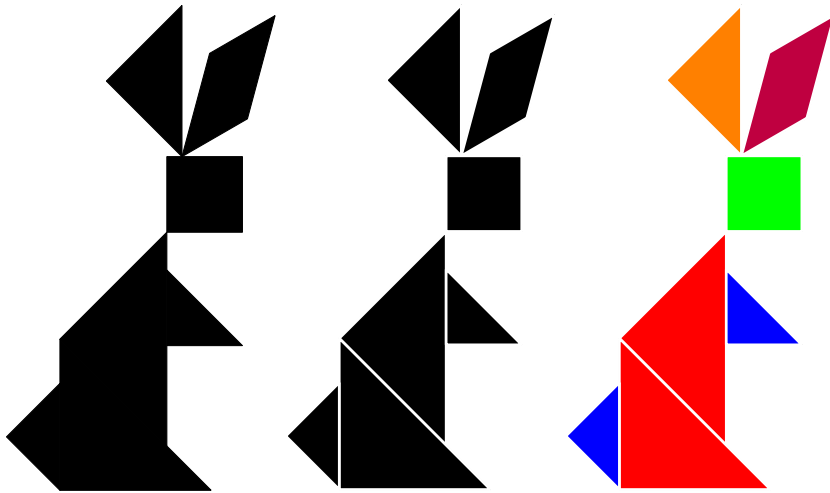
```
\TangramTikz{Dog}
\TangramTikz[Correction]{Dog}
\TangramTikz[ColorCorrection]{Dog}
```



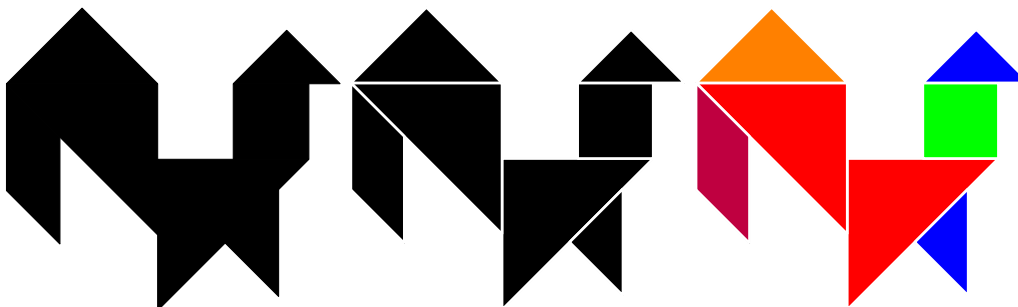
```
\TangramTikz{Plane}
\TangramTikz[Correction]{Plane}
\TangramTikz[ColorCorrection]{Plane}
```



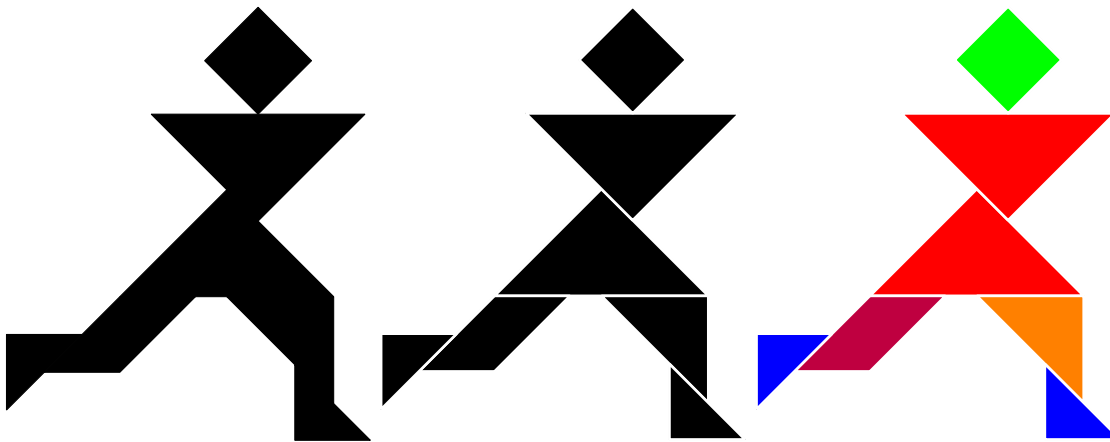
```
\TangramTikz{Rabbit}
\TangramTikz[Correction]{Rabbit}
\TangramTikz[ColorCorrection]{Rabbit}
```



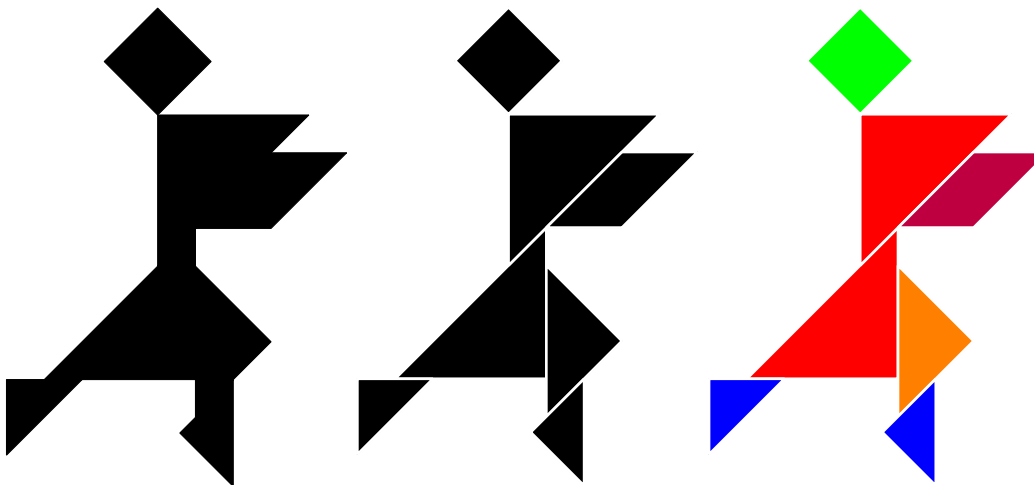
```
\TangramTikz{Rooster}
\TangramTikz[Correction]{Rooster}
\TangramTikz[ColorCorrection]{Rooster}
```



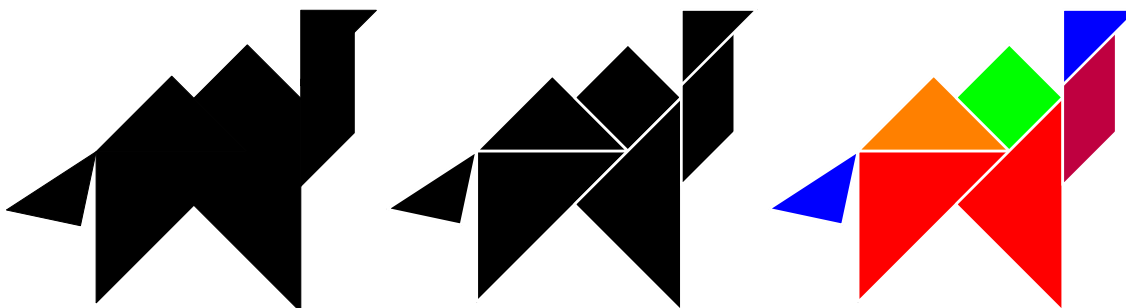
```
\TangramTikz{Jogger}
\TangramTikz[Correction]{Jogger}
\TangramTikz[ColorCorrection]{Jogger}
```



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



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



Part IV

History

v0.1.1 : New models
v0.1.0 : Initial version