MadPattern 1.● Cheat Sheet

How Transformations of A Cell Create Patterns
(...and THANK GOD we don't have to do it manually!)

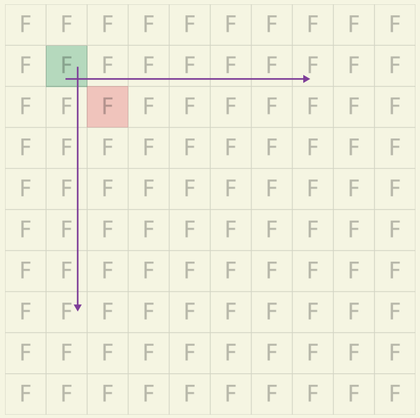
Using MadPattern Templates:

The Cell
Draw in this area to be transformed into patterns.

The Tile
Export the rectangular unit as a tiling image.

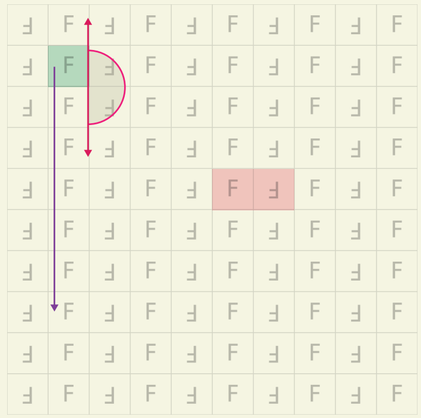
Magic Behind MadPattern:

- Sets of Translations
- Translation Direction
- Sets of Reflections
- Reflection Axis
- Sets of Glide-Reflections
- Glide-Reflection Axis
- Sets of Rotations
- 60°
- 120°
- 90°
- 180°



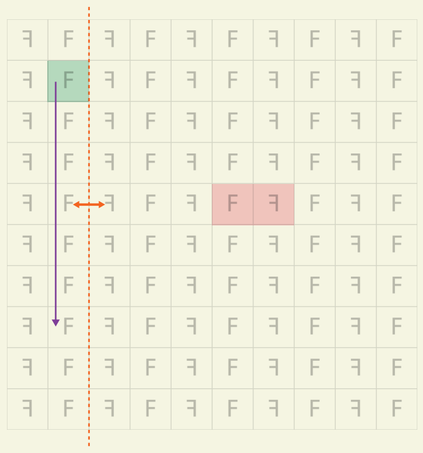
p1

This is the most basic form of repetitive tiling, consisting only of translations. No reflections, glide-reflections, nor rotations. The two translation axes may be inclined at any angle to each other.



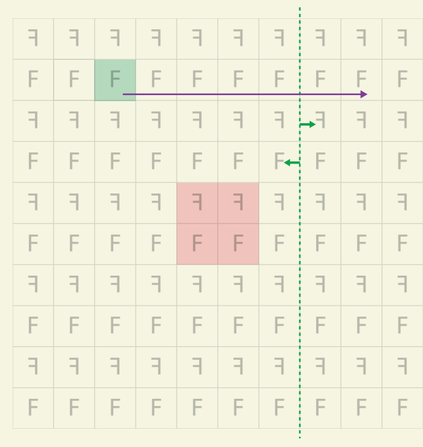
p2

Tiling of this type, in addition to having a repeating cell, can also be turned upside down and remain the same.



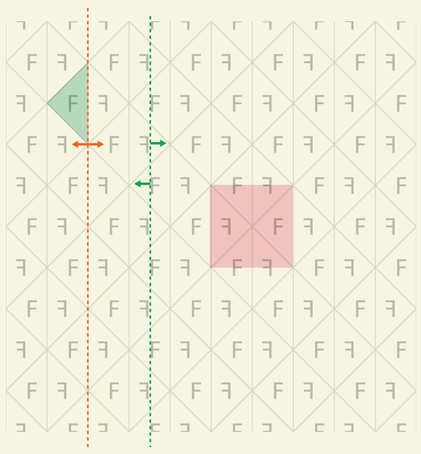
pm

This kind of tiling can be mirror-reflected along one axis. The lattice must be rectangular or square.



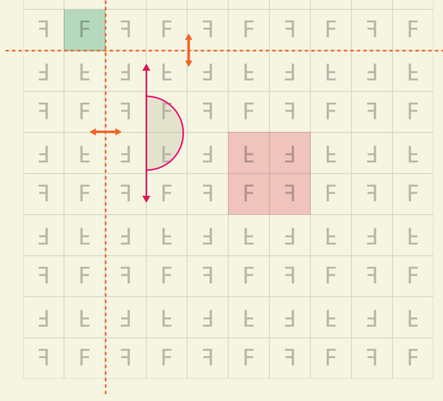
pg

This kind of tiling has a glide reflection; The tiling can be completely unchanged if it is both reflected and translated at the same time. The lattice must be rectangular or square.



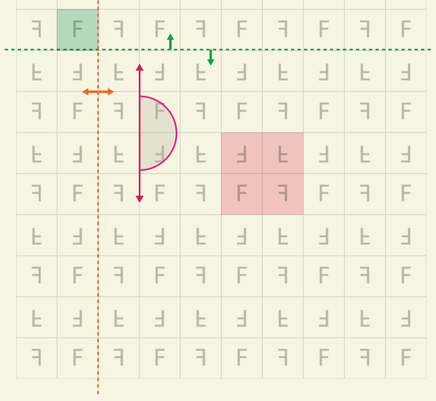
cm

This tiling has both reflections and glide reflections, the axes of which are parallel. The lattice must be a rhombus.



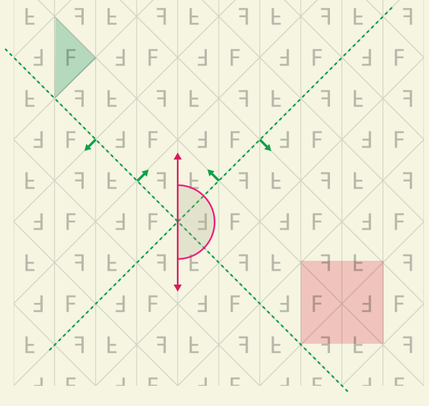
pmm

There are two sets reflection axes. As a result it can turn upside down and remain the same, and the lattice must be rectangular or square in shape.



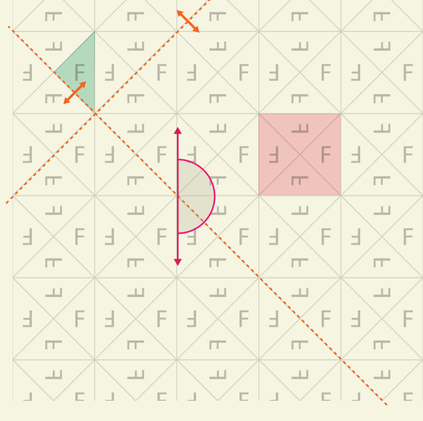
pmg

There is 1 set of axes of reflection, and can be turned by 180°. As a result, it also has a glide reflection, and the lattice must be square or rectangular.



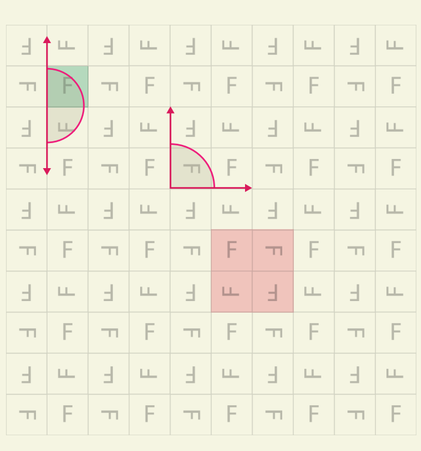
pgg

This type of tiling has glide reflections in two directions, and can also turn 180°. The lattice must be rectangular or square.



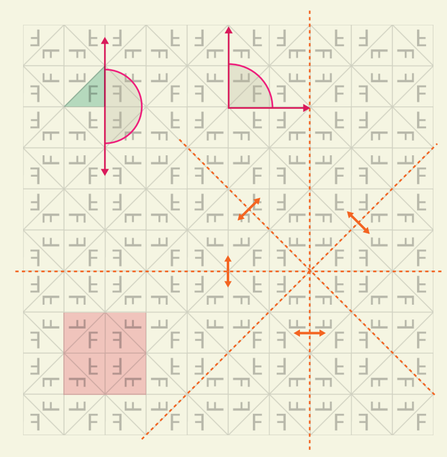
cmm

There are two sets of reflection axes. As a result this tile can turn upside down. Some pivot points may not lie on an axis of reflection. The lattice must be a rhombus.



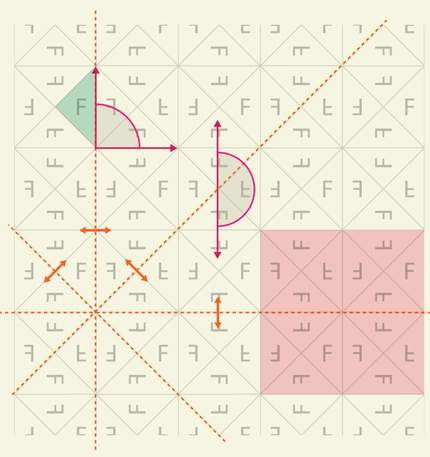
p4

This tiling can rotate 180° and remain the same. The lattice is a square. There are also pivot points which only allow 90° turns.



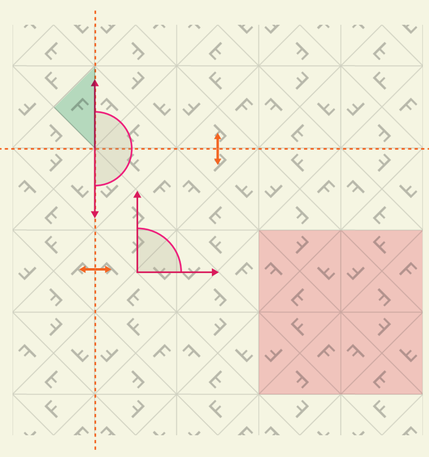
p4m

(p4m) inherits attributes from (p4), and has 4 sets of reflection axes. The pivot points of every possible rotation lie on at least one of the reflection axes.



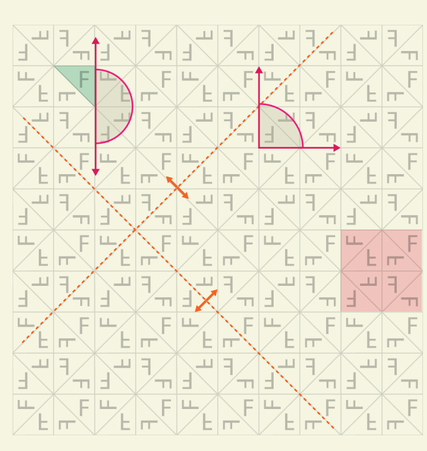
p4m rotated

A rotated version of (p4m) created a tile that invites more dynamics of symmetries.



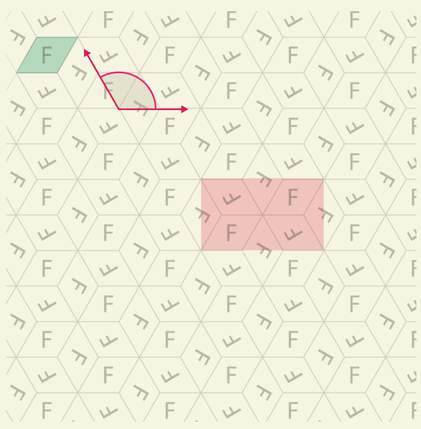
p4g

(p4g) has 2 sets reflection axes. The pivot points for 90° rotation do not lie on the reflection axes, but there are pivot points for 180° rotations only, which do lie on the axes of reflection.



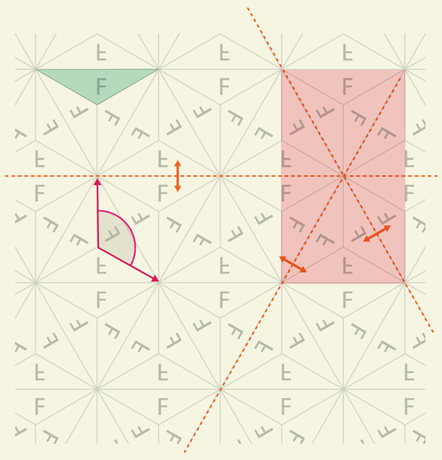
p4g rotated

A rotated version of (p4g).



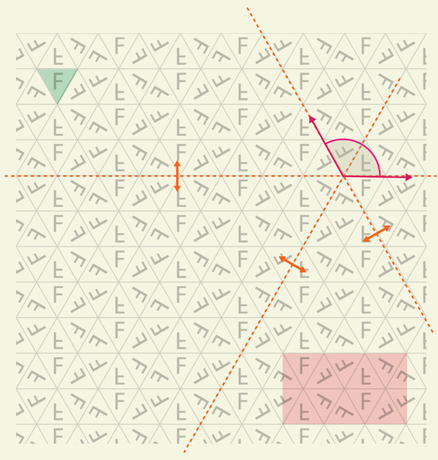
p3

(p3) is symmetrical under rotations of 120°, but have no reflections. The lattice is hexagonal. The rotation centers can be found at the corners, as well as the centers of the hexagon.



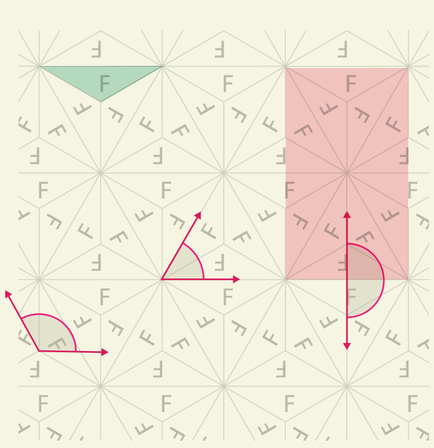
p31m

Within a hexagonal lattice, (p31m) has a 120° rotation and 3 sets of reflection axes. The distinguishing feature of (p31m) is that not all the possible rotation centers lie on a reflection axis.



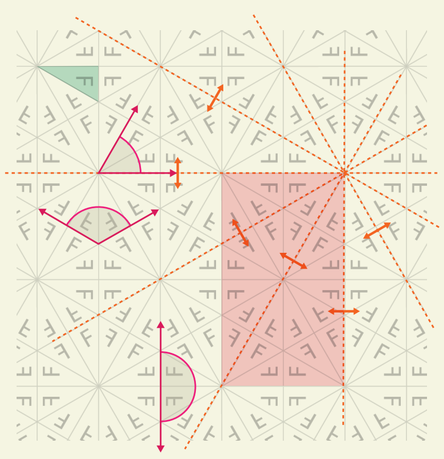
p3m1

Sharing similar attributes as of (p31m), though all the possible rotation centers of (p3m1) lie on reflection axes.



p6

Within a hexagonal lattice, (p6) allows 60° rotations. There are also pivot points either turn only 180° or 120°.



p6m

In addition to all the attributes inherited from (p6), (p6m) has 6 sets of reflection axes, and the 60° rotation centers lie on these axes.

RESOURCE

Download MadPattern Adobe Illustrator template:
http://www.madpattern.com
Read a complete explanation of 17 Wallpaper Groups and many more contents about tiling:
http://www.quadibloc.com/math/tilint.htm and
http://www.clarku.edu/~djoyce/wallpaper/seventeen.html

CREDIT

Cheat Sheet Poster (22" x 28") Designed by Shanfan Huang http://shanfan.tumblr.com
Patterns Included in MadPattern 1.0 Created by Matt Handler http://www.matthandler.com
17 Wallpaper Groups Explanation Cited from John Savard http://www.quadibloc.com
And David E. Joyce http://www.clarku.edu/~djoyce/wallpaper/