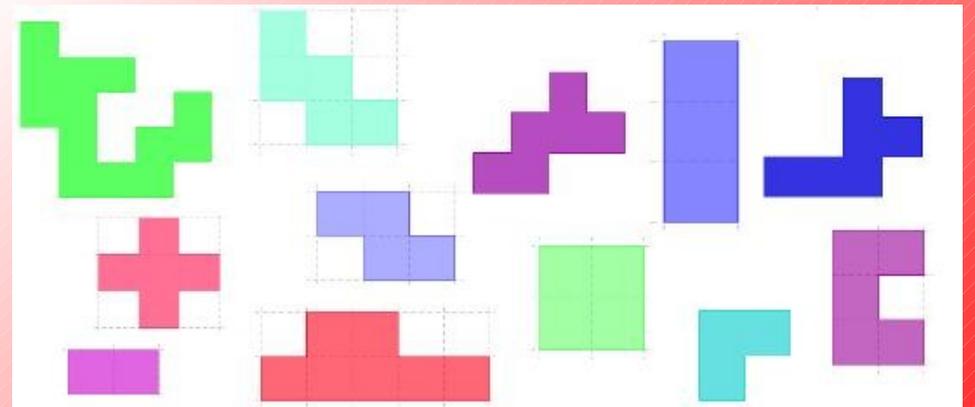


Colloque Mathenjeans 2008, exposé 29 mars 2008

Ordres des polyominos

Alexane, Aurélie, Elodie, Mégane, Vicky
collège Jean Jaurès, Vieux-Condé (Nord)

I Présentation du sujet

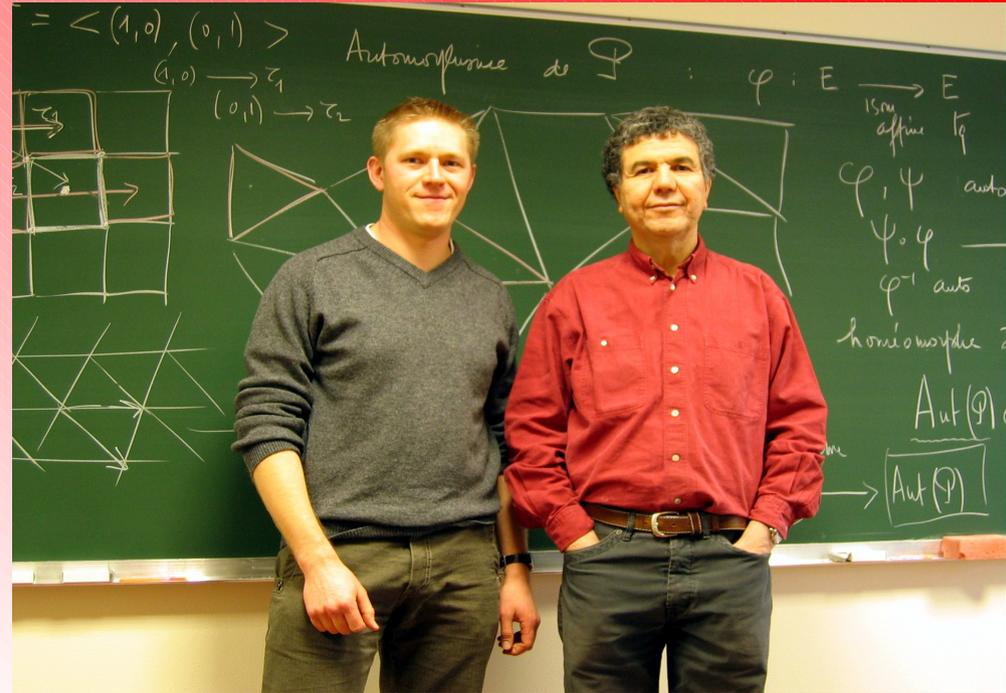


Aziz El Kacimi

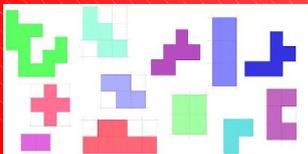
Cédric Rousseau

Université de Valenciennes
(Nord)

laboratoire L.A.M.A.V.

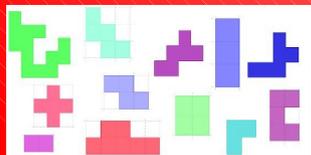
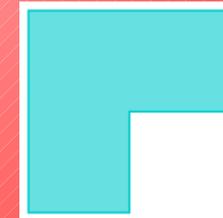
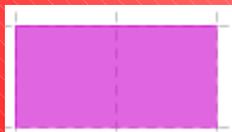
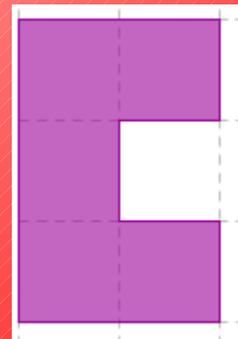
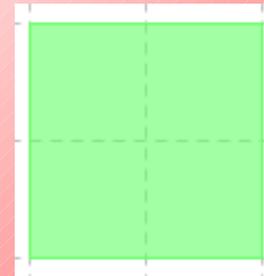
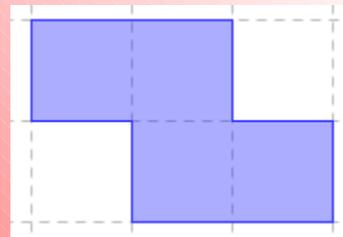
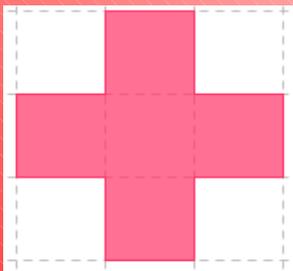
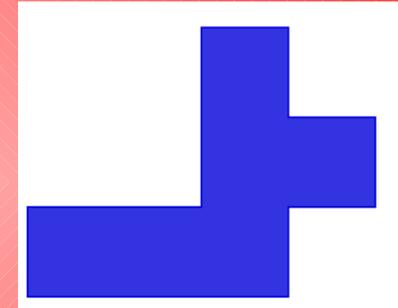
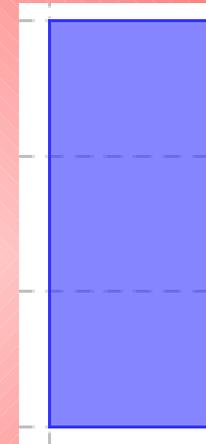
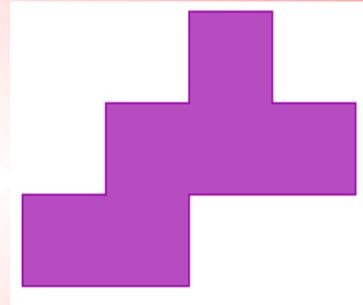
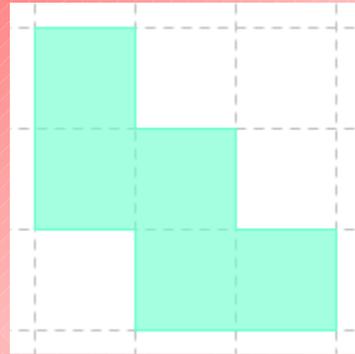
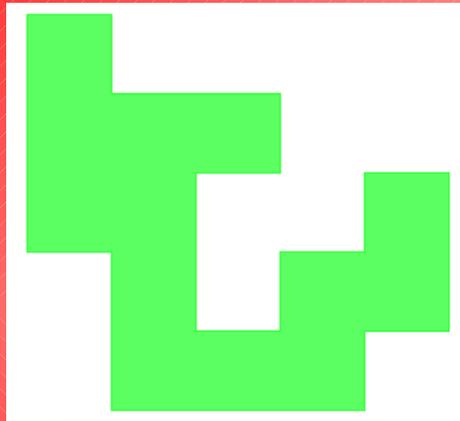
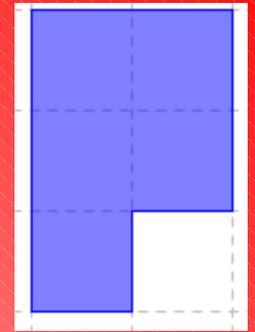
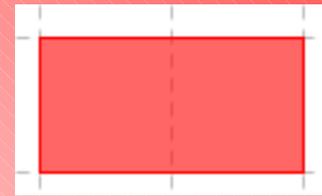
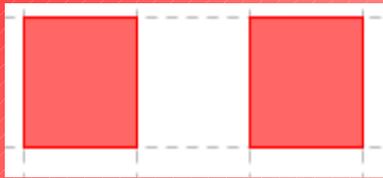


- Trouver parmi les polyominos, quelques-un qui pavent des rectangles.
- Construire, à partir de rectangles donnés, des polyominos pavants



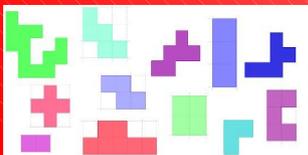
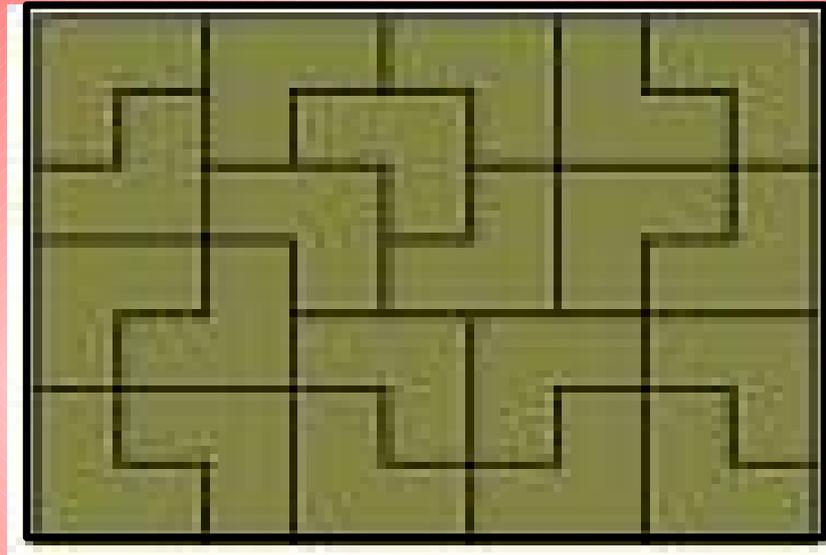
Présentation du sujet

Qu'est-ce qu'un polyomino ?



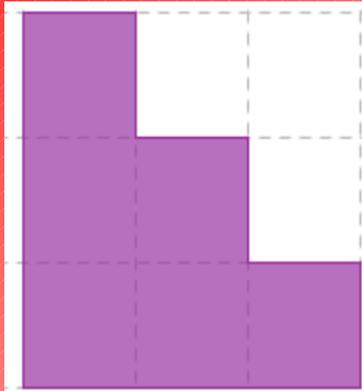
Présentation du sujet

Qu'est-ce que paver un rectangle?

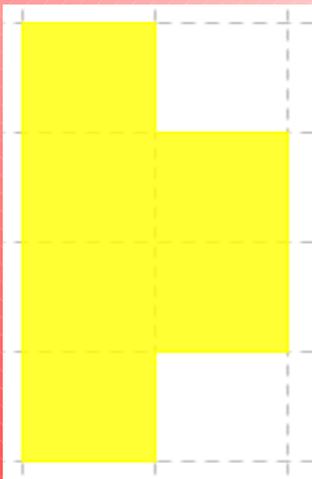
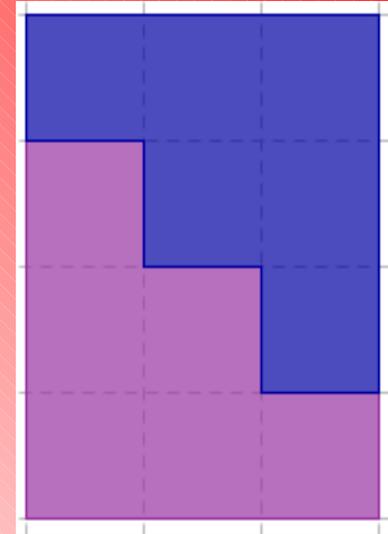


Présentation du sujet

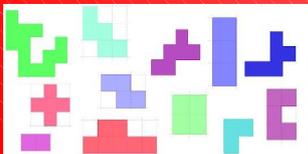
Qu'est-ce que l'ordre d'un polyomino?



est d'ordre 2

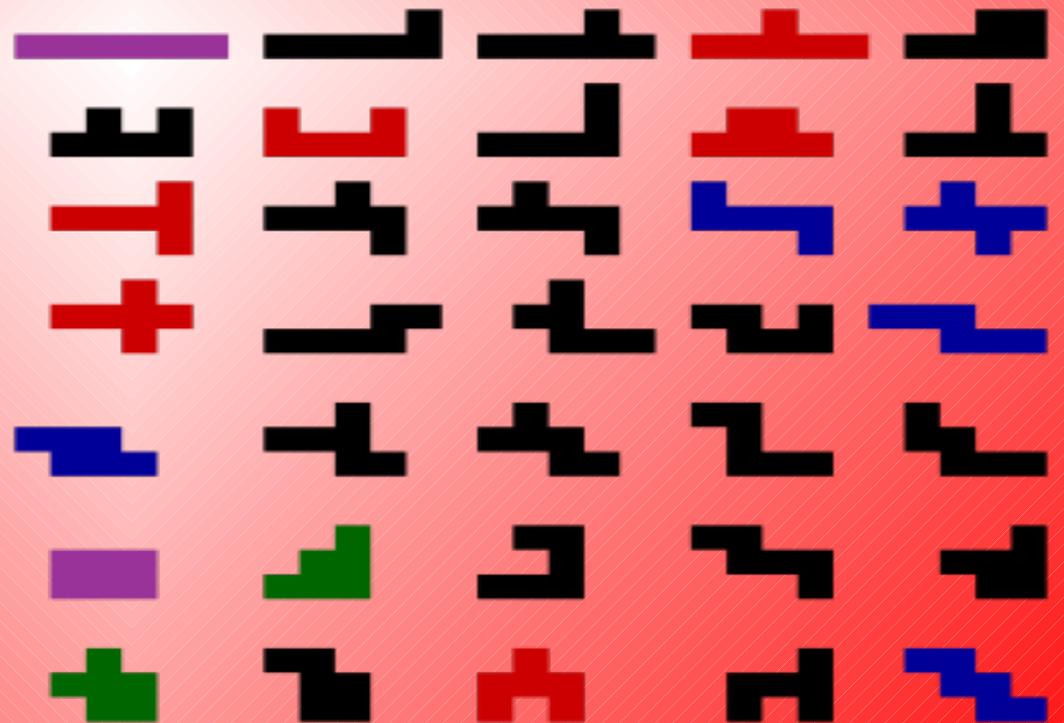


est d'ordre 4



Présentation du sujet

II Recherche des premiers polyominos et de leur ordre



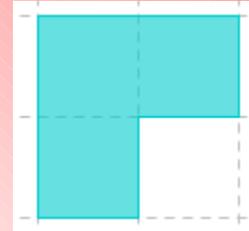
- Monomino



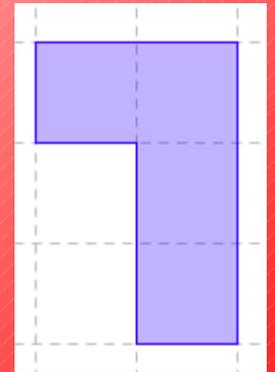
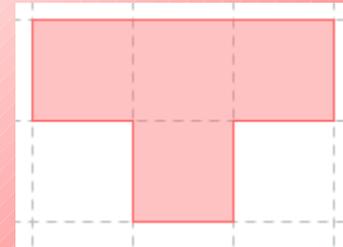
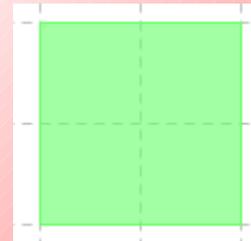
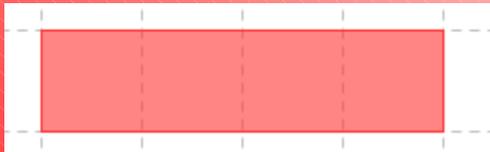
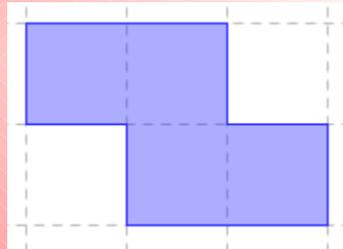
- Domino



- Triominos

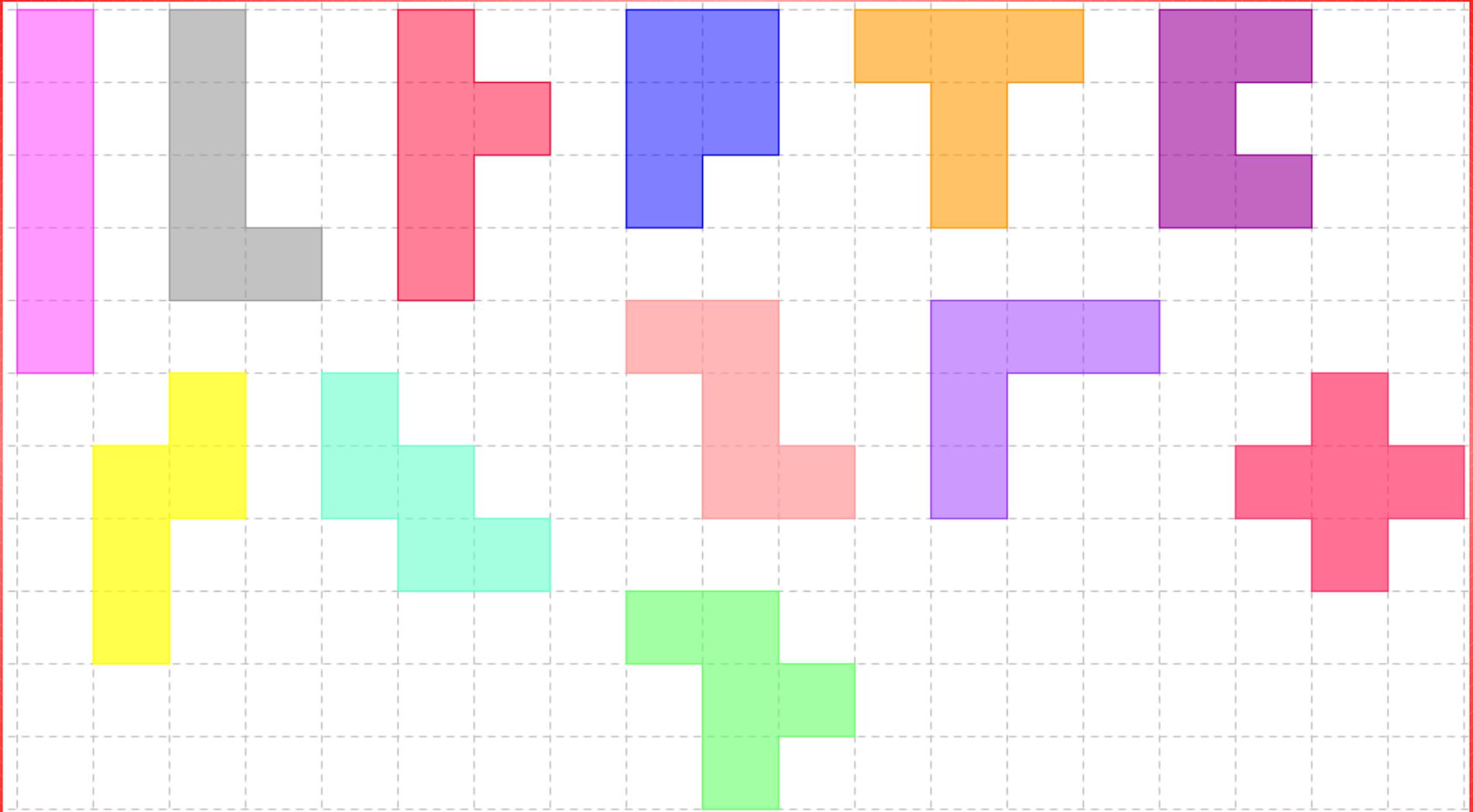


- Tétrominos



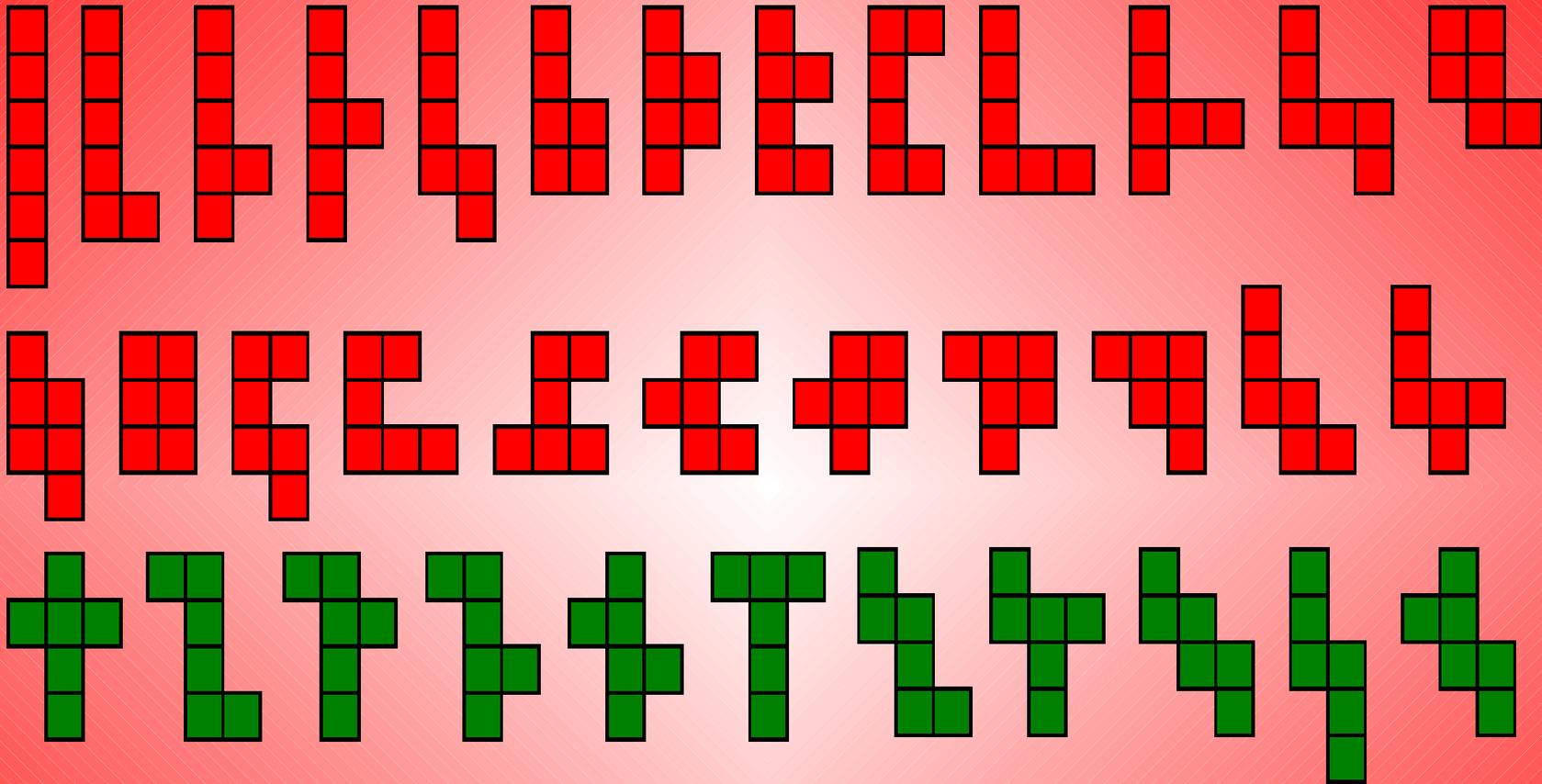
Recherche des premiers polyominos et de leur ordre

- Pentominos



Recherche des premiers polyominos et de leur ordre

- Hexominos

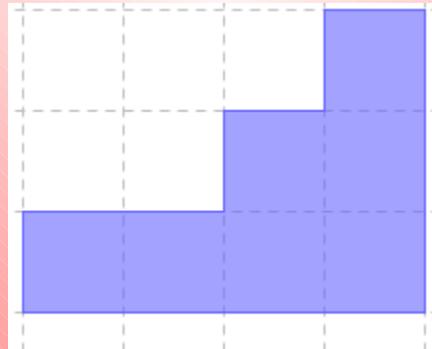
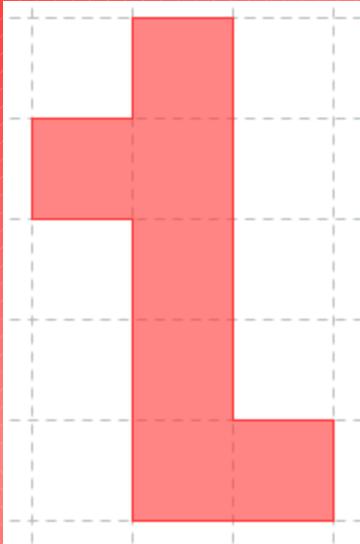


35 Hexominos



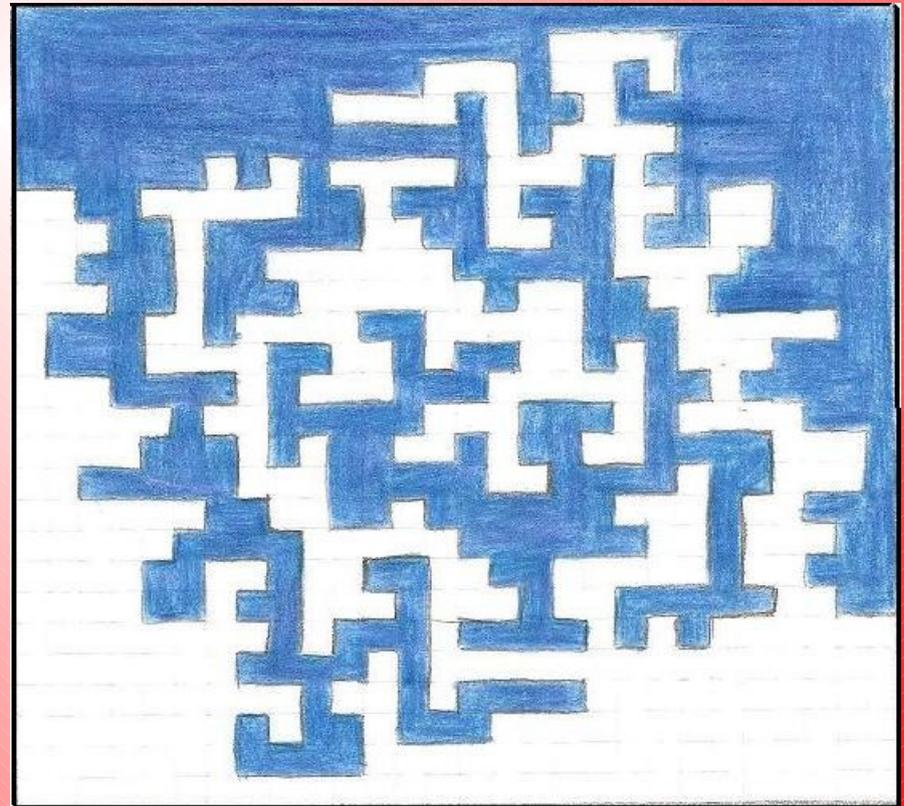
Recherche des premiers polyominos et de leur ordre

-Heptominos : au nombre de 108.

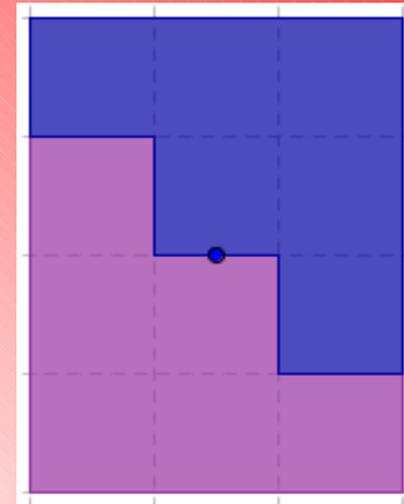
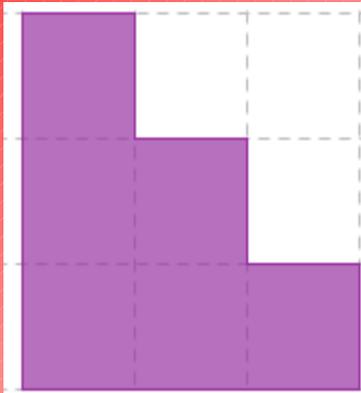


Recherche des premiers polyominos et de leur ordre

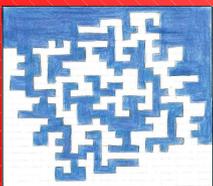
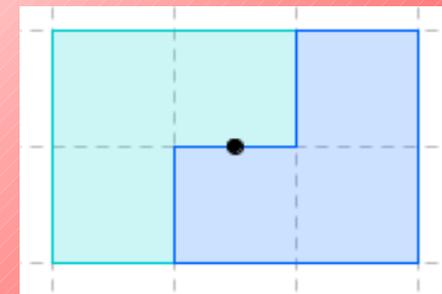
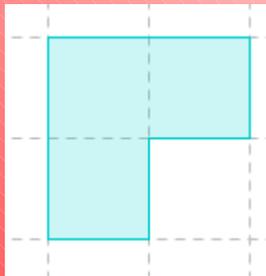
III Les polyominos d'ordre 2



Exemple de polyominos d'ordre 2



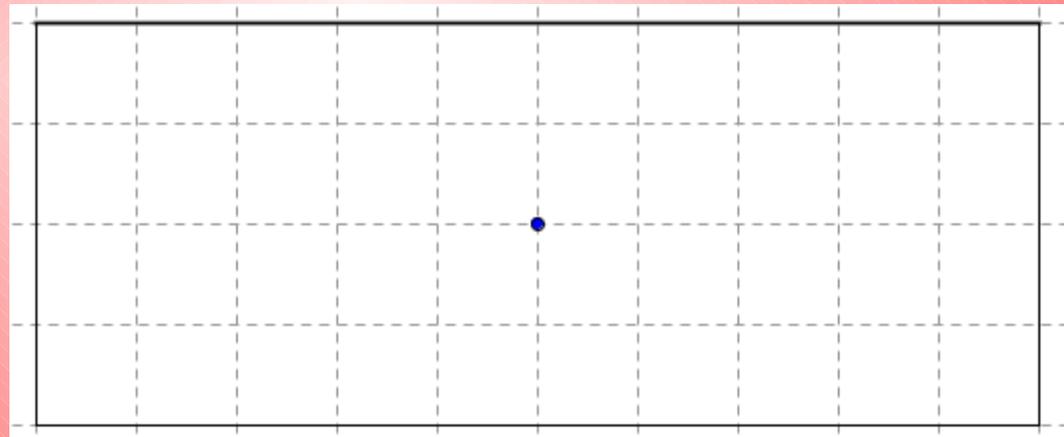
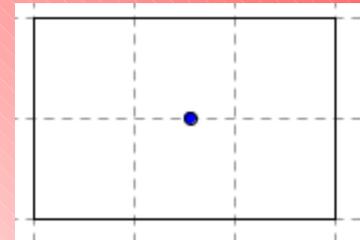
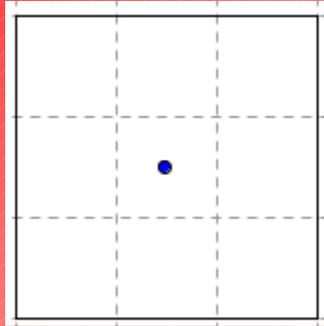
Symétrie centrale



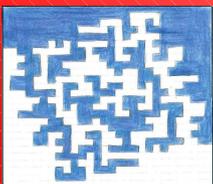
Les polyominos d'ordre 2

Construire des polyominos d'ordre 2

A quelles conditions sur le rectangle peut-on le découper en polyominos d'ordre 2?

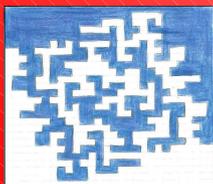
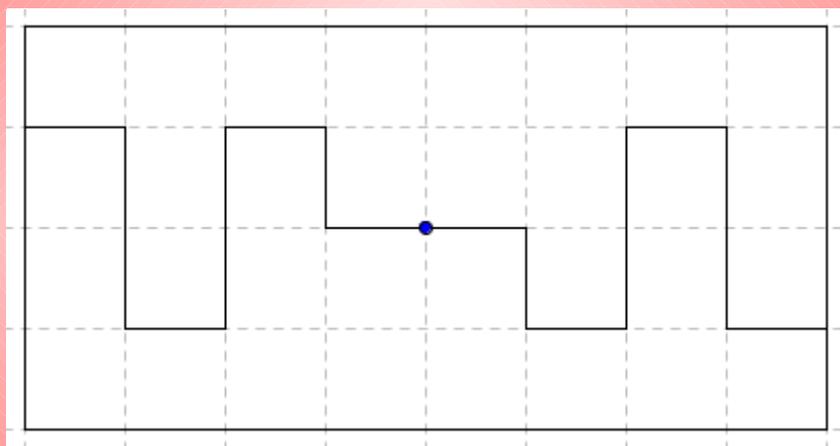


Il faut un nombre pair de petits carrés dans le rectangle

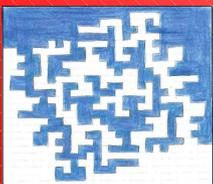
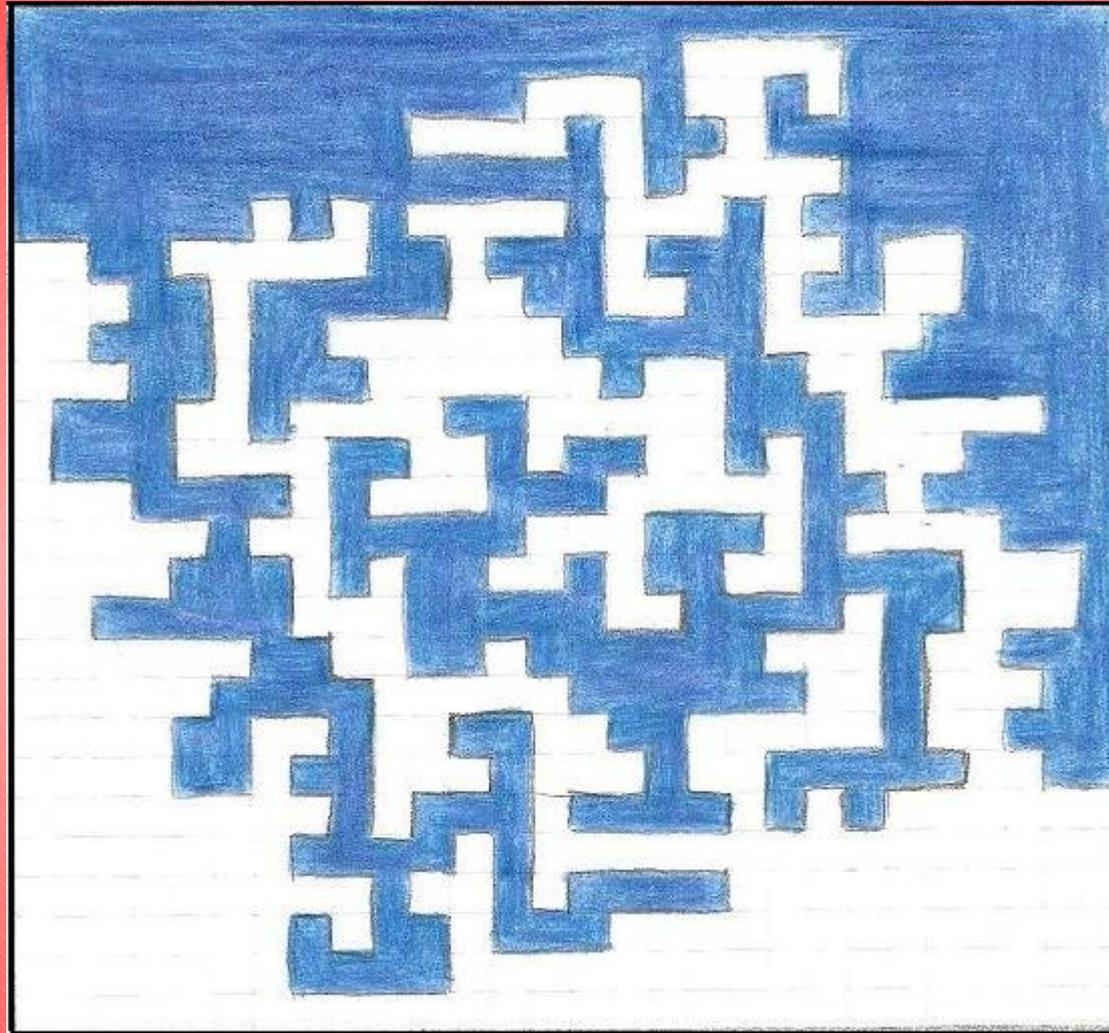


Les polyominos d'ordre 2

Construire des polyominos d'ordre 2

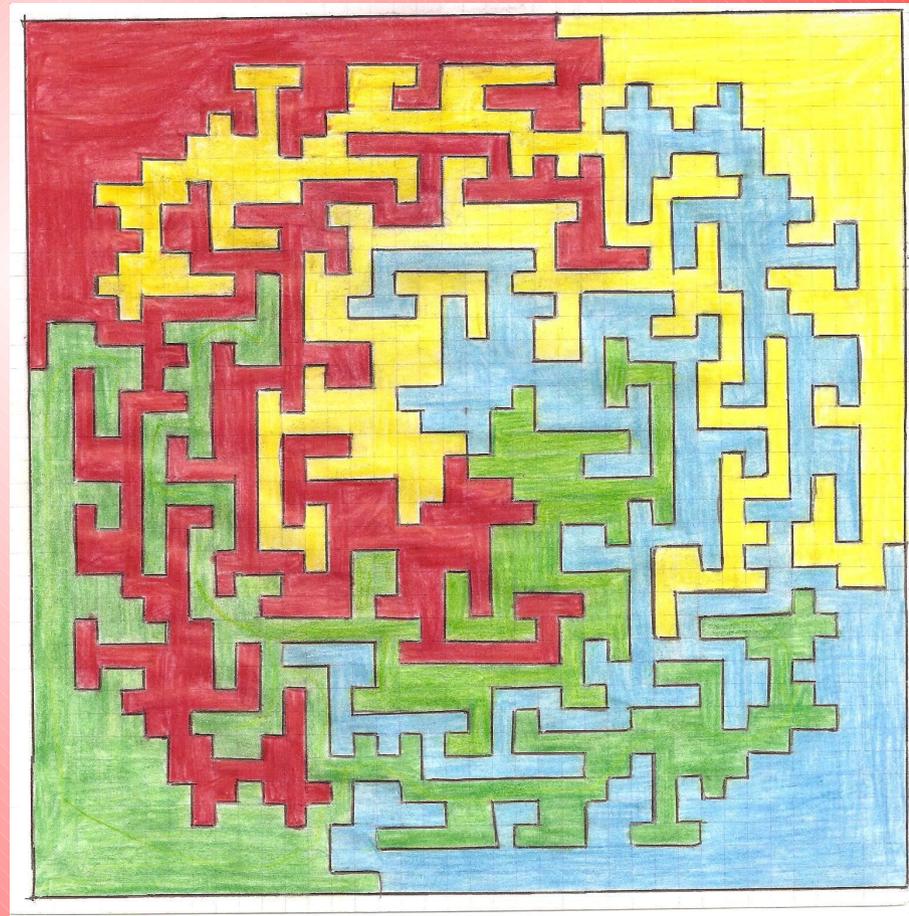


Les polyominos d'ordre 2



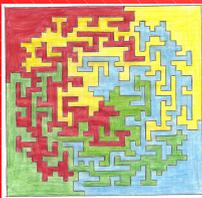
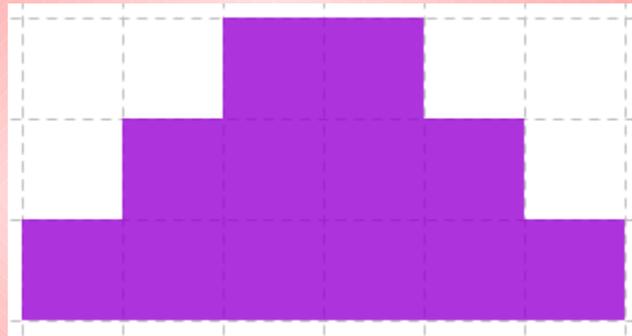
Les polyominos d'ordre 2

IV Les polyominos d'ordre 4



Les différentes façons d'obtenir un polyomino d'ordre 4.

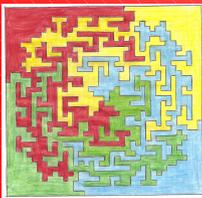
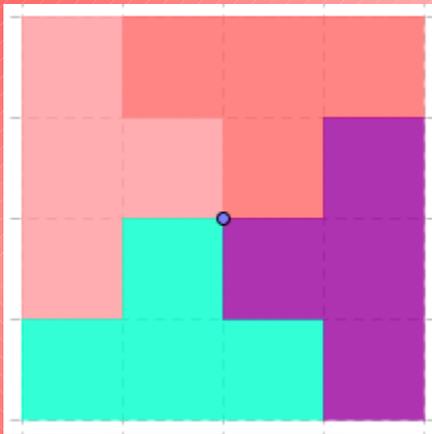
En partant d'un polyomino d'ordre 2 : les polyominos « escaliers »



Les polyominos d'ordre 4

Les différentes façons d'obtenir un polyomino d'ordre 4.

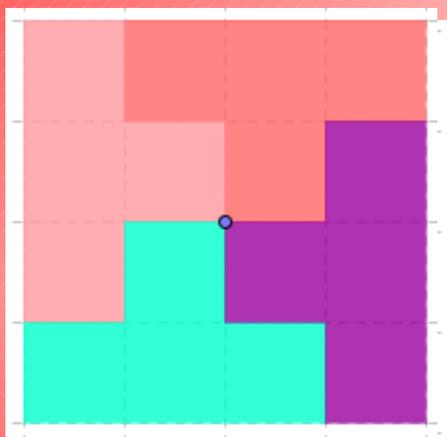
- En partant d'un polyomino d'ordre 2 : les polyominos « escaliers »
- **Par rotation d'un quart de tour**



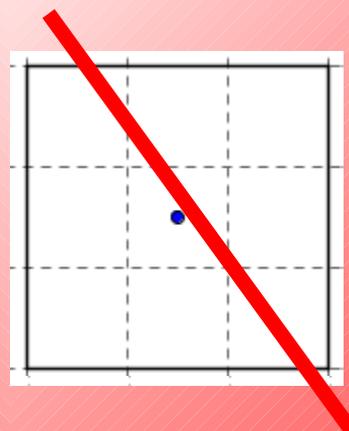
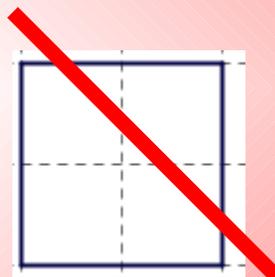
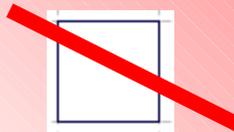
Les polyominos d'ordre 4

Les différentes façons d'obtenir un polyomino d'ordre 4.

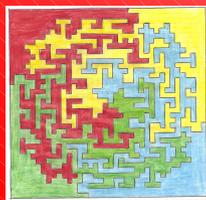
- En partant d'un polyomino d'ordre 2 : les polyominos « escaliers »
- **Par rotation d'un quart de tour**



La rotation ne fonctionne que dans **un carré**

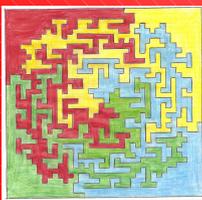
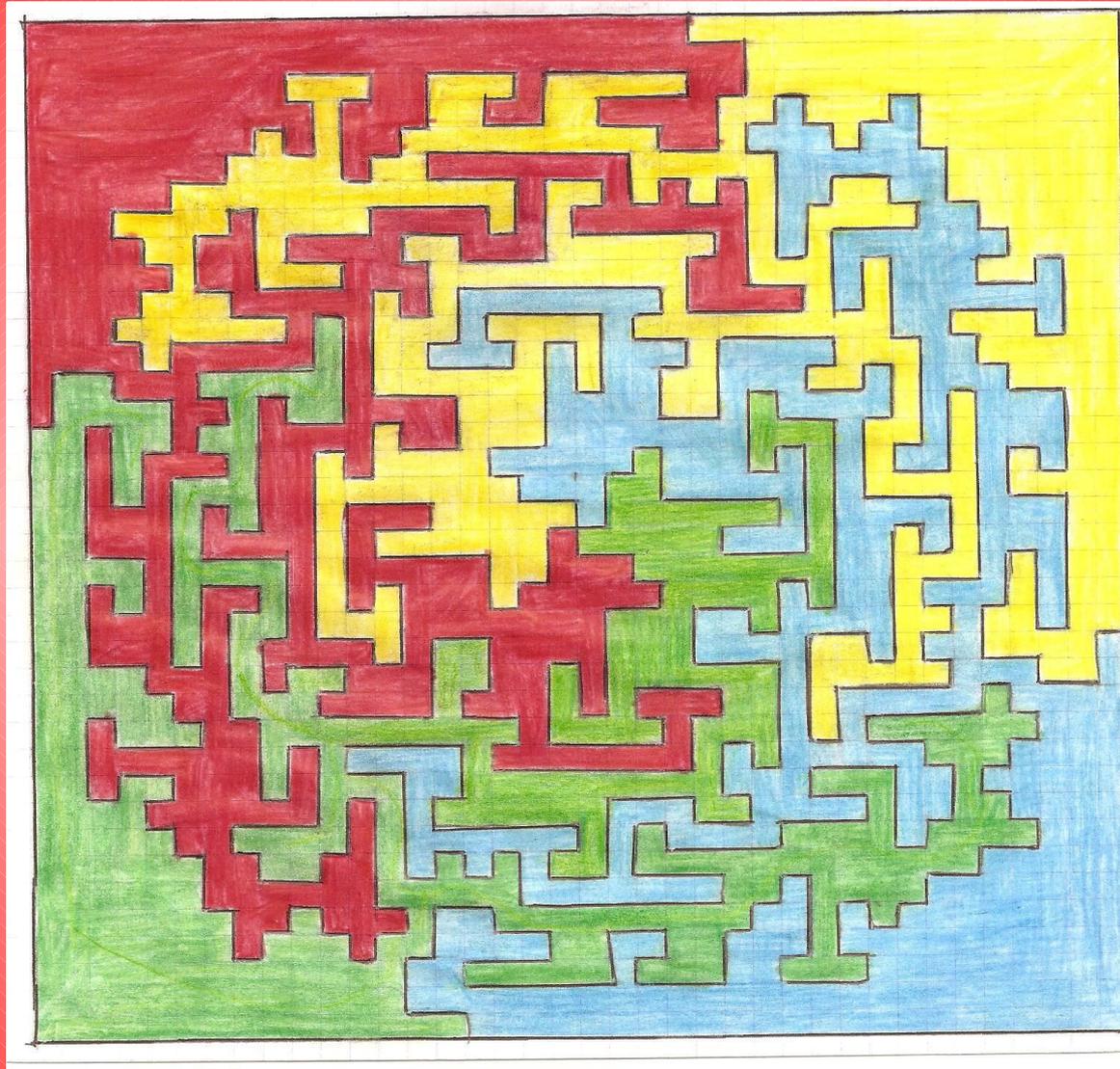


n doit être impair



Les polyominos d'ordre 4

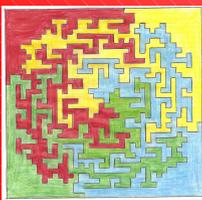
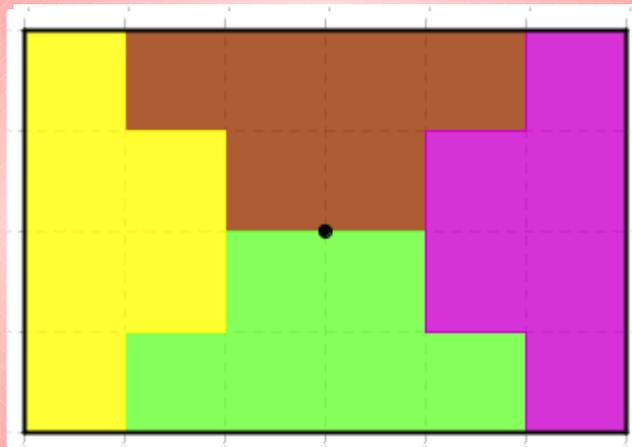
Créer des polyominos d'ordre 4 par rotation



Les polyominos d'ordre 4

Les différentes façons d'obtenir un polyomino d'ordre 4.

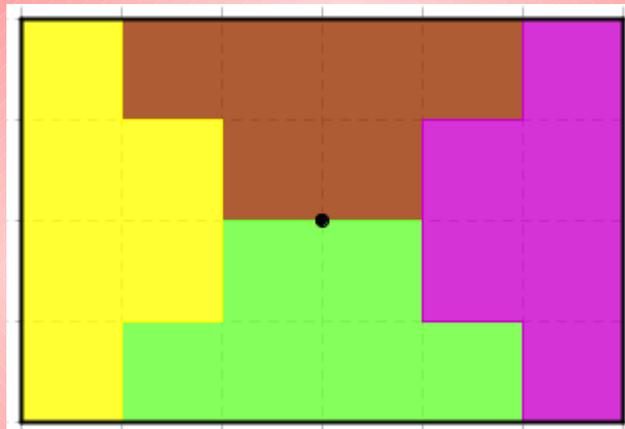
- En partant d'un polyomino d'ordre 2 : les polyominos « escaliers »
- Par rotation d'un quart de tour
- **Par double symétrie centrale**



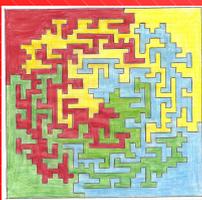
Les polyominos d'ordre 4

Les différentes façons d'obtenir un polyomino d'ordre 4.

- Par rotation d'un quart de tour
- Par double symétrie centrale

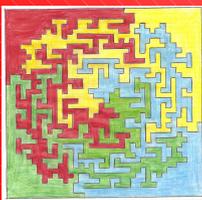
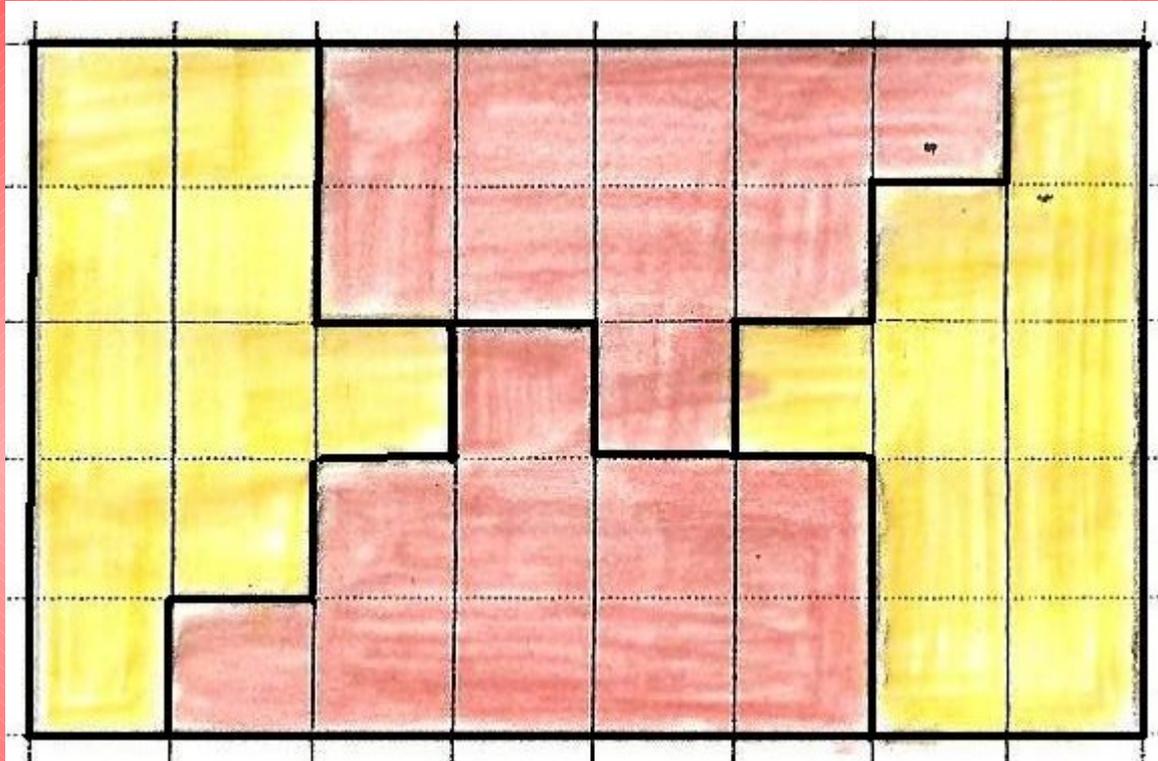


L'une des deux longueurs du rectangle doit avoir un nombre pair de carrés.



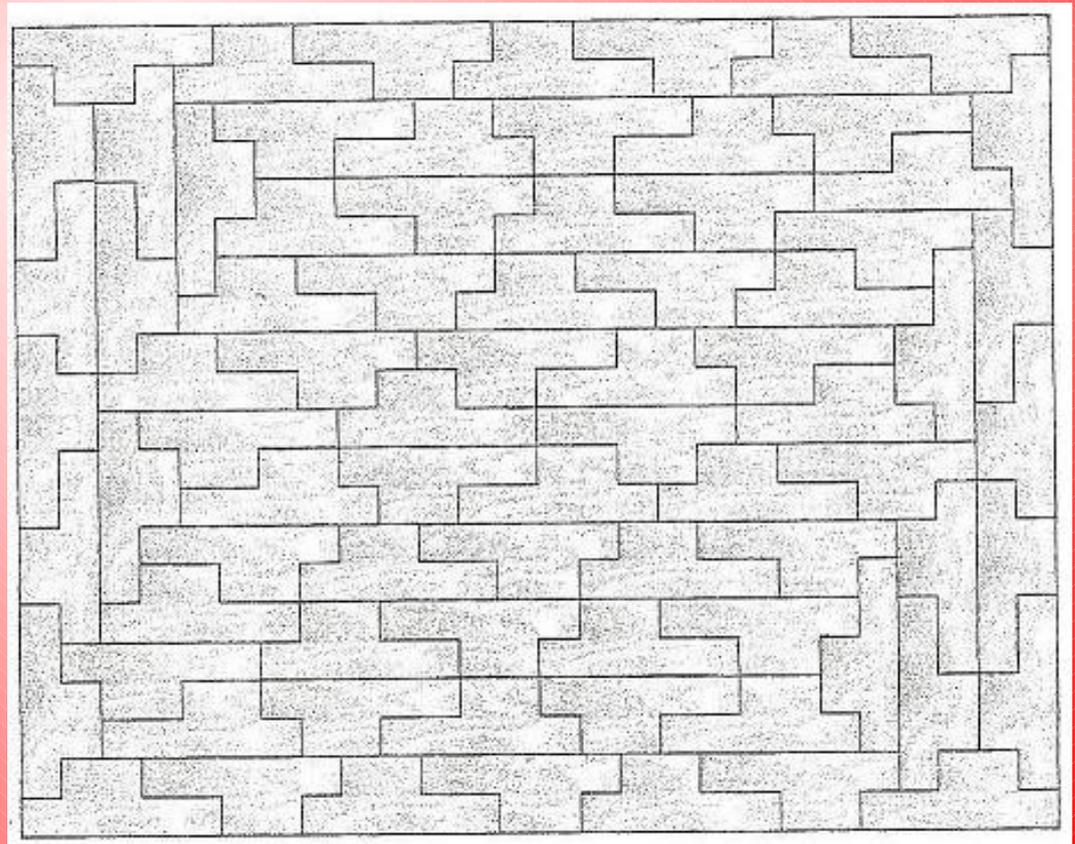
Les polyominos d'ordre 4

Créer des polyominos d'ordre 4 par double symétrie centrale

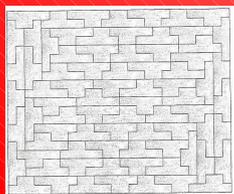
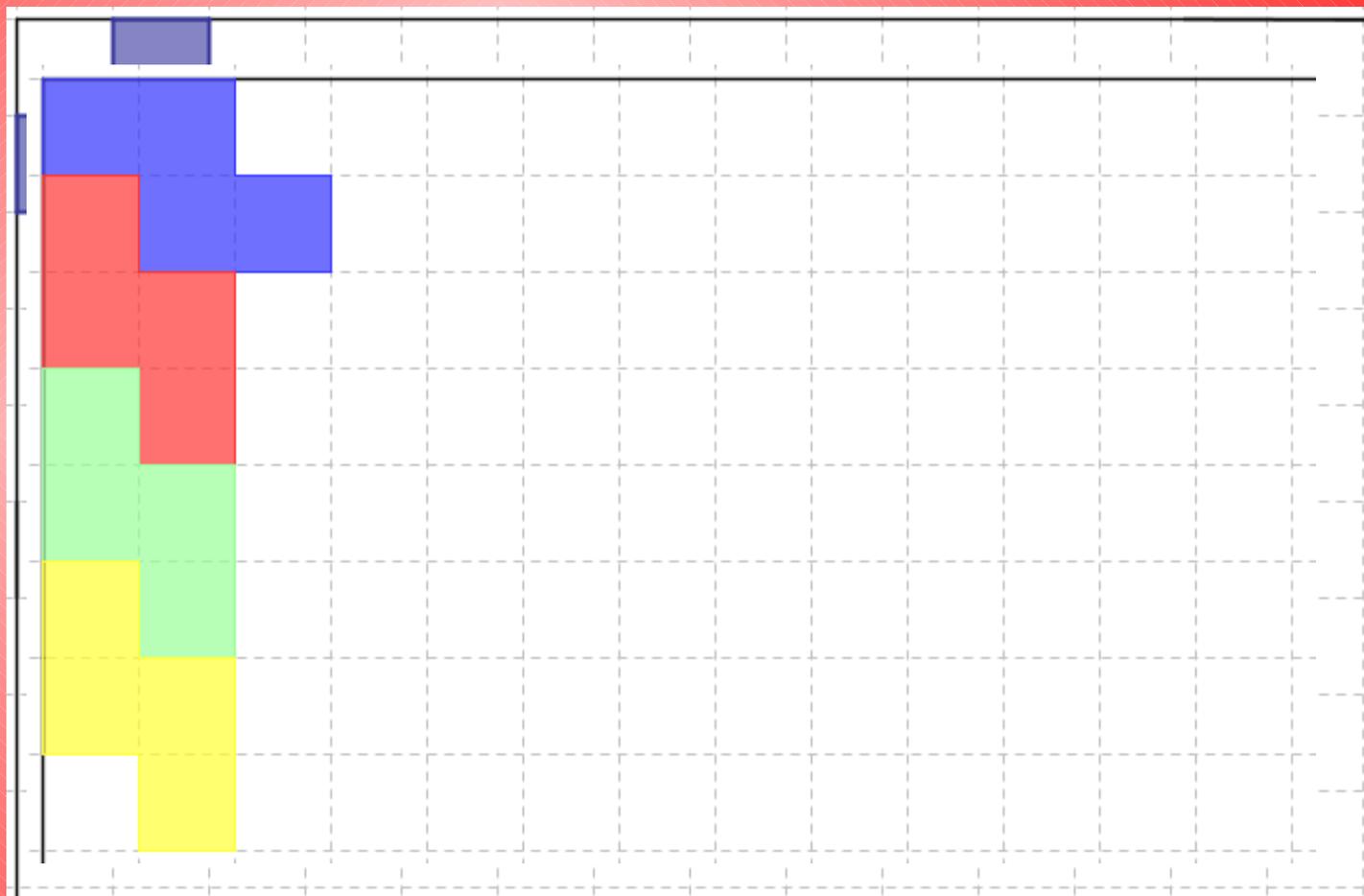
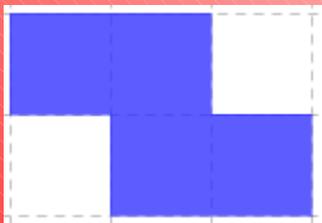
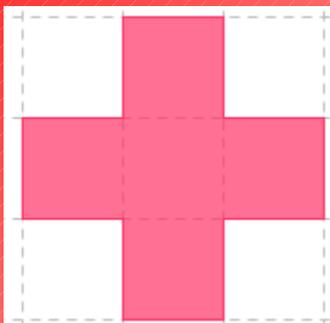


Les polyominos d'ordre 4

V Existe-t-il d'autres ordres
pour les polyominos?



- l'ordre indéterminé



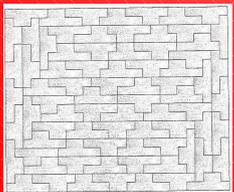
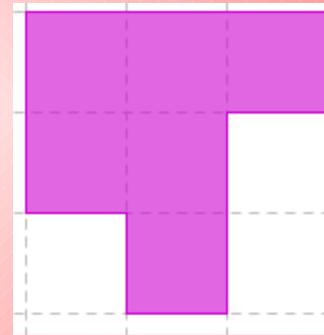
Existe-t-il d'autres ordres de polyominos?

- l'ordre indéterminé
- **l'ordre 10, l'ordre 18**

Un heptomino d'ordre 10



Un hexomino d'ordre 18



Existe-t-il d'autres ordres de polyominos?

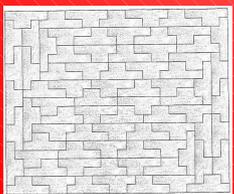
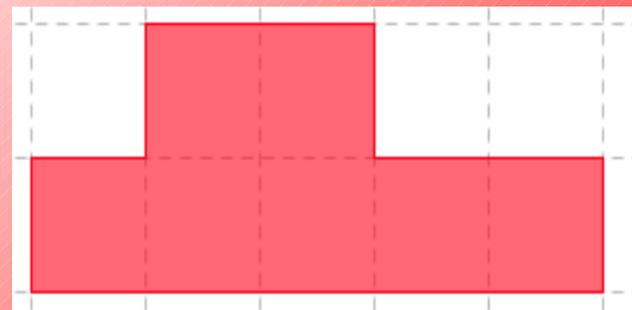
- l'ordre indéterminé
- l'ordre 10, l'ordre 18
- **Et les ordres impairs ?**

Polyomino d'ordre 3?

Polyomino d'ordre 5?

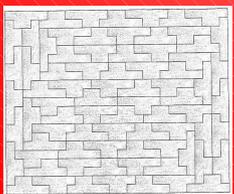
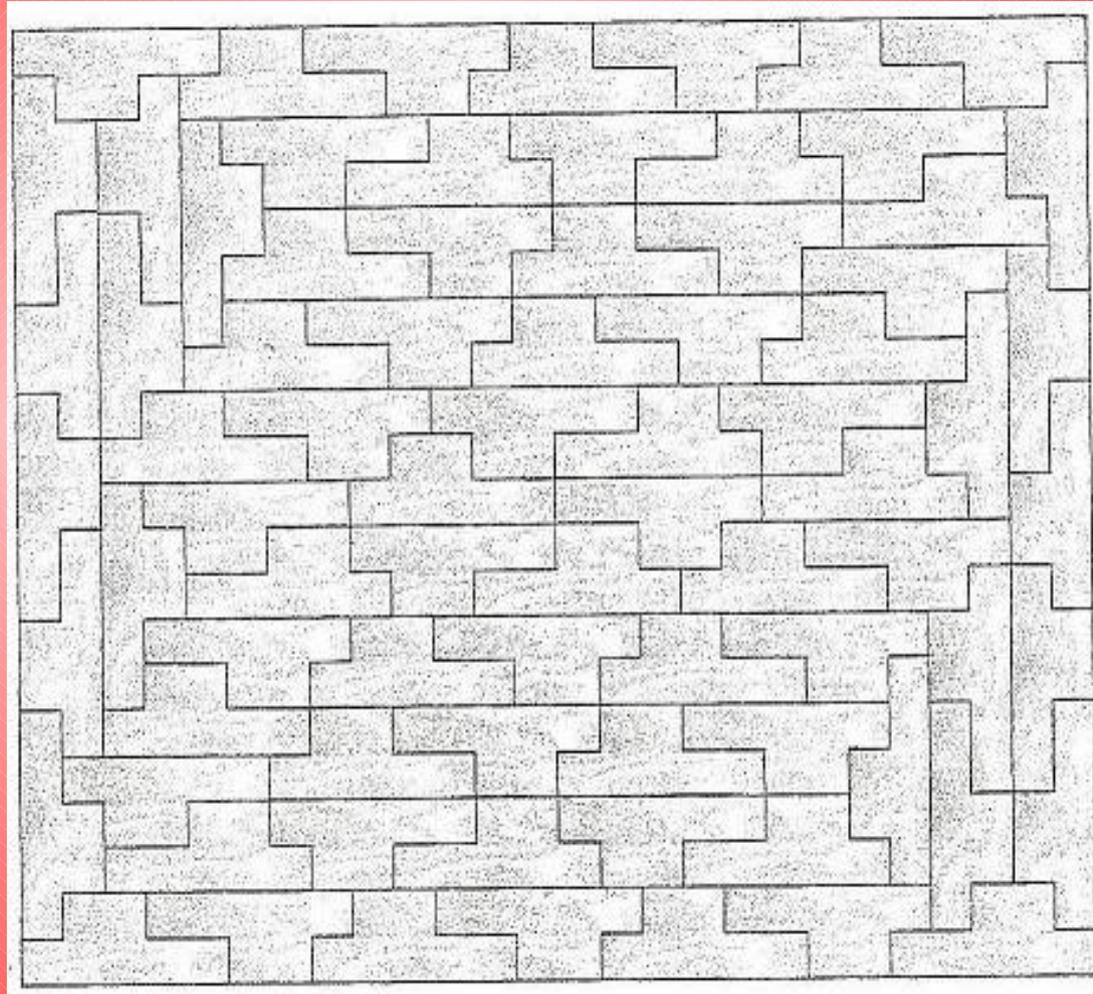
Notre idée : pas de polyomino d'ordre impair

Un heptomino d'ordre 79 !

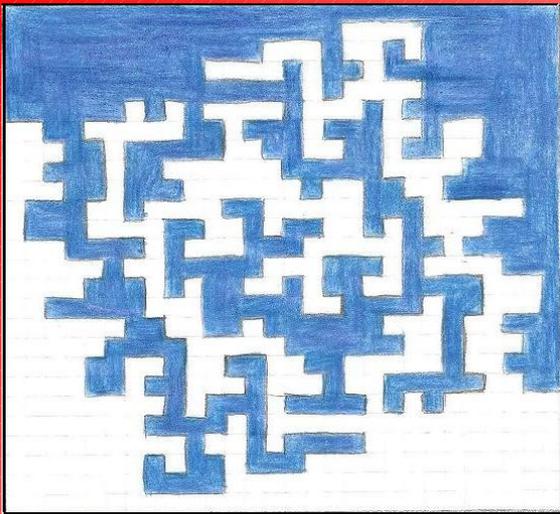


Existe-t-il d'autres ordres de polyominos?

- l'ordre indéterminé
- l'ordre 10, l'ordre 18
- Et les ordres impairs ?
- **Un heptomino d'ordre 79**



Existe-t-il d'autres ordres de polyominos?



Merci de votre attention ...

