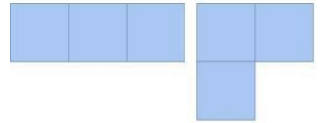


What are Pentominoes?

Today we will learn how to make different shapes from the same simple building blocks. We have small squares that look exactly the same to each other.

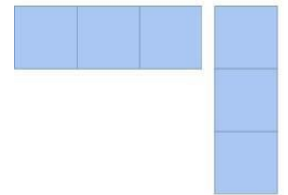
1. **3 squares!** What are the different shapes that we can make using only 3 squares?



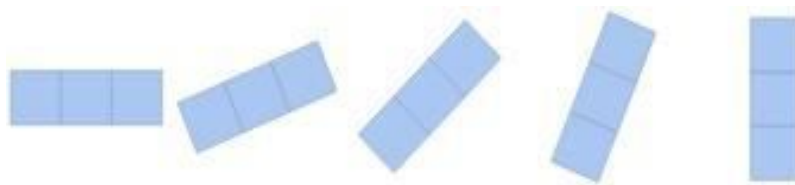
We can connect squares only by their full sides.

Let's try some:

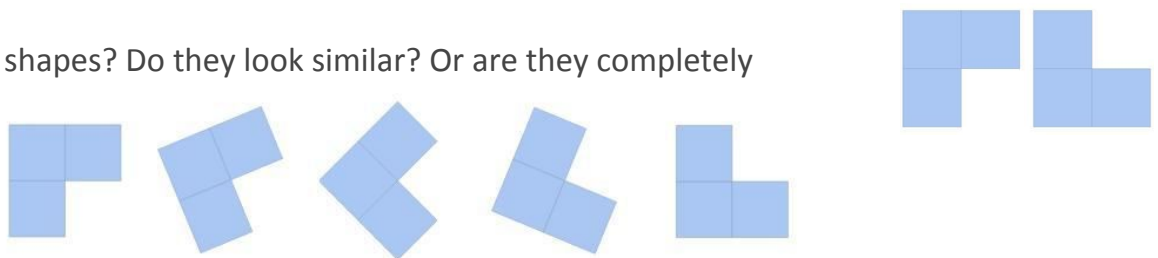
How about these 2 shapes? Are they 2 different shapes or the same exact shape?



It looks like we can rotate one and turn into the other:

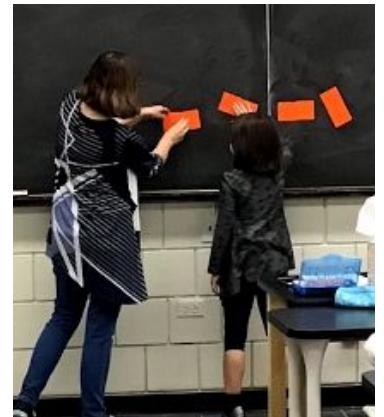
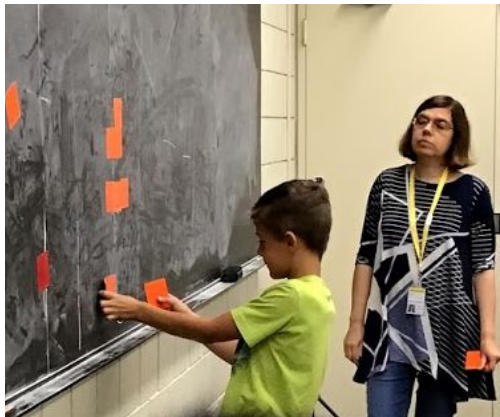


How about these 2 shapes? Do they look similar? Or are they completely different from each other?

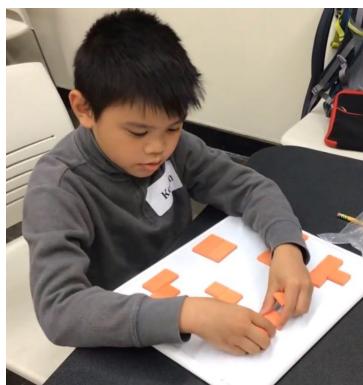


Let us turning the shape on left and try to make it into the shape on right?

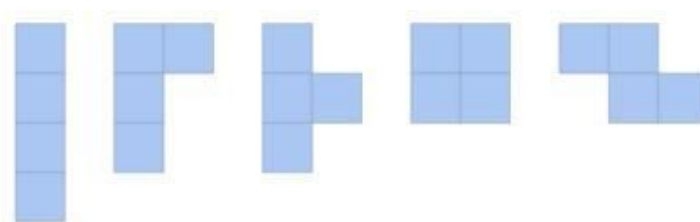
Turns out it is possible and very easy! Just rotate it counter-clockwise a little bit. **So we can build only 2 different shapes out of 3 squares.**



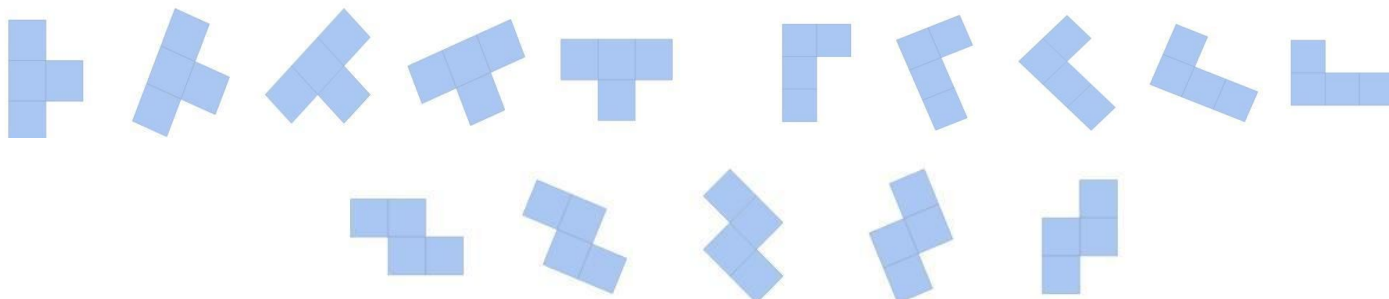
2. Now let's see what we can make out of 4 squares:



We have those five shapes:



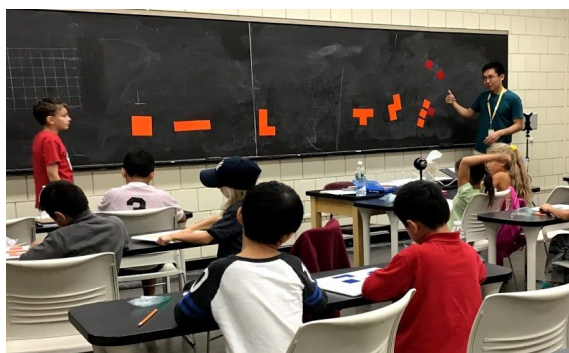
More shapes that we can make by rotating some of those 5:



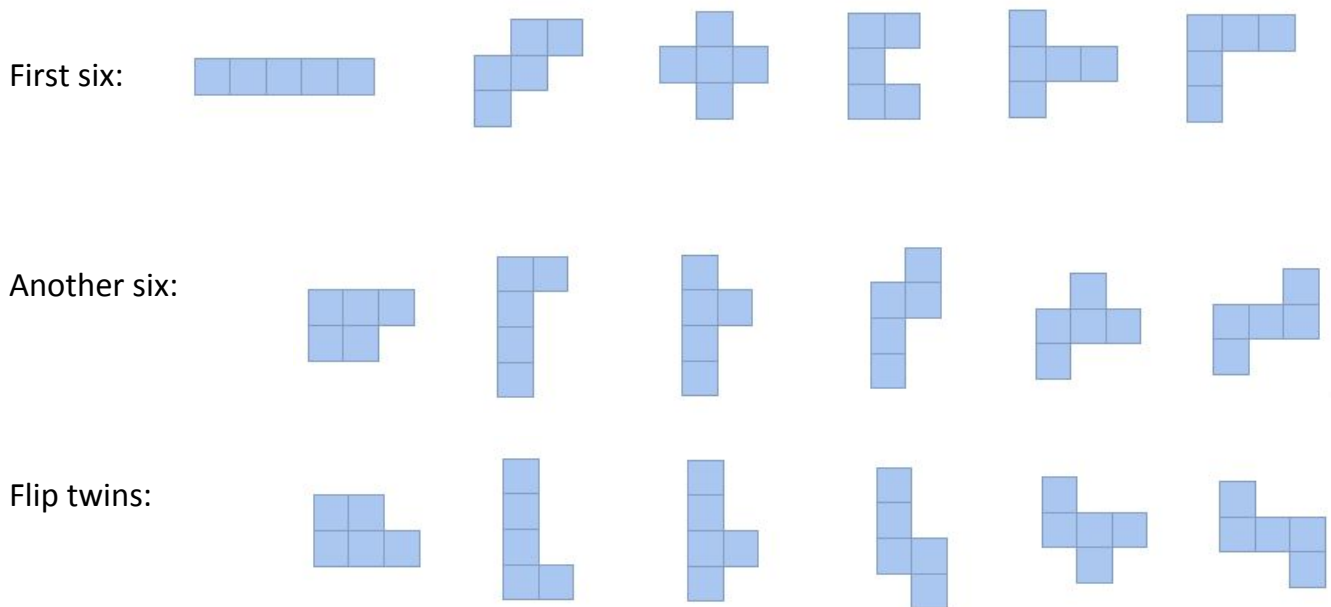
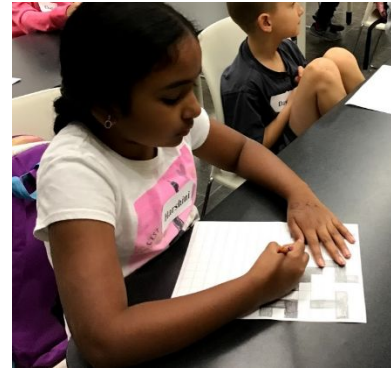
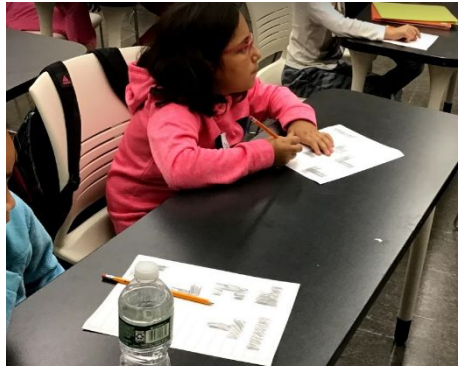
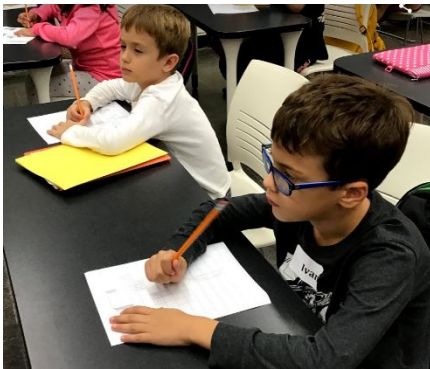
But what to do with this one?

We can't get from one to another by just rotating it. What can we do?

We can flip it! Let us call them flip twins.



2. Let us finally build all pentominoes! Shapes made out of 5 squares.
We will draw them first.

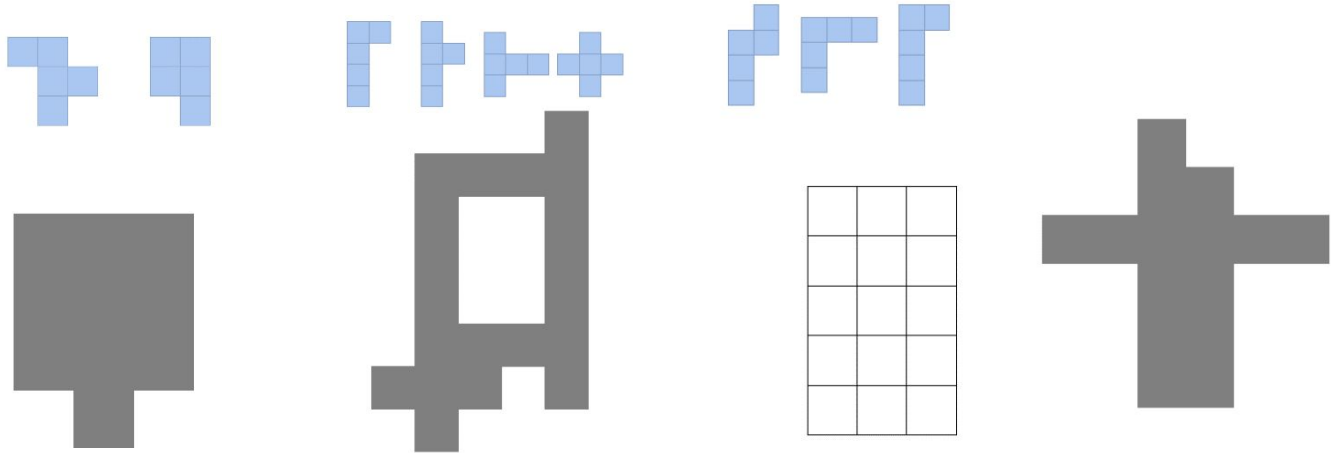


Why first six do not have flip twins but the last six have?

Because of symmetry!!



3. **Fill the puzzles.** From very simple one for 2 pentominoes with hints to not so simple to 5-6 pentominoes without hints.



4. **Let us play the pentominoes game on 5x12 board.** Two players share one set of 12 pentominoes and the one who can't fit the piece on the board loose. Strategies are different :)



See you in two weeks!