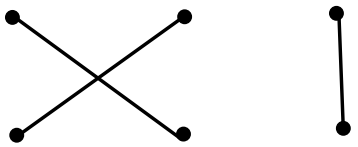
Group Theory Day 1

It's a Snap!

Over the next few days we're going to be talking a lot about what it means to be a **group** (mathematically speaking).

The Three Post Group



How many elements should be in this group?

Retrieve your rulers and see all six elements.

Now we're going to define an operation for these elements in the group. Not addition, not subtraction.....

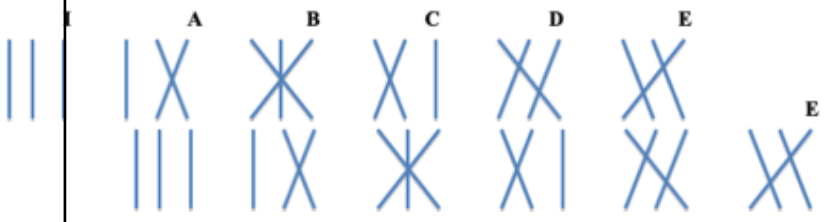
The snap operation!

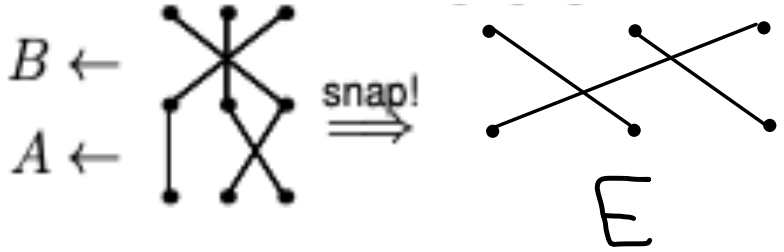
A snap B will be written:

$$A \circ B$$

snap

So what is A snap B?





In general, we'll define A snap B as

$$A \circ B$$

A first (bottom) B second (top)

What is A snap B?

Figure 3: $A \bullet B = E$.

Now begin filling in the chart!

Figure 3: $A \bullet B = E$.

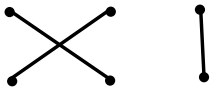
$\bullet$	I	A	B	C	D	E
I						
A			E			
B						
C						
D						
E						

Do one more just to make sure you get it.

B

D 

$\bullet$	I	A	B	C	D	E
I						
A			E			
B						
C						
D				C		
E						



D snap B

C

Then fill in the chart!

A Geometric Approach to Matrices

by Peter Herreshoff, with revisions by Timothy Herchen

Start with Chapter2, It's a Snap

https://nichodon.github.io/gatm/textbook/chapters/itsasnap.pdf

Link for entire book is in our Unit folder.

This unit you will be working in student groups (up to four in a group). You can pick your own group or I will randomly move you to a group.

Recap

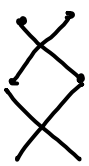
What did you guess the four requirements of a group are??

- Identity element
- Every element has an inverse (takes you back to the identity)
- Associative Property Holds
- Closure

What is meant by the period of an element?

I · E · E · E = I

per of 3

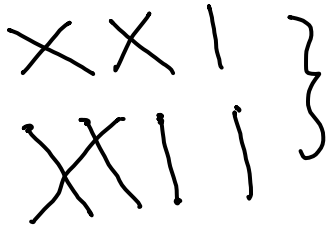


C · C = I

per of 2

How could an element in the **5** post group have a period of 6????

per 2



lcm(2,3)

per 6

3

10 post

4 6 3 12

1 1 3 → per 3

[redacted]

February 4, 2021