



STEM WITH ARTS

projects combining STEM with other disciplines, i.e. arts, music, sports, history, etc.

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TANGLES, DANCES... AND MATHS!

Untie tangles, cut ribbons, magically extract rings from wires, count holes in your pants... discover Topology.

It's a "Topological" dance:

Four people, two ropes, two simple steps.

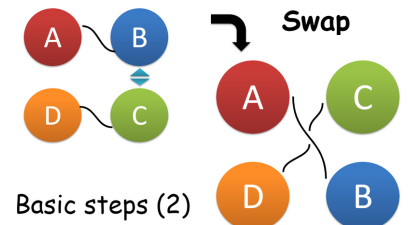
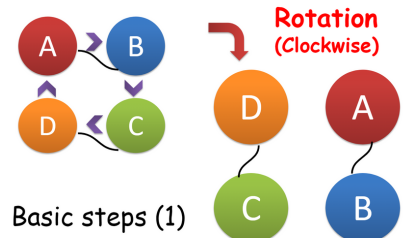
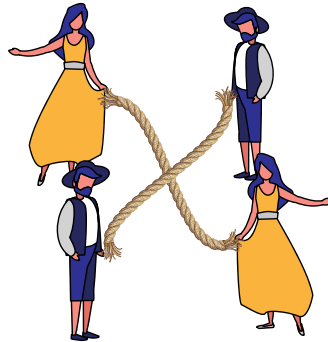
Step 1: **Rotation R** (clockwise)

Step 2: **Swap S** (B over C)

For example, a simple step sequence could be:

S S R S S R S S S

If you dance it, a knot is created in the middle.



The answer now is: how to untie this tangle using only **Swap** and **Rotation**? (please note that you can't go backwards!)

Fraction algebra is needed!!

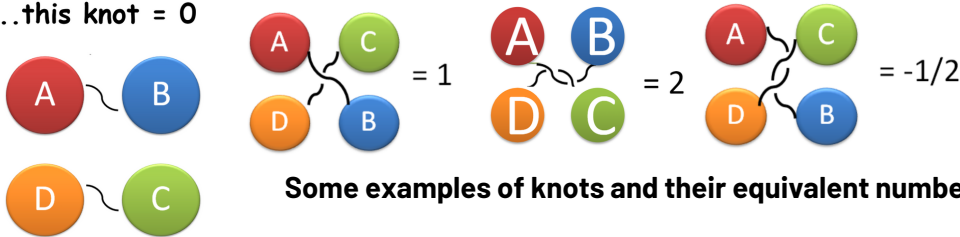
A number is assigned to each knot and an algebraic operator to each step.

Swap is equivalent to **adding 1**

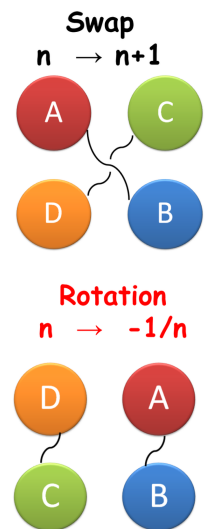
Rotation is equivalent to **inverting and changing sign**

Zero corresponds to the initial configuration (no tangle) and now you'll have to get back **Zero**.

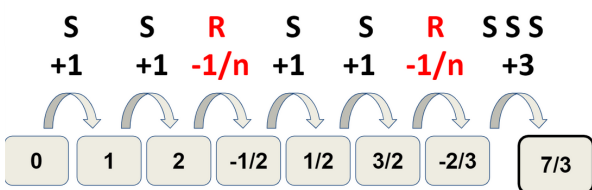
...this knot = 0



Some examples of knots and their equivalent number



The main steps and their equivalent operator



Example of a sequence of dance steps...

...and its solution

