



EXPLORING COMPUTATIONAL THINKING WITH ALGORITHMIC REPRESENTATION

Did you tie your shoelaces this morning? If so, odds are that you didn't think much about it. However, watch a kindergartner trying to tie their shoes and you'll see that it wasn't always such a simple task. Tying your shoes requires you to follow a series of specific steps and, with enough practice, we learn to follow all of the steps automatically without thinking.

In computational thinking, this process of following a step-by-step procedure to overcome a problem is called algorithmic representation or automation. Algorithms are important in computer programming, but we use them in all aspects of day-to-day life, whether solving a math problem, setting an alarm, or remembering where you placed your keys.

In this activity, you'll think more about algorithmic representation within the context of knots.



Scan to access the site
Animated Knots.

GET READY: EXPLORE ANIMATED KNOTS

Open the [Animated Knots](#) website and navigate to the the basic knots page.

Think about the following questions:

- Which knots do you already know?
- What are the different purposes for knots (i.e., stoppers, hitches, etc.)?

ACTIVITY CARD 4





TRY IT: DECOMPOSE THE CHALLENGES

1. Follow the steps to make the square knot from the [Animated Knots](#) site.
2. Repeat the steps over and over until you can make the knot without looking.
3. Decompose the algorithm, or process, for tying a square knot into 5-7 steps.

Step 1	
Step 2	
Step 3	

4. Knowing the square knot is key to understanding other knots. Choose one of knots derived from the square knot: the granny, the double throw, or the surgical knot.
5. Practice the variation until you are comfortable with it.
6. Describe how to make the new type of knot. However this time, do not describe every step of the process. You can assume that the reader already knows how to make a square not.



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GO FURTHER

Try one of the following to extend your understanding of algorithmics representations.

Use a knot for a purpose	Break down another knot	Make a flowchart
Learning new knots is fun, but it can also be practical. Find a use for your new skill. Tie your shoes more securely, attach something to your backpack, or tie a bow on a gift.	Choose another knot and practice it over and over until the process of tying the knot becomes automatic.	Different knots have different purposes. Make a flowchart to describe which knot to use for different situations.

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