



Project Exploration creates transformative learning opportunities for youth underrepresented in the sciences –particularly students of color and girls – by equipping them with the skills, practices, and mindset needed for a lifelong pursuit of learning. STEM@Home makes activities around science, technology, engineering, and math accessible and fun to do at home. This STEMbook activity, resources, and more are available at [www.projectexploration.org/stemathome](http://www.projectexploration.org/stemathome).

## In this activity, you will:

learn the basics of binary code while creating an ornament!



## Supplies Required:

Pony beads, two colors  
Pipe cleaner  
[Binary Code Key](#)

## Video

How does binary code work? <https://tinyurl.com/ssgscty>

## Overview

Binary code is how computers talk and represent information. Letters, numbers, and pictures, and everything else you see on the computer, is made up of different combinations of 0's and 1's. Computers transport, calculate, and translate binary numbers because computer hardware circuits only have two electrical states, on or off. These two states can be represented as 0 (off) or 1 (on). All letters of the alphabet, numbers, and symbols are converted to eight character binary numbers as you work with them in software on your computer. The combination of 0s and 1s make different things appear on a computer screen. For example, a picture of a snowman will have a different sequence of binary code than a picture of a cup of hot chocolate. Let's try it!



## Instructions

1. Assign one color to 1s and another color to 0s. Make sure these stay separate!
2. Using the Binary Code Key, string beads onto the pipe cleaner according to the code.
3. Try: SNOW, TREE, CANDLE, GIFT, and WINTER. You may need more than one pipe cleaner, which is fine! If you need more, just twist them together.
4. Shape your codes into a fun design and hang them around your house to decorate!

## Additional Resources

1. Read more about binary code here: <https://tinyurl.com/hkec44x>
2. Learn how to code for free here: <https://code.org>
3. What is computer coding? <https://tinyurl.com/qdfifg4>

## Share It Out

**Share on social media:** Take a photo of your coded creations and share on social media with family and friends! Use the hashtags:

#CodingOrnament  
#ProjectExploration  
#StemAtHome

For more activities like this one, go to [www.projectexploration.org/stemhome](http://www.projectexploration.org/stemhome). If you're interested in learning more about Project Exploration and our free events, programs, and activities, please complete our interest form and a staff member will be in touch with you: [www.projectexploration.org/interest](http://www.projectexploration.org/interest).



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