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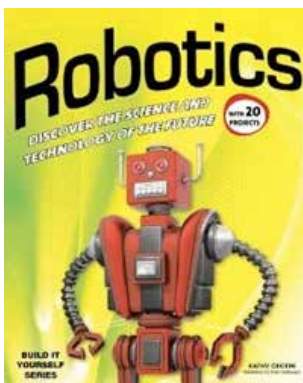
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HOW TO BUILD YOUR OWN ROBOTIC HAND

2012 Chicago Public Library "Best of the Best" Book!
Build real robotics projects inspired by actual research using household materials and recycled toys and devices!

This fun and educational introduction to the exciting field of robotics--the science of designing, building, and operating robots--gives kids the basic tools for creating their own robots using ordinary craft materials and parts salvaged from recycled toys and other household devices.

Budding roboticists will learn how to create working models of robotic hands and arms, write "pencil and paper" computer programs, and design circuits that light up or make noise when sensors are activated. They'll also find out how other fields like chemistry, biology, and psychology are contributing to new breakthroughs, and see how artists, musicians and fashion designers are using robotics technology in their own work.



<http://amzn.to/PoqXEM>



<http://amzn.to/1bw4dSt>



<http://amzn.to/18i9jTk>



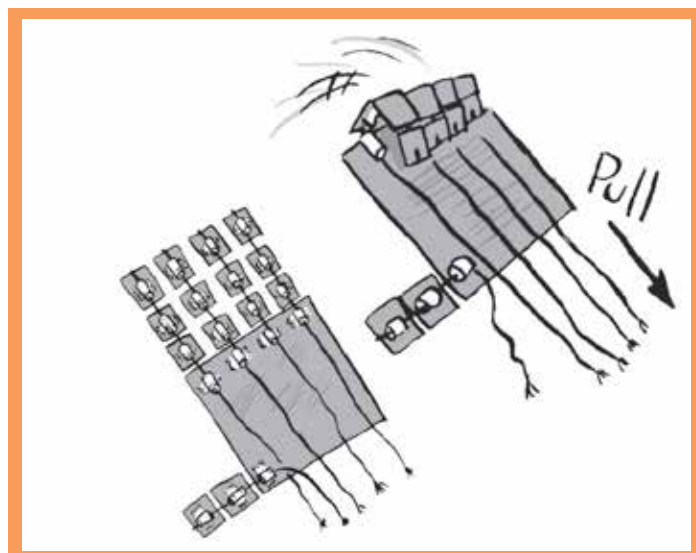


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Tools/Materials

- 1 sheet of stiff cardboard
- Scissors
- Marker
- Clear tape
- 3-4 drinking straws
- 5 pieces of string, each about 10 inches long (25cm)
- Crochet hook (optional)



Find out more
<http://www.CraftsForLearning.com>

Build your own robotic hand

It's a hard job to design a robotic hand that can pick up an object without damaging it. Robotic hands usually have dozens of mechanical joints. Each joint has a servo motor that must be programmed to handle specific objects. In 2010, mechanical engineering professor Aaron Dollar and the Grab Lab at Yale University in Connecticut created a new kind of hand. It was made of soft plastic and rubber and worked like a human hand. A single motor pulled different wires to make the fingers bend. The wires acted like tendons, the strings in a human hand that help muscles move. This cardboard version also uses pull-strings to make the fingers open and close realistically.

1. For the palm of your robot hand, cut out a 4-inch square of cardboard (10 cm square)
2. For the fingers, cut out four rectangles, each $\frac{3}{4}$ inch wide (2 cm) and 3 inches long (7.5 cm) Cut out a rectangle 1 inch wide (2.5cm) and 2 inches long (5 cm) for the thumb. Draw horizontal lines to divide each finger and the thumb into 1-inch sections (2.5cm). These are the joints.
3. Lay out your robot hand by lining up the fingers along the top of the palm and the thumb on the side.
4. Cut the fingers and thumb into sections along the joint lines. Reassemble, leaving a little space between each section.
5. Use tape to connect the finger sections to each other, and to the palm. Making sure to keep a space between each section. Tape the front and back for extra strength.
6. Cut the straws into 19 pieces about $\frac{1}{2}$ inch long (1.5cm)
7. On the inside of the hand, tape one piece of straw onto each finger section and onto the palm below each finger. Trim the tape if needed, so it doesn't hang over the edge of the straw.
8. Thread one string through the straws for each finger. (A crochet hook will help you pull the string through the straws). Tape the end of the string over the tip of the finger, leaving the lower end hanging loose.
9. Pull the strings to curl the fingers inward. With a little practice you'll be able to make your robot hand point or pick up objects with amazingly lifelike gestures.

Adapted from "Robotics: Discover the Science and Technology of the Future" by Kathy Ceceri, published by Nomad Press

