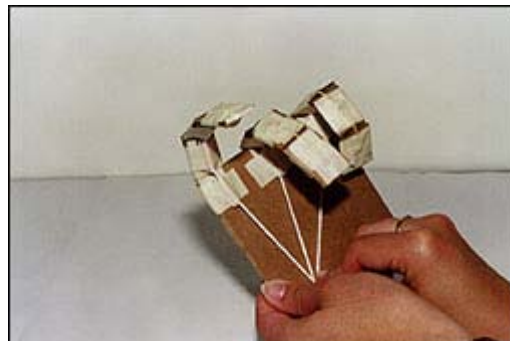
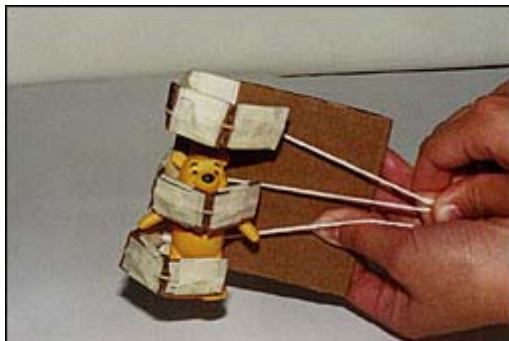


SEEK

Student Engineers Educating Kids

Give Yourself A Hand!



What are robots used for?

Why do we try to build robots like humans?

What uses would a robotic hand/manipulator have?

Materials:

The basic idea is to simulate two different “robotic” hands using:

- 1) Narrow rubber bands
- 2) Narrow drinking straws
- 3) Cardboard
- 4) String
- 5) Pipe cleaners
- 6) Wire

Tools:

- 1) Scissors
- 2) Tape
- 3) Pliers
- 4) Ruler

<http://www.new-sng.com/giveahand.cfm>

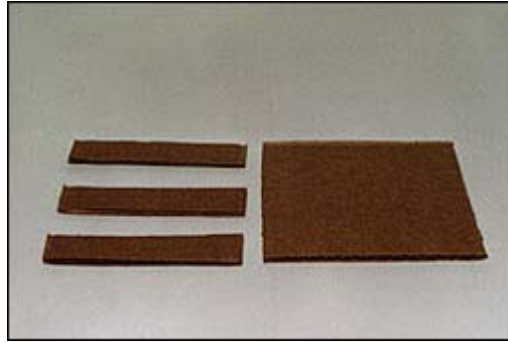
<http://www.piaggio.cci.unipi.it/robotics/research-eng.html>

DAY 1 TASKS:

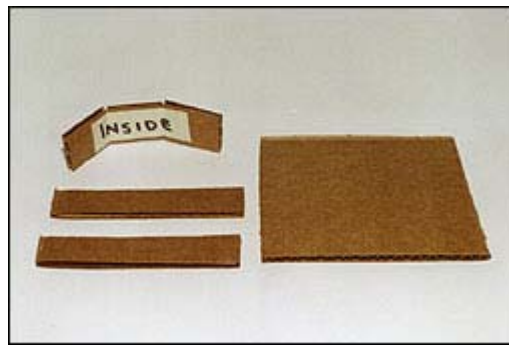
Your task for today is to design two different robotic hands that can manipulate objects (pick things up). Then, start building one of your robotic hands. Try experimenting with different materials. Replace the materials in the basic design with the materials of your choice. Which materials do you think grip better? Which materials allow easiest manipulation? How many fingers do you want on the hand? Do you want to add a thumb? Be creative in the two different designs. You can try to build a left and a right hand, both left, or both right.

The basic design of the hand:

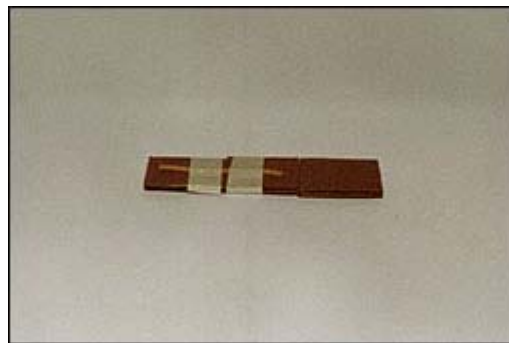
1. Cut a piece of cardboard about 10 cm x 10 cm. This is the "palm" of the hand.
2. Cut three pieces of cardboard about 2 cm x 9 cm. These are the "fingers".
3. Cut one finger into three equal pieces.



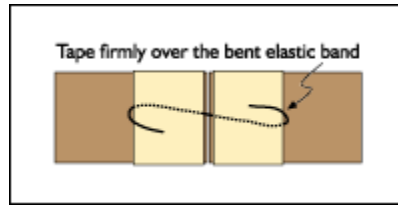
4. Place the three finger pieces back together and put a piece of tape over the two finger joints.
5. Label the side with the tape "Inside".



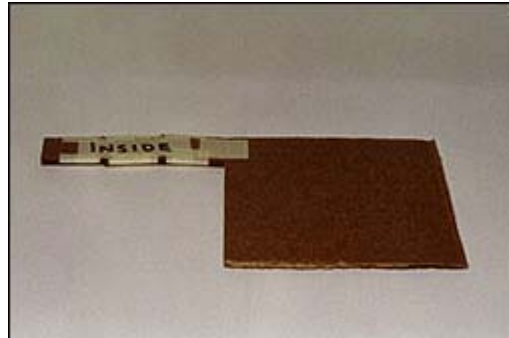
6. Cut a piece of elastic about 5 cm long.
7. Turn the finger over (so the inside is face down) and place the elastic across middle of the first joint.
8. Tape the elastic on either side of the joint, leaving the ends of the elastic untaped. (Note: for this step, you may need to cut the tape to make it a bit thinner.)



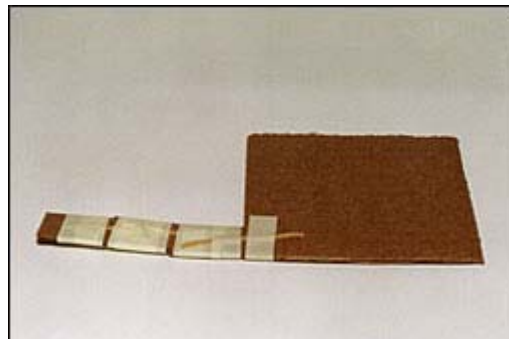
9. Bend the ends of the elastic as shown and tape firmly. This will help prevent the elastic from slipping.



10. Repeat Steps 7 through 9 for the second joint.
11. Tape the finger (inside up) onto the palm.



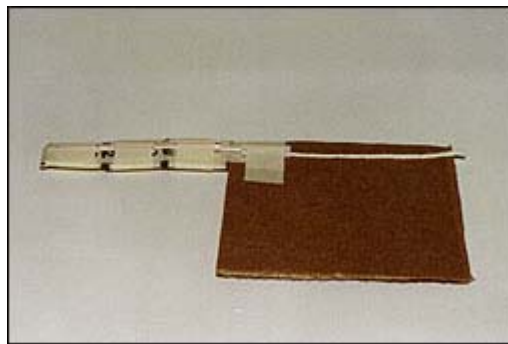
12. Turn the hand over and fasten the last finger joint to the palm using the method described in Steps 7 through 9.



13. Cut a piece of string about 35 cm long and tape one end firmly over the end of the finger.
14. Cut four pieces of straw each about 2 cm long.
15. Thread the pieces of straw onto the string.



16. Tape three of the straws in the middle of each of the finger sections.
17. Tape the last straw to the palm as shown.



18. Repeat Steps 3 through 17 for the last two fingers.
19. Operate the hand by pulling the strings. You should be able to pick up empty soda cans and other light objects with your hand.

