



# Minds in Motion

## Coding Cups

### Activity Rundown:

Are you interested in the world of coding but find yourself not knowing where to start? Coding with cups is a fun and easy way to learn the introductory concepts of coding! After a couple run throughs of our activity you'll be able to teach everyone you know the basics of coding while only using cups.

### You will need:

- + Index cards or paper
- + Stackable cups (Solo cups, plastic cups, etc.)
- + Pen or pencil
- + Symbol key
- + Cards with stacking patterns

### Let's do it!

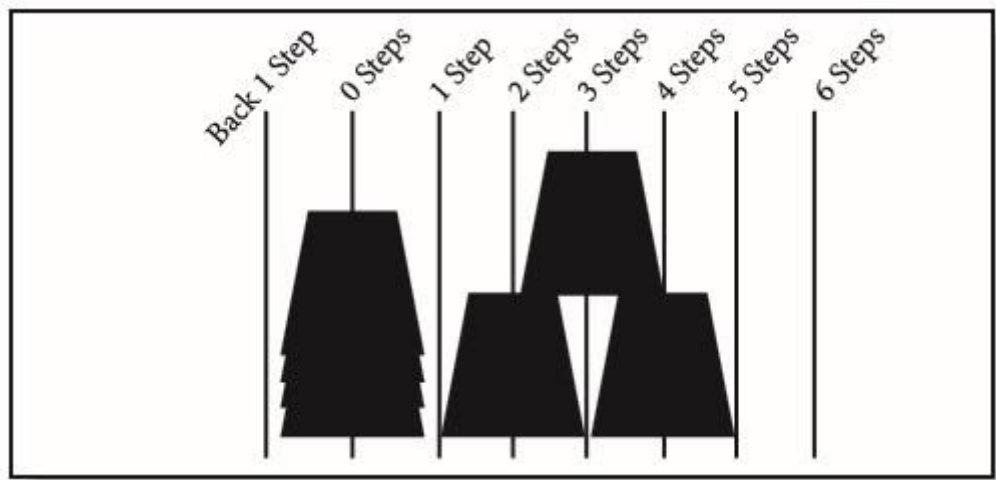
1. How does a robot know it is supposed to do? Computers and robots operate through a series of instructions that they have been pre programmed with. The set of instructions is called a programming language.
2. Do you already know how to program, or know of any programming languages?
  - If so, write them down!
3. In order to accomplish a task, a computer needs instructions that tell it exactly how to complete a task. These instructions are referred to as **code**. What do you think would happen if the instructions were in the wrong order or had missing steps (the computer would get confused and not do what you wanted it to do.)
4. How do you think we could find out which part of the computer's code is causing it to malfunction? (Go through the code step by step to see where the problem starts. This process is called **debugging**.)
5. To relate the concepts back to software/computer engineering, let's talk about why programming is important/how it can be applied. There are multiple ways to tell a computer to do the same thing, but some are more efficient than others and may take less time or use less memory.
6. For this activity we will first need to create a "**Symbol Key**".
7. You will only be allowed to use these symbols in order to "program" and another person (the "robot") to build a stack of cups. The following Symbols all need to be written down in your "**Symbol key**". So, go ahead and write these down.
  - "pick up cup" (up arrow) means that the cup should be picked up to a height above the highest cup in the stack



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- “put down cup” (down arrow) means that the robot should put the cup all the way down
- “move one step right” (right arrow) means that the cup should be moved in the direction of the arrow *half the width of the cup*. It’s really important for them to understand this concept.
- “move one step left” (left arrow) means that the cup should be moved in the direction of the arrow *half the width of the cup*.
- “rotate” (swirly arrow) means that the cup should be flipped upside down.

The following image shows how the steps work:



8. Do an example using Stacking Pattern #1.



Here’s an awesome video showing you how to program this stacking pattern:

[Cup Stacking Programming](#)

9. If you have three people in your house able to participate in this activity that would be great! Otherwise, partners work too. Have each group choose a “robot”. The others in the group will be the “programmers”. The robots should leave the room or go to a different area.
10. While the programmers are working on their code, the “robots” can head to a different room.



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11. Give each group of programmers 6 Dixie cups to start, some paper to write their code on, a pencil, and a stacking pattern card. (The higher the number on the card, the more difficult the pattern. It's probably best to start with the lower numbered cards.)
12. After the "programmers" have finished their code, the "robots" can return to the group. Using the instructions on the index card, they will stack the cups and see if they can achieve the right pattern. The programmers are not allowed to talk to their robots while they are reading the code and following the instructions.
13. Switch so that each person gets a turn at programming and at being the robot. For each switch, each group needs a different stacking pattern card. (You can make variations of the picture shown above). You can also make up your own patterns if they would like to do so!

## Resources:

<https://curriculum.code.org/csf-1718/courseb/6/>

## Reach out!

We would love to hear from you about all the amazing STEM projects you are doing at home! Show us your finished products on any of the following social media platforms by tagging us or by using the following hashtags. We hope these projects have brought some excitement to your day during these difficult times.

Let us know how we did! Please [click here](#) to fill out a short survey on how well we did and what you would like to see more of in the future. Thank you!

Twitter: **@MyMindsInMotion**  
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**#ucalgarycamps #ucalgarytogether**