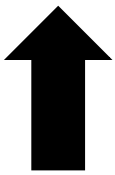
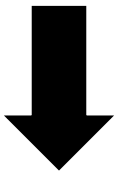
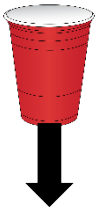
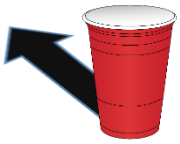
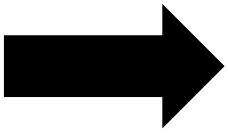
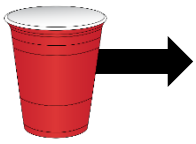
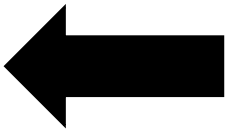
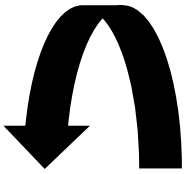
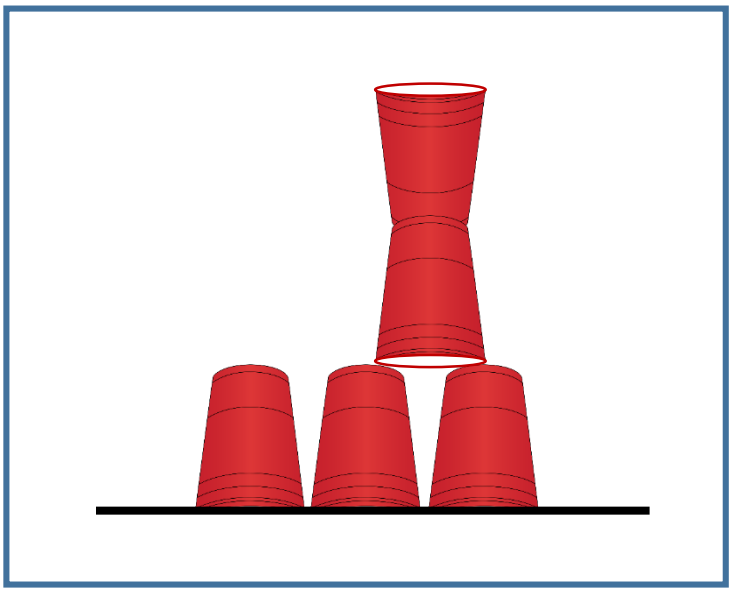
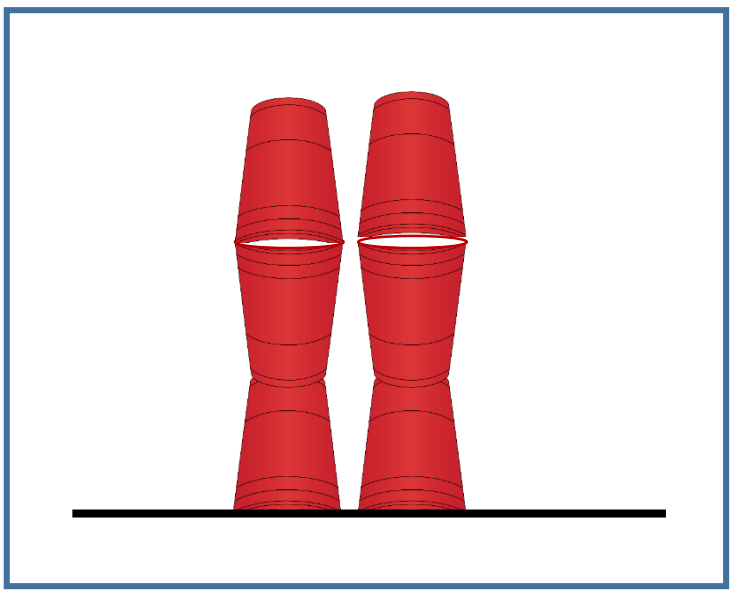
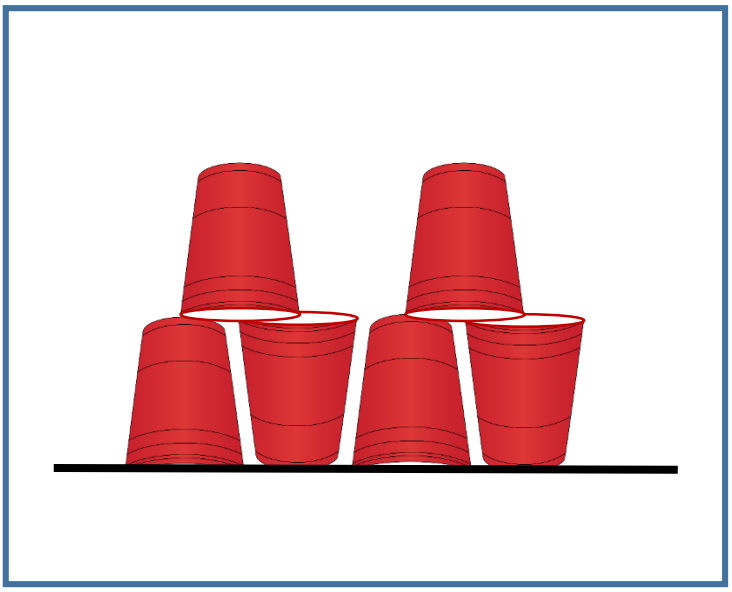
# Cup Stacking Symbol Key

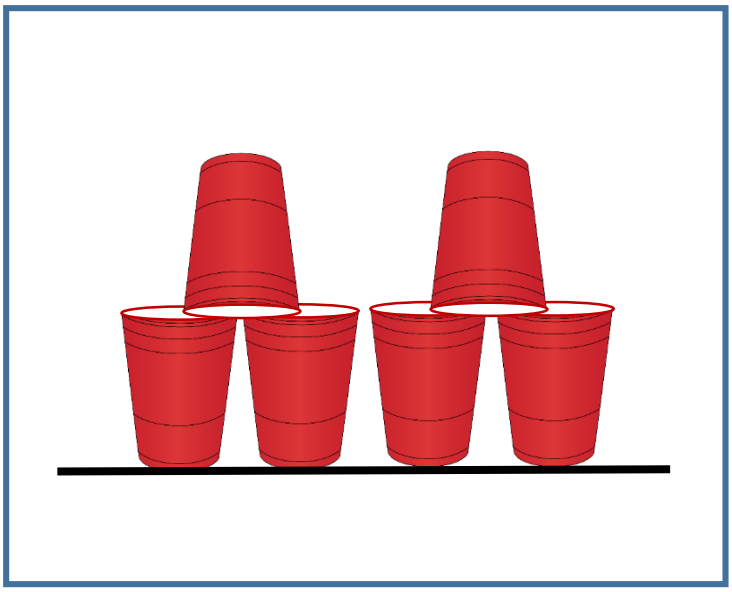
| Symbol | | Command |
|---|---|---|
|  | | **PICK UP CUP.**<br>Pick the cup up as high as it needs to be. |
|  |  | **PUT CUP DOWN**<br>Cut continues in a downward motion until it lands on something. |
| |  | **MOVE FORWARD**<br>Move one step (the diameter of the bottom of the cup) forward |
| | | **MOVE BACKWARD**<br>Move one step (the diameter of the bottom of the cup) back. |
|  |  | **STEP RIGHT**<br>Move one step (the diameter of the bottom of the cup) to the right |
|  | | **STEP LEFT**<br>Move one step (the diameter of the bottom of the cup) to the left. |
|  | | **FLIP CUP OVER**<br>Turn cup over (180°) |

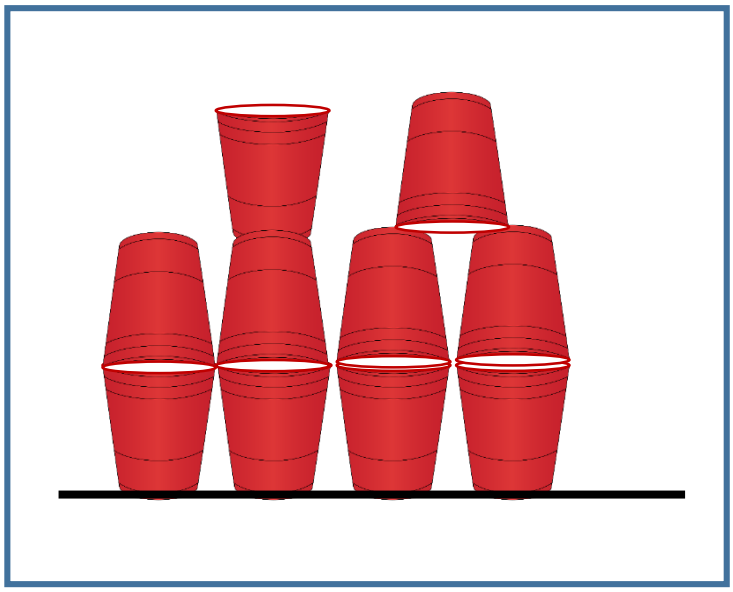
# Cup Stacking Challenge Cards





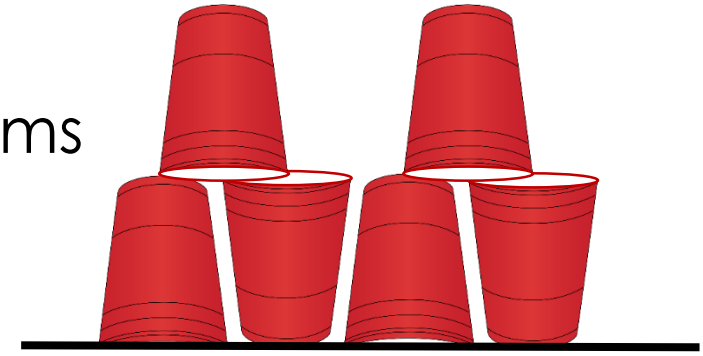






## UNPLUGGED CODING

# Cup Stacking Algorithms



## WHAT YOU NEED:

Symbol Key (1 per team)
Cup Stacking Cards (1 set per team) make sure to cut them into individual cards
Disposable Cups (6 - 10 per team)
Blank Paper
Pencil or Pen

## WHAT TO DO:

Choose a role. Who is going to be the programmer and who is going to be the robot tester?

"Robots" should not look at any of the cards or talk to the programmers.

The programmer should choose one of the cup stacking cards. It will show the exact pattern that the factory needs the cups stacked in.

- As the computer programmer, it's your job to write an algorithm or a step-by-step set of instructions that will tell the "robot" how to recreate that specific cup stack pattern. The sequence needs to start with the cups placed in one stack in front of the robot.

- The robot's computer is only able to "read" code that is written in the symbols listed on the key. Using the Symbol key, write out the algorithm that the robot will use to construct the cup tower.

- Once you've finished it, practice following each step to make sure that the robot will be able to do it without any help. If you find errors in the code, now is the time to rewrite it.

After you've checked your algorithm for errors, it's time to let the robot use the written code to construct the tower on the card.

- Place a copy of the new code, the symbol key and a stack of cups in front of the robot.

- The robot will perform each step of the code as it is written.

- Programmers are not allowed to talk when the robot is working. This includes giving answers or clarifications or pointing out when the robot has done something wrong.

Once the robot has finished, compare the completed tower to the picture on the card. Do they match?

If they don't match - Check of errors in the code and then retest.

If they match – Congratulations your code works. Now, switch roles and pick a new pattern to code.