Drawing Algorithms

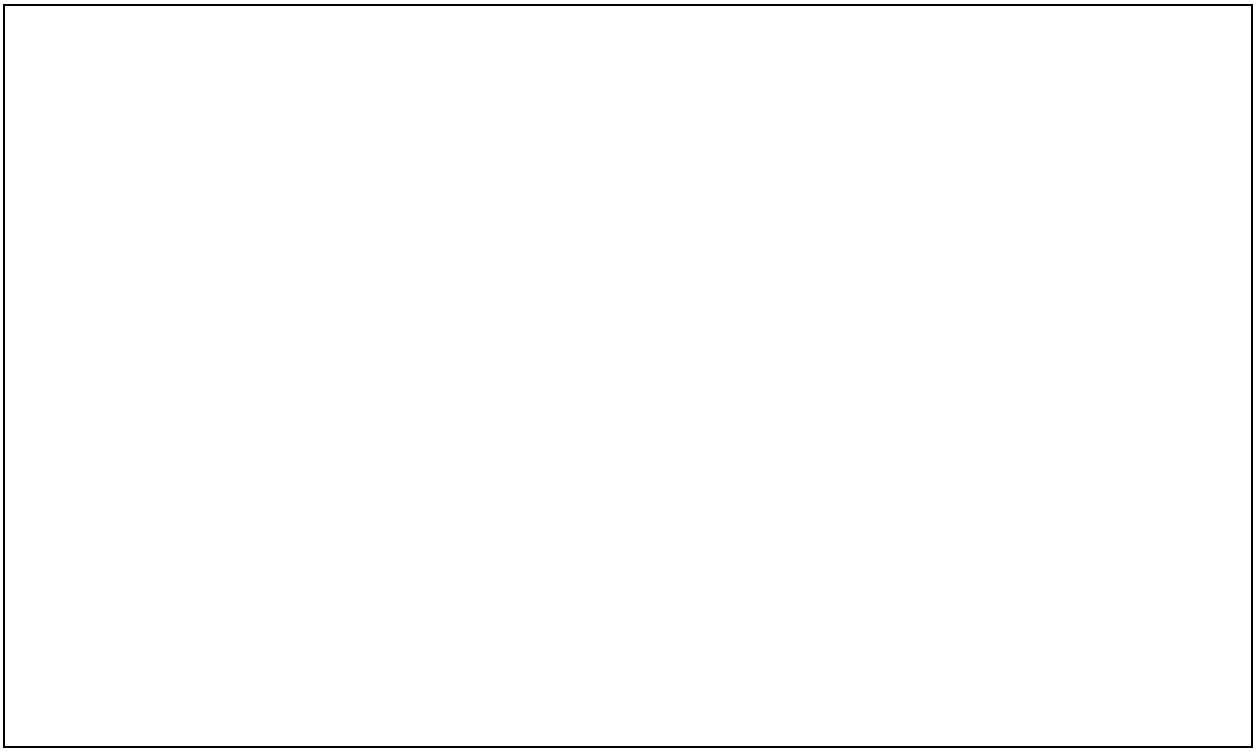
Name:_____ Date:_____

For this activity, you will be coding (writing out instructions) for someone to draw a picture. You will also be given the opportunity to follow someone else's code to draw. (Code in the box below)

Grab a partner and decide who will be the coder and who will be the robot. Each person will be given a picture, and will give instructions on how to draw the image to the drawer. The drawer must follow the coders instructions, drawing in the space below. ***Remember***: the coder is not allowed to tell the drawer what the picture is, and there is no helping while they are drawing! Your partner can not see your picture, even after the first drawing.

After seeing the outcome of the drawing, listen to how the teacher describes how to draw something simple in a demonstrated example.

Try using the next panel to draw the picture from a revised version of the code that the coder wrote.



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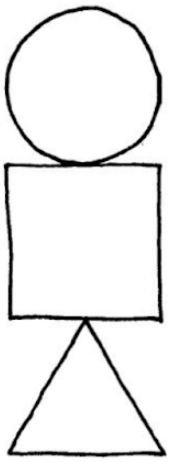

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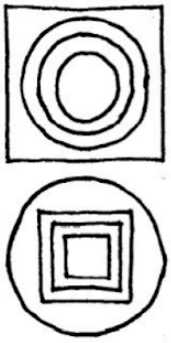

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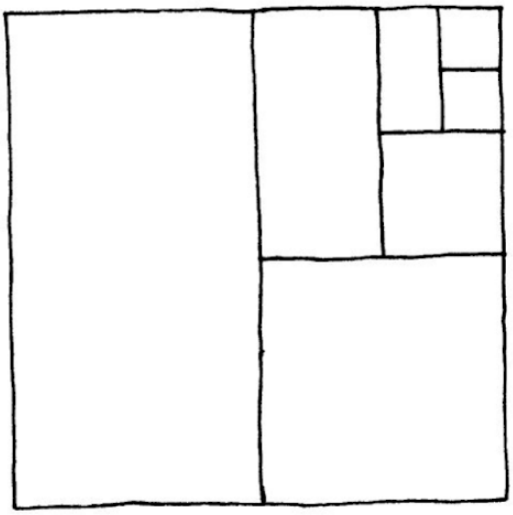

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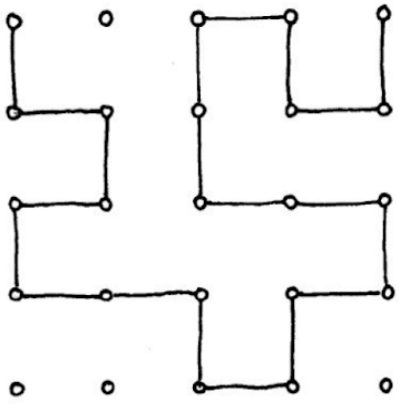

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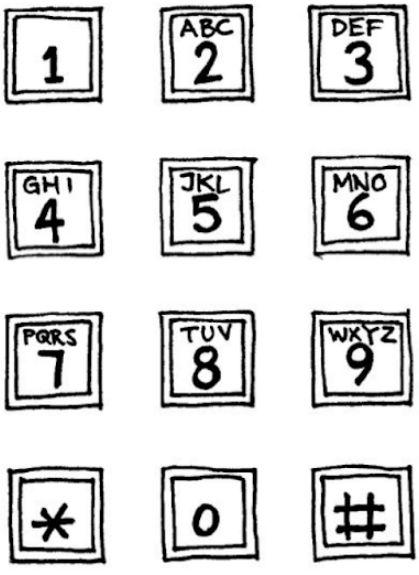
1
ABC 2
DEF 3
GHI 4
JKL 5
MNO 6
PQRS 7
TUV 8
WXYZ 9
*
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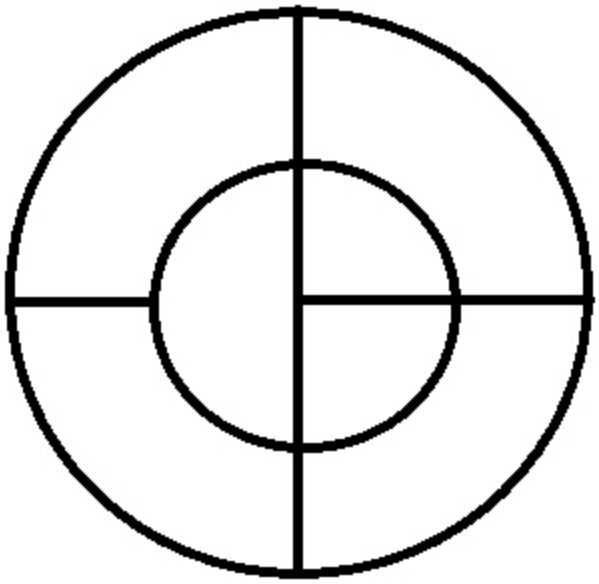
#

Teacher page

After discussing the algorithm discussion, hand out the pages for the Drawing Algorithms activity. Each student in each group of two should have different sample images from the next page. Have the students write out instructions on how to draw the image. Then after some time, have the students exchange codes and have them attempt to draw the image using only the written instructions. After the image is drawn, give the following instructions for an example of a description of the drawing.

1. Draw a circle that fills the majority of the drawing area.
2. Draw a circle centered inside the first circle that is about half the size of the original.
3. Draw a vertical line splitting both circles in half, that starts at the top of the bigger circle and stops at the bottom of the bigger circle.
4. Draw a horizontal line that starts at the center of the circles and the line, and ends at the rightmost side largest circle.
5. Draw a horizontal line that starts at the leftmost side of the larger circle, and ends at the leftmost side of the smaller circle.



Discuss the idea of spacing and trying to use a base shape or object to describe how and where to draw other shapes or lines. For example, we used the large circle to base the positions of the rest of our shapes and lines. We not only based the positions, but also the sizes of certain things from this base shape. All the sample drawings for the assignment can either be based off of a center point or object, or can use a grid. With this new information, have the kids revise or create a new algorithm for drawing their shape. If you suspect anyone has shared their image, you can have people exchange partners so that they do not know what the image is. After the second time drawing, the students can then show each other the sample image so they can compare how accurate it is.

Algorithm Discussion

Bell, Tim, et al. “Activity 12 Marching Orders.” Computer Science Unplugged . . . off-Line Activities and Games for All Ages, 1998.

1. Discuss whether it would be good if people followed instructions exactly. An example would be to point at a closed door and ask someone to go through that door.
    a. Ask students to give some examples of directions, and show or explain what the outcome would be if their directions were carried out exactly as stated.
    b. Give some revised versions of given directions. For example, instead of saying “go through that door” while it is closed, you could say “go to that door, open the door, and walk through the opening.
2. Explain that computers work by following lists of instructions, and that they do exactly what the instructions say, even if they are incorrect.
    a. Explain how this can lead to an undesired outcome from the computer, and that in order to try to create the most successful program, we should try to match the mindset of the computer.
    b. One of the biggest things for this mindset would be assumptions, and that we assume the computer understands basic things, even though we need to explain everything to the computer.