Harold the Robot
Thinking about programming languages

This simple but effective activity was invented by Richard Nelson, Jason Clutterbuck, Sebastian Höhna, Stefan Marks, and Wilson Siringoringo at a workshop for Postgrad Computer Science students in April 2008.

In this activity children simply give directions to a "robot" (either an adult or another child) and find out which instructions the robot is able to follow, and how their instructions are taken literally.

1. Place a small collection of blocks or similar objects on the bench.

2. One person (perhaps the teacher or other adult for a start) plays the role of Harold the Robot. Harold can only respond to particular commands. These commands are *not* given to the children, and can be made up on the fly.

3. Have a child talk Harold through making a tower out of the blocks using instructions such as "Move your hand to the left", "Pick up the block beside your hand" and so on. If the child gives an instruction that is too complex or otherwise not in Harold's vocabulary (e.g. "put the three blocks on top of each other") then Harold expresses confusions by shaking his head or burying his head in his hands.

4. The task is completed when the tower is built. At this point, discuss with the children about which commands it would be reasonable for the robot to respond to, which wouldn't make sense. Does a small vocabulary limit what can be done, or does it simply make more instructions necessary?

This activity has similar goals to the "Marching Orders" activity, and is intended to expose students to the idea that computers follow instructions very precisely, which can be frustrating at times. It also raises the issues surrounding choosing instruction sets, and whether it's better to have a large complex instruction set, or a small efficient set.

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