Algorithmic Thinking: Programs that Solve Well-defined Visual Problem
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In early 2014 I created and taught a CS0 course for women students at Mount Holyoke College. I chose to emphasize algorithmic thinking as a way of solving problems—on and off the computer; so I needed concrete and appealing problems for the students to solve. Having the students create their own problems was my way of doing so.

In class version of each assignment

For Assignment 1 students first design their image composition using paper cuts and/or sketches. Abstraction, simple shapes and few colors are used to tell a story.

Students then translate their physical plans to a Processing program composed of a sequence of calls to graphics functions. A coordinate system and a grid is required to map the picture design to the function call statements with appropriate parameters. In addition mastery of the color model, order of instructions and the painter’s algorithm is required.

Match their output to the paper plans above!

In class version of each assignment

Assignment 1: Composition

Assignment 2: Patterns

Assignment 3: Animations

During the term student’s enthusiasm guided the course development: they were keen to learn new concepts to make complex designs; they frequently asked about graphics research. They requested to learn about gradient for Assignment 1! They enjoyed discussing the contrast between their work and the 3D equivalent.

Students were surprised by the approach and methodology of the course. They didn’t expect programming to be so fun and computer science to involve creativity. They wholeheartedly embraced the course, which changed their view of computer science.

Most important several students expressed unprompted interest in taking a follow-on course. Two students were part of a team of five who went to the 36 hours hacking at Yale University the following November.

• What is their view of computer science one year later?
• Was the women classroom a contributor to this special experience?
• How does this curriculum compare to other CS0 which use a visual approach?