

Computer Science for the Young Mind

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Abstract

Technology has made tremendous leaps and bounds throughout the ages. More and more of today's work force has taken to the field of computer programming. But sadly enough, there has been limited effort to teach computer science at the elementary school level, which this project addresses. The purpose of this project is to implement computer programming to educate elementary school students in math and science.

Background

Since the beginning of civilization, mankind has made momentous leaps and bounds in technological advancement. From the Industrial Revolution of the 1880s to the dawn of the Digital age, because of how far we've come, we now live in a world once deemed unimaginable. At the center of this new world sits an adapting education system, where more and more people are taking up jobs in the field of computer science. Unfortunately, very little progress has been made at the lowest level of education in terms of technology: children.

Traditional computer science programs utilize traditional programming languages, such as Java, Python, or C++, all of which are geared toward high school and college students. The first attempt to teach computer programming to younger children was with Logo, which involved telling a turtle how to move around to make various pictures. Since then, other preliminary programming languages have been implemented with varied levels of success, the most recent of which being Scratch.

Scratch was developed and released in 2007 by MIT; it gets its name from its dynamic editing style, allowing users to edit programs as they're still running. Instead of typing commands on various lines of code, the programming language editor uses drag-and-drop boxes and images to provide coding. Users are even given the ability to create and edit custom sprites. As of 2008, the latest release is version 1.3.

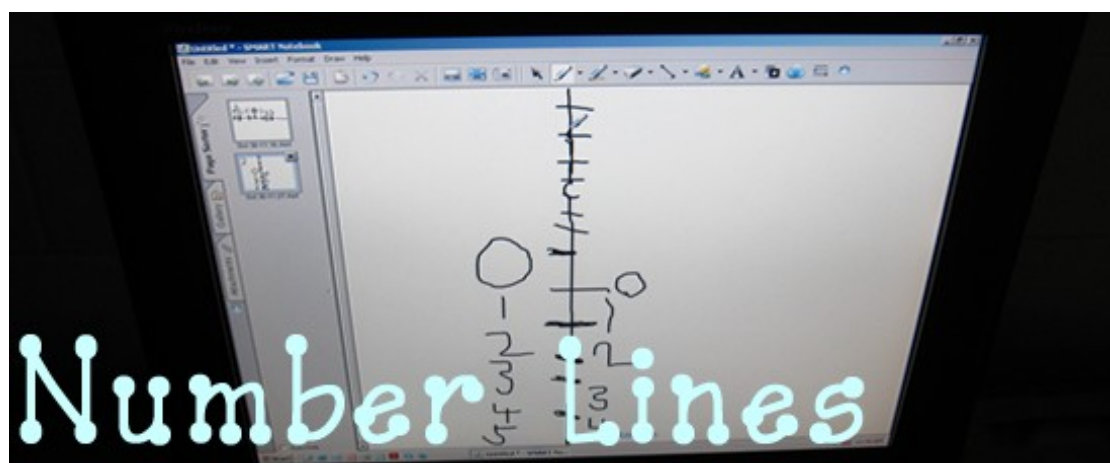


Figure 1: Promotional Image for October 30 Lesson

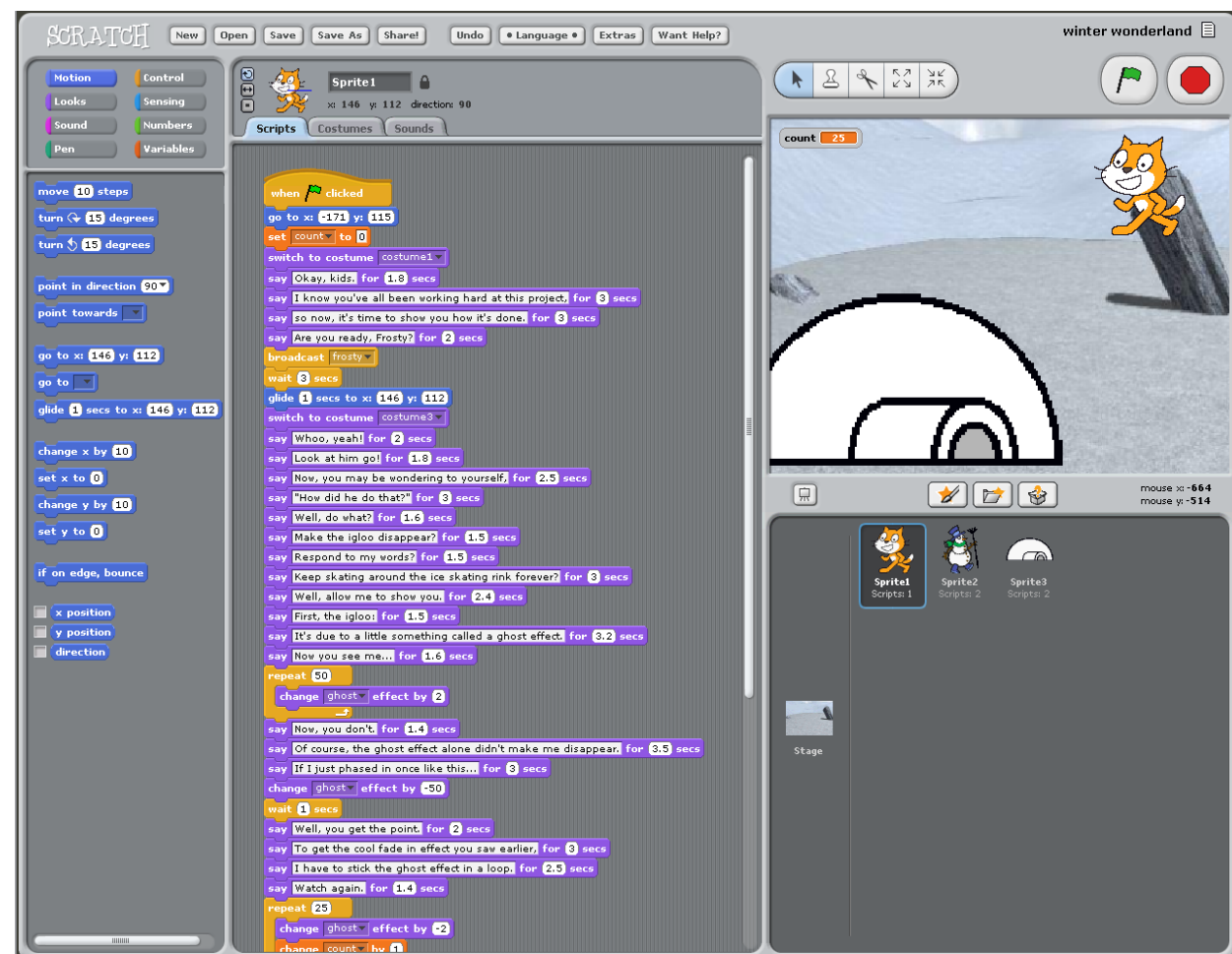


Figure 2: Screenshot of project program demo

Procedures and Methods

The program, started in 2007 by Gregory Gates, had to be expanded on in a series of steps. First, my teammates, Jessica Gorman and Crystal Noel, and I had to work out how we would divide students who had previously taken the Cardinal Forest Elementary School Scratch course from those who had not. Ultimately, we decided to divide the students into groups based on grade level.

Unlike my teammates, I had no way of efficient transportation to Cardinal Forest Elementary. Instead, I stayed behind the scenes and created various programs to help teach the children while Crystal and Jessica visited the school to help Mr. Allard teach. We studied various aspects of teaching in the process.

I primarily served to provide program demos for the kids to use, regularly contacting Mr. Allard for his approval. Sometimes he asked me to help with major aspects, such as quizzes and tests. Each week or so, I sent him a new demo video made with Scratch, which he would post on Blackboard for the students to see; the video content depended directly on what the lesson was each week. Throughout the year, we worked on various projects which were evaluated for functionality and incorporation of new concepts.

Results and Conclusion

Contrary to what many people seem to believe, computer programming can be--and has been--taught to students at the elementary school level, albeit through radically different means than one would normally expect. The earlier they start programming and showing interest in computers, the better. In the end, the students have made great progress in familiarizing themselves with programming through Scratch, and from what I've seen, someday, the computer may very well become the new medium for teaching nearly all subjects, including English and Social Studies. So, how young is too young to start teaching kids how to program (Gates, 2008)? Who knows? Maybe there's no such thing as "too young" to do so.