

Creative Computer Programming Course
North Boone Middle School
2014-2015

Background:

As the name of this course implies, Creative Computer Programming will teach computer programming. Typically, when one hears the phrase “computer programming”, it brings to mind a variety of negative images, including hours spent sitting and typing code in a text editing program and many hours of frustration spent de-bugging this same code. As a result, many young people have avoided computer programming courses. Thus, they have missed out on the satisfaction and fun that can come from being a creator of interactive media rather than just a consumer of it.

Over the past few years, a new model of teaching computer programming has emerged. This model uses a graphic interface in which you put blocks or puzzle pieces together in order to write computer programs. These blocks or puzzle pieces fit together like LEGO blocks. As these blocks are put together, the interface writes the code and the creator can instantly view the results of their design choices through the use of a preview window that is paired with the design interface.

This course will utilize two of the best such interfaces currently available: SCRATCH and Alice. The use of these interfaces will allow students to create works that are personally meaningful to them. It will also allow students to work collaboratively with others in the creation of computer applications and animations in the same way that Google Documents currently allows students to work jointly in the creation of a report or presentation.

Current literature also suggests that students achieve their best results when reflection time is built into the curriculum. As a result, this course will also include built in time for students to review and rethink their designs.

This combination of interactivity, collaboration, and reflection represents something new in technology education at North Boone and should result in a very intellectually stimulating and enriching experience for students at our middle school.

Content:

This course will consist of two parts. Part I will use SCRATCH animation software to create a variety of computer applications in the areas of the arts, storytelling, and game design. Part II will use Alice programming software to create virtual worlds in which characters that students design move, talk, and interact with each other.

What is SCRATCH?

SCRATCH is a free online programming interface developed by the Massachusetts Institute of Technology. With SCRATCH, students can program their own interactive stories, games, and animations. They can also share their programs with the rest of the SCRATCH community. There are currently over 5 million users worldwide. To learn more about this program visit SCRATCH at <http://scratch.mit.edu/>.

What is Alice?

Alice is a free online programming interface developed by Carnegie-Mellon University. Like SCRATCH, Alice can be used to create a nearly endless variety of interactive, stories, and games. However, it differs from SCRATCH in that the worlds created in Alice are fully three dimensional. To learn more about Alice visit <http://www.alice.org/index.php>.

Units:

Unit 1: SCRATCH Programming in the Arts – In Unit 1, students will explore computer programming through the lens of the Arts by creating projects that will include the elements of music, design, drawing, and dance. The programming concepts of sequences and loops and the practices of being iterative and incremental¹ will be highlighted.

Unit 2: SCRATCH Programming for Storytelling – In Unit 2, students will explore computer programming through the lens of storytelling by creating projects that include characters, scenes, and narratives. The programming concepts of parallelism² and events³ and the practices of reusing and remixing⁴ will be highlighted.

Unit 3: SCRATCH Programming in Game Design – In Unit 3, students will explore computer programming through the lens of game design by creating projects that have defined goals and rules. The programming concepts of conditionals⁵, operators⁶, and data and the practices of testing and debugging will be highlighted.

Unit 4: Using Alice Programming for Storytelling – In Unit 4, students will learn the basics of Alice Programming and expand on their knowledge of digital storytelling by designing their first virtual world, creating characters, and developing a storyline. The programming concepts of object positioning, methods⁷, properties⁸, and events will be featured. Programs will also feature the use of billboards⁹, sound, and 3-D text. The use of storyboards to outline a storyline will also be featured.

Unit 5: Using Events in Alice Programming – In Unit 5, students will build on the knowledge of event programming that they learned in Unit 2, by using Alice to create an interactive story that allows for multiple narratives. The concepts of events and parameters¹⁰ will be featured.

Unit 6: Using Loops and Conditions in Alice Programming – In Unit 6, students will build on the knowledge of loops and conditions that they gained in Units 1 and 2 of this course by creating

¹ Being iterative and incremental is the process of developing a little bit, testing, and then developing some more.

² Parallelism is making things happen at the same time.

³ Events – One thing causing another to happen.

⁴ Reusing/Remixing – Making something based on what you or others have done.

⁵ Conditionals – Making decisions based on conditions.

⁶ Operators – Mathematical and logical expressions.

⁷ Methods – Telling objects what to do.

⁸ Properties – The characteristics of an object.

⁹ Billboards – A way of converting a 2D image into a 3D object.

¹⁰ Parameters – The limits to what a character can do. These are similar to the performance parameters for any machine or limited capabilities that any living thing has.

programs with characters that repeat some actions automatically and that can make decisions based on the conditions present on the screen.

Software to Be Used:

- SCRATCH – Free download from Massachusetts Institute of Technology available at <http://scratch.mit.edu/>
- Alice – Free download from Carnegie-Mellon University available at <http://www.alice.org/index.php>.