

Gifted LearningLinks Program Course Syllabus

Instructor name: Brian Myers
E-mail address: xxx@xxx.xxx

Course Title

Scratching Technology II: Introduction to Computer Programming (Advanced)

Session Date: Winter 2011

Course Description

Scratching Technology II is intended for students wishing to build upon the skills acquired in the first level course while enhancing and adding to their store of foundational computer programming concepts. Students explore intermediate concepts in programming including loops, user input, recursion, conditionals and comparison operators while working creatively within a dynamic digital media environment. In the process, students will create highly engaging and sophisticated one- and two-player games that they can share with family and friends. This course challenges students with an interest and ability in math and science as well as a desire to think crazy, creatively and imaginatively solve problems, while establishing computer literacy and a firm foundation for future computer programming courses.

Outcomes

Upon successful completion of this course, students will:

- Have a basic understanding of the structure of computer programs.
- Have established an understanding of the concepts, logic, and problem-solving skills that will carry over into more complex computer programming environments (e.g. scripts, loops, variables).
- Be able to read, write, debug programs using the Scratch programming language.
- Be comfortable discussing with the class the process by which they designed and executed their plan
- Understand the role that creativity can play in technology and, more specifically, computer programming.

Evaluation Process

Students are evaluated on their ability to complete weekly projects, on their analytic and creative approach to design problems, and their ability to express to others what they have learned. Weekly reading assignments and design projects will be posted, with details either specified by the instructor or designed by the students themselves. A large portion of the evaluation will depend on the student's participation in the online class forum.

Required resources:

Scratch web site: <http://scratch.mit.edu>

Students will be required to create a Scratch account to create and maintain an online portfolio of projects. Every effort will be taken to maintain privacy of the students.

Scratch resource folder / Course pack

You will accumulate a number of handouts and project templates during our nine week course. It will be useful to collect these in a folder or binder for easy access.

Recommended additional resources:

Learn Scratch web site: <http://learnscratch.org>

Ford, Jerry Lee, Jr. *Scratch Programming for Teens*. (2008) ISBN: 1598635360

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.

Contact Information:

Email: xxx@xxx.xxx

Schedule

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Week 1	Class orientation and introductions	Phone conference with instructor to discuss class structure and access to online resources.	Provide instructor with Scratch username.	Following initial orientation, instructional strategies will provide for differentiation through open-ended lab activities and broad variability in the content and product domains.
Week 2	Review of Programming Basics Sensing and collision detection; autonomous agents	Maze game project	Students will create a simple maze game with a user-controlled character and autonomous enemies.	Students will be encouraged to customize and enhance classroom examples in a way that is both challenging and personally meaningful.

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Week 3	Loops and randomness Inner loops User input	Random squares	Students will create a project that combines random elements with user-supplied inputs as the basis for a solitaire-style game such as tic-tac-toe or Mah Jong.	
Week 4	2-Dimensional Positioning, randomness, motion and vectors	Target Practice	Students will combine randomness and grid positioning to create a target game in which the player must shoot moving objects; we'll also explore vectors and basic linear mechanics as we apply directional shooting and gravity.	
Week 5	Linear mechanics, loops, level design	Lunar Lander	Students will receive a basic demo that provides the coding structures needed to control a Lunar Lander and animate an explosion; they will be required to build upon this basic project to create at least a three-level game.	

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Week 6	Variables, sound, animation, scoring	Duck Hunt	Students will create a clone of the classic Duck Hunt game using teacher-provided graphics and sound files. Students will be challenged to use variables to control ammunition, scoring and lives and will be required to create an original intro and winner's/loser's screens.	
Week 7	Advanced Topics: Gravity & Jumping, Levels, Scrolling Animation; Discuss Downloading Online Resources	Platform Game Hands-on lab: platform mechanics Gravity Collision detection	<u>Final Project Proposal</u> We will review the basic platform project offered during the first course, and introduce additional features including enemies, shooting and levels.	

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Week 8	Advanced Topics: Gravity & Jumping, Levels, Scrolling Mario Platform Game	Platform Game Hands-on lab (cont'd): platform mechanics Inventory management and level design Individual work on final project	Complete and customize platform game Discussion of the students' ideas, planning process, problems, and solutions Students will also be offered an opportunity to participate in an optional workshop in which they'll create a two-player Harry Potter Quidditch game	
Week 9	Complete Final Projects	Student designed games & final presentations of projects	Discussion of the students' ideas, planning process, problems, and solutions	