

ACM Categories & Descriptors: graphical

Keywords: drag-and-drop extension to the Scratch programming language. Scratch

Circuits and Microcontrollers in Computer Organization Laboratories

Marge M. Coahran, *Dickinson College*
Janet Davis, *Grinnell College*

This workshop will introduce a set of hands-on laboratory activities appropriate for a first Computer Organization course. Participants will work with real equipment: first implementing elementary digital circuits with TTL logic chips, and then programming AVR microcontrollers in assembly to drive fun accessories such as LEDs and speakers. Participants will not take equipment home afterwards, but will receive parts lists and vendor information. The workshop is intended for educators with little electronics background who are interested in incorporating electronics laboratories into their courses. Laptops (Linux, Mac, or Windows) will provide the programming environment for the AVRs. Free software will be available before the workshop. Participants will work in pairs. Laptop recommended.

ACM Categories & Descriptors: K.3.2

Keywords: Computer organization laboratories, digital circuits, assembly language, AVR microcontroller

Web Development with Python and Django

Ariel Ortiz, *Tecnológico de Monterrey, Campus Estado de México*

Many instructors have already discovered the joy of teaching programming using the Python programming language. Now it's time to take Python to the next level. This workshop will introduce Django, an open source Python web framework that saves you time and makes web development fun. It's aimed at Computer Science instructors who want to teach how to build elegant web applications with minimal fuss. Django follows the Model-View-Controller (MVC) architectural pattern. Its goal is to ease the creation of complex, database-driven websites. Django emphasizes reusability and pluggability of components, rapid development, and the principle of DRY (Don't Repeat Yourself). Python is used throughout, even for settings, files, and data models. Topics that will be covered during the workshop include: setup and configuration, template language, and database integration through object-relational mapping. Participants should have some familiarity with Python, HTML and SQL. Laptop Required.

ACM Categories & Descriptors: K.3.2; C.2.4

Keywords: Python, Django, MVC, Web development

Improving the Accessibility of Computing Enrichment Programs

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Jeff Bigham, *University of Rochester*
Stephanie Ludi, *Rochester Institute of Technology*
Daniela Marghitu, *Auburn University*
Andreas Stefik, *University of Southern Illinois, Edwardsville*

Many wonderful enrichment programs have been created to introduce young people to computing, but with little attention to making them accessible to students with disabilities. In this workshop participants will learn from practitioners who have introduced computing and programming to young people with disabilities. They will also learn first-hand from students with disabilities about their needs in learning programming. There will be breakout sessions for participants to apply what they have learned to improve existing enrichment programs such as Alice, Arduino, Scratch, Kodu, App Inventor, Greenfoot, Lego Mindstorms, Processing, and Computer Science Unplugged.

ACM Categories & Descriptors: K.3.2

Keywords: Disability, Computing Enrichment, Programming

Enhancing Student Interest by Extending Graphics Applications

Samuel A. Rebelsky, *Grinnell College*

Computer science teachers strive for new examples and problems to interest millennials. The Media Computation approach has proven successful in attracting students in contexts from community colleges to R1 universities students are clearly excited by writing programs that make images. In this workshop, we show how to go a step further and have write scripts and plug-ins in Python for open-source graphics programs such as the GNU Image Manipulation Program and Inkscape, open source alternatives to Photoshop and Illustrator. With this approach, students not only make images, they also write filters and features that they can share with others, even with non-programmers. For example, students have written filters that fractalize vector graphics or that turn images into something that looks like stained glass. The ability to make programs that others will use is particularly motivational. We will explore ways in which students can interact with both Inkscape and GIMP, from working with interactive programming consoles to writing plug-ins that can easily be shared with others. We will also consider the ways in which different models of image making can be used to motivate the major programming paradigms. The approach has been used with Python, Scheme, and C and for everything from a one-week module to a full course.

ACM Categories & Descriptors: K.3.2

Keywords: Novice programming, Python, GNU Image Manipulation Program, Inkscape, Open Source