Saturday Workshops

Server-side Web Development with JavaScript and Node.js

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Node.js is one of the hottest open source web platforms currently available. It's built on Google Chrome's V8 JavaScript runtime engine and it allows you to write all kinds of network applications and servers in just a few lines of code. Node.js uses an asynchronous programming model built on non-blocking I/O and a single-threaded event loop. What this means, basically, is that you don't need to be concerned with awful race conditions or synchronization issues that arise when programming for a concurrent multi-user environment. This workshop is aimed mainly at web development instructors that would like to consider teaching a single programming language, JavaScript, for both client-side and server-side coding. Participants will learn how to employ Node.js on Windows, Mac OS or Linux in order to write scalable web servers and applications. Additionally, the Express web framework will be introduced in order to demonstrate how to quickly program traditional webapps and single-page applications (SPA) with the aid of jQuery, AJAX and RESTful web services. The resulting programs will be usable from any modern web browser, including those found in desktop and laptop computers, and mobile devices such as tablets and smart-phones. Participants should have prior working knowledge of client-side (running on a browser) JavaScript and HTML. More information: http://node.arielortiz.info/ Laptop Required.

ACM Categories & Descriptors: K.3.2 Computer and Information Science Education; C.2.4 Distributed Systems

Keywords: JavaScript; Node.js; Server-side programming

Artbotics with Lego Mindstorms

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This workshop introduces participants to the Artbotics program, which combines art and robotics to teach students about computer science while creating kinetic, interactive sculptures. The material covered will be provided in introductory fashion, requiring no prior experience with computer science, art, or robotics. The Lego Mindstorms NXT platform will be used to create two projects during the workshop: a spirograph-like drawing produced by programming a car holding a marker to drive using a sequence of motor movements (teaching the need for looping in programming) and an interactive, kinetic sculpture that reacts to sensor input (teaching the need for decisions in programming and building simple mechanisms). Examples of both projects can be seen at youtube.com/artbotics. The workshop will end with a short discussion of lessons learned and best practices, using examples from previous Artbotics programs for a variety of ages. Topics will include appropriate time frames, how to best use limited resources, and appropriate levels of depth for each age group. The workshop administrators will be providing laptops with the proper Lego Mindstorms NXT software, Lego Mindstorms NXT kits, and all needed building materials. ***For additional information see artbotics.org/lego. Bringing your own laptop is optional.***

ACM Categories & Descriptors: J.2 Physical Sciences and Engineering

Keywords: computer science; art; robotics; Artbotics; education; interactive; kinetic sculpture; drawing

Using the AP CS Labs in the Classroom

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The Advanced Placement (AP) Computer Science (CS) A Development Committee is replacing the large case study (GridWorld) with a hands-on structured lab component with the following characteristics:

- At least three labs explore computing in context at a significant level, building upon supplied code that provides examples of good style and appropriate use of programming language constructs
- Each lab contains a significant problem-solving component in which students study alternative approaches for solving a problem, solve new problems, or modify existing code to solve altered problem.
- At least one lab provides students with experience working with programs involving multiple interactive classes and may involve decomposing a program into classes and using inheritance, interfaces, and other object-oriented concepts as identified in the AP Computer Science A topic outline.
- Collectively, lab experiences will cover at least 80% of the topics listed in the course description and will involve at least 20 hours of class time.

In investigating the use of labs, the AP CS A program developed three labs that cover many introductory topics and may be used at various times throughout a course. Since these labs cover many basic concepts and perspectives, the labs are appropriate for both AP CS A courses and many college CS1 courses. This workshop will introduce teachers to the AP CS A lab materials and provide practical experience in using these materials within introductory courses.

ACM Categories & Descriptors: K.3.0 General

Keywords: AP Courses and Curriculum; K-12 Instruction

SIGCSE'14, March 5–8, 2014, Atlanta, Georgia, USA.
ACM 978-1-4503-2605-6/14/03.