Presentations/ Workshops in RGAN 103

Hour of Code
(10:00 am to 11:00 am) 103 RGAN
This 60-minutes session is a part of nation-wide initiative and is based on http://csedweek.org/learn to get started with programming. We will use Lightbot that offers an easy way for novice programmers to learn concepts like loops, if-then statements.
level: middle schools, and high schools – programming novices
format: hands-on guided by CS students

Programming in Alice
(11:15 am to 11:45 am) 103 RGAN
Alice is a popular 3D programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web. Alice is a freely available teaching tool designed to be a student’s first exposure to object-oriented programming. For more information, see http://www.alice.org. This hands-on session will explain how to use Alice environment and learn about programming.
level: students from age 6 or 7 to college seniors.
format: hands-on, guided by a CS faculty and students

Programming Video Games in 50-minutes with GameMaker
(12:00 noon to 12:50 pm) 103 RGAN
Participants will learn basic programming concepts and how to use the GameMaker environment. The tutorial will focus on implementing a fully-playable version of the game Tetris.
level: Interesting to people of all ages, technical details targeted at high schoolers
format: Interactive, will use Game Maker on individual computers so participants can actively start writing their own video game.
**DEMONSTRATIONS IN RGAN 102**  (Note: Not all the presentations are available at the same time.)

1. **LASER PROJECTOR**

   **WARNING: Laser, Strobing/Flashing Light**
   The Laser Projector project brings together computer science, electrical engineering, and computer engineering. The project utilizes rather simple geometry and not so simple algorithms to manipulate the light emitted by a laser pointer – allowing us to project images onto almost any surface. This is achieved by two Galvanometers that redirect the laser beam, moving it on an X and Y-axis. These Galvanometers are controlled by drivers, which are in turn controlled by an Arduino micro-controller. The participants will be able to interact with the projector to create images or play a game.
   **level:** middle or high school  
   **format:** hands-on.

2. **VIRTUAL REALITY: TECH OF TOMORROW**

   Virtual Reality is developing technology, which allows the user to explore and interact with virtual environments. The Head-Mounted Display (HMD) houses two small LCD screens, which mimic the perspective view of each eye. The 3D image turns and rotates to match your movement – this creates an illusion of presence within the virtual world. The session will introduce participants to virtual reality through direct demo experiences of Oculus Rift headset.
   **level:** All ages welcome  
   **format:** Interactive, students able to experience Virtual Reality with the Head-Mounted Display.

3. **PROGRAMMING IN ALICE**  (see also a tutorial session in 103RGAN at 11:15 am)

   Alice is a popular programming environment that makes it easy to create an animation for telling a story, playing an interactive game, or a video to share on the web. Alice is a freely available teaching tool designed to be a student’s first exposure to object-oriented programming. For more information, see [http://www.alice.org](http://www.alice.org).
   **level:** It is accessible to students from age 6 or 7 up  
   **format:** hands-on

4. **PEG PUZZLE SOLVER USING GRAPH ALGORITHMS**

   This demonstration shows the implementation of graph searching algorithms to solve a common puzzle. Specifically, the solver uses depth first search to solve a triangular peg puzzle. The purpose of this project is to show an application of algorithmic programming.
   **level:** All  
   **format:** hands-on. The application will be running on a laptop computer. Participants can select a board size and choose the initial location of the hole and the program will solve the given arrangement.

5. **SUDOKU SOLVER WITH DANCING LINKS AND PYTHON**

   By implementing efficient algorithms, such as Knuth’s Dancing Links, it is possible to solve most of Sudoku puzzles in a fraction of a second. Participants will be able to input a Sudoku puzzle to see the auto-complete functionality. They will also learn how the puzzle is solved and how the algorithm is translated into computer code.
   **level:** Middle and High School students  
   **format:** Interactive, students able to enter own Sudoku puzzle and see how they are solved.
6. **Least Significant Bit Image Steganography**
   Steganography is the practice of concealing a message – secrets – within another file, message, image, or video. Visitors will learn about concealing messages in images using steganography techniques and will be also input/extract their secret own messages.
   **level:** Interesting to all students; technical parts just for high schoolers
   **format:** Informative, visual, and interactive demo

7. **Julia Sets as Mathematical Art**
   Julia sets are infinitely complex shapes generated by a single mathematical equation. These sets demonstrate properties of a variety of things found in nature, and are now being used in a wide range of disciplines.
   **level:** All ages welcome
   **format:** Interactive, students able to generate their own Julia sets

8. **Optimizing Ice Cream: The CP-net Visualizer Demo**
   Come see a software tool developed at UK to visualize Conditional Preference Networks (CP-nets). Learn about undergraduate and high school research at UK, and learn how computer science is helping us to understand humans. Also find a better way to order ice cream.
   **level:** middle or high school
   **format:** hands-on. The software running on a laptop, is also available for use online. With a flash drive (or email address) you can keep your ice cream preferences forever!

9. **My Ten Years of Developing Games with GameMaker** (see also tutorial at 12:00 noon to 12:50PM in 10 RGAN)
   This presentation shows my path to Computer Science and Computer Engineering. I started programming video games as a hobby at age 11. All projects have been developed with GameMaker, with my own video game concepts and a wide variety of game styles and ideas. Some of those games will be demonstrated and discussed.
   **level:** All ages welcome
   **format:** Demo, interactive.

10. **Reading Bubble-sheets with Android Mobile Device to Reward Your Good Work Quickly**
    Everyone who have ever taken a test have seen a bubble sheet. We will show an app developed for Android mobile devices to scan a bubble-sheet for fast grading. For participants interested in app development some technical details of programming will be discussed.
    **level:** middle or high school
    **format:** answer a multiple choice set of questions, and you might win a small prize when 10/10. Prizes on the first-come-first-served basis.