

Intro to Computer Programming Gets a Makeover at UC San Diego

December 9, 2008

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UC San Diego undergrads taking an intro-to-computer programming course held a campus art show recently. The art? Glossy collages created by pairs of students as a week-four homework assignment for Beth Simon's CSE8A class, the first programming course computer science majors take at the Jacobs School of Engineering. The students learn to program in Java by writing code to manipulate digital images and create art.

"Our students grew up manipulating digital images. We are now introducing these students to computer programming through the lens of digital media, something that is very much relevant to nearly every student on campus," said Beth Simon, the UC San Diego computer scientist who helped bring this new twist on computer science education to UC San Diego.

The students showed off the collages they made by assembling and manipulating at least three different images. They wrote Java code to rotate, blend and mirror images, apply filters, and even create new filters.

"Instead of using Photoshop to manipulate images, students write computer programs that do the specific image manipulations of their choosing," said Simon.

"By adjusting our approach to introductory computer science courses, we are striving to connect with as broad a group of students as possible. We want to help a wide variety of students to understand-and more importantly experience-all the wonderful career opportunities that are and will continue to be available to computing professionals," Simon explained.

According to the Bureau of Labor Statistics' occupational employment projections for 2016, over 800,000 of 1.4 million new professional jobs (57%) will be in computing.

"The need for highly trained computer scientists is expected to continue growing, despite the current economic situation. Software and computing are critical to so many aspects of society, and this is not going to change," said Simon. "It is important that the diversity in our society is reflected in the field of computer science."

"Programming and computational thinking are skills that are meaningful to all of today's students, including those who have never programmed before. By presenting programming in this context, we are able to engage a much larger set of students," said Keith Marzullo, chair and professor, Department of Computer Science and Engineering at UC San Diego's Jacobs School of Engineering.

Debugging Your Art Project

Early indications suggest the UC San Diego students are enjoying the fresh approach to computer programming.

"I love creating stuff from scratch," said Kacey Mack, one of the undergrads taking CSE8A this fall and who presented her computer programmed art. "Any kind of art making I can do. Programming is just another medium for making art."

Max Bunker, another student in the class, is also enjoying the class despite the hard work and many hours dedicated to writing code to perform tricks on images.

"It's an awesome class. You learn quite a bit," said Bunker.

To create the images that looked like photographic negatives in his black and white checkerboard collage, Bunker used "for loops" in Java to go through each pixel in a particular part of his collage and calculate the inverse of the pixel.

"It's about creating art and at the same time mastering the concepts that are going to serve the students throughout their careers as computer science professionals," said Simon.

Each of the collages was printed on glossy paper and hung next to the Java code the students wrote. Simon thanked the Hewlett-Packard Company (HP) for printing out each of the collages and making the gallery event possible. She extended a special thanks to HP's Frank Drogo, Director of Research & Development Printing and Technology Platforms (and a UC San Diego alumnus) for helping make the printing possible. Media Contact: Daniel Kane, 858-534-3262 Computer Science Contact: Beth Simon



