0203-686-01 Special Topic: Programming SVGA Graphics Devices Fall 2003

Synopsis:

This course explores fundamental principles of raster graphics programming from a hardware and systems software perspective, and utilizes the advanced learning facilities of the Michael D. Kudlick interactive computer classroom which affords convenient opportunities for combining formal instruction with "hands-on" programming exercises.

Topics include:

- functional components of a standard SuperVGA graphics adapter
- relationship of video memory to screen resolution and color depth
- standard and non-standard display-modes for text and graphics
- basic computer algorithms for line-drawing and region-filling
- construction of wireframe models and principles of animation
- fundamentals of lighting, coloring, and perspective drawing
- user-interface issues in window systems and event-driven programs
- mathematics of ray-tracing used to create photorealistic images
- exercises in font, icon, and cursor designs and interactive controls

Familiarity with the C/C++ programming language and the UNIX/Linux operating system is assumed, plus an acquaintance with the Intel Pentium processor's registers, instruction-set, and assembly language. Students also should have completed coursework in calculus, linear algebra, and data structures.

This course is open to USF computer science graduate students (and to qualified undergraduates with instructor permission).

Graphics programming is among the more challenging things you can do with a computer – it requires a substantial degree of insight into how the hardware and formats involved work…

-- Steve Rimmer, SuperVGA Graphics Programming Secrets, Windcrest/McGraw-Hill (1993), p. 23

Few software applications fully use the advanced features of the SuperVGAs.

-- Richard F. Ferraro, Programmer's Guide to the EGA, VGA, and Super VGA Cards, Addison-Wesley (1994), p. xxi

The VGA is unparalleled in the history of computer graphics, for it is by far the most widely-used graphics standard ever, the closest we may ever come to a lingua franca of computer graphics...Virtually every PC compatible sold today has full VGA compatibility built in… What this means is that if you write your programs for the VGA, you'll have the largest possible market for your software.

-- Michael Abrash, The Zen of Computer Graphics, Coriolis Group Books (1995), p. 1

Learning Outcomes:

- You will become acquainted with the components of standard PC displays
- You will acquire experience using an assortment of video display modes
- You will be able to apply standard algorithms from the realm of graphics
- You will be able to evaluate suitability of graphics hardware for a task
- You will know how illusions of animation and photorealism are achieved
- You will gain experience in performing "reverse engineering" exercises
- You will know how graphics issues have influenced the computer industry
- You will lay a foundation for pursuing some additional career options

Instructor:

Dr. Allan B. Cruse, Professor of Computer Science and Mathematics
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Textbook:

Julio Sanchez and Maria P. Canton, ***The PC Graphics Handbook,***
CRC Press LLC (2003), ISBN 0-8493-1678-2

Classroom Facilitiy:

The course meets on Mondays and Wednesdays, 5:15-7:00pm, in the new Kudlick Computer Classroom (HRN-235). Students will need to have individual computer accounts set up for access during classes.

Exam Dates:

Midterm Exam I will be Monday, October 6.
Midterm Exam II will be Monday, November 10.
Final Exam will be Monday, December 15.

Grading scheme:

Class Participation	20%
Programming Projects	30%
Midterm Exams (2)	30%
Final Examination	20%

NOTE: Unprofessional conduct, such as an abuse of USF computer privileges (unauthorized access), or a violation of academic integrity (plagiarism or fraud), will result in the student receiving a failing grade.