PSY 590 Scientific Programming in C Spring 2008

Instructor: J. Farley Norman, Ph.D. 233 Tate Page Hall
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Office Hours: by appointment

Texts:

Required: Kernighan, B. W., & Ritchie, D. M. (1988). The C Programming Language (2nd edition). Englewood Cliffs, NJ: Prentice Hall P T R.

Woo, M., Neider, J., & Davis, T. (1997). OpenGL Programming Guide (2nd edition). Reading, MA: Addison-Wesley Developers Press.

Overview:

The emphasis in this course is placed upon the ***practical*** usages of the C computer programming language as applied towards scientific research in Psychology (for example, for experiments on the study of human visual perception).

Course requirements:

There will be a series of projects of increasing complexity and usefulness. The grade will depend upon the number of projects that are successfully completed. The specific nature of the 10 projects are described below. Each project will be worth up to 10 percent of the final grade (depending upon the functionality and quality of the programs used to complete the project). I will supply the data files needed for each project. Use comments liberally within your source code to document how your program works.

Grading criteria:

A : 90 – 100 % D: 60 – 69 %

B: 80 – 89 % F: 59 % and below

C: 70 – 79%

Project 1 - Write a program that reads in a data file (using fopen) and then calculates and prints out the mean, standard deviation, and standard error.

Project 2 - Write a program that when given a data file will transform the data (by calculating the logarithm of the data; the program should be able to do this for arbitrary log bases, such as log base 3, log base 8, log base 10, etc.) and output new files that are the transformed versions of the old file. The program should read in the desired log base using scanf() from the standard C console.

Project 3 - Write a program that reads in a data file, sorts the numbers into ascending and descending orders, and outputs the sorted numbers into two new files.

Project 4 - Write a program that when given a data file containing columns of x and y values, performs linear regression (using least squares minimization), determines the slope and y-intercept of the best-fitting regression line as well as the Pearson r correlation coefficient.

Project 5 - Write a program that performs a one-way within-subjects Analysis of Variance (ANOVA).

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Project 6 - Write a program that performs a Kruskal-Wallis one-way Analysis of Variance of Ranks (ANOVA of Ranks).

Project 7 - Write a program that performs a two-way within-subjects Analysis of Variance (ANOVA).

Project 8 - Write a graphics program using OpenGL that draws selected portions of the Mandelbrot set (a "fractal") into a graphics window. Alternatively you can choose to draw Julia sets if you prefer.

Project 9 - Write a graphics OpenGL program that draws a random-dot stereogram of a curved surface portrayed as an anaglyph (i.e., can be viewed with red/green glasses).

Project 10 - Write a graphics OpenGL program that depicts a 3-D object using the kinetic depth effect.

In compliance with university policy, students with disabilities who require accommodations (academic adjustments and/or auxiliary aids or services) for this course must contact the Office for Student Disability Services in DUC A-200 of the Student Success Center in Downing University Center.

Please DO NOT request accommodations directly from the professor or instructor without a letter of accommodation from the Office for Student Disability Services.

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