Weeks 6 Laboratory Exercise (Version 1.0)
BE-104, Dr. C. S. Tritt, Spring '05

Due at the start of lab in week 7 (4/21) but may be submitted at any time.

Assignment

Create a new and improved version of the class you created for the Programming Problem 1 assignment (the biometrics program). The new class should to deal with both male and female subjects and test for valid subject age. Your new class should use the following equations to estimate an individual's the lean body mass, surface area and plasma volume based on their height and weight:

Use the "Method of Hume" to estimate the lean body mass:

For men over the age of 16: Lean body mass in kilograms =
(0.32810 * (body weight in kilograms)) + (0.33929 * (height in centimeters)) - 29.5336

For women over the age of 30: Lean body mass in kilograms =
(0.29569 * (body weight in kilograms)) + (0.41813 * (height in centimeters)) - 43.2933

Use the formula of Dubois and Dubois for Body Surface Area. The body surface area can be calculated from a person's height and weight using the following equation:

Body surface area in square meters =
((weight in kg)^(0.425)) * ((height in cm)^(0.725)) * (0.007184)

Given the Body Surface Area (BSA), the plasma volume can be calculated fairly accurately using:

For males: plasma volume in mL = (BSA in m^2) * 1560
For females: plasma volume in mL = (BSA in m^2) * 1410

Write a main method to test your class. If you used GUI I/O in your previous program, use console I/O this time and visa versa. You may have the user enter their sex using either a letter (type *char*) or a word (class String). Your evaluation of this input does not have to be robust (i.e. you can require the input to be in a particular case).

Submission and Evaluation Requirements

I suggest you show me your plan (class and main program designs and test vectors) before you start writing code, but this is not required. You must either demonstrate your completed program to me during lab or e-mail it to me as a zip file.

Reference

The Medical Algorithms Project (http://www.medal.org/).