CS 2213 Advanced Programming Recitation

Arithmetic expression - Math lib --if-else

Background: General equation for a line is Ax + By + C = 0 (A, B, C are const).

Suppose we have two different lines A1x + B1y + C1 = 0 and A2x + B2y + C2 = 0.

To find the intersection point of these lines and the angle between them, we can use the following formulas:

$$x_{0} = \frac{\begin{vmatrix} B1 & C1 \\ B2 & C2 \\ \hline A1 & B1 \\ A2 & B2 \end{vmatrix}} \text{ and } y_{0} = \frac{\begin{vmatrix} C1 & A1 \\ C2 & A2 \\ \hline A1 & B1 \\ A2 & B2 \end{vmatrix}} \text{ and}$$
$$x_{0} = \frac{A1 * A2 + B1 * B2}{\sqrt{A1^{2} + B1^{2}} \sqrt{A2^{2} + B2^{2}}}$$

HW Question:

Write a program that asks user to enter *A1*, *B1*, *C1* for the first line and *A2*, *B2*, *C2* for the second line, and then

- 1. the program first computes the intersection point x0 and y0 and prints them then
- 2. it finds the angle between the lines and prints it in degree. (you need to solve that problem, the above formula of cos(angle)=... will help but you need to consider its inverse. Also we want angle in degrees (note that cos in C assumes that angle is in radians).

Note that if $\begin{vmatrix} A1 & B1 \\ A2 & B2 \end{vmatrix} == 0$ holds, the lines are parallel. So your program should detect that case before computing the intersection point or angle...

You must submit your work using Blackboard Learn and respect the following rules:

- 1) All assignments must be submitted as either a zip or tar archive file unless it is a single pdf file.
- 2) Assignments must include all source code.
- 3) Assignments must include an output.txt file which demonstrates the final test output run by the student.
- 4) If your assignment does not run/compile, the output.txt file should include an explanation of what was accomplished, what the error message was that prevented the student from finishing the assignment and what the student BELIEVES to be the underlying cause of the error.