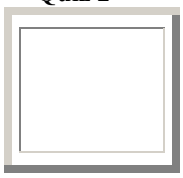
Quiz 2



The first letter of your LAST name

_____ First Name

_____ Last Name

Q2-1 (25 pts)	Q2-2 (25 pts)	Q2-3 (25 pts)	Q2-4 (25 pts)	Total

Note: You have 60 min. Be careful about the time allocation. Try not to leave any problems totally blank so that I can give you some partial credit. Good luck!

24-311 NUMERICAL METHOD Fall 02

QUIZ 2

Date and time	10/1 (Tue), 10:30AM-11:30AM (60 min)
Weight	8 % of final grade
Coverage	lectures and reading assignments: (8), (9), and (10) problem sets: PS3, PS4
Format	closed book, closed notes
Note	bring a basic calculator with + - x / keys (no computer allowed in quiz!)

Q2-1 (25pts) Write a C, C++, Java, or Fortran code that:

(1) keeps reading integer numbers from the keyboard as long as they are positive numbers,

(2) finds the largest and the smallest among all the positive integer numbers typed in from the keyboard,

(3) displays on the screen the following message: "The largest number that you typed was xxx, and the smallest was yyy," where xxx is the largest integer number that your program found, and yyy is the smallest number.

For example, if the following sequence of integer numbers are typed in:

3, 10, 8, 9, 22, 2, 6, 13, 39, -1

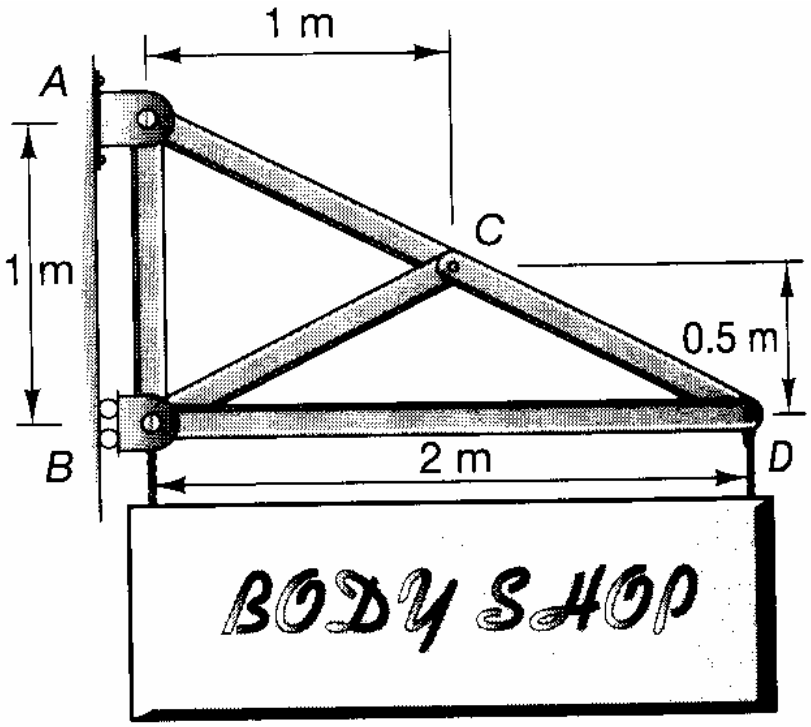
your program should display on the screen,

"The largest number that you typed was 39, and the smallest was 2."

Your code has to be complete, that is, compilable and linkable without errors.

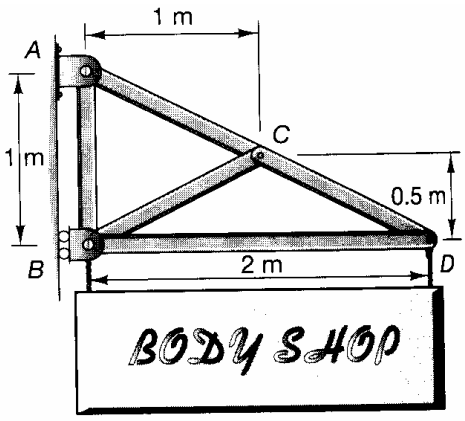
Q2-2 (25pts)

(1) A sign of uniform density having a mass of 250kg is supported by a five-member truss. Let the unknown forces in truss members AC, CD, AB, BC, and BD be f_1, f_2, f_3, f_4, and f_5. The forces in truss members are positive when they are in tension. How many other unknowns does the system have? Explain what they are.



(2) Complete the following matrix equation to find the unknown forces in the truss members. (You don't need to solve the equation.) Arrange the rows in the following order:

force balance in the horizontal direction at node A
force balance in the vertical direction at node A
force balance in the horizontal direction at node B
force balance in the vertical direction at node B
force balance in the horizontal direction at node C
force balance in the vertical direction at node C
force balance in the horizontal direction at node D
force balance in the vertical direction at node D



$$\begin{bmatrix} & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \end{bmatrix} \begin{Bmatrix} f_1 \\ f_2 \\ f_3 \\ f_4 \\ f_5 \end{Bmatrix} = \begin{Bmatrix} \\ \\ \\ \\ \end{Bmatrix}$$

Q2-3 (25pts) Consider the following system of equations:

$$15x + y + 17z = 10$$
$$24x + y = 1$$
$$x + 5y + z = 5$$

Use the Gauss-Seidel method to solve for x, y, and z. Run the Gauss-Seidel iteration once. Use the initial guess of $x = y = z = 1$

Q2-4 (25pts) Solve the following set of equations with LU decomposition without partial pivoting. Show all the intermediate steps.

$$x_1 + x_2 + 2x_3 = 9$$
$$x_1 + 3x_2 + x_3 = 10$$
$$4x_1 + 2x_2 + 4x_3 = 20$$

This is the last page of Quiz 2, and this page is intentionally left blank
so that you can use it if you need more space to write your solution or do some calculations.