

ENGR 102 - Lab 4b

You are to write the following programs, each of which should be done individually. However, you may talk with others in lab about how to go about doing each of them.

Program 1:

Using conditional statements (i.e. statements like if-elif-else) write a program that asks a user for 3 numbers, and then reports what the largest of those 3 numbers is.

Program 2:

Write a program to read in a person's height and weight. Report whether the person is underweight, at a healthy weight, overweight, or obese

- See: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html

Program 3:

Write a program to read in values of a fluid velocity, kinematic viscosity, and characteristic linear dimension to compute a Reynolds number. From this, report whether flow is in the laminar, transition, or turbulent region.

- The exact transition points below which flow is laminar, or above which it is turbulent have varying definitions. You are to find an online source that gives values that you will use for these levels. Output a text statement that gives a website address for the source you find to use for the breakpoints.

Program 4:

Assume a machine during its initial testing phase produces 10 widgets a day. After 10 days of testing (starting on day 11), it begins to run at full speed, producing 40 widgets a day. After 50 days at full speed (days 11-60), it gradually starts becoming less productive, and produces 1 widget less per day, (ie. 39 widgets on day 61, etc.) until on day 100 it no longer produces any widgets. Write a program that will read in a day, and will report the total number of widgets produced by that day (including that day). For example, entering 3 would report 30 widgets. (Note: part of the challenge in this program is for YOU to work out the model for how to compute widgets produced in total, given the above information.)

Program 5:

A quadratic equation is an equation of the form Ax^2+Bx+C . A, B, and C are the coefficients of the equation, and the roots are the values of x at which the equation evaluates to 0, and the well-known quadratic formula is often used to find these roots. (Hint: you may want to look at the cmath module)

Write a program that asks a user for the 3 coefficients and outputs the roots of that equation. Be aware of the following:

- Be sure that your request for input and your output both have descriptive text.
- Be sure to handle the cases where some or even all of the coefficients are 0.
- If the roots have an imaginary component, use i when representing the imaginary term in the output. For example, you may output "3 + 7i" as a root.

- There could be 2 roots, 1 root, no roots, or infinite roots. If 1 or 2, you should output those. If no roots or infinite roots, you should output text stating that.

Completion

You will need to label the files using the following approach:

Lab4b_Program[#]_[Last_name]_[First_name].pdf

Turn in all programs as separate files.