Programming 1 – Exercise Set 5

1. Define a structure Rational representing a rational number, i.e. a number which can be represented as a fraction of two integers, with two members representing the numerator and the denominator of that fraction. Define following functions:
    a. function which takes two integer parameters and returns the rational number with the numerator and denominator members set to the first and second parameter values.
    b. function which will print the rational number to the console window.
    c. function which takes a pointer to the Rational variable. It should ask the user to type in two integer values and store them in the members of its argument.
    d. function which calculates a sum of two Rational values. The return type should be Rational as well.
    e. function which calculates a difference of two Rational values. The return type should be Rational as well.
    f. function which calculates a product of two Rational values. The return type should be Rational as well.
    g. function which calculates a quotient of two Rational values. The return type should be Rational as well.
    h. function which will return the value of a Rational variable as double.
    i. function that will compare two Rational values returning 1 if the first one is larger than the second, -1 if the first one is smaller or 0 if they are equal.

2. Define a structure `Student` with three members: a first name as an array of 10 characters, a last name as an array of 20 characters and semester as an integer. Write a function which will compare two students first by last name, than by first name and finally by the semester. In main define array of students and sort it.
3. A length, specified in meters and centimeters, is represented by two integers. For example, the length 3m 75cm is represented by 3 and 75. using a structure to represent a length, write functions to compare, add, and subtract two lengths.
4. Define a structure `TIME` which hours, minutes and second as three integer members. Write a function which calculates the difference between two time periods. The result is displayed in main( ) function without returning it from function (using call by reference).