

Question 1:

Define a class for rational numbers. A rational number is a number that can be represented as the quotient of two integers. For example, $1/2$, $3/4$, $64/2$, and so forth are all rational numbers. (By $1/2$ and so on we mean the everyday fraction, not the integer division this expression would produce in a C++ program.). Represent rational numbers as two values of type `int`, one for the numerator and one for the denominator. Call the class `Rational`.

Include a constructor with two arguments that can be used to set the member variables of an object to any legitimate values. Also include a constructor that has only a single parameter of type `int`; call this single parameter `whole Number` and define the constructor so that the object will be initialized to the rational number `whole Number / 1`. Include a default constructor that initializes an object to 0 (that is, to $0/1$). Overload the input and output operators `>>` and `<<`. Numbers are to be input and output in the form $1/2$, $15/32$, $300/401$, and so forth. Note that the numerator, the denominator, or both may contain a minus sign, so $-1/2$, $15/-32$, and $-300/-401$ are also possible inputs. Overload all the following operators so that they correctly apply to the type `Rational`: `=`, `<`, `<=`, `>`, `>=`, `+`, `-`, `*`, and `/`.

Write a test program to test your class.

OR

Create a class `InputFile`. Write a member function in class that reads an input text file's contents and stores them in a string data member. Every object of class `InputFile` would open different text files accordingly. Overload operator- for `InputFile` class. Overloaded operator- should eliminate all the same words in both input files from invoking object's input file.

For Example:

| File1.txt | File2.txt |
|--------------------------|-----------------------|
| This is one line of text | This is one line text |

`InputFile obj1` opens and read first text file.

`InputFile obj2` opens and read second file.

The statement `obj1-obj2` should return an object of `InputFile` say, `rObj`, which is supposed to save in file 1

Result: of

Note: You must design on generalize data.

8 marks

Question 2:

Write a program that keeps track of flights at an airport has a `Flight` class and an `Airplane` class. A `Flight` has flight number, destination, and departure date/time. An `Airplane` has I.D. (sort of like a vehicle VIN that uniquely identifies one specific airplane), an airline name, airplane model (e.g. 747), and number

A Flight is assigned to a specific Airplane, but it can be assigned to a different Airplane if something is wrong with the original Airplane. An Airplane can be responsible for many different Flights. A Crew is assigned to a specific Flight and could be assigned to other Flights if they return from a completed Flight.

Question 3:

8 marks

Write a class template with generic data type array to

- a) Check for palindrome.
- b) Copy the contents to temp array, and print sum.
- c) Show the result for following types:
 - i. Double array for example: {0.178,0.24,0.35,0.46} for Palindrome would print "The given array is Not Palindrome" and for sum would print 1.228
 - ii. Char array for example: {'t', 'o', 'p', 's', 'p', 'o', 't'} for Palindrome would print "The given array is Palindrome" and for sum would print "topspot".