

Problem Set 06 - Methods

Complete each task below. Remember to include all header files in the accompanying cpp file. Additionally, the accompanying header file contains the function `GCD()` that returns the greatest common divisor of two integers.

Tasks:

1. Create a header file named "`Currency.h`" and define the class `Currency` within the namespace `PS6`. The class must contain

- ☐ a public double field named `value`.
- ☐ a public default constructor that assigns 0 to `value`.
- ☐ a public overloaded constructor that takes a double parameter and assigns the parameter to `value`.
- ☐ a public copy constructor.
- ☐ a public assignment operator.
- ☐ a public empty destructor.
- ☐ a public string constant method named `ToString()` that takes no parameters. It returns a string in the format

$$\begin{cases} \$y & \text{if } x \geq 0 \\ \$ (y) & \text{if } x < 0 \end{cases}$$

where x is the value of the `value` field and y is the absolute value of x with two decimal places.

- ☐ an ostream operator that returns an outcome in the same format as `ToString()`.

Afterward, within the accompanying cpp file, within the main function, initialize two `Currency` objects such that one is assigned a positive value and the other is assigned a negative value; and then, display both objects.

2. Create a header file named "`Boolean.h`" and define the class `Boolean` within the namespace `PS6`. The class must contain

- ☐ a public bool field named `value`.
- ☐ a public default constructor that assigns false to `value`.
- ☐ a public overloaded constructor that takes a bool parameter and assigns the parameter to `value`.
- ☐ a public copy constructor.
- ☐ a public assignment operator.
- ☐ a public empty destructor.
- ☐ a public string constant method named `ToString()` that takes no parameters. It returns a string in the format

$$\begin{cases} \text{true} & \text{if } x = \text{true} \\ \text{false} & \text{if } x = \text{false} \end{cases}$$

where x is the value of the `value` field.

- ☐ an ostream operator that returns an outcome in the same format as `ToString()`.

Afterward, within the accompanying cpp file, within the main function, initialize two `Boolean` objects such that one is assigned `true` and the other is assigned `false`; and then, display both objects.

3. Create a header file named "Rational.h" and define the class *Rational* within the namespace *PS6*. The class must contain

- a public int array field named *values* with a size of 2.
- a public default constructor that assigns {0,1} to *values*.
- a public overloaded constructor that takes two int parameters and assigns the parameters to the elements of *values* in order.
- a public copy constructor.
- a public assignment operator.
- a public empty destructor.
- a public string constant method named ToString() that takes no parameters. It returns a string in the format

$$\left\{ \begin{array}{ll} c & \text{if } |y| = 1 \\ \text{undef} & \text{if } y = 0 \\ 0 & \text{if } x = 0 \text{ and } y \neq 0 \\ a/b & \text{if } x \cdot y > 0 \\ -a/b & \text{if } x \cdot y < 0 \end{array} \right.$$

where x and y are the value of the first and second elements of the *values* field respectively, c is the product of x and y , a is the absolute value of x divided by the gcd of the absolute values of x and y , and b is the absolute value of y divided by the gcd of the absolute values of x and y .

- an ostream operator that returns an outcome in the same format as ToString().

Afterward, within the accompanying cpp file, within the main function, initialize five *Rational* objects such that each will produce a different outcome format; and then, display all objects.