MCA 1st SEMESTER
Object Oriented Prog. Methodology
PRACTICAL SHEET : S2
Submission : 10th January 2022, 3.00 pm

1. Create a class **Rectangle**. The class has attributes **length** and **width**, each of which defaults to 1. It has methods that calculate the **perimeter** and the **area** of the rectangle. It has *set* and *get* methods for both **length** and **width**. The *set* method should verify that **length** and **width** are each floating-point numbers larger than 0.0 and less than 20.0.

2. Create a more sophisticated **Rectangle** class than the one you created in Problem 1. This class stores only the Cartesian coordinates of the four corners of the rectangle. The constructor calls a *set* method that accepts four sets of coordinates and verifies that each of these is in the first quadrant with no single x or y coordinate larger than 20.0. The *set* method also verifies that the supplied coordinates do, in fact, specify a rectangle. Member methods calculate the **length**, **width**, **perimeter** and **area**. The length is the larger of the two dimensions. Include a predicate method **square** that determines if the rectangle is a square.

3. Create a class **HugeInteger** that uses a 40-element array of digits to store integers as large as 40-digits each. Provide member methods **inputHugeInteger**, **outputHugeInteger**, **addHugeIntegers** and **substractHugeIntegers**. For comparing **HugeInteger** objects, provide methods **isEqualTo**, **isNotEqualTo**, **isGreaterThan**, **isLessThan**, **IsGreaterThanOrEqualTo** and **isLessThanOrEqualTo**--each of these is a “predicate” method that simply returns **true** if the relationship holds between the two huge integers and returns **false** if the relationship does not hold. Also provide a predicate method **isZero.**

4. Write a program that demonstrates the use of all types of Constructors and a destructor.

5. Write a Program and demonstrate whether the use of inline function increases or decreases the size of the object code.

6. Overload the subscript operator [] to return the largest element of a collection, the second largest, the third largest, etc.

7. Create a class **RationalNumber** (fractions) with the following capabilities:
   (a).Create a constructor that prevents a 0 denominator in a fraction, reduces or simplifies fractions that are not in reduced form and avoids negative denominators.
   (b) Overload the addition, subtraction, multiplication and division operators for this class.
   (c) Overload the relational and equality operators for this class.

8. For an object m1 of matrix class, can we use m1<<cout . If yes prove it.

9. Overload the *,+,-,= =,!= and = operators for the complex class.

10. For the class Date with properties int month; int day; int year, overload the following operators.
    a. + operator [a+b (a is of date type and b is an integer), use the assumption that all years have 360 days and months 30 days.
    b. – operator [a-b(same as above)]
    c. = operator [supporting a=b=c=d]
    d. <,<=,>,>=
    e. ++, --[post and pre both]