# CS3201: OBJECT ORIENTED PROGRAMMING LAB EXAM

**Date: 03/05/2024** **Max marks: 20**

1. Create a class `Fraction` to represent fractions with private member variables `numerator` and `denominator`. Implement the following:
   - A constructor to initialize the fraction.
   - A `displayFraction()` member function to display the fraction in the format "numerator/denominator".
   - Declare a friend function `multiplyFractions()` outside the class that takes two `Fraction` objects as parameters and multiplies them.
   - Inside `multiplyFractions()`, access the private members of the `Fraction` class to perform the multiplication.

2. Implement a class `Vector` to represent a 2-dimensional vector( x $\hat{\imath}$ + y $\hat{\jmath}$). Overload the addition (+) operator so that it performs element-wise addition of two vector objects. Also, overload the multiplication (*) operator to perform dot product of two vectors.

3. Implement class `Math` with static functions `factorial` and `combination`. Inputs must be obtained from user, and function calls must be done *without* object initialization.
   - The `factorial` function calculates the factorial of a given integer.
   - The `combination` function calculates the number of combinations of `r` items from a set of `n` items, denoted as $\frac{n!}{r!*(n-r)!}$

4. You are given a class `Student` with `name`, `roll_no`, and `age` as its data members. Have a menu-driven program with the following functionalities-
   - A print option where the function takes a `Student` object as a parameter and prints the name, roll_no, and age.
   - An update option where the user is allowed to update the roll_no or age of any of the student objects. **However, user must not be allowed to update name.**
   - Option to remove a student object. Trying to access this student record later must display “Student not found” message.

| P. No. | Comments | Marks |
|---|---|---|
| 1. | | /5 |
| 2. | | /5 |
| 3. | | /5 |
| 4. | | /5 |
| TOTAL MARKS: | | |