



CSE 215: Programming Language II Lab

Lab – 7

Classes & Objects

Objective:

- To learn about class and objects
- To learn to implement a class using UML

Java has very strong leanings towards Object Oriented Programming.

A class can be thought of as the “concept” of an “idea”, while objects can be thought of as the “materialization” of that idea.

Formal, dilated definition: A non-primitive data type created by programmer is called class. An instance of a class is known as object.

This is similar to `struct` in C, however, we could not include methods in `struct`.

```
// class signature, access_modifier can't be "private"
<access_modifier> class <identifier> {
    // attributes
    // methods
}
```

Example:

```
public class Person {
    public int age;
    public float heightInCm;

    // default constructor
    Person() {
    }

    // overloaded constructor
    Person(int age, float heightInCm) {
        this.age = age;
        this.heightInCm = heightInCm;
    }
    // other methods belonging to this class
}
```

Task:

Implement the following class and test its methods:

Fraction
- numerator: int - denominator: int
+ Fraction(numerator: int, denominator: int) + getNumerator(): int + getDenominator(): int + setNumerator(numerator: int): void + setDenominator(denominator: int): void + toString(): String + add(fraction: Fraction): void + sub(fraction: Fraction): void + multiplication(fraction: Fraction): void + division(fraction: Fraction): void

void add(Fraction fraction)

Adds two Fraction objects and **stores the result** into **calling object**. This is how addition is performed for fractions (assume that this is how it works):

$$\frac{1}{4} + \frac{3}{5} = \frac{1 * 5 + 3 * 4}{4 * 5} = \frac{17}{20}$$

String toString()

Returns the value of the fraction in $\frac{n}{m}$ format where n is the numerator and m is denominator.

e.g. Your console output should look like: 17 / 20

Now write a test program, take two Fraction objects. Print both of them. Test add, sub, multiplication and division methods. Print calling object after each method call.