

# Object-oriented Programming

## Assignment Sheet No. 8

Date: December 13

### Exercise 8.1 (Classes, Constructors, and Operators)

Design a class `Date` that stores the following data:

- a month as an `int`
- a day as an `int`
- a year as an `int`

Implement a default constructor that initializes the date to 1/1/1900 and a constructor taking three arguments (month, day, and year). Overload the `+`-operator such that it can advance a date by a given number of days (e.g. `11/25/2011 + 3 = 11/28/2011`); use the prototype:

```
Date operator+(const Date &date, int days);
```

Make sure that only valid dates can be stored in `Date`! Furthermore, implement input and output operators for `Date` that use the format `mm/dd/year` for a date.

### Exercise 8.2 (Classes, Inheritance, and Member Functions)

We want to implement three classes `Rectangle`, `Circle`, and `Square`, which shall represent different shapes. All these classes shall have suitable constructors (including default constructors), a position given in  $(x, y)$ -coordinates, and two methods `area` and `circumference`.

Design a suitable inheritance hierarchy for these classes with the class `Shape` as base class. Add the required data and function members in appropriate places (try to avoid unnecessary replications in derived classes). Use `float` for representing coordinates.