Zadatak 1.

(*Algebra: quadratic equations*) Design a class named `QuadraticEquation` for a quadratic equation $ax^2 + bx + x = 0$. The class contains:

- Private data fields `a`, `b`, and `c` that represent three coefficients.
- A constructor for the arguments for `a`, `b`, and `c`.
- Three getter methods for `a`, `b`, and `c`.
- A method named `getDiscriminant()` that returns the discriminant, which is $b^2 - 4ac$.
- The methods named `getRoot1()` and `getRoot2()` for returning two roots of the equation

$$r_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad \text{and} \quad r_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

These methods are useful only if the discriminant is nonnegative. Let these methods return `0` if the discriminant is negative.

Draw the UML diagram for the class and then implement the class. Write a test program that prompts the user to enter values for a, b, and c and displays the result based on the discriminant. If the discriminant is positive, display the two roots. If the discriminant is 0, display the one root. Otherwise, display "The equation has no roots." See Programming Exercise 3.1 for sample runs.

Zadatak 2.

(*Algebra:* 2×2 *linear equations*) Design a class named `LinearEquation` for a 2×2 system of linear equations:

$$\begin{aligned} ax + by &= e \\ cx + dy &= f \end{aligned} \qquad x = \frac{ed - bf}{ad - bc} \qquad y = \frac{af - ec}{ad - bc}$$

The class contains:

- Private data fields `a`, `b`, `c`, `d`, `e`, and `f`.
- A constructor with the arguments for `a`, `b`, `c`, `d`, `e`, and `f`.
- Six getter methods for `a`, `b`, `c`, `d`, `e`, and `f`.
- A method named `isSolvable()` that returns true if $ad - bc$ is not 0.
- Methods `getX()` and `getY()` that return the solution for the equation.

Draw the UML diagram for the class and then implement the class. Write a test program that prompts the user to enter `a`, `b`, `c`, `d`, `e`, and `f` and displays the result. If $ad - bc$ is 0, report that "The equation has no solution." See Programming Exercise 3.3 for sample runs.

Zadatak 3.

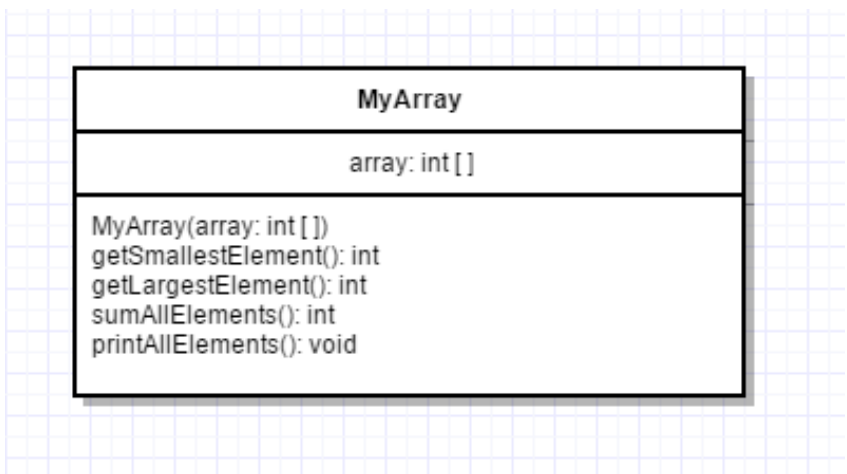
(*Use the `GregorianCalendar` class*) Java API has the `GregorianCalendar` class in the `java.util` package, which you can use to obtain the year, month, and day of a date. The no-arg constructor constructs an instance for the current date, and the methods `get(GregorianCalendar.YEAR)`, `get(GregorianCalendar.MONTH)`, and `get(GregorianCalendar.DAY_OF_MONTH)` return the year, month, and day.

Write a program to perform two tasks:

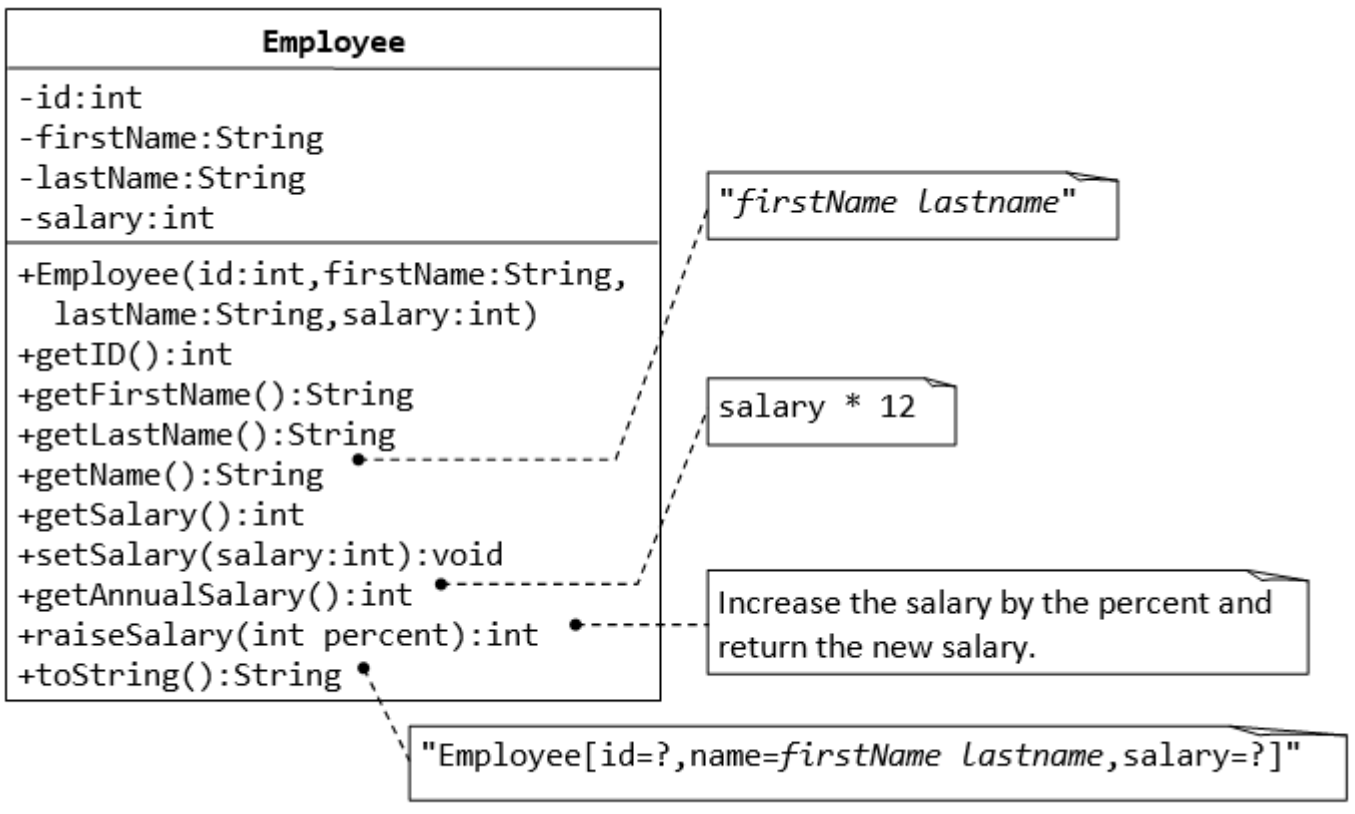
- Display the current year, month, and day.
- The `GregorianCalendar` class has the `setTimeInMillis(long)`, which can be used to set a specified elapsed time since January 1, 1970. Set the value to `1234567898765L` and display the year, month, and day.

Zadatak 4.

Napisati MyArray klasu koja ima jedan data field koji predstavlja jednodimenzionalni niz cijelih brojeva. Klasa treba da sadrzi metode za dobijanje najmanjeg elementa u nizu, dobijanje najveceg elementa u nizu, racunanje sume svih elemenata u nizu i printanje niza.



Zadatak 5.


Employee
-id:int
-firstName:String
-lastName:String
-salary:int
+Employee(id:int,firstName:String,
lastName:String,salary:int)
+getID():int
+getFirstName():String
+getLastName():String
+getName():String
+getSalary():int
+setSalary(salary:int):void
+getAnnualSalary():int
+raiseSalary(int percent):int
+toString():String
"firstName lastname"
salary * 12
Increase the salary by the percent and return the new salary.
"Employee[id=?,name=firstName lastname,salary=?]"