

IF184301 Object Oriented Programming (C)**Quiz 1**

Starting date: 23 September 2021
 Deadline: 30 September 2021, 23:59 WIB. **Penalty: 0.15% of grade/minute of tardiness.**
 Exam type: Open
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 with the subject: **IF184301_OOP(C)_Q1_StudentID_Name**
 File type and format: A zip file containing all of the .java source files & the declaration
 Filename format: IF184301_OOP(C)_Q1_StudentID_Name.ZIP

Instruction

Please do these steps as in the following.

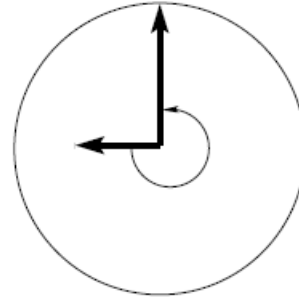
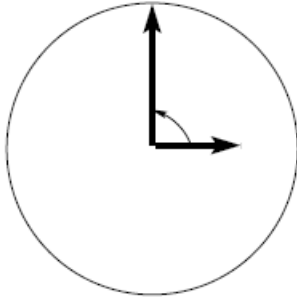
1. **[10 points]** In the following e_1 and d_1 represent the fraction $\frac{e_1}{d_1}$ and correspondingly e_2 and d_2 the fraction $\frac{e_2}{d_2}$, where e_1 and e_2 are integers and d_1 and d_2 positive integers. Write a Java class, namely `Q11Fraction.java`, which computes numbers es , ds and ep , dp , which stand for the sum and the product of the two fractions, respectively. E.g., $\frac{1}{2} + \frac{1}{3} = \frac{5}{6}$, and $\frac{1}{2} * \frac{1}{3} = \frac{1}{6}$. Note that addition and multiplication on fractions are defined by:

$$\frac{e_1}{d_1} + \frac{e_2}{d_2} = \frac{e_1*d_2+e_2*d_1}{d_1*d_2} \quad \frac{e_1}{d_1} * \frac{e_2}{d_2} = \frac{e_1*e_2}{d_1*d_2}$$

Test your class for $\frac{1}{2} + \frac{1}{3}$, $\frac{1}{3} + \frac{3}{4}$, $\frac{1}{2} * \frac{2}{3}$, and $\frac{1}{4} * \frac{2}{3}$.

```
// File: Q11Fraction.java
public class Q11 {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 1 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class in here
    }
}
```

2. **[10 points]** This time is 13:03. We represent the time by two variables `hours` and `minutes`, that is `hours = 13;` and `minutes = 03;`. Write a Java class, namely `Q12Time.java`, which computes the angle between the hour hand and the minute hand on a traditional analogue clock. Angles should be measured counterclockwise from hour to minute hand. The results should be rounded and normalised so that it is between 0 and 359 (inclusively). For instance, the angles at 3:00 and 9:00 hours should be 90° and 270°, respectively.



Hint: 1 minute $\approx 6^\circ$, 1 hour $\approx 30^\circ$. Start at 12 o'clock.

Note that your program must be able to compute the output for arbitrary inputs, in which hours may take values from 0 through 24 and minutes from 0 to 60. Do not forget to write comments which explain why your program is correct.

Test your program for the following times: 9:00, 3:00, 18:00, 1:00, 2:30, and 4:41 (with results 270° , 90° , 180° , 30° , 255° , and 254° , respectively).

```
// File: Q12Time.java
public class Q12Time {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 2 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class in here
    }
}
```

3. [10 points] Define a class `Q13ComputerAccount` and a constructor to create it. A computer account should be built from the three strings `realName`, `userName`, and `password`. It should implement methods `printRealName`, `printUserName`, `printPassword`, and `changePassword`. The first three methods take no arguments. The last method takes one argument of type `String`, the new password, and sets the password to the new password; its return value is `void`.

Note that you have always to comment and test your program appropriately, not just for this assignment. We will not write this to the assignments in future, but still, if you fail to do so marks will be subtracted.

```
// File: Q13ComputerAccount.java
public class Q13ComputerAccount {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 3 above.
     * Remember how to comment properly.
     */
    // Define your properties/fields here

    // Define your constructor here

    // Define your getters and setters in here
}
```

```
// File: Q13ComputerAccountTest.java
public class Q13ComputerAccountTest {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 3 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class: Q13ComputerAccount in here
    }
}
```

4. **[10 points]** Define a class `Q14Student` as well as a constructor and getter methods. A `Q14Student` should be represented by her/his name, her/his Student ID, and the Degree Programme, each of which is a `String`. Also, write a method `toString` that returns a `String` in the following format:

```
"[Sri Purwaningsih, ID: 1000001, Bachelor Informatics]"
```

```
// File: Q14Student.java
public class Q14Student {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 4 above.
     * Remember how to comment properly.
     */
    // Define your properties/fields here

    // Define your constructor here

    // Define your method/function toString in here
}
```

```
// File: Q14StudentTest.java
public class Q14StudentTest {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 4 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class: Q14Student in here
    }
}
```

5. **[20 points]** In Lecture #3: Exercises, Ex2. Conversion, we wrote a program that converts masses given in the imperial system into the metric system. Write a program that can deal with weights given in pounds. Make use of the conversion:

1 pound = 0.45359237 kilograms

Define a `Q15Weight` class, and write a constructor `Q15Weight(double p)` to generate a weight given in pounds. Implement methods `getPounds` and `getKilograms` which return the weight in pounds and kilograms, respectively.

```
// File: Q15Weight.java
public class Q15Weight {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 5 above.
     * Remember how to comment properly.
     */
    // Define your properties/fields here

    // Define your constructor here

    // Define your methods/functions in here
}

// File: Q15WeightTest.java
public class Q15WeightTest {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 5 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class: Q15Weight in here
    }
}
```

6. **[20 points]** In no. 1 we looked at the addition and multiplication of two fractions. In this assignment, fractions should be represented by a Java class `Q16Fraction`. You have to define this class, which in addition to the constructor and the accessor methods `getNumerator` and `getDenominator` has methods `toString` (to print a rational number) as well as `getSum` and `getProduct`, which generate the sum and the product of fractions and return the corresponding object of Class `Q16Fraction`. For instance, if we generate fractions `Q16Fraction f1 = new Q16Fraction(1, 2);` and `Q16Fraction f2 = new Q16Fraction(3, 7);` then
- `f1.toString()` should return the string "1/2";
 - `System.out.print(f2.getProduct(f1));` should print 3/14 (which corresponds to the product of f2 and f1); and
 - `System.out.print(f2.getSum(f1));` should print 13/14 (which corresponds to the sum of f2 and f1).

```
// File: Q16Fraction.java
public class Q16Fraction {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 6 above.
     * Remember how to comment properly.
     */
    // Define your properties/fields here

    // Define your constructor here

    // Define your methods/functions in here
}

```

```
// File: Q16FractionTest.java
public class Q16FractionTest {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 6 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class: Q16Fraction in here
    }
}

```

7. **[20 points]** Create a class `Q17FixedBankAccount` with constructor `Q17FixedBankAccount(float initialCapital, int d)` where the `initialCapital` is left for `d` days on the account and then the total capital is returned. The annual interest rate is `interestRate` of type `float` (e.g., `interestRate = 0.01;`). The daily interest is a 365^{th} of this. We do not consider leap years. The interest is added to the capital after each full year. Write a method that computes the total capital after `d` days have elapsed. Make use only of programming constructs introduced in the lecture - Lecture #3: Exercises, Ex3. Investment, that is, not of loops or conditionals. Test your program for `interestRate = 0.01`, `initialCapital = 1000.00`, and `d = 1000`.

```
// File: Q17FixedBankAccount.java
public class Q17FixedBankAccount {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 7 above.
     * Remember how to comment properly.
     */
    // Define your properties/fields here

    // Define your constructor here

    // Define your methods/functions in here
}

```

```
// File: Q17FixedBankAccountTest.java
public class Q17FixedBankAccountTest {
    /**
     * Write down in this class your solution and
     * its explanation of question no. 7 above.
     * Remember how to comment properly.
     */
    public static void main(String[] args) {
        // Test your class: Q17FixedBankAccount in here
    }
}
```

8. To avoid plagiarism/cheating, every student needs to pledge and declare, then she/he must submit her/his **signed pledge and declaration** as in the following. Failed to do so will be resulted in getting a 0 (zero) grade. Attach the **scanned/photo** of your *declaration* in your report.

“By the name of Allah (God) Almighty, herewith I pledge and truly declare that I have solved quiz 1 by myself, didn’t do any cheating by any means, didn’t do any plagiarism, and didn’t accept anybody’s help by any means. I am going to accept all of the consequences by any means if it has proven that I have been done any cheating and/or plagiarism.”

[Place, e.g., Surabaya], [date, e.g., 30 September 2021]

<Signed>

[Full name, e.g., Sri Purwaningsih]
[StudentID, e.g., 05112040000xxx]

9. Have a wonderful day, guys! Good luck! 😊