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CENG 305

Object Oriented Programming with Java

Spring 2019-2020

Homework 1

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Due Date: 20th March 2020, 23:59, via ODTUCLASS

1. Objectives

This assignment aims to make you familiar basic concepts of Object Oriented Programming. You are expected to write java code for the following three problems.
Use **this** reference operator wherever it is applicable.

2. Questions

1) Write a program that reads two times in military format (0900, 1730) and prints the number of hours and minutes between the two times. Here is a sample run. User input is in color.

   Please enter the start time of work hours: 0900
   Please enter the finish time of work hours: 1730
   8 hours 30 minutes

   You must also consider the case where the first time is later than the second:
   Please enter the start time of work hours: 1730
   Please enter the finish time of work hours: 0900
   15 hours 30 minutes

2) Write a program that reads in the name and salary of an employee. Here the salary (weekly) will denote an *hourly* wage, such as $9.25. Then ask how many hours the employee worked in the past week. Be sure to accept fractional hours. Compute the pay. Any overtime work (over 40 hours per week) is paid at 150 percent of the regular wage. Print a paycheck for the employee. In your solution, implement a class Employee.

3) Write a program that asks the user to enter a month (1 for January, 2 for February etc.) and then prints the number of days in the month. For February, print "28 days".

   Enter the id of the month: 6
   There are 30 days in this month
   Use a class *Days_of_Months* with a method
   public int getLength()
   !!!**Do not use a separate if/else branch for each month. Use Boolean operators**

3. Specifications

➢ **Programming Language:** You will use Java to implement the assignment. You should use BlueJ IDE to write and implement Java code. You can download it from www.bluej.org

➢ **The variables and functions must be used in the classes as it is indicated in the Figure 1 UML diagram. You have to use private variables if it is indicated so. There is '-' sign at the beginning of variable or function if it is private and '+' for public.**

➢ Design and implement "Test" class such that the main function will properly invoke the methods of the classes above in accordance with menu shown in the sample output Figure 2.

➢ You have to get the inputs of all classes in Driver class main method by using "javax.swing.JOptionPane" library as it is shown in the figures below. Similarly, all outputs of the classes must be displayed by using "javax.swing.JOptionPane".

➢ An example on the use of javax.swing.JOptionPane was provided in ODTUCLASS and here are the sample outputs shown below Figures 3 - 5.

➢ Write documentation (javadoc) for your "classes", "methods" and "variables". Generate html documentation using javadoc. This documentation will affect 25 percent of your homework grade. You may want to check chapter 3.2.4 from the textbook (Big Java: Early Objects).

➢ **Grading for hw1 is as follows:**

  o Question 1: 25 points

  o Question 2: 25 points

  o Question 3: 25 points

  o Javadoc files of your code: 25 points

4. Regulations

1. **Submission type:** You will submit a zip file named as e1234567_ceng305_hw1.zip which includes all of your BlueJ project files and generated **javadoc** files. e1234567 should be your student identification number.

2. **Late submission:** In case of late submission your score will be calculated as follows:

   SCORE-(5*day*day)

3. **Cheating:** We have zero tolerance policy for cheating. People involved in cheating will be punished according to the university regulations. Your code will be compared with those of your friends both semantically and visually.

4. **No grouping:** The assignment has to be done individually.

5. **Communication:** You can use the 'discussion forum' on ODTUCLASS for your questions and share your ideas. Check the 'news forum' for announcements regulary. Also, you can contact with 'gozsari@metu.edu.tr' for your problems or questions.
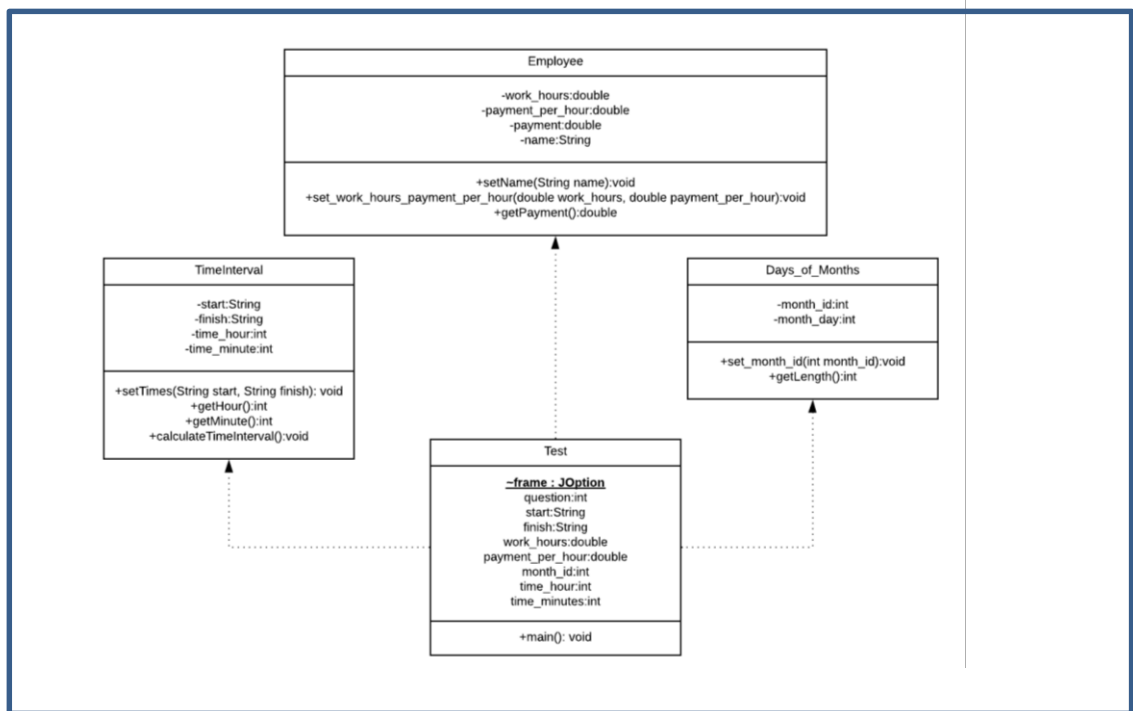
Employee

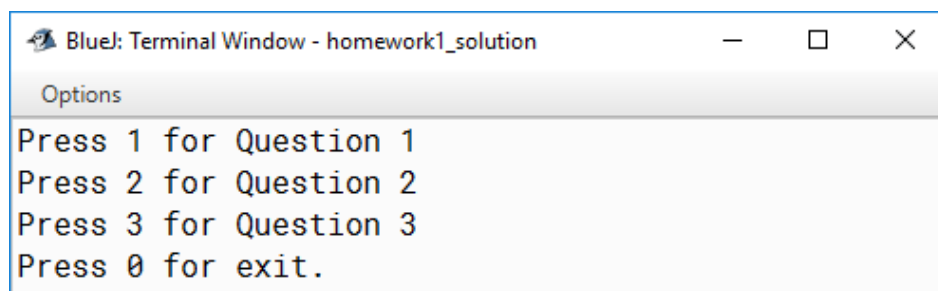-work_hours:double
-payment_per_hour:double
-payment:double
-name:String

+setName(String name):void
+set_work_hours_payment_per_hour(double work_hours, double payment_per_hour):void
+getPayment():double

TimeInterval

-start:String
-finish:String
-time_hour:int
-time_minute:int

+setTimes(String start, String finish): void
+getHour():int
+getMinute():int
+calculateTimeInterval():void

Days_of_Months

-month_id:int
-month_day:int

+set_month_id(int month_id):void
+getLength():int

Test

~frame : JOption
question:int
start:String
finish:String
work_hours:double
payment_per_hour:double
month_id:int
time_hour:int
time_minutes:int

+main(): void

Figure 1: Class Diagram

BlueJ: Terminal Window - homework1_solution

Options

```
Press 1 for Question 1
Press 2 for Question 2
Press 3 for Question 3
Press 0 for exit.
```

Figure 2: Sample Menu

Input

Please enter start time of work hours:

0900

OK   Cancel

Input

Please enter finish time of work hours:

1700

OK   Cancel

Message

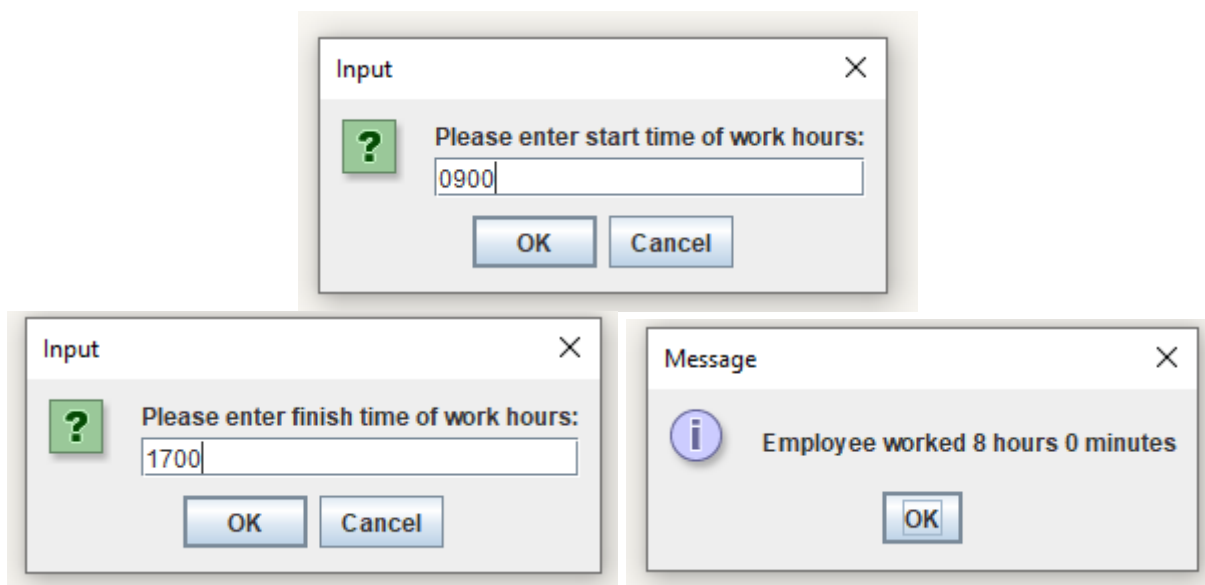Employee worked 8 hours 0 minutes
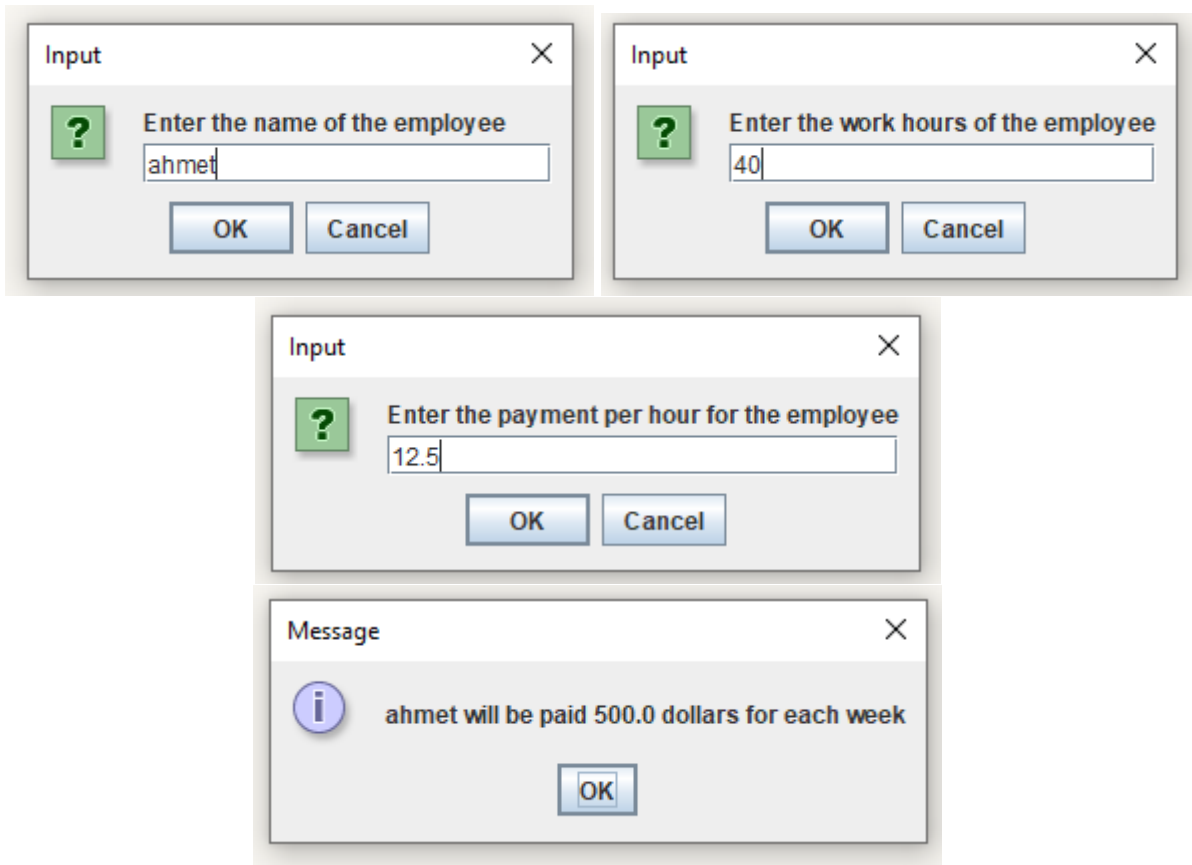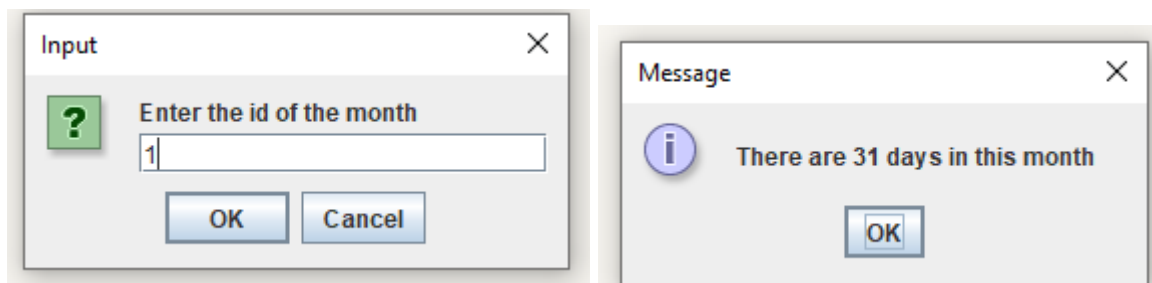
OK

Figure 3: Sample run of question 1

Figure 4: Sample run of question 2

Figure 5: Sample run of question 3