Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Exam Examination, Spring 2021 @ DIU Blended Learning Center
Course Code: CSE221 (Day), Course Title: Object-Oriented Programming
Level: 1;   Term: 3;   Section: All
Instructor: TAB;   Modality: Open Book Exam
Date: Sunday 7 March, 2020;   Time: 09:00am-11:30am
Two and half hours (2:30) to support online open/case study based assessment   Marks: 25

Questions(Answer All)	Marks
1 Is multiple inheritance possible in Java ? If not, then how can we achieve this property? Justify your answer with proper examples.	**3**
2 A "Vacation" class is given below with the following attributes in bullet point.	**10** (2.5*4)

- name: String representing the name of the vacation
- day: Int representing the day of the month of the vacation
- numOfVacation: Int representing the number of vacations in a year
- month: String representing the month the vacation is in

```
public class Vacation {
  private String name;
  private int day;
  private int numOfVacation;
  private String month;
// Write your code in this section
}
```

a) Write a constructor which sets the value of the variables from the users input in the Vacation class. Comment your explanation in the code.

b) Write a method sameName which compares two objetcs of the Vacation class and returns true if the name is the same and false otherwise. Explain your answer with proper justification

c) Write a method named calculateVacation that takes numOfVacation as input. Now calculate the percentage of the vacation taken if the highest vacation allowed for a

person in a year is 8.

d) Write a piece of code that creates a Vacation object with the name "Birthday", with the day "09", with the numOfVacation "01", and with the month "January".

12
(5+7)

3 Let us consider a Company class with properties of name, reg_no and type and the function elements are getter and setter methods for each data field. It has a parameterized constructor to initialize the name, reg_no and type at the time of object creation. Company class also has a display method to show the company details.

Company has a large number of employees of two different categories. Employee class has emp_id, emp_name, designation as data fields and getter and setter methods for these data fields. It defines a default constructor. Employee class also has a payment method but has no implementation.

SalariedEmployee is one type of Employee with the basic properties of Employee with additional properties of salaryScale. It has a method to set salaryScale and it overrides the payment method from the Employee class which returns the salary of the employee.

HourlyEmployee is another category or Employee which inherits the Employee class and has the data member of hours_worked and hourly_payment. It has getter and setter methods for data fields and it implements the payment method for salary payment returning hours_worked*hourly_payment.

a) Create a UML Class diagram for the above mentioned company's class hierarchy maintaining all mentioned relationships. What type of relationship can be created in this scenario and give proper justification of your answer.

b) Write a JAVA program for implementing the above system and create necessary objects in main() method to show their respective operations. Explain your code to justify your answer.