IASON KOTAKIS 214617732

I have read and understood the Academic Honesty Statement specified in the course outline, and I have adhered fully at all time to the academic honesty rules and policies laid by the instructor, the School of Information Technology and York University Senate's Academic Integrity Policy.

Question 1:

StudentBody.java

```
public class StudentBody {
	public static void main(String[] args)
	{
			Address school = new Address("800 Lancaster Ave",
"Villanova", "PA", 19085);
			Address jHome = new Address("21 Jump Street","Lynchburg",
"VA", 24551);
			Student john = new Student("John","Smith", jHome,school, 80,
90, 85);
			Address mHome = new Address("123 Main Street","Euclid","OH",
44132);
			Student marsha = new Student("Marsha","Jones",
			mHome, school, 77, 99, 88);
			System.out.println(john);
			System.out.println();
			System.out.println (marsha);
			john.setTestScore(2,75);
			System.out.println("\nAfter set the test score2 to the John,
the details would be:"+john);
			System.out.println("\nThe score of test 3 of
Marsha:"+marsha.getTestScore(3));
	}

}
```

Student.java

```
public class Student {
	private String firstName, lastName;
	private Address homeAddress, schoolAddress;
	private int score1,score2, score3;
	public Student()
	{
	score1=0;
	score2=0;
	score3=0;
	}

	public Student(String first, String last,Address home,Address school,int
test1,int test2 ,int test3)
	{
			firstName = first;
			lastName = last;
			homeAddress = home;
			schoolAddress = school;
			score1 = test1;
			score2 = test2;
			score3 = test3;
	}

			public void setTestScore(int test,int score)
			{
			if (test==1)
			score1=score;
			else if(test ==2)
```

```
                        score2=score;
                        else if(test == 3)
                        score3=score;
                        else
                        {
                        System.out.println("Wrong input test number should be 1 or 2
or 3");
                        System.exit(0);
                        }
                        }
                        public int getTestScore(int test)
                        {
                              int score=-1;
                              if (test==1)
                                    score=score1;
                                    else if(test ==2)
                                    score = score2;
                                    else if(test == 3)
                                    score=score3;
                                    else
                                    {
                                    System.out.println("Wrong input test number
should be 1 or 2 or 3");
                                    System.exit(0);
                                    }
                              return score;
                        }
                        public double average()
                        {
                              double sum=score1+score2+score3;
                              return sum/3;
                        }
                        public String toString()
                        {
                              String result;
                              result=firstName+""+lastName+"\n";
                              result+="Home Address:\n"+homeAddress+"\n";
                              result+="School Address:\n"+schoolAddress+"\n";
                              result+= "Three test
scores:\nTest1:"+getTestScore(1)+"\nTest2:"+getTestScore(2)+"\nTest3:"+getTestScore(3)+
"\n";
                              result+="The average of three test scores:"+average();
                              return result;

                        }
}
```

Address.java

```
public class Address {
      private String streetAddress,city,state;
      private long zipCode;
      public Address(String street,String town,String st,long zip)
      {
            streetAddress=street;
            city=town;
            state=st;
            zipCode=zip;
      }
```

```
	public String toString()
	{
		String result;
		result=streetAddress+"\n";
		result+=city+","+state+","+zipCode;
		return result;

	}

}
```

Output:

```
JohnSmith
Home Address:
21 Jump Street
Lynchburg,VA,24551
School Address:
800 Lancaster Ave
Villanova,PA,19085
Three test scores:
Test1:80
Test2:90
Test3:85
The average of three test scores:85.0

MarshaJones
Home Address:
123 Main Street
Euclid,OH,44132
School Address:
800 Lancaster Ave
Villanova,PA,19085
Three test scores:
Test1:77
Test2:99
Test3:88
The average of three test scores:88.0

After set the test score2 to the John, the details would be:JohnSmith
Home Address:
21 Jump Street
Lynchburg,VA,24551
School Address:
800 Lancaster Ave
Villanova,PA,19085
Three test scores:
Test1:80
Test2:75
```

Question 2:

Driver.java

```
public class Driver {

	public static void main(String[] args)
	{
		Address school = new Address("800 Lancaster Ave", "Villanova", "PA",
19085);
```

```
            Address jHome = new Address("21 Jump Street","Lynchburg", "VA", 24551);
            Student john = new Student("John","Smith", jHome,school, 80, 90, 85);
            Address mHome = new Address("123 Main Street","Euclid","OH", 44132);
            Student marsha = new Student("Marsha","Jones",mHome, school, 77, 99, 88);
            Address aHome = new Address("abc Street","Hyderabad", "OH",44787);
            Student alex = new Student("Alex","Lee", jHome,school, 50, 60, 70);
            Address mikeHome = new Address("123 pqr Street","Hyderabad", "OH",44777);
            Student mike = new Student("Mike","Lee", mikeHome,school, 64, 68, 70);
            Address GabrillaHome = new Address("123 pqr Street","Hyderabad",
"OH",44774);
            Student gabrilla = new Student("Gabrilla","Desuza", GabrillaHome,school,
64, 68, 70);
            Course java=new Course("java");
            java.addStudent(john);
            java.addStudent(alex);
            java.addStudent(gabrilla);
            Course cpp=new Course("CPP");
            cpp.addStudent(mike);
            cpp.addStudent(marsha);
            System.out.println("The following students are related to the course
java:");
            java.roll();
            System.out.println("The following students are related to the course
CPP:");
            cpp.roll();
            System.out.println("\nThe overall java course test
average:"+java.average());
            System.out.println("\nThe overall cpp course test
average:"+cpp.average());

      }

}
```

Course.java

```
import java.util.ArrayList;

public class Course {

      private String name;
      ArrayList<Student> students=new ArrayList<Student>();
      public Course(String name)
      {
            this.name=name;
      }
      public double average()
      {
            double total=0.00;
            double average=0.00;
            for(Student student : students)
            {
                  total+=student.average();
            }
            average=total/students.size();
            return average;
      }
      public void roll()
      {
            System.out.println("Course: "+name);
            System.out.println("Students:");
```

```
		for(Student student : students)
		{
			System.out.println("\n"+student.toString());
		}
	}
	public void addStudent(Student student) {
		students.add(student);
	}
}
```

Student.java

```
package Firm_new;

public class Student {
	private String firstName, lastName;
	private Address homeAddress, schoolAddress;
	private int score1,score2, score3;
	public Student()
	{
	score1=0;
	score2=0;
	score3=0;
	}

	public Student(String first, String last,Address home,Address school,int
test1,int test2 ,int test3)
	{
			firstName = first;
			lastName = last;
			homeAddress = home;
			schoolAddress = school;
			score1 = test1;
			score2 = test2;
			score3 = test3;
	}

			public void setTestScore(int test,int score)
			{
			if (test==1)
			score1=score;
			else if(test ==2)
			score2=score;
			else if(test == 3)
			score3=score;
			else
			{
			System.out.println("Wrong input test number should be 1 or 2
or 3");
			System.exit(0);
			}
			}
			public int getTestScore(int test)
			{
				int score=-1;
				if (test==1)
					score=score1;
					else if(test ==2)
					score = score2;
					else if(test == 3)
					score=score3;
					else
```

```
                                        {
                                        System.out.println("Wrong input test number
should be 1 or 2 or 3");
                                        System.exit(0);
                                        }
                                return score;
                        }
                        public double average()
                        {
                                double sum=score1+score2+score3;
                                return sum/3;
                        }
                        public String toString()
                        {
                                String result;
                                result=firstName+""+lastName+"\n";
                                result+="Home Address:\n"+homeAddress+"\n";
                                result+="School Address:\n"+schoolAddress+"\n";
                                result+= "Three test
scores:\nTest1:"+getTestScore(1)+"\nTest2:"+getTestScore(2)+"\nTest3:"+getTestScore(3)+
"\n";
                                result+="The average of three test scores:"+average();
                                return result;

                        }
}
```

Address.java

```
package Firm_new;

public class Address {
        private String streetAddress,city,state;
        private long zipCode;
        public Address(String street,String town,String st,long zip)
        {
                streetAddress=street;
                city=town;
                state=st;
                zipCode=zip;
        }
        public String toString()
        {
                String result;
                result=streetAddress+"\n";
                result+=city+","+state+","+zipCode;
                return result;

        }

}
```

Output:

```
The following students are related to the course java:
Course: java
Students:

JohnSmith
Home Address:
21 Jump Street
Lynchburg,VA,24551
School Address:
800 Lancaster Ave
Villanova,PA,19085
Three test scores:
Test1:80
Test2:90
Test3:85
The average of three test scores:85.0

AlexLee
Home Address:
21 Jump Street
Lynchburg,VA,24551
School Address:
800 Lancaster Ave
Villanova,PA,19085
Three test scores:
Test1:50
Test2:60
Test3:70
The average of three test scores:60.0

GabrillaDesuza
Home Address:
123 pqr Street
Hyderabad,OH,44774
School Address:
800 Lancaster Ave
```

Question 3:
Implementation.java

```
class ReadingMaterial
{
String type;
int noofpages;
ReadingMaterial()
{
type = "Book";
noofpages = 1000;
}
ReadingMaterial(String t, int n)
{
type = t;
noofpages = n;
}
void print()
{
System.out.println("Reading Material Type:" + type);
System.out.println("Number of Pages" + noofpages);
}
}
```

```
class Book extends ReadingMaterial
{
String primarychar1;
String primarychar2;
String primarychar3;

Book()
{
super();
primarychar1 = "A";
primarychar2 = "B";
primarychar3 = "C";
}
Book(String a,int n,String b,String c,String d)
{
super(a,n);
primarychar1 = b;
primarychar2 = c;
primarychar3 = d;
}
void print()
{
super.print();
System.out.println("Primary Character :" + primarychar1);
System.out.println("Primary Character :" + primarychar2);
System.out.println("Primary Character :" + primarychar3);
}
}
class Novel extends ReadingMaterial
{
String primarychar1;
String primarychar2;
String primarychar3;

Novel()
{
super();
primarychar1 = "A";
primarychar2 = "B";
primarychar3 = "C";
}
Novel(String a,int n,String b,String c,String d)
{
super(a,n);
primarychar1 = b;
primarychar2 = c;
primarychar3 = d;
}
void print()
{
super.print();
System.out.println("Primary Character :" + primarychar1);
System.out.println("Primary Character : "+ primarychar2);
System.out.println("Primary Character : "+ primarychar3);
}
}
class Magazine extends ReadingMaterial
{
String primarychar1;
String primarychar2;
String primarychar3;
```

```
Magazine()
{
super();
primarychar1 = "A";
primarychar2 = "B";
primarychar3 = "C";
}
Magazine(String a,int n,String b,String c,String d)
{
super(a,n);
primarychar1 = b;
primarychar2 = c;
primarychar3 = d;
}
void print()
{
super.print();
System.out.println("Primary Character :" + primarychar1);
System.out.println("Primary Character :" + primarychar2);
System.out.println("Primary Character :" + primarychar3);
}
}
class TechnicalJournal extends ReadingMaterial
{
String primarychar1;
String primarychar2;
String primarychar3;

TechnicalJournal()
{
super();
primarychar1 = "A";
primarychar2 = "B";
primarychar3 = "C";
}
TechnicalJournal(String a,int n,String b,String c,String d)
{
super(a,n);
primarychar1 = b;
primarychar2 = c;
primarychar3 = d;
}
void print()
{
super.print();
System.out.println("Primary Character :" + primarychar1);
System.out.println("Primary Character :" + primarychar2);
System.out.println("Primary Character :" + primarychar3);
}
}
class TextBook extends ReadingMaterial
{
String primarychar1;
String primarychar2;
String primarychar3;

TextBook()
{
super();
primarychar1 = "A";
primarychar2 = "B";
primarychar3 = "C";
```

```
}
TextBook(String a,int n,String b,String c,String d)
{
super(a,n);
primarychar1 = b;
primarychar2 = c;
primarychar3 = d;
}
void print()
{
super.print();
System.out.println("Primary Character :" + primarychar1);
System.out.println("Primary Character :" + primarychar2);
System.out.println("Primary Character :" + primarychar3);
}
}
class Implementation
{
public static void main(String args[])
{
ReadingMaterial r = new ReadingMaterial();
r.print();
Book b = new Book();

b.print();
Book b1 = new Book("Book",100,"Primary 1","Primary 2","Primary 3");
b1.print();
Novel n = new Novel();
n.print();
Novel n1 = new Novel("Novel",100,"Primary 1","Primary 2","Primary 3");
n1.print();

Magazine m = new Magazine();
m.print();
Magazine m1 = new Magazine("Magazine",100,"Primary 1","Primary 2","Primary 3");
m1.print();

TechnicalJournal t = new TechnicalJournal();
t.print();
TechnicalJournal t1 = new TechnicalJournal("TechnicalJournal",100,"Primary 1","Primary
2","Primary 3");
t1.print();

TextBook tb = new TextBook();
tb.print();
TextBook tb1 = new TextBook("TextBook",100,"Primary 1","Primary 2","Primary 3");
tb1.print();
}
}
```

Output :

```
Reading Material Type:Book
Number of Pages1000
Reading Material Type:Book
Number of Pages1000
Primary Character :A
Primary Character :B
Primary Character :C
Reading Material Type:Book
Number of Pages100
Primary Character :Primary 1
Primary Character :Primary 2
Primary Character :Primary 3
Reading Material Type:Book
Number of Pages1000
Primary Character :A
Primary Character : B
Primary Character : C
Reading Material Type:Novel
Number of Pages100
Primary Character :Primary 1
Primary Character : Primary 2
Primary Character : Primary 3
Reading Material Type:Book
Number of Pages1000
Primary Character :A
Primary Character :B
Primary Character :C
Reading Material Type:Magazine
Number of Pages100
Primary Character :Primary 1
Primary Character :Primary 2
Primary Character :Primary 3
Reading Material Type:Book
Number of Pages1000
Primary Character :A
Primary Character :B
```

Question 4

Firm.java

```
package Firm_new;

public class Firm
{
public static void main (String[] args)
{
Staff personnel = new Staff();
personnel.printVacationDays();
}
}
```

Staff.java

```
package Firm_new;

public class Staff
{
   private StaffMember[] staffList;
   public Staff ()
   {
```

```
        staffList = new StaffMember[4];

        staffList[0] = new Executive ("Sam", "123 Main Line",
                "555-0469", "123-45-6789", 2423.07);
        staffList[1] = new Employee ("Carla", "456 Off Line",
                "555-0101", "987-65-4321", 1246.15);
        staffList[2] = new Employee ("Woody", "789 Off Rocker",
                "555-0000", "010-20-3040", 1169.23);
        staffList[3] = new Hourly ("Diane", "678 Fifth Ave.",
                "555-0690", "958-47-3625", 10.55);
    }


    public void printVacationDays ()
    {
        System.out.println("Get vacation Days : ");
        for (int count=0; count < staffList.length; count++)
        {
            System.out.println(staffList[count]);
            System.out.println ("Vacation Days : "+staffList[count].getVacationDays());
            System.out.println ("-----------------------------------");
        }
    }
}
```

Employee.java

```
package Firm_new;

public class Employee extends StaffMember
{
    protected String socialSecurityNumber;
    protected double payRate;
    public Employee (String eName, String eAddress, String ePhone,String socSecNumber,
double rate)
    {
        super (eName, eAddress, ePhone);

        socialSecurityNumber = socSecNumber;
        payRate = rate;
    }
    public String toString()
    {
        String result = super.toString();

        result += "\nSocial Security Number: " + socialSecurityNumber;

        return result;
    }

    public double pay()
    {
        return payRate;
    }

    /*Override getVacationDays method*/
    public double getVacationDays() {
        return VACATION_DAYS;
    }
}
```

StaffMember.java

```
package Firm_new;
abstract public class StaffMember
{
   protected int VACATION_DAYS=12;
   protected String name;
   protected String address;
   protected String phone;

   public StaffMember (String eName, String eAddress, String ePhone)
   {
       name = eName;
       address = eAddress;
       phone = ePhone;
   }

   public String toString()
   {
       String result = "Name: " + name + "\n";

       result += "Address: " + address + "\n";
       result += "Phone: " + phone;

       return result;
   }

   public abstract double pay();
   public abstract double getVacationDays();
}
```

Executive.java

```
package Firm_new;

public class Executive extends Employee
{
private double bonus;
private int EXTRA_VAC_DAYS=5;
public Executive (String eName, String eAddress, String ePhone,
String socSecNumber, double rate)
{
super (eName, eAddress, ePhone, socSecNumber, rate);
bonus = 0; // bonus has yet to be awarded
}

public void awardBonus (double execBonus)
{
bonus = execBonus;
}

public double pay()
{
double payment = super.pay() + bonus;

bonus = 0;

return payment;
}
public double getVacationDays() {
       return super.getVacationDays()+EXTRA_VAC_DAYS;
```

```
   }
}
```

Hourly.java

```
package Firm_new;

public class Hourly extends Employee
{
private int hoursWorked;
private int EXTRA_VAC_DAYS=2;
public Hourly (String eName, String eAddress, String ePhone,
String socSecNumber, double rate)
{
super (eName, eAddress, ePhone, socSecNumber, rate);
hoursWorked = 0;
}

public void addHours (int moreHours)
{
hoursWorked += moreHours;
}

public double pay()
{
double payment = payRate * hoursWorked;

hoursWorked = 0;

return payment;
}
public String toString()
{
String result = super.toString();

result += "\nCurrent hours: " + hoursWorked;

return result;
}
public double getVacationDays() {
       return super.getVacationDays()+EXTRA_VAC_DAYS;
   }

}
```

Output :

```
Get vacation Days :
Name: Sam
Address: 123 Main Line
Phone: 555-0469
Social Security Number: 123-45-6789
Vacation Days : 17.0
-----------------------------------
Name: Carla
Address: 456 Off Line
Phone: 555-0101
Social Security Number: 987-65-4321
Vacation Days : 12.0
-----------------------------------
Name: Woody
Address: 789 Off Rocker
Phone: 555-0000
Social Security Number: 010-20-3040
Vacation Days : 12.0
-----------------------------------
Name: Diane
Address: 678 Fifth Ave.
Phone: 555-0690
Social Security Number: 958-47-3625
Current hours: 0
Vacation Days : 14.0
-----------------------------------
```