1. (Rectangle Class) Create a class Rectangle with attributes length and width, each of which defaults to 1. Provide member functions that calculate the perimeter and the area of the rectangle. Also, provide set and get functions for the length and width attributes.
2.

```java
public class Triangle{
    private int a;
    private int b;
    private int c;

    public Triangle(int newa, int newb, int newc){
        this.a = newa;
        this.b = newb;
        this.c = newc;
    }
    public boolean isTriangle(){
        if((a>0) && (b>0) && (c>0) && (a+b<c) && (a+c<b) && (b+c<a)){
            return true;
        }else{
            return false;
        }

    }

    public double getArea(){
        double Area = 0.5*(a * b);
        return Area ;
    }


    public static void main (String [] args){
        Triangle tr = new  Triangle(38, 76, 23);

        System.out.println(" The all positive and they satisfy the triangle inequality: "+ tr.isTriangle());
        System.out.println(" The Triangle are is: "+tr.getArea());


    }
}
```

ANSWER

2. (Invoice Class) Create a class called Invoice that a hardware store might use to represent an invoice for an item sold at the store. An Invoice should include four pieces of information as data members a part number (type string), a part description (type string), a quantity of the item being purchased (type int) and a price per item (type int). Your class should have a constructor that initializes the four data members. Provide a set and a get function for each data member. In addition, provide a member function named getInvoiceAmount that calculates the invoice amount (i.e., multiplies the quantity by the price per item), then returns the amount as an int value. If the quantity is not positive, it should be set to 0. If the price per item is not positive, it should be set to 0. Write a test program that demonstrates class Invoice's capabilities.

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```java
voice.java
public class Invoice{
    private String PartNumber;
    private String PartDescription;
    private int QuantityPurchase;
    private int Price;

    public Invoice( String PN, String PD, int QP, int P){
        this.PartNumber = PN;
        this.PartDescription = PD;
        this.QuantityPurchase = QP;
        this.Price = P;
    }
    public void setPartNumber(String PartNumber){
        this.PartNumber = PartNumber;

    }
    public String getPartNumber(){
        return PartNumber;

    }
    public void setPartDescription(String PartDescription){
        this.PartDescription = PartDescription;

    }
    public String getPartDescription(){
        return PartDescription;
    }
    public void setQuantityPurchase(int QuantityPurchase){
        if (QuantityPurchase>0){
            this.QuantityPurchase= QuantityPurchase;
        }else{
            QuantityPurchase= 0;
        }

    }
    public int getQuantityPurchase(){
        return QuantityPurchase;
    }
    public void setPrice(int Price){
        if (Price>0){
            this.Price= Price;
        }else{
            Price= 0;
        }

    }
    public int getPrice(){
        return Price;
    }

    public int getInvoiceAmount(){
        return QuantityPurchase*Price;



    }

    public static void main (String [] args){
        Invoice store = new Invoice ("8765","Unga",121,15000);
        System.out.println("The data member Part number is : " + store.getPartNumber());
        System.out.println("The data member Part Describtion  is : " + store.getPartDescription());
        System.out.println("The Quantity of Purchase  is : " + store.getQuantityPurchase());
        System.out.println("The PRICE  is : " + store.getPrice());
        System.out.println("The amount value  is : " + store.getInvoiceAmount());

    }
}
```

ANSWER

```
PS C:\Users\DYDA\Desktop\Test1> javac Invoice.java
PS C:\Users\DYDA\Desktop\Test1> java Invoice
The data member Part number is : 8765
The data member Part Describtion  is : Unga
The Quantity of Purchase  is : 121
The PRICE  is : 15000
The amount value  is : 1815000
PS C:\Users\DYDA\Desktop\Test1>
```

3. (Account Class) Create a class called Account that a bank might use to represent customers' bank accounts. Your class should include one data member of type int to represent the account balance. Your class should provide a constructor that receives an initial balance and uses it to initialize the data member. The constructor should validate the initial balance to ensure that it is greater than or equal to 0. If not, the balance should be set to 0 and the constructor should display an error message, indicating that the initial balance was invalid. The class should provide three member functions. Member function credit should add an amount to the current balance.

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Member function debit should withdraw money from the Account and should ensure that the debit amount does not exceed the Account's balance. If it does, the balance should be left unchanged and the function should print a message indicating "Debit amount exceeded account balance." Member function getBalance should return the current balance. Create a program that creates two Account objects and tests the member functions of class Account.

```
public class Account{
    private int Account_Balance;

    public Account(int initial_Balance ){
        if (initial_Balance>0){
         Account_Balance = initial_Balance;
        }else{
            Account_Balance= 0 ;

         System.out.println("Initial Balance was Invalid");

        }
    }
    public double credit(int amount){
         Account_Balance=Account_Balance+amount;
         return Account_Balance;
    }
    public double debit(int amount){
         if(amount >Account_Balance){
             System.out.println("Debit amount exceed account Balance");
         } else{
             Account_Balance = Account_Balance - amount;

         }
         return Account_Balance;


    }
    public int getBalance(){

         return Account_Balance;
    }
    public static void main (String [] args){
         Account acc1=new Account(23000);
         Account acc2=new Account(40000);

         System.out.println("The account1 balance is: "+ acc1.getBalance());
         System.out.println("The account2 balance is: "+acc2.getBalance());

         acc1.credit(23000);
         acc2.credit(40000);

         System.out.println("The account1 balance in credit is: "+acc1.getBalance());
         System.out.println("The account2 balance  in credit is: "+acc2.getBalance());

         acc1.debit(23000);
         acc2.debit(40000);

         System.out.println("The account1 balance in debit is: "+acc1.getBalance());
         System.out.println("The account2 balance in debit  is: "+acc2.getBalance());
```

ANSWERS

```
PS C:\Users\DYDA\Desktop\Test1> java Account
The account1 balance is: 23000
The account2 balance is: 40000
The account1 balance in credit is: 46000
The account2 balance  in credit is: 80000
The account1 balance in debit is: 23000
The account2 balance in debit  is: 40000
PS C:\Users\DYDA\Desktop\Test1>
```

4. (Employee Class) Create a class called Employee that includes three pieces of information as data members a first name (type string), a last name (type string) and a monthly salary (type int). Your class should have a constructor that initializes the three data members. Provide a set and a get function for each data member. If the monthly salary is not positive, set it to 0. Write a test program that demonstrates class Employee's capabilities. Create two Employee objects and display each object's yearly salary. Then give each Employee a 10 percent raise and display each Employee's yearly salary again.

```java
public class Employee{
    private String FirstName;
    private String LastName;
    private int MonthSalary;


    public Employee( String FN, String LN, int MS){
        this.FirstName = FN;
        this. LastName = LN;
        this.MonthSalary = MS;

    }
    public void setFirstName(String FirstName){
        this.FirstName = FirstName;

    }
    public String getFirstName(){
        return FirstName;

    }
    public void setLastName(String LastName){
        this.LastName = LastName;

    }
    public String getLastName(){
        return LastName;
    }
    public void setMonthSalary(int MonthSalary){
        if (MonthSalary>0){
            this.MonthSalary= MonthSalary;
        }else{
            MonthSalary= 0;
        }

    }

    public int getMonthSalary(){
        return MonthSalary;
    }
    public int getYear(){
        return MonthSalary*12;
    }
    public double getpercentageRise(){
        double raiseapply = 0.1;
        return  (MonthSalary*12*raiseapply);
    }

    public static void main (String [] args){
        Employee emp1=new Employee("Said","Khalfan", 3000);
        Employee emp2=new Employee("Ashura","Juma", 10000);

        System.out.println("The year salary of employee : " + emp1.getYear());
        System.out.println("The year salary of employee : " + emp2.getYear());

        System.out.println("The year salary rais 10% percentage of employee : " + emp1.getpercentageRise());
        System.out.println("The year salary rais 10% percentage of employee : " + emp2.getpercentageRise());


    }
}
```

ANSWER

```
PS C:\Users\DYDA\Desktop\Test1> java Employee
The year salary of employee : 36000
The year salary of employee : 120000
The year salary rais 10% percentage of employee : 3600.0
The year salary rais 10% percentage of employee : 12000.0
PS C:\Users\DYDA\Desktop\Test1>
```

5. (Date Class) Create a class called Date that includes three pieces of information as data members a month (type int), a day (type int) and a year (type int). Your class should have a constructor with three parameters that uses the parameters to initialize the three data members. For the purpose of this exercise, assume that the values provided for the year and day are correct, but ensure that the month value is in the range 1-12; if it is not, set the month to 1. Provide a set and a get function for each data member. Provide a member function displayDate that displays the month, day and year separated by forward slashes (/). Write a test program that demonstrates class Date's capabilities.

Date.java

```
public class Date{
    private int month;
    private int day;
    private int year;

    public Date(int m, int d, int y){
        this.month= m;
        this.day = d;
        this.year= y;
    }
    public void setMonth(){
        if (0< month && month<=12){
            this.month = month;
        }else{
            month = 1;
        }
    }

    public void setmonth(int month){
        this.month = month;

    }
    public int getmonth(){
        return month;

    }

    public void setday(int day){
        this.day = day;

    }
    public int getday(){
        return day;

    }

    public void setyear(int year){
        this.year = year;

    }
    public int getyear(){
        return year;

    }

    public void DisplayDate(){
        System.out.println(day + "/"+ month+ "/"+ year);
    }

    public static void main (String [] args ){
        Date date = new Date(31,04,2012);
        date.DisplayDate();


    }
}
```

ANSWER

```
PS C:\Users\DYDA\Desktop\Test1> jav
PS C:\Users\DYDA\Desktop\Test1> jav
4/31/2012
PS C:\Users\DYDA\Desktop\Test1>
```

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