**Task 1**

**Consider the following code:**

|  |
| --- |
| **public class Quiz1** |
| **{** |
| **public static void main(String args[])** |
| **{** |
| **double [] myArray = new double[5];** |
| **String test = "";** |
| **int i = 0, j = 0, k = 18;** |
| **while (i < 4){** |
| **myArray[i] = i + 3;** |
| **test = "-->";** |
| **j = i - 1;** |
| **while (j > (i - 3) ){** |
| **if (j >= 0){** |
| **myArray[i] = myArray[i+1] - myArray[j] / 2 + 1;** |
| **}** |
| **j--;** |
| **}** |
| **test = test + myArray[i] + "-->" + j + 3 + 45;** |
| **System.out.println(test);** |
| **i++;** |
| **}** |
| **test = "-->" + myArray[i-3] + "-->" + myArray[i-1];** |
| **System.out.println(test);** |
| **}** |
| **}** |

What is the output?

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**Task 2**

Consider the following class:

**class Student{**

**public String name;**

**public double cgpa;**

**}**

**Show the output of the following sequence of statements:**

|  |  |
| --- | --- |
| **Student s1 = new Student();** **Student s2 = new Student();** **Student s3;** **s1.name = "Student One";** **s1.cgpa = 2.3;** **s3 = s1;** **s2.name = "Student Two";**  **s2.cgpa = s3.cgpa++;**  **s3.name = "New Student";** **System.out.println(s1.name);** **System.out.println(s2.name);** **System.out.println(s3.name);** **System.out.println(s1.cgpa);** **System.out.println(s2.cgpa);** **System.out.println(s3.cgpa);** **s3 = s2;** **s1.name = "old student";** **s2.name = "older student";** **s3.name = "oldest student";**  **s2.cgpa = s1.cgpa - s3.cgpa + 1.3;**  **System.out.println(s1.name);** **System.out.println(s2.name);** **System.out.println(s3.name);** **System.out.println(s1.cgpa);** **System.out.println(s2.cgpa);** **System.out.println(s3.cgpa);** | **Output** |
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**Task 3**

**Consider the following code:**

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| --- |
| **class msgClass{** |
| **public int content;** |
| **}** |
| **public class FinalT5A{** |
| **private int sum = 2;** |
| **private int y = 1;** |
| **public int x = 1;** |
| **public void methodA(){** |
| **int x=0, y =0, i = 0;** |
| **while (i < 2){** |
| **msgClass myMsg = new msgClass();** |
| **myMsg.content = this.x;** |
| **this.y = this.y + methodB(myMsg, myMsg.content);** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **y = this.y / 2;** |
| **x = y + sum/2 - i;** |
| **sum = x + y + myMsg.content;** |
| **i++;** |
| **}** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **private int methodB(msgClass mg2, int mg1){** |
| **int x = 0;** |
| **y = y + mg2.content;** |
| **mg2.content = y + mg1;** |
| **x = this.x + 3 + mg1;** |
| **sum = sum + x + y;** |
| **System.out.println(this.x + " " + this.y+ " " + sum);** |
| **mg2.content = sum - mg1 ;** |
| **return sum;** |
| **}** |
| **}** |

What is the output of the following code sequence?

|  |  |  |  |
| --- | --- | --- | --- |
| **FinalT5A fT5A = new FinalT5A();**  **fT5A.methodA();** | **x** | **y** | **sum** |
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#### **Task 4**

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| --- |
| **public class FinalT6A{** |
| **public static int temp = 3;** |
| **private int sum;** |
| **private int y = 2;** |
| **public FinalT6A(int x, int p){** |
| **temp+=3;** |
| **y = temp - p;** |
| **sum = temp + x;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **public void methodA(){** |
| **int x=0, y =0;** |
| **y = y + this.y;** |
| **x = this.y + 2 + temp;** |
| **sum = x + y + methodB(temp, y);** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **public int methodB(int temp, int n){** |
| **int x = 0;** |
| **y = y + (++temp);** |
| **x = x + 2 + n;** |
| **sum = sum + x + y;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **return sum;** |
| **}** |
| **}** |

What is the output of the following code sequence?

|  |  |  |  |
| --- | --- | --- | --- |
| **FinalT6A q1 = new FinalT6A(2,1);**  **q1.methodA();**  **q1.methodA();** | **x** | **y** | **sum** |
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#### **Task 5**

**public class Quiz1{**

**public static int temp = 4;**

**public int sum;**

**public int y;**

**public Quiz1(){**

**y = temp - 1;**

**sum = temp + 1;**

**temp+=2;**

**}**

**public Quiz1(int p){**

**y = temp + p ;**

**sum = p+ temp + 1;**

**temp-=1;**

**}**

**public void methodA(){**

**int x=0, y =0;**

**y = y + this.y;**

**x = this.y + 2 + temp;**

**sum = x + y + methodB(x, y);**

**System.out.println(x + " " + y+ " " + sum);**

**}**

**public int methodB(int m, int n){**

**int x = 0;**

**y = y + m + (++temp);**

**x = x + 2 + n;**

**sum = sum + x + y;**

**System.out.println(x + " " + y+ " " + sum);**

**return sum;**

**}**

**}**

**Consider the following code:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Quiz1 q1 = new Quiz1();**  **q1.methodA();**  **q1.methodA();**  **Quiz1.temp+= 2;**  **Quiz1 q2 = new Quiz1(2);**  **q2.methodA();**  **q2.methodA();** | **x** | **y** | **sum** |
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**Task 6**

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| --- |
| **class A{** |
| **public static int temp = 4;** |
| **public int sum;** |
| **public int y;** |
| **public A(){** |
| **y = temp - 2;** |
| **sum = temp + 1;** |
| **temp-=2;** |
| **}** |
| **public void methodA(int m, int n){** |
| **int x = 0;** |
| **y = y + m + (temp++);** |
| **x = x + 1 + n;** |
| **sum = sum + x + y;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **}** |
| **class B{** |
| **public static int x;** |
| **public int y = 5;** |
| **public int temp = -5;** |
| **public int sum = 2;** |
| **public B(){** |
| **y = temp + 3 ;** |
| **sum = 3 + temp + 2;** |
| **temp-=2;** |
| **}** |
| **public B(B b){** |
| **sum = b.sum;** |
| **x = b.x;** |
| **b.methodB(2,3);** |
| **}** |
| **public void methodA(int m, int n){** |
| **int x = 2;** |
| **y = y + m + (temp++);** |
| **x = x + 5 + n;** |
| **sum = sum + x + y;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **public void methodB(int m, int n){** |
| **int y = 0;** |
| **y = y + this.y;** |
| **x = this.y + 2 + temp;** |
| **methodA(x, y);** |
| **sum = x + y + sum;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **}** |

**Consider the following code:**

|  |  |  |  |
| --- | --- | --- | --- |
| **A a1 = new A();**  **B b1 = new B();**  **B b2 = new B(b1);**  **b1.methodA(1, 2);**  **b2.methodB(3, 2);** | **x** | **y** | **sum** |
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**Task 7**

|  |
| --- |
| **class A{** |
| **public static int temp = 3;** |
| **public int sum;** |
| **public int y;** |
| **public int x;** |
| **public A(){** |
| **int temp = -3;** |
| **int sum = 7;** |
| **y = temp - 5;** |
| **sum = temp + 2;** |
| **temp-=2;** |
| **this.x = sum + temp + y;** |
| **}** |
| **public A(int y, int temp){** |
| **y = temp - 1+ x;** |
| **sum = temp + 2 -x;** |
| **temp-=2;** |
| **}** |
| **public void methodA(int m, int [] n){** |
| **int x = 0;** |
| **y = y + m + methodB(x,m)+(temp++)+y;** |
| **x = this.x + 2 + (++n[0]);** |
| **sum = sum + x + y;** |
| **n[0] = sum + 2;** |
| **System.out.println(n[0] + x + " " + y+ " " + sum + n[0]);** |
| **}** |
| **public int methodB(int m, int n){** |
| **int [] y = {0};** |
| **this.y = y[0] + this.y + m;** |
| **x = this.y + 2 + temp - n;** |
| **sum = x + y[0] + this.sum;** |
| **System.out.println(y[0]+ x + "this.temp" + y[0]+ " " +sum+ y[0]);** |
| **return y[0];** |
| **}** |
| **}** |
| **class B{** |
| **public int y=1;** |
| **public int temp=-3;** |
| **public int x = 1;** |
| **public static int sum = 2;** |
| **public B(){** |
| **y = temp + 1 ;** |
| **x = 3 + temp + x;** |
| **temp-=2;** |
|  |
| **}** |
| **public B(B b){** |
| **sum = b.sum + this.sum;** |
| **x = b.x + x;** |
| **b.methodB(3,5);** |
| **}** |
| **public void methodA(int m, int [] n){** |
| **int x = 0;** |
| **y = y + m + (temp++);** |
| **x = x + 2 + (++n[0]);** |
| **sum = sum + x + y;** |
| **n[0] = sum + 2;** |
| **System.out.println(temp + x + " " + y+ " " + sum + temp);** |
| **}** |
| **public void methodB(int m, int n){** |
| **int [] y = {0};** |
| **this.y = y[0] + this.y + m;** |
| **x = this.y + 2 + temp - n;** |
| **methodA(x, y);** |
| **sum = x + y[0] + this.sum;** |
| **System.out.println(n + x + " " + y[0]+ " " + sum + n);** |
| **}** |
| **}** |
| **Consider the following code:** |
| **int x[] = {35};** |
| **A a1 = new A();** |
| **A a2 = new A(-5,-7);** |
| **B b1 = new B();** |
| **B b2 = new B(b1);** |
| **a1.methodA(1, x);** |
| **b2.methodB(3, 2);** |
| **a2.methodA(1, x);** |

#### **Task 8**

|  |
| --- |
| **class msgClass{** |
| **public int content;** |
| **}** |
|  |
| **public class Quiz3{** |
| **private int sum;** |
| **private int y;** |
| **public static int x;** |
| **public Quiz3(){** |
| **sum = 5;** |
| **x = 2;** |
| **y = 2;** |
| **}** |
| **public Quiz3(int k){** |
| **sum = sum + k;** |
| **y = 3;** |
| **x += 2;** |
| **}** |
| **public void methodA(){** |
| **int x=1, y=1;** |
| **msgClass [] msg = new msgClass[1];** |
| **msgClass myMsg = new msgClass();** |
| **myMsg.content = Quiz3.x;** |
| **msg[0] = myMsg;** |
| **msg[0].content = this.y + myMsg.content;** |
| **this.y = this.y + methodB(msg[0]);** |
| **y = methodB(msg[0]) + this.y;** |
| **x = y + methodB(msg, msg[0]);** |
| **sum = x + y + msg[0].content;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **}** |
| **private int methodB(msgClass [] mg2, msgClass mg1){** |
| **int x = 2;** |
| **y = y + mg2[0].content;** |
| **mg2[0].content = y + mg1.content;** |
| **x = x + 2 + mg1.content;** |
| **sum = sum + x + y;** |
| **mg1.content = sum - mg2[0].content ;** |
| **System.out.println(Quiz3.x + " " + this.y+ " " + sum);** |
| **return sum;** |
| **}** |
| **public int methodB(msgClass mg1){** |
| **int x = 1, y = 2;** |
| **y = sum + mg1.content;** |
| **this.y = y + mg1.content;** |
| **x = Quiz3.x + 5 + mg1.content;** |
| **sum = sum + x + y;** |
| **Quiz3.x = mg1.content + x + 3;** |
| **System.out.println(x + " " + y+ " " + sum);** |
| **return y;** |
| **}** |
| **}** |

**Consider the following code:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Quiz3 a1 = new Quiz3();**  **Quiz3 a2 = new Quiz3(5);**  **msgClass msg = new msgClass();**  **a1.methodA();**  **a2.methodB(msg);** | **x** | **y** | **sum** |
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#### **Task 9**

**Study the following output**

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| --- | --- |
| **Code** | **Output** |
| **public class StudentTest{**  **public static void main(String [] args){**  **Student s1 = new Student();**  **System.out.println(s1.getName());**  **Student s2 = new Student("Matin");**  **System.out.println(s2.getName());**  **Student s3 = new Student("Saad");**  **System.out.println(s3.getName());**  **System.out.println(Student.numberOfStudents);**  **}**  **}** | **default name**  **Matin**  **Saad**  **3** |

Write the code for the Student class so that the StudentTest class generates the output shown above.

#### **Task 10**

Write a **Java program** takes a positive number ***n*** typed by the user and then, using nested iterations (loops), outputs the following triangle of numbers. You may assume that as the value of ***n***, user may enter any number between 1 and 9.

**[Answer on the answer-script]**

1

22

333

…..

…..

nnn…n

#### **Task 11**

Generate the following pattern (e.g using ‘loop’ and ‘break’ operation)

0

0 1

0 2 4

0 3 6 9

0 4 8 12 16

0 5 10 15 20 25

0 6 12 18 24 30 36

0 7 14 21 28 35 42 49

0 8 16 24 32 40 48 56 64

0 9 18 27 36 45 54 63 72 81

**Task 12**

Write a Java program that will ask a BU student for his/her Name and BU ID and then show the student:

1) His/her first name

2) His/her last name

3) Middle initials

4) His/her department

5) His/her first year at BU

6) His/her first semester at BU

7) Till now how many semesters he/she has finished at BU.

8) Assuming it takes 12 semesters to graduate show the approximate semester and year and semester the student is going to graduate in.

**TASK 13**

Create a class called BankAccount as described below:

* **Fields:**name, address, accountID, balance
* **Methods:**   
  public String getName()  
  public void setName(String n)  
  public String getAccountID()  
  public void setAccountID(String i)  
  public String getAddress()  
  public void setAddress(String a)  
  public double getBalance()  
  public void setBalance(double c)  
  public void addInterest() //adds 7% of the balance

Write a class called AccountTester to write a main() method:

* public static void main(String[] args){  
    
  }
* Inside the main() method
  + Create 3 objects/instances of BankAccount called acc1, acc2 and acc3
  + Set their fields to some value using the public methods.
  + Call addInterest() on acc1 and acc3
  + Print the information of each BankAccount using System.out.println()

Add constructors to BankAccount and use the constructor to set the field values.

##### Task 14

Create a class **SavingsAccount,** which will use a **static** class variable to store the **annualInterestRate** for all account holders.

* Each object of the class contains a **private** instance variable **savingsBalance** indicating the amount the saver currently has on deposit.
* Provide method **calculateMonthlyInterest()** to calculate the monthly interest [by multiplying the **savingsBalance** by **annualInterestRate** divided by 12], this interest should be added to **savingsBalance**.
* Provide a **static** method **modifyInterestRate()** that sets the **annualInterestRate** to a new value.

Write a driver program to test class **SavingsAccount**.

* Instantiate two **SavingsAccount** objects, **saver1** and **saver2**, with balances $20000.00 and $30000.00, respectively using constructor.
* Set **annualInterestRate** to 4.2%, then calculate the monthly interest and print the new balances for each of the savers using **printSavingsBalance( )** method.
* Then set the **annualInterestRate** to 5.5% and calculate the next month’s interest and print the new balances for each of the savers.

**Task 15**

**Output:**

**========================**

**Name: Saad Abdullah**

**Department: CSE**

**List of courses**

**========================**

**CSE 110 Programming Language I**

**CSE 111 Programming Language-II**

**========================**

**========================**

**Name: Mumit Khan**

**Department: CSE**

**List of courses**

**========================**

**CSE 220 Data Structures**

**CSE 221 Algorithms**

**CCSE 230 Discrete Mathematics**

**========================**

**========================**

**Name: Sadia Kazi**

**Department: CSE**

**List of courses**

**========================**

**CSE 310 Object Oriented Programming**

**CSE 320 Data Communications**

**CSE 340 Computer Architecture**

**========================**

**Tester:**

public class TestTeacher{

public static void main(String [] args){

Teacher t1 = new Teacher("Saad Abdullah", "CSE");

Teacher t2 = new Teacher("Mumit Khan", "CSE");

Teacher t3 = new Teacher("Sadia Kazi", "CSE");

Course c1 = new Course("CSE 110 Programming Language I");

Course c2 = new Course("CSE 111 Programming Language-II");

Course c3 = new Course("CSE 220 Data Structures");

Course c4 = new Course("CSE 221 Algorithms");

Course c5 = new Course("CCSE 230 Discrete Mathematics");

Course c6 = new Course("CSE 310 Object Oriented Programming");

Course c7 = new Course("CSE 320 Data Communications");

Course c8 = new Course("CSE 340 Computer Architecture");

t1.addCourse(c1);

t1.addCourse(c2);

t2.addCourse(c3);

t2.addCourse(c4);

t2.addCourse(c5);

t3.addCourse(c6);

t3.addCourse(c7);

t3.addCourse(c8);

t1.printDetail();

t2.printDetail();

t3.printDetail();

}

}

Write the Teacher and Course classes so that the TestTeacher class produces the outputs given above