OOP Basics

Task 1: [Homework]

Consider the following class:

```
public class Human{
    public int age;
    public double height;
}
```

Show the output of the following sequence of statements:

	Output

`Human h1 = new Human();`
`Human h2 = new Human();`
`h1.age = 21;`
`h1.height = 5.5;`
`System.out.println(h1.age);`
`System.out.println(h1.height);`
`h2.height = h1.height - 3;`
`System.out.println(h2.height);`
`h2.age = h1.age++;`
`System.out.println(h1.age);`
`h2 = h1;`
`System.out.println(h2.age);`
`System.out.println(h2.height);`
`h2.age++;`
`h2.height++;`
`System.out.println(h1.age);`
`System.out.println(h1.height);`
`h1.age = ++h2.age;`
`System.out.println(h2.age);`
`System.out.println(h2.height);`	

Task 2:

Design the necessary class to generate the correct output from the driver code provided below:

Driver Code	Output

`public class CourseTester{`
`  public static void main(String args []){`
`  Course c1 = new Course();`
`  System.out.println("Course Name: "+c1.courseName);`
`  System.out.println("Course Code: "+c1.courseCode);`
`  System.out.println("Credit: "+c1.credit);`
`  }`
`}`
	`Course Name: null`
	`Course Code: null`
	`Credit: 0`

Task 3 :

Design the class to generate the correct output from the driver code provided below:

Driver Code	Output

`public class CourseTester{`
`  public static void main(String args []){`
`  Course c1 = new Course();`
`  System.out.println("Course Name: "+c1.courseName);`
`  System.out.println("Course Code: "+c1.courseCode);`
`  System.out.println("Credit: "+c1.credit);`
`  }`
`}`
	`Course Name: Programming Language II`
	`Course Code: CSE111`
	`Credit: 3`

Task 4: [Homework]

Design the class to generate the correct output from the driver code provided below:

Driver Code	Output

public class PlayerTester{
public static void main(String args[]){
Player player1 = new Player();
player1.name = "Ronaldo";
player1.jersy_number = 9;
player1.position = "Striker";
	Name of the Player: Ronaldo
	Jersey Number of player: 9
	Position of player: Striker
	==========
	Name of the player: Neuer

System.out.println("Name of the Player: "+ player1.name);
System.out.println("Jersey Number of player: "+ player1.jersy_number);
System.out.println("Position of player: "+ player1.position);
System.out.println("==========================");
Player player2 = new Player();
player2.name = "Neuer";
player2.jersy_number = 1;
player2.position = "Goal Keeper";
System.out.println("Name of the player: "+ player2.name);
System.out.println("Jersey Number of player: "+ player2.jersy_number);
System.out.println("Position of player: "+ player2.position);
}
}
	Jersey Number of player: 1
	Position of player: Goal Keeper

Instance Method

Task 5:

Design the **Phone** class to generate the correct output from the driver code provided below:

Driver Code	Output

public class PhoneTester{
  public static void main(String args[]){
  Phone p1 = new Phone();
  p1.showDetails();
  System.out.println("---------1---------");
  System.out.println(p1.increasePrice(2000));
  System.out.println("---------2---------");
  p1.showDetails();
  Phone p2 = new Phone();
  System.out.println("---------4---------");
  p2.showDetails();
  System.out.println("---------5---------");
  System.out.println(p2.increasePrice(5000));
  System.out.println("---------6---------");
  p2.changeBrandName("Oppo");
  System.out.println("---------7---------");
  p2.showDetails();
  }
}
	Brand Name: Nokia
	Color: Blue
	Price: 14000 Taka
	---------1---------
	The price is updated
	---------2---------
	Brand Name: Nokia
	Color: Blue
	Price: 16000 Taka
	---------4---------
	Brand Name: Nokia
	Color: Blue
	Price: 14000 Taka
	---------5---------
	The price is updated
	---------6---------
	Brand name is changed to Oppo
	---------7---------
	Brand Name: Oppo
	Color: Blue
	Price: 19000 Taka

Task 6: **[Homework]**

Design the necessary class to generate the correct output from the driver code provided below:

Driver Code	Output

public class VehicleTester{
  public static void main (String args[]){
  Vehicle v1 = new Vehicle();
  v1.x = 0;
  v1.y = 0;
  System.out.println(v1.details());
  System.out.println("============");
  v1.moveUp();
	0,0
	============
	0,1
	============
	-1,0
	============
	0,0
	============

```
    System.out.println(v1.details());
    System.out.println("============");
    v1.moveLeft();
    v1.moveDown();
    System.out.println(v1.details());
    System.out.println("============");
    v1.moveRight();
    System.out.println(v1.details());
    System.out.println("============");
  }
}
```

Task 7:

Design the **Student** class to generate the correct output from the driver code provided below: **Hint: A student can add a maximum of 4 courses.**

Driver Code	Output

public class StudentTester{
  public static void main (String args[]){
  Student std1 = new Student();
  std1.studentInfo();
  System.out.println("1----------");
  std1.name = "Bob";
  std1.id = 123;
  System.out.println(std1.addCourse("CSE110"));
  System.out.println("2----------");
  std1.studentInfo();
  System.out.println("3----------");
  Student std2 = new Student();
  std2.name = "Max";
  std2.id = 456;
  System.out.println(std2.addCourse("CSE250"));
  System.out.println(std2.addCourse("CSE370"));
  std2.studentInfo();
  System.out.println("4----------");
  System.out.println(std2.addCourse("PHY111"));
  System.out.println(std2.addCourse("MAT120"));
  System.out.println("5----------");
  std2.studentInfo();
  System.out.println("6----------");
	Student Name: Default
	Student ID: 0
	Maximum Course Limit: 4
	Courses Taken: 0
	Courses:
	1----------
	CSE110 course is added
	2----------
	Student Name: Bob
	Student ID: 123
	Maximum Course Limit: 4
	Courses Taken: 1
	Courses: CSE110
	3----------
	CSE250 course is added
	CSE370 course is added
	Student Name: Max
	Student ID: 456
	Maximum Course Limit: 4
	Courses Taken: 2
	Courses: CSE250 CSE370
	4----------
	PHY111 course is added

System.out.println(std2.addCourse("CSE470"));
System.out.println("7----------");
std2.studentInfo();
 	
}
}
	MAT120 course is added
	5----------
	Student Name: Max
	Student ID: 456
	Maximum Course Limit: 4
	Courses Taken: 4
	Courses: CSE250 CSE370 PHY111 MAT120
	6----------
	The maximum course limit exceeded
	7----------
	Student Name: Max
	Student ID: 456
	Maximum Course Limit: 4
	Courses Taken: 4
	Courses: CSE250 CSE370 PHY111 MAT120

Task 8:

Write the design class with the required properties to produce the given output for the provided driver code.

Driver Code	Output

public class TaxiTester{
public static void main(String args[]){
Taxi t1 = new Taxi();
t1.createTaxi(4);
System.out.println("1----------");
t1.info();
System.out.println("2----------");
t1.addPassenger("Walker", 200);
t1.addPassenger("Matt", 200);
System.out.println("3----------");
t1.info();
System.out.println("4----------");
t1.addPassenger("Wilson",400);
System.out.println("5----------");
t1.info();
System.out.println("5----------");
t1.addPassenger("Henry",150);
System.out.println("6----------");
t1.info();
System.out.println("7----------");
t1.addPassenger("Marry", 200);
System.out.println("8----------");
	A taxi is created with a capacity of 4
	1----------
	Total Passenger: 0
	Maximum Capacity: 4
	Total Fare: 0 Taka
	Passenger List:
	2----------
	Dear Walker! Welcome to Taxi
	Dear Matt! Welcome to Taxi
	3----------
	Total Passenger: 2
	Maximum Capacity: 4
	Total Fare: 400 Taka
	Passenger List:
	Walker Matt
	4----------
	Dear Wilson! Welcome to Taxi
	5----------
	Total Passenger: 3
	Maximum Capacity: 4
	Total Fare: 800 Taka
	Passenger List:
	Walker Matt Wilson
	5----------
	Dear Henry! Welcome to Taxi

```
    t1.info();
    System.out.println("9------------");
    Taxi t2 = new Taxi();
    t2.createTaxi(3);
    System.out.println("10------------");
    t2.info();
  }
}
```

```
6------------
Total Passenger: 4
Maximum Capacity: 4
Total Fare: 950 Taka
Passenger List:
Walker Matt Wilson Henry
7------------
Taxi is full
8------------
Total Passenger: 4
Total Fare: 950 Taka
Passenger List:
Walker Matt Wilson Henry
9------------
A taxi is created with a capacity of 3
10------------
Total Passenger: 0
Maximum Capacity: 3
Total Fare: 0 Taka
Passenger List:
```

Task 9:

Write the design class with the required properties to produce the given output for the provided driver code.

Driver Code	Output

```
public class CartTester{
  public static void main(String args[]){
    Cart c1 = new Cart();
    System.out.println("1------------");
    c1.info();
    System.out.println("2------------");
    Cart c2 = new Cart();
    System.out.println("3------------");
    c1.addItem("Coke", 12);
    c1.addItem("Biscuit", 50);
    System.out.println("4------------");
    c1.info();
    System.out.println("5------------");
    c1.addItem("Chocolate",15);
    System.out.println("6------------");
    c1.info();
    System.out.println("7------------");
    c1.addItem("Pen",5);
    System.out.println("8------------");
    c1.info();
    System.out.println("9------------");
```

```
1------------
Cart capacity: 3
Total Item: 0
Total Price: 0 Taka
Item  List:
2------------
3------------
Coke is added to cart.
Biscuit is added to cart.
4------------
Cart capacity: 3
Total Item: 2
Total Price: 62 Taka
Item  List:
Coke Biscuit
5------------
Chocolate is added to cart.
6------------
Cart capacity: 3
Total Item: 3
Total Price: 77 Taka
```

```
    c2.addItem("Water",10);
    System.out.println("10------------");
    c2.info();
  }
}
```

```
Item  List:
Coke Biscuit Chocolate
7------------
Cart is full
8------------
Cart capacity: 3
Total Item: 3
Total Price: 77 Taka
Item  List:
Coke Biscuit Chocolate
9------------
Water is added to cart.
10------------
Cart capacity: 3
Total Item: 1
Total Price: 10 Taka
Item  List:
Water
```

Task 9:

```
1  public class Task11 {
2     public int p = 3, y = 2, sum;
3     public void methodA(){
4         int x = 0, y = 0;
5         y = y + this.y;
6         x = sum + 2 + p;
7         sum = x + y + this.methodB(p, y);
8         System.out.println(x + " " + y+ " " + sum);
9     }
10    public int methodB(int p, int n){
11        int x = 0;
12        y = y + (++p);
13        x = x + 2 + n;
14        sum = sum + x + y;
15        System.out.println(x + " " + y+ " " + sum);
```

```
16          return sum;
17      }
18  }
```

Driver code:

```
public class Tester11 {
   public static void main(String [] args){
       Task11 t1 = new Task11 ();
       t1.methodA();
       t1.methodA();
   }
}
```

Outputs		
x	**y**	**Sum**

Task 10: **[Homework]**

```
1   public class A {
2      public int temp = 4;
3      public int sum, y, x;
4      public void methodA(int m){
5          int [] n = {2,5};
6          int x = 0;
7          y = m + this.methodB(x++,m)+(temp++);
8          x = this.x + 2 + n[0];
9          sum = sum + x + y;
10         n[0] = sum + 2;
11         System.out.println(n[0]+" " + x+ " " + sum);
12     }
13     public int methodB(int m, int n){
14         int y = 4 + this.y + m;
15         x = this.y + y + (++temp) - n;
16         sum = x + y + this.sum;
```

```
17          System.out.println(y+ " " + this.x + " " +sum);
18          return x;
19        }
20  }
```

```
public class Tester {
   public static void main(String [] args){
       A t1 = new A();
       t1.methodA(5);
       A t2 = new A();
       t2.methodB(12, 2);
   }
}
```

Outputs		