1. Write the output of the following program:

```
class Bicycle {

    int cadence = 0;
    int speed = 0;
    int gear = 1;

    void changeCadence(int newValue) {
        cadence = newValue;
    }

    void changeGear(int newValue) {
        gear = newValue;
    }

    void speedUp(int increment) {
        speed = speed + increment;
    }

    void applyBrakes(int decrement) {
        speed = speed - decrement;
    }

    void printStates() {
        System.out.println("cadence:" +
                cadence + " speed:" +
                speed + " gear:" + gear);
    }
}
```

```
class BicycleDemo {
    public static void main(String[] args) {

        // Create two different
        // Bicycle objects
        Bicycle bike1 = new Bicycle();
        Bicycle bike2 = new Bicycle();

        // Invoke methods on
        // those objects
        bike1.changeCadence(50);
        bike1.speedUp(10);
        bike1.changeGear(2);
        bike1.printStates();

        bike2.changeCadence(50);
        bike2.speedUp(10);
        bike2.changeGear(2);
        bike2.changeCadence(40);
        bike2.speedUp(10);
        bike2.changeGear(3);
        bike2.printStates();
    }
}
```

2. Write the output of the following code:

```
class Student{

    public String name;
    public String id;
    public float cgpa;
    public int creditCompleted;

    public Student(String name, String id, float cgpa, int creditCompleted) {
        this.name = name;
        this.id = id;
        this.cgpa = cgpa;
        this.creditCompleted = creditCompleted;
    }

    //The updateCgpa function updates a student's CGPA.
    //UIU uses a similar method to update a student's CGPA
    //after each semester.
    public void updateCgpa(int credit, float gpa){
        cgpa = (cgpa*creditCompleted + credit*gpa)/(creditCompleted+credit);
        creditCompleted = creditCompleted + credit;
    }
    public float getCgpa(){
        return cgpa;
    }
}
```

```
class TestMultipleStudents {
    public static void main(String[] args) {


        Student studentR = new Student("Rashid", "011181991", 3.0f, 20);
        Student studentK = new Student("Khaled", "011181992", 3.2f, 18);


        System.out.println(studentR.name + "; Credit Completed: " +
            studentR.creditCompleted +"; Previous cgpa: "+ studentR.cgpa);

        System.out.println(studentK.name + "; Credit Completed: "+
            studentK.creditCompleted +"; Previous cgpa: "+ studentK.cgpa);

        studentR.updateCgpa(3, 4.0f);

        System.out.println("After Update");
        System.out.printf("%s; Credit Completed: %d; New cgpa: %.2f\n",
            studentR.name, studentR.creditCompleted, studentR.cgpa);

        System.out.printf("%s; Credit Completed: %d; New cgpa: %.2f",
            studentK.name, studentK.creditCompleted, studentK.cgpa);
    }
}
```

3.

Write the output of the code.

```
public class A {
    A()
    {
        System.out.println("Inside A");
    }
    A(String msg)
    {
        System.out.println("A: "+msg);
    }

}
public class B extends A{
    B()
    {
        System.out.println("Inside B");
    }
    B(String msg)
    {
        System.out.println("B: "+msg);
    }
}
```

```
public class C extends B{
    C()
    {
        System.out.println("Inside C");
    }
    C(String msg)
    {
        System.out.println("C: "+msg);
    }
    public static void main(String[] args)
{
        C c1=new C();
        C c2=new C("University");
    }

}
```

4. Write the output of the following code:

```
public class Animal {
    Animal()
    {
        System.out.println("Animal created");
    }
    void eat()
    {
        System.out.println("Animal eats");
    }
    void fly()
    {
        System.out.println("Animal fly");
    }

}
```

```
public class Bird extends Animal{
    Bird()
    {
        System.out.println("Bird created");
    }
    void fly()
    {
        System.out.println("Birds fly");
    }
    public static void main(String[] args)
    {
        Animal a= new Bird();
        a.fly();
        a.eat();
    }

}
```

5. Create a class named "**Box**" which has 3 attribute: **length**, **width**, **height** and a method named **getVolume**(). **getVolume**() method will calculate the volume of the Box and return the value. From "**main**" method create **2 Box objects** with different length, width, height, then call the **getVolume**() method and print the volumes. Use **constructor** while creating Box objects.

6.

Suppose youre building a software for a private organization. Now, write a class named **Employee**. It has two attributes **name** and **salary** with types respectively String and Floating point number. The constructor of Employee class initializes name and salary with this reference keyword. There is one method named **void printSalary()**. The classes that extend Employee are **PlatinumEmployee** and **SilverEmployee**. **PlatinumEmployee** class overrides **printSalary()** method by invoking parent method and also prints the name and bonus amount which is 15% of the actual salary and finally prints the total salary by adding the bonus amount. **SilverEmployee** class also overrides **printSalary()** in similar way except that the bonus amount is 7% in this case. Write the code of these two classes also.