

# CSE18R272-LAB MANUAL

KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION

COMPUTER SCIENCE AND EDUCATION

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Section: A5

Course name: java programming

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1.) Create a base class Shape with relevant data members and member functions to get data and print the area. Create two more classes Rectangle and Triangle which inherit Shape class. Test the classes in main method.

**Source Code:**

```
interface Shape{
    double pi =3.14;
    public double perimeter();
    public double area();
}
class Circle implements Shape{
    float radius;
    Circle(float r){
        radius = r;
    }
    public double area(){
        return pi*radius*radius;
    }
    public double perimeter(){
        return 2*pi*radius;
    }
}
class Ellipse implements Shape{
    float a,b;
    Ellipse(float a,float b){
        this.a = a;
        this.b=b;
    }
}
```

```

    public double perimeter(){
        return (2*pi*Math.sqrt(a*a+b*b));
    }

    public double area(){
        return pi*a*b;
    }
}

public class ellipse
{
    public static void main(String[] args) {
        Circle c = new Circle(9.0f);
        Ellipse e = new Ellipse(9.0f,6.0f);

        System.out.println("area of circle is "+ c.area());
        System.out.println("area of ellipse is "+ e.area());
        System.out.println("perimeter of circle is "+ c.perimeter());
        System.out.println("perimeter of ellipse is "+ e.perimeter());
    }
}

```

2.) Design a vehicle class that contains the following properties of motor vehicles: Fuel tank capacity, average fuel consumption per 100 km and the distance a vehicle can travel on a full tank. The vehicle class should be designed as a base class from which the Car and Truck classes are derived. The derived classes should have following member functions. A function that contains data for a vehicle from the user A function that computes and returns the distance a vehicle can travel on a full tank. A function that computes and returns how many times a vehicle has to be refueled to travel a given distance. Test the class in the main method.

**Source Code:**

```

class Vehicle{
    int capacity;
    float consumption, distance;
}

```

```

Vehicle(int a,float b, float c){
    capacity=a;
    consumption=b;
    distance=c;
}
}
class Car extends Vehicle{
    Car(int a, float b, float c){
        super(a,b,c);
    }
    float compute_dist(){
        float d=capacity*consumption/100;
        return d;
    }
    float compute_fuel(int d){
        return (distance*100)/(consumption);
    }
}
class Truck extends Vehicle{
    Truck(int a, float b, float c){
        super(a,b,c);
    }
    float compute_dist(){
        float d=capacity*consumption/100;
        return d;
    }
    float compute_fuel(int d){
        return (distance*100)/(consumption);
    }
}

```

```

public class vehicle_main
{
    public static void main(String[] args) {
        Car c = new Car(35,25.0f,30.0f);

        System.out.println("Distance covered by Car: "+ c.compute_dist()+" km\n"+"Fuel
Consumed by Car: "+c.compute_fuel(5)+" litres");

        Truck t= new Truck(55,35.0f,50.0f);

        System.out.println("\nDistance covered by Truck: "+ t.compute_dist()+"
km\n"+"Fuel Consumed by Truck: "+t.compute_fuel(15)+" litres \n");
    }
}

```

3.) Create three classes Student, Test and Result classes. The student class contains student relevant information. Test class contains marks for five subjects. The result class contains Total and average of the marks obtained in five subjects. Inherit the properties of Student and Test class details in Result class through multilevel inheritances.

#### **Source Code:**

```

class Student
{
    int regno;
    String name, dept;
    Student(int rno, String name, String dept)
    {
        regno = rno; this.name=name; this.dept =dept;
    }
    void display()
    {
        System.out.print(regno + " " + name + " " + dept);
    }
}

```

```
class Test extends Student
```

```
{  
    int marks[];  
    Test(int r, String n, String d, int m[])  
    {  
        super(r,n,d);  
        marks = m;  
    }  
}
```

```
class Result extends Test
```

```
{  
    Result(int r, String n, String d, int m[])  
    {  
        super(r,n,d,m);  
    }  
    void printResult() {  
        display();  
        int sum = 0;  
        for (int i =0; i< marks.length; i++)  
            sum += marks[i];  
        System.out.println(" Total Marks: "+ sum + " Average = " + (sum/5.0) );  
    }  
}
```

```
public class student_mark
```

```
{  
    public static void main(String arg[])  
    {  
        int mark[] = {87,89,98,86,87};  
        Result r = new Result(4140, "Gnana Prakash", "CSE", mark);  
        r.printResult();  
    }  
}
```

```
int mark2[] = {86,98,76,89,89};  
Result r2 = new Result(4044,"Ramu", "CSE", mark2);  
r2.printResult();  
}  
}
```