Object Oriented Programming
Lab Task 4

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Activity 1:

```java
package LAB4;

class ObjectPass {
    public int value;

    public static void increment(ObjectPass a) {
        a.value++;
    }
}

public class ObjectPassTest {
    public static void main(String[] args) {
        ObjectPass p = new ObjectPass();
        p.value = 5;
        System.out.println("Before calling: " + p.value); // output is 5
        ObjectPass.increment(p);
        System.out.println("After calling: " + p.value); // output is 6
    }
}
```

Output:

```
PS D:\Ishtudy Material\3r
ExceptionMessages' '-cp'
Before calling: 5
After calling: 6
PS D:\Ishtudy Material\3r
```

Activity 2:

```java
package LAB4;

class Complex {
    private double real;
    private double imag;

    public Complex() {
        real = 0.0;
        imag = 0.0;
    }

    public Complex(double r, double im) {
```

```
        real = r;
        imag = im;
    }

    public Complex Add(Complex b) {
        Complex c_new = new Complex(real + b.real, imag + b.imag);
        return c_new;
    }

    public void Show() {
        System.out.println(real + imag);
    }
}

public class ComplexTest {
    public static void main(String args[]) {
        Complex C1 = new Complex(11, 2.3);
        Complex C2 = new Complex(9, 2.3);
        Complex C3 = new Complex();
        C3 = C1.Add(C2);
        C3.Show();
    }
}
```

Output:

```
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual> d:; c
les\Java\jdk-18.0.2\bin\java.exe' '-XX:+ShowCodeDetailsIn
nual\bin' 'LAB4.ComplexTest'
After Adding two objects. The sum of complex is :24.6
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

Activity 3:

```
package LAB4;

class Point {
    private int X;
    private int Y;

    public Point() {
        X = 5;
        Y = 6;
    }
```

```
    public Point(int a, int c) {
        X = a;
        Y = c;
    }

    public void setX(int a) {
        X = a;
    }

    public void setY(int c) {
        Y = c;
    }

    public int getX() {
        return X;
    }

    public int getY() {
        return Y;
    }

    public Point Add(Point Pa, Point Pb) {
        Point p_new = new Point(X + Pa.X + Pb.X, Y + Pa.Y + Pb.Y);
        return p_new;
    }

    public void display() {
        System.out.println(X);
        System.out.println(Y);
    }
}

public class PointTest {
    public static void main(String[] args) {
        Point p1 = new Point(10, 20);
        Point p2 = new Point(30, 40);
        Point p3 = new Point();
        Point p4 = p1.Add(p2, p3);
        System.out.println("Printing Point 1");
        p1.display();
        System.out.println("Printing Point 2");
        p2.display();
        System.out.println("Printing Point 3");
        p3.display();
```

```
        System.out.println("Printing Point 4 made by addition of point 2 and
point 3 in point 1");
        p4.display();
    }
}
```

Output:

```
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual> & 'C:\Program Files\Java
ExceptionMessages' '-cp' 'D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual\bin
Printing Point 1
10
20
Printing Point 2
30
40
Printing Point 3
5
6
Printing Point 4 made by addition of point 2 and point 3 in point 1
45
66
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

Solved Lab Task 1:

```
package LAB4;

public class DistanceCheck {
    public static void main(String[] args) {
        Distance d1 = new Distance(5.3, 2.3);
        Distance d2 = new Distance(2.3, 5.5);
        Distance d3 = d1.addTwoDistance(d1, d2);
        d1.display();
        d2.display();
        d3.display();
    }
}

class Distance {
    private double feet;
    private double inches;

    public Distance() {
        // Default Values for no arguments
        feet = 10;
        inches = 10;
```

```
    }

    public Distance(double feet, double inches) {
        this.feet = feet;
        this.inches = inches;
    }

    public double getFeet() {
        return feet;
    }

    public void setFeet(double feet) {
        this.feet = feet;
    }

    public double getInches() {
        return inches;
    }

    public void setInches(double inches) {
        this.inches = inches;
    }

    public Distance addTwoDistance(Distance d1, Distance d2) {
        double NewFeets = d1.feet + d2.feet;
        double newInches = d1.inches + d2.inches;
        Distance newDis = new Distance(NewFeets, newInches);
        return newDis;

    }

    void display() {
        System.out.println("Feets: " + this.feet);
        System.out.println("inches: " + this.inches);
    }
}
```

Output:

```
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>  & 'C:\Pro
ExceptionMessages' '-cp' 'D:\Ishtudy Material\3rd Sem\OOP\LAB
Feets: 5.3
inches: 2.3
Feets: 2.3
inches: 5.5
Feets: 7.6
inches: 7.8
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

Solved Lab Task 2:

```java
package LAB4;

/**
 * BookRunner
 */

class Book {
    String author;
    String[] chapterName = new String[10];

    public Book(String author, String[] chapterName) {
        this.author = author;
        this.chapterName = chapterName;
    }

    // For default constructor
    public Book() {
        this.author = "Unknown";
        this.chapterName[0] = "Unknown";
    }

    boolean compareBooks(Book b) {
        if (this.author == b.author) {
            return true;
        } else {
            return false;
        }
    }

    boolean compareChapterNames(Book b) {
        if (this.chapterName[0] == b.chapterName[0]) {
            return true;
```

```
        } else {
            return false;
        }
    }

    void display() {
        System.out.println("Author: " + this.author);
        System.out.println("Chapters: ");
        for (int i = 0; i < this.chapterName.length; i++) {
            System.out.println(this.chapterName[i]);
        }
    }

}

public class BookRunner {
    public static void main(String[] args) {
        Book b1 = new Book("Hasaan", new String[] { "Beginning", "Pilot",
"Scene3" });
        b1.display();
        Book b2 = new Book("Mujtaba", new String[] { "Intro To Java", "CPP",
"Hello World" });
        b2.display();
        // Declaring same book as 1 to check compare method
        Book b3 = new Book("Hasaan", new String[] { "Beginning", "Pilot",
"Scene3" });
        System.out.println(b1.compareBooks(b3));
        System.out.println(b1.compareChapterNames(b3));
        // testing false results
        System.out.println(b1.compareChapterNames(b2));

    }
}
```

Output:

```
Files\Java\jdk-18.0.2\bin\java.exe -XX:+ShowCodeDetail
nual\bin' 'LAB4.BookRunner'
Author: Hasaan
Chapters:
Beginning
Pilot
Scene3

Author: Mujtaba
Chapters:
Intro To Java
CPP
Hello World

true
true
false
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```

Solved Lab Task 3:

```java
package LAB4;

class Fraction {
    private int numerator;
    private int denominator;

    public Fraction(int numerator, int denominator) {
        this.numerator = numerator;
        this.denominator = denominator;
    }

    public Fraction(int numerator) {
        this.numerator = numerator;
        this.denominator = 1;
    }

    public void setNumerator(int numerator) {
        this.numerator = numerator;
    }

    public void setDenominator(int denominator) {
        this.denominator = denominator;
    }

    public int getNumerator() {
```

```
        return numerator;
    }

    public int getDenominator() {
        return denominator;
    }

    public void display() {
        System.out.println(numerator + "/" + denominator);
    }

    public boolean equals(Fraction other) {
        return numerator * other.denominator == other.numerator * denominator;
    }
}

/**
 * FractionRunner
 */
public class FractionRunner {
    public static void main(String[] args) {
        Fraction f1 = new Fraction(4, 5);
        f1.display();
        Fraction f2 = new Fraction(5, 6);
        f2.display();
        System.out.println(f1.equals(f2));
        Fraction f3 = new Fraction(4, 5);
        System.out.println(f1.equals(f3));
    }
}
```

Output:

```
Try the new cross-platform PowerShell https://aka.ms/

PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>  &
ExceptionMessages' '-cp' 'D:\Ishtudy Material\3rd Sem
4/5
5/6
false
true
PS D:\Ishtudy Material\3rd Sem\OOP\LABS\LabManual>
```