# 1.Odd Or Even

```java
import java.util.Scanner;
public class OddOrEven {
    public static void main(String[] args){
        System.out.print("Enter a number : ");
        Scanner scanner = new Scanner(System.in);
        int num=scanner.nextInt();
        if(num%2==0){
            System.out.print(num+ " is even number");
        }
        else{
            System.out.print(num + " is odd number");
        }
        scanner.close();
    }

}
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac OddOrEven.java } ; if ($?) { ja
va OddOrEven }
Enter a number : 5
5 is odd number
```

# 2.Calculator

```java
import java.util.Scanner;
public class Calculator{
    public static void main(String[] args){
        System.out.print("Enter the choice for calculator 1.Additon
2.Subtraction 3.Multiplication 4.Division : ");
        Scanner sc = new Scanner(System.in);
        int choice=sc.nextInt();
        System.out.println("enter Two numbers");
        double a = sc.nextDouble();
        double b = sc.nextDouble();
        switch(choice){
            case 1 : double sum = a+b;
            System.out.print("sum is " + sum);
            break;
            case 2 : double diff = a-b;
            System.out.print("difference is " + diff);
            break;
```

```java
            case 3 : double prod = a*b;
            System.out.print("Product is " + prod);
            break;
            case 4 : double div;
            if(b==0){
                System.out.print("cannot be divided by zero");
                break;
            }
            else{
                div=a/b;
                System.out.print("Division  is " + div);
                break;
            }
            default : System.out.println("Invalid Choice");
            break;
        }
    }
}
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Calculator.java } ; if ($?) { j
ava Calculator }
Enter the choice for calculator 1.Additon 2.Subtraction 3.Multiplication 4.Division : 3
enter Two numbers
15
4
Product is 60.0
```

```
Enter the choice for calculator 1.Additon 2.Subtraction 3.Multiplication 4.Division : 1
enter Two numbers
15
23
sum is 38.0
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Calculator.java } ; if ($?) { j
ava Calculator }
Enter the choice for calculator 1.Additon 2.Subtraction 3.Multiplication 4.Division : 2
enter Two numbers
23
11
difference is 12.0
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Calculator.java } ; if ($?) { j
ava Calculator }
Enter the choice for calculator 1.Additon 2.Subtraction 3.Multiplication 4.Division : 4
enter Two numbers
20
3
Division  is 6.666666666666667
```

## 3. Addition of 2 Numbers

```java
import java.util.Scanner;
public class Add {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("n1 : ");
        int n1 = sc.nextInt();
```

```
        System.out.print("n2 : ");
        int n2 = sc.nextInt();
        int sum = n1+n2;
        System.out.print("Sum is "+ sum);
        sc.close();
    }
}
```

```
 PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Add.java } ; if ($?) { java Add
  }
 n1 : 26
 n2 : 18
 Sum is 44
```

## 4. Swapping of Two Numbers

```
import java.util.Scanner;
public class Swap {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("n1 : ");
        int n1 = sc.nextInt();
        System.out.print("n2 : ");
        int n2 = sc.nextInt();
        int temp =n1;
        n1=n2;
        n2=temp;
        System.out.println("After Swapping : ");
        System.out.println("n1 = " + n1 + "  n2 : " + n2);
    }
}
```

```
 PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Swap.java } ; if ($?) { java Sw
 ap }
 n1 : 26
 n2 : 15
 After Swapping :
 n1 = 15  n2 : 26
```

## 5. Largest of 3 Numbers

```
import java.util.Scanner;
public class Largest{
```

```java
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Three Numbers : ");
        int n1 = sc.nextInt();
        int n2 = sc.nextInt();
        int n3 = sc.nextInt();
        if(n1>n2 && n1>n3){
            System.out.println("Largest is "+ n1);
        }
        else if(n2>n3){
            System.out.println("Largest is "+ n2);
        }
        else{
            System.out.println("Largest is "+ n3);
        }
    }
}
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Largest.java } ; if ($?) { java
 Largest }
Enter Three Numbers :
4
2
6
Largest is 6
```

6.check number can be expressed in sum of 2 prime numbers

```java
import java.util.Scanner;
public class ClassIsPrime {
    public static boolean isPrime(int num) {
        if (num<=1){
            return false;
        }
        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0) {
                return false;
            }
        }
        return true;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number : ");
        int n = sc.nextInt();
        boolean found = false ;
        System.out.println("Combinations is ");
```

```java
        for(int i = 2; i<=n;i++){
            if (isPrime(i) && isPrime(n-i)){
                System.out.println(n + " = " + i + " + " + (n-i));
                found = true;
            }
        }
        if(!found){
            System.out.println("Can't be Expressed");
        }
    }
}
```

7.Solve the roots of Quadratic Equation

```java
import java.util.Scanner;

public class QuadraticEquation {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter coefficient a: ");
        double a = scanner.nextDouble();

        System.out.print("Enter coefficient b: ");
        double b = scanner.nextDouble();

        System.out.print("Enter coefficient c: ");
        double c = scanner.nextDouble();

        double d = b * b - 4 * a * c;

        if (a == 0) {
            System.out.println("Coefficient 'a' cannot be zero.");
        } else if (d > 0) {
            double r1 = (-b + Math.sqrt(d)) / (2 * a);
            double r2 = (-b - Math.sqrt(d)) / (2 * a);
            System.out.println("Roots are real and different.");
            System.out.println("Root 1 = " + r1);
```

```java
            System.out.println("Root 2 = " + r2);
        } else if (d == 0) {
            double root = -b / (2 * a);
            System.out.println("Roots are real and equal.");
            System.out.println("Root = " + root);
        } else {
            double realPart = -b / (2 * a);
            double imaginaryPart = Math.sqrt(-d) / (2 * a);
            System.out.println("Roots are complex and different.");
            System.out.println("Root 1 = " + realPart + " + " + imaginaryPart
+ "i");
            System.out.println("Root 2 = " + realPart + " - " + imaginaryPart
+ "i");
        }

        scanner.close();
    }
}
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac QuadraticEquation.java } ; if (
$?) { java QuadraticEquation }
Enter coefficient a: 2
Enter coefficient b: 3
Enter coefficient c: 2
Roots are complex and different.
Root 1 = -0.75 + 0.6614378277661477i
Root 2 = -0.75 - 0.6614378277661477i
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac QuadraticEquation.java } ; if (
$?) { java QuadraticEquation }
Enter coefficient a: 1
Enter coefficient b: 6
Enter coefficient c: 2
Roots are real and different.
Root 1 = -0.3542486889354093
Root 2 = -5.645751311064591
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac QuadraticEquation.java } ; if (
$?) { java QuadraticEquation }
Enter coefficient a: 1
Enter coefficient b: 2
Enter coefficient c: 1
Roots are real and equal.
Root = -1.0
```

8.Palindrome

```java
import java.util.Scanner;
public class Palindrome {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter a word : ");
        String n = sc.nextLine();
        String rev = "";
        for(int i=n.length()-1;i>=0;i--){
            rev+=n.charAt(i);
        }
        if (n.equalsIgnoreCase(rev)){
            System.out.println("Palindorme");
        }else{
            System.out.println("Not Palindorme");
        }
    }
}
```

```
PS C:\Users\Admin\Desktop\Arun Kumar> cd "c:\Users\Admin\Desktop\Arun Kumar\" ; if ($?) { javac Palindrome.java } ; if ($?) {
ava Palindrome }
Enter a word :
Mam
Palindorme
```

9. Bank Details using Inheritance (Lab 5)

```java
import java.util.Scanner;

class Account {
    String customerName;
    String accountNumber;
    String accountType;
    double balance;

    Account(String customerName, String accountNumber, String accountType,
double balance) {
        this.customerName = customerName;
        this.accountNumber = accountNumber;
        this.accountType = accountType;
        this.balance = balance;
    }

    void deposit(double amount) {
        if (amount > 0) {
            balance += amount;
            System.out.println("Amount deposited successfully. New Balance is
" + balance);
```

```java
        } else {
            System.out.println("Invalid deposit amount.");
        }
    }

    void displayBalance() {
        System.out.println("\n--- Account Details ---");
        System.out.println("Name : " + customerName);
        System.out.println("Account No : " + accountNumber);
        System.out.println("Type : " + accountType);
        System.out.println("Balance : " + balance);
    }
}

class SavAcct extends Account {
    double interestRate = 0.05;

    SavAcct(String name, String number, double balance) {
        super(name, number, "Savings", balance);
    }

    void computeAndDepositInterest() {
        double interest = balance * interestRate;
        balance += interest;
        System.out.println("Interest of " + interest + " added. New balance: "
+ balance);
    }

    void withdraw(double amount) {
        if (amount > balance) {
            System.out.println("Insufficient balance.");
        } else {
            balance -= amount;
            System.out.println("Amount withdrawn successfully. New balance: "
+ balance);
        }
    }
}

class CurAcct extends Account {
    double minimumBalance = 1000;
    double serviceCharge = 100;

    CurAcct(String name, String number, double balance) {
        super(name, number, "Current", balance);
    }

    void withdraw(double amount) {
        if (amount > balance) {
            System.out.println("Insufficient balance.");
            return;
        }
```

```java
        balance -= amount;
        System.out.println("Amount withdrawn successfully. New balance: " +
balance);
        checkMinimumBalance();
    }

    void checkMinimumBalance() {
        if (balance < minimumBalance) {
            balance -= serviceCharge;
            System.out.println("Balance below minimum. Service charge of " +
serviceCharge + " imposed.");
            System.out.println("New balance: " + balance);
        }
    }
}

public class Bank {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        System.out.print("Enter customer name: ");
        String name = sc.nextLine();

        System.out.print("Enter account number: ");
        String number = sc.nextLine();

        System.out.print("Enter account type (savings/current): ");
        String type = sc.nextLine().toLowerCase();

        System.out.print("Enter initial balance: ");
        double balance = sc.nextDouble();

        // Use a flag to control the loop
        boolean exit = false;

        // --- Savings Account Logic ---
        if (type.equals("savings")) {
            SavAcct sa = new SavAcct(name, number, balance);
            sa.displayBalance();

            while (!exit) {
                System.out.println("\n--- Savings Account Operations ---");
                System.out.println("1. Deposit");
                System.out.println("2. Withdraw");
                System.out.println("3. Compute/Deposit Interest");
                System.out.println("4. Display Balance");
                System.out.println("5. Exit");
                System.out.print("Enter your choice: ");

                int choice = sc.nextInt();
                double amount;
```

```java
            switch (choice) {
                case 1: // Deposit
                    System.out.print("Enter amount to deposit: ");
                    amount = sc.nextDouble();
                    sa.deposit(amount); // Uses Account's deposit()
                    break;

                case 2: // Withdraw
                    System.out.print("Enter amount to withdraw: ");
                    amount = sc.nextDouble();
                    sa.withdraw(amount); // Uses SavAcct's withdraw()
                    break;

                case 3: // Compute Interest
                    sa.computeAndDepositInterest();
                    break;

                case 4: // Display Balance
                    sa.displayBalance();
                    break;

                case 5: // Exit
                    exit = true;
                    System.out.println("Exiting....");
                    break;

                default:
                    System.out.println("Invalid choice. Please try
again.");
            }
        }

        // --- Current Account Logic ---
    } else if (type.equals("current")) {
        CurAcct ca = new CurAcct(name, number, balance);
        ca.displayBalance();

        while (!exit) {
            System.out.println("\n--- Current Account Operations ---");
            System.out.println("1. Deposit");
            System.out.println("2. Withdraw");
            System.out.println("3. Display Balance");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");

            int choice = sc.nextInt();
            double amount;

            switch (choice) {
                case 1: // Deposit
                    System.out.print("Enter amount to deposit: ");
                    amount = sc.nextDouble();
```

```java
                        ca.deposit(amount); // Uses Account's deposit()
                        break;

                    case 2: // Withdraw
                        System.out.print("Enter amount to withdraw: ");
                        amount = sc.nextDouble();
                        ca.withdraw(amount); // Uses CurAcct's withdraw() and
checks minimum balance
                        break;

                    case 3: // Display Balance
                        ca.displayBalance();
                        break;

                    case 4: // Exit
                        exit = true;
                        System.out.println("Exiting.....");
                        break;

                    default:
                        System.out.println("Invalid choice. Please try
again.");
                }
            }

        } else {
            System.out.println("Invalid account type entered.");
        }

        sc.close();
    }
}
```

```
nk }
Enter customer name: Arun
Enter account number: 12645247
Enter account type (savings/current): savings
Enter initial balance: 25643

--- Account Details ---
Name : Arun
Account No : 12645247
Type : Savings
Balance : 25643.0

--- Savings Account Operations ---
1. Deposit
2. Withdraw
3. Compute/Deposit Interest
4. Display Balance
5. Exit
Enter your choice: 2
Enter amount to withdraw: 25000
Amount withdrawn successfully. New balance: 643.0

--- Savings Account Operations ---
1. Deposit
2. Withdraw
3. Compute/Deposit Interest
4. Display Balance
5. Exit
Enter your choice: 3
Interest of 32.15 added. New balance: 675.15

--- Savings Account Operations ---
1. Deposit
2. Withdraw
3. Compute/Deposit Interest
4. Display Balance
5. Exit
Enter your choice: 5
Exiting....
```

```
Enter customer name: Arun Kumar
Enter account number: 35673671
Enter account type (savings/current): current
Enter initial balance: 983

--- Account Details ---
Name : Arun Kumar
Account No : 35673671
Type : Current
Balance : 983.0

--- Current Account Operations ---
1. Deposit
2. Withdraw
3. Display Balance
4. Exit
Enter your choice: 1
Enter amount to deposit: 7638
Amount deposited successfully. New Balance is  8621.0

--- Current Account Operations ---
1. Deposit
2. Withdraw
3. Display Balance
4. Exit
Enter your choice: 2
Enter amount to withdraw: 8000
Amount withdrawn successfully. New balance: 621.0
Balance below minimum. Service charge of 100.0 imposed.
New balance: 521.0

--- Current Account Operations ---
1. Deposit
2. Withdraw
3. Display Balance
4. Exit
Enter your choice: 4
Exiting.....
PS C:\Users\Admin\Desktop\Arun Kumar>
```
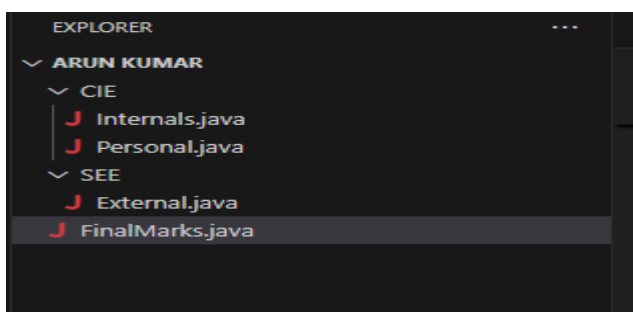
## 10. LAB 6 Packages



**For CIE**

```java
package CIE;



public class Personal {

    public String usn;
```

```java
    public String name;

    public int sem;


    public Personal(String usn, String name, int sem) {

        this.usn = usn;

        this.name = name;

        this.sem = sem;

    }


    public void display() {

        System.out.println("USN: " + usn);

        System.out.println("Name: " + name);

        System.out.println("Semester: " + sem);

    }

}
```

```java
package CIE;


public class Internals {

    public int[] internalMarks = new int[5];


    public void setMarks(int[] marks) {

        for (int i = 0; i < 5; i++) {

            internalMarks[i] = marks[i];

        }

    }


    public int[] getMarks() {
```

```
        return internalMarks;

    }

}
```

**For SEE**

```java
package SEE;


import CIE.Personal;


public class External extends Personal {

    public int[] seeMarks = new int[5];


    public External(String usn, String name, int sem) {

        super(usn, name, sem);

    }


    public void setSEE(int[] marks) {

        for (int i = 0; i < 5; i++) {

            seeMarks[i] = marks[i];

        }

    }


    public int[] getSEE() {

        return seeMarks;

    }

}
```

**Main Code**

```java
import CIE.*;

import SEE.*;

import java.util.*;


public class FinalMarks {

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);


        System.out.print("Enter number of students: ");

        int n = sc.nextInt();


        External[] students = new External[n];

        Internals[] internals = new Internals[n]; // Using Internals from CIE


        for (int i = 0; i < n; i++) {

            sc.nextLine(); // consume newline

            System.out.println("\nEnter details for student " + (i + 1));

            System.out.print("USN: ");

            String usn = sc.nextLine();

            System.out.print("Name: ");

            String name = sc.nextLine();

            System.out.print("Semester: ");

            int sem = sc.nextInt();


            students[i] = new External(usn, name, sem);

            internals[i] = new Internals();
```

```java
        int[] internalMarks = new int[5];

        System.out.println("Enter 5 Internal Marks:");

        for (int j = 0; j < 5; j++) {

            internalMarks[j] = sc.nextInt();

        }

        internals[i].setMarks(internalMarks);


        int[] seeMarks = new int[5];

        System.out.println("Enter 5 SEE Marks:");

        for (int j = 0; j < 5; j++) {

            seeMarks[j] = sc.nextInt();

        }

        students[i].setSEE(seeMarks);

    }


    System.out.println("\n===== FINAL MARKS =====");

    for (int i = 0; i < n; i++) {

        students[i].display();

        int[] internal = internals[i].getMarks();

        int[] see = students[i].getSEE();


        System.out.println("Course-wise Final Marks:");

        for (int j = 0; j < 5; j++) {

            int finalMarks = internal[j] + (see[j] / 2); // SEE out of
100, internal out of 50

            System.out.println("Course " + (j + 1) + ": " + finalMarks);

        }

        System.out.println("-------------------------");

    }
```

```
        sc.close();

    }

}
```

beba57a9d2\redhat.java\jdt_ws\Arun Kumar_1fce2050\bin` `FinalMarks`
```
Enter number of students: 2

Enter details for student 1
USN: 1wn24cs050
Name: Arun Kumar
Semester: 3
Enter 5 Internal Marks:
45
48
46
44
43
Enter 5 SEE Marks:
98
95
94
90
88

Enter details for student 2
USN: 1wn24cs038
Name: Aneesh
Semester: 3
Enter 5 Internal Marks:
47
44
49
50
43
Enter 5 SEE Marks:
100
95
98
94
90

===== FINAL MARKS =====
USN: 1wn24cs050
Name: Arun Kumar
Semester: 3
Course-wise Final Marks:
Course 1: 94
Course 2: 95
Course 3: 93
Course 4: 89
Course 5: 87
-------------------------
USN: 1wn24cs038
Name: Aneesh
Semester: 3
Course-wise Final Marks:
Course 1: 97
Course 2: 91
Course 3: 98
Course 4: 97
Course 5: 88
-------------------------
```

## 11. Lab 4 Shapes

```java
abstract class Shape {

    int x, y;

    abstract void printArea();

}


// Rectangle class

class Rectangle extends Shape {

    Rectangle(int length, int breadth) {

        x = length;

        y = breadth;

    }


    void printArea() {

        System.out.println("Area of Rectangle = " + (x * y));

    }
}


// Triangle class

class Triangle extends Shape {

    Triangle(int base, int height) {

        x = base;

        y = height;

    }


    void printArea() {

        System.out.println("Area of Triangle = " + (0.5 * x * y));
```

```java
        }
}


// Circle class
class Circle extends Shape {

    Circle(int radius) {

        x = radius;

    }


    void printArea() {

        System.out.println("Area of Circle = " + (3.14 * x * x));

    }
}



public class Shapes {

    public static void main(String[] args) {


        Rectangle r = new Rectangle(10, 20);

        Triangle t = new Triangle(10, 15);

        Circle c = new Circle(7);


        r.printArea();

        t.printArea();

        c.printArea();

    }
}
```

## 12 . lab5 BOOKS

```java
import java.util.Scanner;


class Book {

    private String name;

    private String author;

    private double price;

    private int num_pages;


    // Constructor

    Book(String name, String author, double price, int num_pages) {

        this.name = name;

        this.author = author;

        this.price = price;

        this.num_pages = num_pages;

    }


    // Setter methods

    public void setName(String name) {

        this.name = name;
```

```java
    }


    public void setAuthor(String author) {

        this.author = author;

    }


    public void setPrice(double price) {

        this.price = price;

    }


    public void setNumPages(int num_pages) {

        this.num_pages = num_pages;

    }


    // Getter methods

    public String getName() {

        return name;

    }


    public String getAuthor() {

        return author;

    }


    public double getPrice() {

        return price;

    }


    public int getNumPages() {
```

```java
        return num_pages;

    }


    // toString method

    public String toString() {

        return "Book Details:\n"

                + "Name: " + name + "\n"

                + "Author: " + author + "\n"

                + "Price: " + price + "\n"

                + "Number of pages: " + num_pages;

    }

}


public class ToString{

    public static void main(String[] args) {


        Scanner sc = new Scanner(System.in);


        System.out.print("Enter number of books: ");

        int n = sc.nextInt();

        sc.nextLine();

        Book[] books = new Book[n];


        for (int i = 0; i < n; i++) {

            System.out.println("\nEnter details of book " + (i + 1));


            System.out.print("Enter Book name: ");

            String name = sc.nextLine();
```

```java
        System.out.print("Enter Author name: ");

        String author = sc.nextLine();


        System.out.print("Enter Price: ");

        double price = sc.nextDouble();


        System.out.print("Enter Number of pages: ");

        int pages = sc.nextInt();

        sc.nextLine();


        books[i] = new Book(name, author, price, pages);

    }


    System.out.println("\nDisplaying Book details:\n");

    for (int i = 0; i < n; i++) {

        Book b = books[i];

        System.out.println(b.toString());


    }


    sc.close();

  }

}
```

```
PS C:\Users\admin\Desktop\Arun Kumar>  & 'C:\Program Files\Java\jdk-23\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\User
ser\workspaceStorage\e36ae857acd3b75c02607bbeba57a9d2\redhat.java\jdt_ws\Arun Kumar_1fce2050\bin' 'ToString'
Enter number of books: 2

Enter details of book 1
Enter Book name: NCERT
Enter Author name: CV
Enter Price: 2000
Enter Number of pages: 920

Enter details of book 2
Enter Book name: Oops in Java
Enter Author name: Codd
Enter Price: 3468
Enter Number of pages: 1534

Displaying Book details:

Book Details:
Name: NCERT
Author: CV
Price: 2000.0
Number of pages: 920
Book Details:
Name: Oops in Java
Author: Codd
Price: 3468.0
Number of pages: 1534
PS C:\Users\admin\Desktop\Arun Kumar>
```