

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“JnanaSangama”, Belgaum -590014, Karnataka.



LAB REPORT
on

Object Oriented Java Programming **(23CS3PCOOJ)**

Submitted by

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in partial fulfillment for the award of the degree of
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in

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CERTIFICATE

This is to certify that the Lab work entitled “Object Oriented Java Programming (23CS3PCOOJ)” carried out by **SHRIHARI VISWANATHAN (1BF24CS288)**, who is bonafide student of **B.M.S. College of Engineering**. It is in partial fulfilment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum. The Lab report has been approved as it satisfies the academic requirements in respect of an Object-Oriented Java Programming (23CS3PCOOJ) work prescribed for the said degree.

Dr. Seema Patil Associate Professor Department of CSE, BMSCE	Dr. Kavitha Sooda Professor & HOD Department of CSE, BMSCE
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Github Link:

[https://github.com/ShrihariViswanathan/Semester-3/tree/main/Java\(OOJ\)](https://github.com/ShrihariViswanathan/Semester-3/tree/main/Java(OOJ))

Lab Program 1

QUADRATIC EQUATION

```
1  /*Develop a Java program that prints all real solutions to the quadratic
2  equation  $ax^2+bx+c = 0$ . Read in a, b, c and use the quadratic formula. If
3  the discriminate  $b^2-4ac$  is negative, display a message stating that there
4  are no real solutions.*/
5
6  import java.util.Scanner;
7
8  class QUADRATIC_EQUATION{
9  public static void main(String args[]){
10     double a;
11     double b;
12     double c;
13
14     Scanner scan = new Scanner(System.in);
15
16
17     System.out.print("a: ");
18     a = scan.nextDouble();
19
20     System.out.print("b: ");
21     b = scan.nextDouble();
22
23     System.out.print("c: ");
24     c = scan.nextDouble();
25
26     double disc = (b*b) - (4*a*c);
27
28     if (disc > 0){
29         System.out.println("The solutions are real");
30         double alpha = (-b + Math.pow(disc, 1/2))/(2 * a);
31         double beta = (-b - Math.pow(disc, 1/2)) / (2 * a);
32         System.out.println("Alpha: " + alpha);
33         System.out.println("Beta: " + beta);
34     }
35
36     if (disc == 0){
37         System.out.println("The solutions are equal");
38         double sol = (-b) / (2*a);
39         System.out.println("Beta: " + sol);
40         System.out.println("Alpha: " + sol);
41     }
42
43
44     if (disc < 0 ){
45         System.out.println("The roots are imaginary");
46     }
47
48
49
50     scan.close();
51
52
53 }
54
55
56 }
```

OUTPUT:

```
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) {
a: 1
b: 1
c: 1
The roots are imaginary
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) {
a: 1
b: -5
c: 6
The solutions are real
Alpha: 3.0
Beta: 2.0
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) {
a: 1
b: -2
c: 1
The solutions are equal
Beta: 1.0
Alpha: 1.0
PS C:\1bf24cs288> █
```

Lab Program 2

SGPA CALCULATION

```
1  import java.util.Scanner;
2
3  class Subject {
4      int subjectMarks;
5      int credits;
6      int grade;
7  }
8
9  class Student {
10     String name;
11     String usn;
12     double SGPA;
13     Scanner s;
14     Subject[] subject;
15
16     // Constructor
17     Student() {
18         s = new Scanner(System.in);
19         subject = new Subject[8]; // 8 subjects
20         for (int i = 0; i < 8; i++) {
21             subject[i] = new Subject();
22         }
23     }
24
25     // Method to get student's name and USN
26     void getStudentDetails() {
27         System.out.print(s: "Student Name: ");
28         name = s.nextLine();
29         System.out.print(s: "USN: ");
30         usn = s.nextLine();
31     }
32
33     // Method to read marks and credits and calculate grades
34     void getMarks() {
35         for (int i = 0; i < 8; i++) {
36             System.out.println("Enter Details for Subject " + (i + 1));
37
38             // Input marks
39             System.out.print(s: "Marks (0-100): ");
40             subject[i].subjectMarks = s.nextInt();
41             while(subject[i].subjectMarks < 0 || subject[i].subjectMarks > 100) {
42                 System.out.println(x: "Invalid marks! Please enter marks between 0 and 100.");
43                 System.out.print(s: "Marks (0-100): ");
44                 subject[i].subjectMarks = s.nextInt();
45             }
46
47             // Input credits
48             System.out.print(s: "Credits: ");
49             subject[i].credits = s.nextInt();
50             while(subject[i].credits <= 0) {
51                 System.out.println(x: "Invalid credits! Please enter positive credits.");
52                 System.out.print(s: "Credits: ");
53                 subject[i].credits = s.nextInt();
54             }
55
56             // Calculate grade based on marks
57             subject[i].grade = (subject[i].subjectMarks / 10) + 1;
58
59             // If marks > 100, grade capped at 10 (already checked but just in case)
60             if (subject[i].grade == 11)
61                 subject[i].grade = 10;
62         }
63     }
64 }
```

```

63         // If marks < 40, grade set to 0 (fail)
64         if (subject[i].subjectMarks < 40)
65             subject[i].grade = 0;
66     }
67 }
68
69 // Calculate SGPA
70 void computeSGPA() {
71     int effectiveScore = 0;
72     int totalCredits = 0;
73
74     for (int i = 0; i < 8; i++) {
75         effectiveScore += (subject[i].grade * subject[i].credits);
76         totalCredits += subject[i].credits;
77     }
78
79     SGPA = (double) effectiveScore / (double) totalCredits;
80 }
81
82 // Display student details and SGPA
83 void display() {
84     System.out.println(x: "\nStudent Details:");
85     System.out.println("Name: " + name);
86     System.out.println("USN: " + usn);
87     System.out.printf(format: "SGPA: %.2f\n", SGPA);
88
89
90     System.out.println();
91 }
92
93 }
94
95 }
96
97 class cgpa{
98     Run | Debug | Run main | Debug main
99     public static void main(String[] args) {
100
101         Student students[] = new Student[2];
102         for (int i = 0; i < 2; i++){
103             students[i] = new Student();
104             students[i].getStudentDetails();
105             students[i].getMarks();
106             students[i].computeSGPA();
107             students[i].display();
108         }
109     }
110 }

```

OUTPUT:

```
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) { javac cgpa.java } ; if ($?) { java cg
Student Name: shrihari
USN: 1bf24cs288
Enter Details for Subject 1
Marks (0-100): 100
Student Name: shrihari
USN: 1bf24cs288
Enter Details for Subject 1
Marks (0-100): 100
USN: 1bf24cs288
Enter Details for Subject 1
Marks (0-100): 100
Credits: 3
Marks (0-100): 100
Credits: 3
Enter Details for Subject 2
Credits: 3
Enter Details for Subject 2
Enter Details for Subject 2
Marks (0-100): 90
Credits: 4
Enter Details for Subject 3
Credits: 4
Enter Details for Subject 3
Marks (0-100): 95
Credits: 2
Enter Details for Subject 3
Marks (0-100): 95
Credits: 2
Marks (0-100): 95
Credits: 2
Credits: 2
Enter Details for Subject 4
Marks (0-100): 90
Credits: 1
Enter Details for Subject 5
Marks (0-100): 90
Credits: 3
Enter Details for Subject 6
Marks (0-100): 100
Credits: 3
Enter Details for Subject 7
Marks (0-100): 100
Credits: 4
Enter Details for Subject 8
Marks (0-100): 100
Credits: 2

Student Details:
Name: shrihari
USN: 1bf24cs288
SGPA: 10.00
```


Lab Program 3: TO STRING DEMO

```
test.java > ...
1  import java.util.Scanner;
2
3  class Book{
4      String name;
5      String author;
6      double price;
7      int numPages;
8
9      Book(String name, String author, double price, int numPages){
10         this.name = name;
11         this.author = author;
12         this.price = price;
13         this.numPages = numPages;
14     }
15
16
17     public String toString(){
18         String name, author, price, numPages;
19         name = "Book name: " + this.name + "\n";
20         author = "Author name: " + this.author + "\n";
21         price = "Price: " + this.price + "\n";
22         numPages = "Number of pages: " + this.numPages + "\n";
23
24         return name + author + price + numPages;
25     }
26
27 } //end of class
28
29
30 class Books{
31     Run | Debug | Run main | Debug main
    public static void main(String args[]){
```

```

33     Scanner s = new Scanner(System.in);
34
35     int n;
36     String name;
37     String author;
38     double price;
39     int numPages;
40
41     System.out.print(s: "No.of Books: ");
42     n = s.nextInt();
43     s.nextLine();
44
45     Book b[];
46     b = new Book[n];
47
48     for (int i = 0; i < n; i++){
49         //name
50
51         System.out.print("Name of Book " + (i+1));
52         name = s.nextLine();
53
54         System.out.print("Author of Book " + (i + 1));
55         author = s.nextLine();
56
57         System.out.print("Price of Book " + (i + 1));
58         price = s.nextDouble();
59
60         System.out.print("No.of Pages for Book " + (i + 1)) ;
61         numPages = s.nextInt();
62
63         b[i] = new Book(name, author, price, numPages);
64     }
65
66
67     for (int i = 0; i < b.length; i++){
68         System.out.println(b[i]);
69     }
70
71 }
72 }

```

OUTPUT:

```
05 (C:\eclanet.java) > java -ms (C:\jdk_1.8.0_101\bin) -Djava.class.path=. Book1.java
No.of Books: 1
Name of Book 1cruel prince
Author of Book 1holly jackson
Price of Book 1500
No.of Pages for Book 1358
Book name: cruel prince
Author name: holly jackson
Price: 500.0
Number of pages: 358
```

Lab Program 4: ABSTRACT CLASS DEMO

```
1  import java.util.Scanner;
2
3  class Input {
4      Scanner sc = new Scanner(System.in);
5
6      int getInt(String message) {
7          System.out.print(message);
8          return sc.nextInt();
9      }
10 }
11
12 abstract class Shape extends Input {
13     int a, b;
14     abstract void printArea();
15 }
16
17 class Rectangle extends Shape {
18     void input() {
19         a = getInt(message: "Enter length: ");
20         b = getInt(message: "Enter breadth: ");
21     }
22
23     void printArea() {
24         System.out.println("Area of rectangle: " + (a * b));
25         System.out.println();
26     }
27 }
28
29 class Triangle extends Shape {
30     void input() {
31         a = getInt(message: "Enter base value: ");
32         b = getInt(message: "Enter height value:");
```

```

33     }
34
35     void printArea() {
36         System.out.println("Area of Triangle: " + (0.5 * a * b));
37         System.out.println();
38     }
39 }
40
41 class Circle extends Shape {
42     void input() {
43         a = getInt(message: "Enter the radius: ");
44     }
45
46     void printArea() {
47         System.out.println("Area of Circle: " + (3.14159265 * a * a));
48         System.out.println();
49     }
50 }
51
52 public class abstractClass {
53     Run | Debug | Run main | Debug main
54     public static void main(String args[]) {
55         Rectangle r = new Rectangle();
56         r.input();
57         r.printArea();
58
59         Triangle t = new Triangle();
60         t.input();
61         t.printArea();
62         t.printArea();
63
64         Circle c = new Circle();
65         c.input();
66         c.printArea();
67     }
68 }

```

OUTPUT:

```
PS D:\1BF24CS288> cd "d:\1BF24CS288\"
va abstractClass }
Enter length: 12
Enter breadth: 3
Area of rectangle: 36

Enter base value: 4
Enter height value:5
Area of Triangle: 10.0

Enter the radius: 6
Area of Circle: 113.09733540000002
```

Lab Program 5:

BANK

```
1  import java.util.Scanner;
2
3  class Account{
4      String customerName;
5      int accountNumber;
6      String accountType;
7      double balance;
8
9      Scanner sc = new Scanner(System.in);
10
11     void input(){
12         System.out.print(s: "Enter Customer Name: ");
13         customerName = sc.nextLine();
14
15         System.out.print(s: "Enter Account Number: ");
16         accountNumber = sc.nextInt();
17         sc.nextLine();
18     }
19
20
21     void deposit(){
22         System.out.print(s: "Enter amount to deposit: ");
23         double amount = sc.nextDouble();
24
25         balance += amount;
26         System.out.println(x: "Amount deposited Successfully");
27     }
28
29
30     void displayBalance(){
31         System.out.println("Current Balance: " + balance);
32     }
```

```

33
34     void withdraw(){
35         System.out.print(s: "Enter amount to withdraw: ");
36         double amount = sc.nextDouble();
37
38         if(amount <= balance){
39             balance -= amount;
40             System.out.println("You have " + amount + " rupees");
41             System.out.println(x: "Transaction Successful");
42             checkMinBalance();
43         }
44
45         else{
46             System.out.println(x: "Insufficient balance");
47         }
48     }
49
50     void checkMinBalance(){
51
52     }
53
54 }
55
56
57
58 class Savings extends Account{
59     final double interestRate = 0.05;
60     Savings() {
61         accountType = "Savings";
62     }
63
64     void computeInterest(){
65         System.out.print(s: "Enter no.of Years: ");
66         double years = sc.nextDouble();
67
68         double interest = balance * Math.pow((1 + interestRate), years) - balance;
69         balance += interest;
70
71         System.out.println("Interest Added: " + interest);
72     }
73
74 }
75
76
77 class Current extends Account{
78     final double serviceCharge = 100;
79     final double minBalance = 1000;
80
81     Current() {
82         accountType = "Current";
83     }
84
85
86     @Override
87     void checkMinBalance(){
88         if (balance < minBalance){
89             balance -= serviceCharge;
90             System.out.println(x: "Balance < minBalance");
91             System.out.print("Penalty of " + serviceCharge + " is imposed");
92         }
93     }
94

```



```

95 }
96
97
98 public class bank {
    Run | Debug | Run main | Debug main
99     public static void main(String[] args) {
100         Scanner sc = new Scanner(System.in);
101
102         System.out.print(s: "Enter account type (Savings/Current): ");
103         String accountType = sc.nextLine();
104
105         Account account = null;
106
107         if (accountType.trim().equalsIgnoreCase(anotherString: "Savings")) {
108             account = new Savings();
109         } else if (accountType.equalsIgnoreCase(anotherString: "Current")) {
110             account = new Current();
111         } else {
112             System.out.println(x: "Invalid account type.");
113             return;
114         }
115
116         account.input();
117
118         while (true) {
119             printMenu();
120             System.out.print(s: "Enter your choice: ");
121             int choice = sc.nextInt();
122
123             switch (choice) {
124                 case 1:
125                     account.deposit();
126                     break;
127                 case 2:
128                     account.withdraw();
129                     break;
130                 case 3:
131                     account.displayBalance();
132                     break;
133                 case 4:
134                     if (account instanceof Savings) {
135                         ((Savings) account).computeInterest();
136                     }
137
138                     else {
139                         System.out.println(x: "Compute Interest not available for Current accounts.");
140                     }
141                     break;
142                 case 5:
143                     System.out.println(x: "Exiting the bank system.");
144                     return;
145                 default:
146                     System.out.println(x: "Invalid choice. Please try again.");
147             }
148         }
149     }
150
151     public static void printMenu() {
152         System.out.println(x: "\n1. Deposit");
153         System.out.println(x: "2. Withdraw");
154         System.out.println(x: "3. Display Balance");
155         System.out.println(x: "4. Compute Interest (Only for Savings accounts)");
156         System.out.println(x: "5. Exit");
157     }
158
159 }

```

OUTPUT:

```
1. Deposit
2. Withdraw
3. Display Balance
4. Compute Interest (Only for Savings accounts)
5. Exit
Enter your choice: 2
Enter amount to withdraw: 3
Insufficient balance

1. Deposit
2. Withdraw
3. Display Balance
4. Compute Interest (Only for Savings accounts)
5. Exit
Enter your choice: 2
Enter amount to withdraw: 150
You have 150.0 rupees
Transaction Successful
Balance < minBalance
Penalty of 100.0 is imposed

Enter account type (Savings/Current): current
Enter Customer Name: name12
Enter Account Number: 1234

1. Deposit
2. Withdraw
3. Display Balance
4. Compute Interest (Only for Savings accounts)
5. Exit
Enter your choice: 1
Enter amount to deposit: 250
Amount deposited Successfully
```

```
Enter account type (Savings/Current): savings
Enter Customer Name: name1
Enter Account Number: 1234

1. Deposit
2. Withdraw
3. Display Balance
4. Compute Interest (Only for Savings accounts)
5. Exit
Enter your choice: 1
Enter amount to deposit: 125
Amount deposited Successfully

1. Deposit
2. Withdraw
3. Display Balance
4. Compute Interest (Only for Savings accounts)
5. Exit
Enter your choice: 2
Enter amount to withdraw: 125
You have 125.0 rupees
Transaction Successful
```

Lab Program 6

PACKAGES

Folder Order :

Main.java

SEE/

Externals.java

CIE/

Internals.java

Personal.java

1. Externals.java

```
1 package SEE;
2
3 import CIE.Internals;
4 import java.util.Scanner;
5
6 /**
7  * Derived from Internals, stores Semester End Examination (SEE) marks and calculates final marks.
8  */
9 public class Externals extends Internals {
10
11     // This array stores SEE marks (out of 100).
12     protected int marks[] = new int[5];
13     // Stores the final calculated marks (out of 100).
14     protected int finalMarks[] = new int[5];
15
16
17
18     /**
19     * Reads SEE marks for 5 courses using the provided Scanner object.
20     * @param s The shared Scanner instance.
21     */
22     public void inputSEEmarks(Scanner s) {
23         System.out.println(x: "\n--- Entering SEE Marks (out of 100) ---");
24         for (int i = 0; i < 5; i++) {
25             System.out.print("Enter SEE mark for Course " + (i + 1) + " (max 100): ");
26             while (!s.hasNextInt()) {
27                 System.out.println(x: "Invalid input. Please enter a number: ");
28                 s.next();
29             }
30             // 'this.marks' refers to the SEE marks array
31             this.marks[i] = s.nextInt();
32             // Basic validation
```

```

33         if (this.marks[i] < 0 || this.marks[i] > 100) {
34             System.out.println(x: "Warning: Mark is outside the 0-100 range. Continuing...");
35         }
36     }
37     s.nextLine(); // Consume newline
38 }
39
40 /**
41  * Calculates final marks using the formula: Final = CIE Mark + (SEE Mark / 2).
42  */
43 public void calculateFinalMarks() {
44     System.out.println(x: "Calculating final marks...");
45     for (int i = 0; i < 5; i++) {
46         // super.marks refers to the CIE marks array from the Internals class.
47         int cie = super.marks[i];
48         // this.marks refers to the SEE marks array from the Externals class.
49         int see = this.marks[i];
50
51         // Final Mark (out of 100) = CIE (50) + (SEE/2) (50)
52         this.finalMarks[i] = cie + (see / 2);
53
54         // Cap the final mark at 100
55         if (this.finalMarks[i] > 100) {
56             this.finalMarks[i] = 100;
57         }
58     }
59 }
60
61 /**
62  * Displays all student details and the final calculated marks.
63  */
64 public void displayFinalMarks() {
65     System.out.println(x: "\n=====");
66     System.out.println(x: " Final Marks Report");
67     System.out.println(x: "=====");
68     // Explicitly call inherited method from Student class
69     super.displayStudentDetails();
70
71     System.out.println(x: "\nCourse | CIE (50) | SEE (100) | Final (100)");
72     System.out.println(x: "-----");
73     for (int i = 0; i < 5; i++) {
74         // Accessing CIE marks (super.marks) and SEE marks (this.marks)
75         System.out.printf(format: " %d | %d | %d | %d\n",
76             (i + 1), super.marks[i], this.marks[i], this.finalMarks[i]);
77     }
78     System.out.println(x: "=====");
79 }
80 }

```

2. Internals.java

```
1 package CIE;
2 import java.util.Scanner;
3
4
5 public class Internals extends Personal{
6
7
8
9
10     // Stores CIE marks for 5 courses (out of 50).
11     protected int marks[] = new int[5];
12
13
14     public void inputCIEMarks(Scanner s) {
15         // Using the passed shared Scanner instance.
16         System.out.println(x: "\n--- Entering CIE Marks (out of 50) ---");
17         for (int i = 0; i < 5; i++) {
18             System.out.print("Enter CIE mark for Course " + (i + 1) + " (max 50): ");
19             while (!s.hasNextInt()) {
20                 System.out.println(x: "Invalid input. Please enter a number: ");
21                 s.next();
22             }
23             marks[i] = s.nextInt();
24             // Basic validation
25             if (marks[i] < 0 || marks[i] > 50) {
26                 System.out.println(x: "Warning: Mark is outside the 0-50 range. Continuing...");
27             }
28         }
29         s.nextLine(); // Consume newline
30
31     }
32 }
```

3. Main.java

```

1  import SEE.Externals;
2  import java.util.Scanner;
3
4  /**
5   * Main class to demonstrate the package structure, inheritance,
6   * and calculation of final marks for n students.
7   * FIX: The single Scanner 's' is now passed to all input methods
8   * to prevent input stream corruption.
9   */
10 class Main {
11     Run | Debug | Run main | Debug main
12     public static void main(String args[]) {
13         // Only one Scanner object is created here to manage System.in
14         Scanner s = new Scanner(System.in);
15         int n = 0;
16
17         System.out.println(x: "--- Student Mark Calculation System ---");
18         System.out.print(s: "Enter the number of students (n): ");
19         if (s.hasNextInt()) {
20             n = s.nextInt();
21             if (n <= 0) {
22                 System.out.println(x: "Number of students must be positive. Setting n to 1.");
23                 n = 1;
24             }
25         } else {
26             System.out.println(x: "Invalid input. Setting number of students to 1.");
27             n = 1;
28         }
29
30         s.nextLine(); // Consume the rest of the line after reading n
31
32         // Array to hold n instances of the Externals class
33         Externals students[] = new Externals[n];
34
35         for (int i = 0; i < n; i++) {
36             System.out.println("\n--- Entering details for Student " + (i + 1) + " of " + n + " ---");
37
38             students[i] = new Externals();
39
40             // 2. Input student details - PASSING the Scanner
41             students[i].inputStudentDetails(s);
42
43             // 3. Input CIE marks - PASSING the Scanner
44             students[i].inputCIEmarks(s);
45
46             // 4. Input SEE marks - PASSING the Scanner
47             students[i].inputSEEmarks(s);
48         }
49
50         System.out.println(x: "\n*****");
51         System.out.println(x: "                FINAL RESULTS REPORT                ");
52         System.out.println(x: "*****");
53
54         for (int i = 0; i < n; i++) {
55             // 5. Calculate Final marks
56             students[i].calculateFinalMarks();
57
58             // 6. Display Final marks
59             students[i].displayFinalMarks();
60         }
61
62         s.close(); // Close the main scanner resource ONLY once
63     }
64 }

```

4. Personal.java

```
1 package CIE;
2 import java.util.Scanner;
3
4 public class Personal {
5
6
7     protected String usn = "";
8     protected String name = "";
9     protected int sem;
10
11     public void inputStudentDetails(Scanner s) {
12         // Using the passed shared Scanner instance.
13         System.out.print(s: "Enter Student USN: ");
14         this.usn = s.nextLine();
15         System.out.print(s: "Enter Student Name: ");
16         this.name = s.nextLine();
17         System.out.print(s: "Enter Semester: ");
18         // Ensure input is an integer
19         while (!s.hasNextInt()) {
20             System.out.println(x: "Invalid input. Please enter a number for the Semester: ");
21             s.next(); // Consume invalid input
22         }
23         this.sem = s.nextInt();
24         s.nextLine(); // Consume newline for safety
25     }
26
27
28     public void displayStudentDetails() {
29         System.out.println("Student USN: " + usn);
30         System.out.println("Student Name: " + name);
31         System.out.println("Semester: " + sem);
32     }
33 }
34
35 }
```


Lab program 7

EXCEPTION

```
1  import java.util.Scanner;
2
3  class WrongAge extends Exception{
4      WrongAge(String message){
5          super(message);
6      }
7  }
8
9  class Father{
10     float fatherAge;
11
12     Father(float fatherAge){
13         try{
14             if (fatherAge < 0)
15                 throw new WrongAge(message: "Father cant be less than zero years old");
16             this.fatherAge = fatherAge;
17         } catch (WrongAge e){
18             System.out.println("Error: " + e);
19         }
20     }
21 }
22
23
24
25 class Son extends Father{
26     float sonAge;
27
28     Son(float fatherAge, float sonAge){
29         super(fatherAge);
30         try{
31             if (sonAge >= fatherAge)
32                 throw new WrongAge(message: "Son's age cannot be greater than father's age");
33             this.sonAge = sonAge;
34         } catch(WrongAge e){
35             System.out.println("Error: " + e);
36         }
37     }
38 }
39
40 Son (float fatherAge){
41     super(fatherAge);
42 }
43 }
44
45
46 public class LAB_07_EXCEPTION{
47     Run | Debug | Run main | Debug main
48     public static void main(String[] args) {
49         Scanner sc = new Scanner(System.in);
50
51         Son s1;
52
53         System.out.print(s: "Enter father age: ");
54         float fatherAge = sc.nextFloat();
55         if (fatherAge < 0){
56             s1 = new Son(fatherAge);
57             System.exit(status: 0);
58         }
59
60         System.out.print(s: "Enter Son age: ");
61         float sonAge = sc.nextFloat();
62         s1 = new Son(fatherAge, sonAge);
63     }
64 }
```

Output

```
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) { javac LAB_07_EXCEPTION.java } ; if ($?) { java LAB_07_EXCEPTION }
Enter father age: -78
Error: WrongAge: Father cant be less than zero years old
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) { javac LAB_07_EXCEPTION.java } ; if ($?) { java LAB_07_EXCEPTION }
Enter father age: 55
Enter Son age: 30
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) { javac LAB_07_EXCEPTION.java } ; if ($?) { java LAB_07_EXCEPTION }
Enter father age: 55
Enter Son age: 66
Error: WrongAge: Son's age cannot be greater than father's age
PS C:\1bf24cs288> 
```

Lab program 8

THREADS

```
1  class CollegeThread implements Runnable {
2      public void run() {
3          try {
4              while(true) {
5                  System.out.println(x: "BMS College of Engineering");
6                  Thread.sleep(millis: 10000); // 10 seconds
7              }
8          } catch (InterruptedException e) {
9              System.out.println(x: "CollegeThread interrupted");
10         }
11     }
12 }
13
14 class CSEThread implements Runnable {
15     public void run() {
16         try {
17             while(true) {
18                 System.out.println(x: "CSE");
19                 Thread.sleep(millis: 2000); // 2 seconds
20             }
21         } catch (InterruptedException e) {
22             System.out.println(x: "CSEThread interrupted");
23         }
24     }
25 }
26
27 public class TwoThreadsDemo {
28     Run | Debug | Run main | Debug main
29     public static void main(String[] args) {
30         Thread t1 = new Thread(new CollegeThread());
31         Thread t2 = new Thread(new CSEThread());
32
33         t1.start();
34         t2.start();
35     }
36 }
```

OUTPUT

```
PS C:\1bf24cs288> cd "c:\1bf24cs288\" ; if ($?) { javac Tw
BMS College of Engineering
CSE
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BMS College of Engineering
CSE
```