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Lab 1

1) Quadratic Equation

```
import java.util.Scanner;
class equation {
    public static void main (String [] args) {
        double x1, x2;
        Scanner num = new Scanner (System.in);
        System.out.println ("Let the equation be
        of the form ax^2 + bx + c = 0 \n");
        System.out.println ("Enter value of a");
        double a = num.nextDouble();
        System.out.println ("Enter value of b");
        double b = num.nextDouble();
        System.out.println ("Enter value of c");
        double c = num.nextDouble();
        double det = (b*b) - (4*a*c);
        double Sqrt = Math.sqrt (det);
        if (det > 0) {
            x1 = (-b + Sqrt) / (2*a);
            x2 = (-b - Sqrt) / (2*a);
            String s1 = String.format ("%.2f", x1);
            String s2 = String.format ("%.2f", x2);
            System.out.println ("Roots are Real and distinct");
        System.out.println ("Roots are" + " " + s1
            + " " + "and" + " " + s2);
    }
    else if (det == 0) {
        System.out.println ("Roots are Real and equal");
        x1 = (-b + Sqrt) / (2*a);
```

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```
System.out.println("Root is");
String s3 = String.format("%.2f", s1);
System.out.println(s3);
}
else {
    System.out.println("No real roots\n");
  }
}
}
```

Lab 2

1) Develop a Java program to create a class Student with members USN, name, an array credits and an array marks. Include methods to accept & display details & a method to calculate SGPA of a Student.

Sol":-

```
import java.util.Scanner;
class Student {
    private int a_cred[], total_cred = 0;
    private double a_mark[], a_cal, sum = 0,
                   sgpa, sum[];
    private String name, usn;

void acceptDetails()
{
    System.out.println("Enter student details:");
    Scanner s1 = new Scanner(System.in);
    System.out.println("Enter name:");
    name = s1.nextLine();
    System.out.println("Enter usn:");
    usn = s1.nextLine();
    a_mark = new double[5]
    a_cred = new int[5]
    a_cal = new double[5];
    for (int i=0; i<5; i++) {
        System.out.println("Enter a_mark["+i+"]");
        a_mark[i] = s1.nextDouble();
    }
    for (int i=0; i<5; i++) {
        System.out.println("Enter a_cred["+i+"]");
```

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```
        a-[sid[i] = s1.nextInt();
    }
}

void displayDetails()
{
    System.out.println("name:" + name);
    System.out.println("usn:" + usn);
    System.out.println("Marks of students are:");
    for(int i=0; i<5; i++){
        System.out.println("a-mark[" + i + "]" + "
                    i" + a-mark[i]);
    }
}

void calculate(){
    num = new double[5];
    for(int i=0; i<5; i++){
    if(a-mark[i] >100){
        System.out.println("invalid marks");
    }
    else if(a-mark[i] >=90){
        num[i] = 10;
    }
    else if(a-mark[i] >=80 && a-mark[i] <90){
        num[i] = 9;
    }
    else if(a-mark[i] >=70 && a-mark[i] <80){
        num[i] = 8;
    }
    else if(a-mark[i] >=60 && a-mark[i] <80){
        num[i] = 7;
}
```

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```
        else if ( a_mash[i]>=50 && a_mash[i]<60){
            num[i] = 5;
        }
        else if (a_mash[i]>=40 && a_mash[i]<50){
            num[i] = 4;
        }
        else {
            num[i] = 0;
        }
        a_cal[i] = num[i] * a_cred[i];
        Sum = Sum + a_cal[i];
        total_cred = total_cred + a_cred[i];
    }
        Sgpa = Sum / total_used;
        System.out.println("Sgpa:" + Sgpa);
    }
}
```

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Lab 3

1) Create a class book which contains four members: name, author, price, num_pages. Include a constructor to set the values for the members. Include methods to set and get the details of the objects. Include a toString() method that could display complete details of the book. Develop a Java program to create n book objects.

Sol^:-

```
import java.util.Scanner

class Book {
    String name, author;
    double price;
    int num_page;
    Book()
    {}
    public Book(String name, String author, double price,
                int num_page)
    {
      this.name = name;
      this.author = author;
      this.price = price;
      this.num_page = num_page;
    }
    void set() {
      Scanner s1 = new Scanner(System.in);
      System.out.println("Enter name of book");
      name = s1.nextLine();
      System.out.println("Enter author of book");
      author = s1.nextLine();
```

```
        System.out.println("Enter price of book");
        price = s1.nextDouble();
        System.out.println("Enter number of page of bo
        num_page = s1.nextInt();
    }
    public String toString(){
        return "name: " + name + "\n author: " + author +
            "\n price: " + price + "\n number of pages: "
            num_page;
    }
}
class Bmain{
    public static void main(String args[]){
        Scanner s2 = new Scanner(System.in);
        System.out.println("Enter number of book");
        int n = s2.nextInt();
        Book b[] = new Book[n];
        for(int i=0; i<n; i++){
            b[i] = new Book();
            System.out.println("Enter details of book" +
            b[i].Set();
        }
        for(int i=0; i<n; i++){
            System.out.println("Details of book" + i + ":
            System.out.println(b[i]);
        }
    }
}
```

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Q1 ~~Prog~~ Java program to create

Lab - 1

```
abstract class Shape {
    double dim1, dim2;
    abstract double printArea();
}

class Rectangle extends Shape {
    Rectangle (double a, double b) {
        dim1 = a;
        dim2 = b;
    }
    double printArea() {
        System.out.println("Inside the Rectangle");
        return dim1 * dim2;
    }
}

class Triangle extends Shape {
    Triangle (double a, double b) {
        dim1 = a;
        dim2 = b;
    }
    double printArea() {
        System.out.println("Inside the Triangle");
        return dim1 * dim2 / 2;
    }
}

class Circle extends Shape {
    Circle (double a) {
```

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```
        dim1 = a;
    }
    double printArea(){
        System.out.println("Inside the circle");
        return 3.14 * dim1 * dim1;
    }
}

class abs1Main {
    public static void main(String args[]){
        Rectangle r = new Rectangle(10,20);
        Triangle t = new Triangle(20,30);
        Circle c = new Circle(35);

    System.out.println("Area of Rectangle is:"+
                        r.printArea());
    System.out.println("Area of Triangle is:"+
                        t.printArea());
    System.out.println("Area of ~~Rectangle~~ is & Circle
                        is c.printArea());
    }
}
```

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Lab - 5

Q) Develop a Java program to create a class Bank Account that maintains two kinds of account for its customers, one called saving account & the other current account. The saving account provides compound interest and withdrawal facilities but no cheque book facilities. The current account provides cheque book facilities but no interest. Current account holder should also maintain a min balance & if balance falls below level, a service charge is imposed. Create a class Account that stores customer names, account number and type of account. From this derive the classes Cur-acct & Sav-acct to make them more specific to their requirements.

Sol^n:-

```
import java.util.Scanner;

abstract class Account {
    String c_name, acc_type;
    int    acc_num;
    double balance;
    int    minbalance = 2000;
    Account ( String c_name, int acc_num, double balance) {
        this.c_name = c_name;
        this.acc_num = acc_num;
        this.balance = balance;
        this.acc_type = acc_type;
    }

    abstract void addbal (double amount);
```

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```
    abstract void display();
    abstract void withdrawal(double amount);
}

class curr_acct extends Account {
    curr_acct(String c_name, int ac_num, double
                                        balance){
        super(c_name, ac_num, balance);
        System.out.println("Details of the customer:");
        System.out.println("Customer name:" + c_name +
        "\t Account number:" + ac_num + "\t Balance:" +
        balance + "Account type: Current");
}

void addbal(double amount) {
    this.balance += amount;
}

void display() {
    System.out.println("The balance is:" + this.balance);

void withdrawal() {
    if (this.balance < amount) {
        System.out.println("Insufficient funds");
        System.out.println("Your balance is:" + this.balance);
        return;
    }
    this.balance = this.balance - amount;
    if (this.balance < minbalance) {
        this.balance = this.balance - amount;
        System.out.println("a Balance is:" + this.balance);
        this.balance = this.balance - this.balance * 0.5;
```

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```
System.out.println("A penalty of Rs."+this.balance*0.5+
"has been charged as minimum balance is not satisfied");
System.out.println("Updated Balance:"+this.balance);
System.out.println("Cannot withdraw");
}
else if(balance>=minbalance){
    this.balance = this.balance - amount;
    System.out.println("Balance is:"+this.balance);
  }
}
}

class Sav_acct extends Account{
  Sav_acct(String c_name, int acc_num, double balance)
  {
    super(c_name, acc_name, balance);
    System.out.println("customer name:"+c_name+
    "\t Account number:"+acc_num+"\t Balance:"+balance
    +"Account type: Savings");
  }

  void addbal(double amount){
      this.balance += amount;
  }

  void display(){
    System.out.println("The balance is:"+this.balance);
  }

  void withdraw(double amount){
    if(this.balance < amount){
        System.out.println("Insufficient funds");
```

```
        System.out.println("Your balance is : " + this.balance);
    }
    this.balance = this.balance - amount;
    if (this.balance < minbalance) {
        this.balance = this.balance - this.balance * 0.5;
        System.out.println("A penalty of Rs." + this.balance * 0.5
        + " has been charged as minimum balance is not
        maintained");
        System.out.println("updated balance : " + this.balance);
        System.out.println("Cannot withdraw");
    }
    else if (balance > minbalance) {
        this.balance = this.balance - amount;
        System.out.println("Balance is : " + this.balance);
    }
}

void intrest (double amount) {
    int time = 3, n = 1
    System.out.println("Rate of intrest is 0.2");
    this.balance = this.balance * Math.pow ((1+0.2)/n,
                                            (n*t));
    }
}

class abc2 Main {
    public static void main (String args[]) {
        int choice, ch, n = 1;
        double amount;
        Scanner s1 = new Scanner (System.in);
        Curr_acct c = new Curr_acct ("jatin, 12345, 500");
```

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```
Sav_acct s = new Sav_acct ("jatin", 1234$, 50000);
System.out.println("press 1. For current account \n
press 2. For Savings account");
choice = s1.nextInt();
switch (choice) {
  case 1: System.out.println("**** Current Account");
    while (n!=0) {
      System.out.println("1. Add balance \n 2. display
      - Balance \n 3. withdraw \n 4. check book \n 5.
      Exit");
    ch = s1.nextInt();
    String reciever;
    double recamount;
    switch (ch) {
      case 1:
        System.out.println("enter amount to be added:");
        amount = s1.nextDouble();
        c.addbal(amount);
        break;

      case 2: c.display();
              break;

      case 3: System.out.println("Enter amount to be
                                  withdrawn:");
              amount = s1.nextDouble();
              c.withdraw(amount);
              break;

      case 4: System.out.println("Enter the name of
               the reciever:");
              reciever = s1.next();
```

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```
System.out.println("Enter amount to be deposited in
    reciever");
recamount = s1.nextDouble();
if (recamount > c.balance) {
    System.out.println("Insufficient Balance");
}
else {
    System.out.println("Amount of" + recamount +
        "sent to" + reciever);
    c.balance = c.balance - recamount;
    System.out.println("Balance:" + c.balance);
    s.balance = c.balance;
}

Case 5: n=0;
        break;

default: System.out.println("Invalid Input");
    }
}
break;

Case 2: System.out.println("*** Savings Account ***");
        while(n!=0){
            System.out.println("1. AddBalance \n2.
            displayBalance \n 3. withdraw \n 4. Exit");
            ch = s1.nextInt();
            switch(ch){
            Case 1:
                System.out.println("Enter amount to be
                    added");
                s.addbal(amount);
                break;
```

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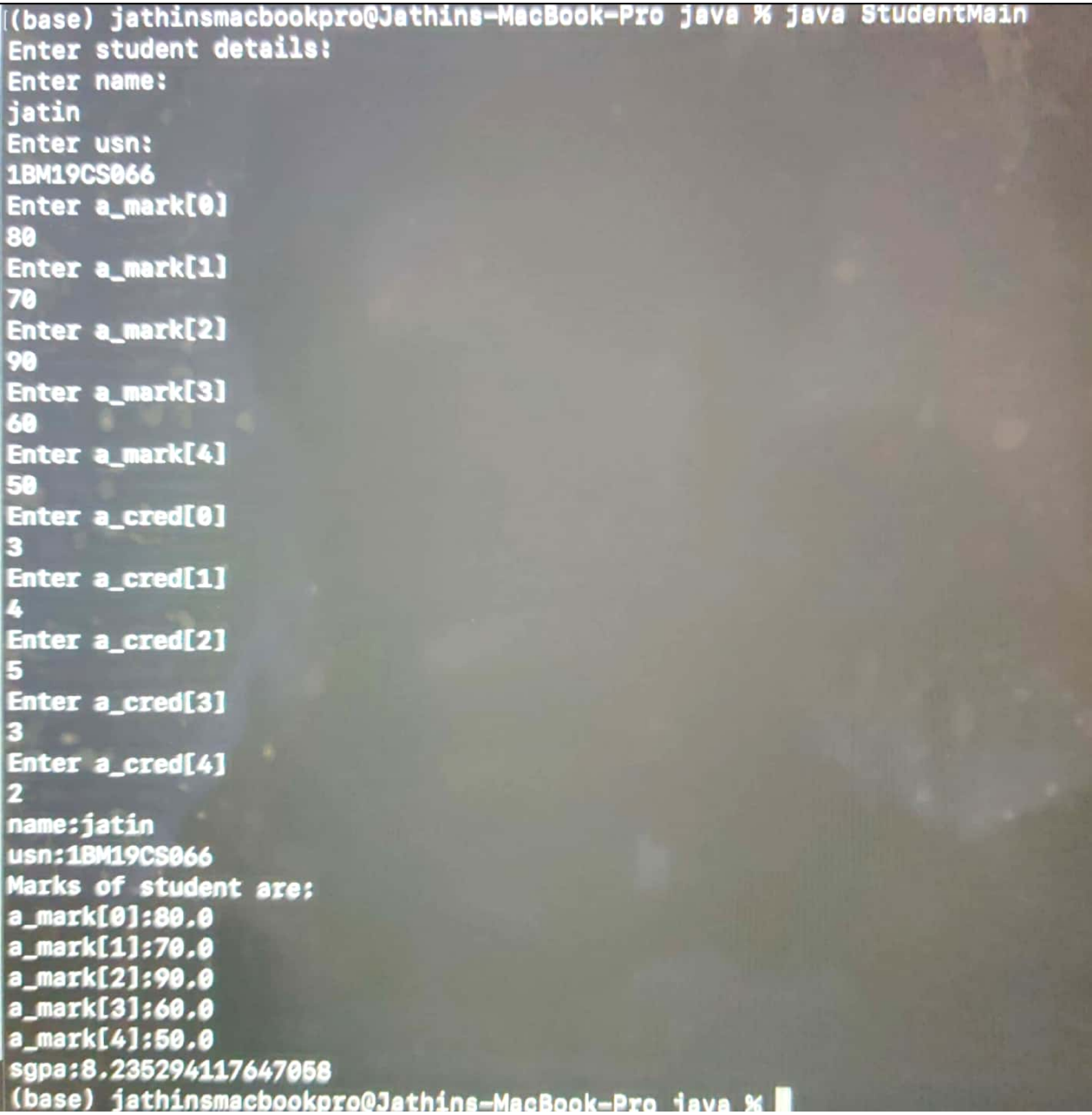
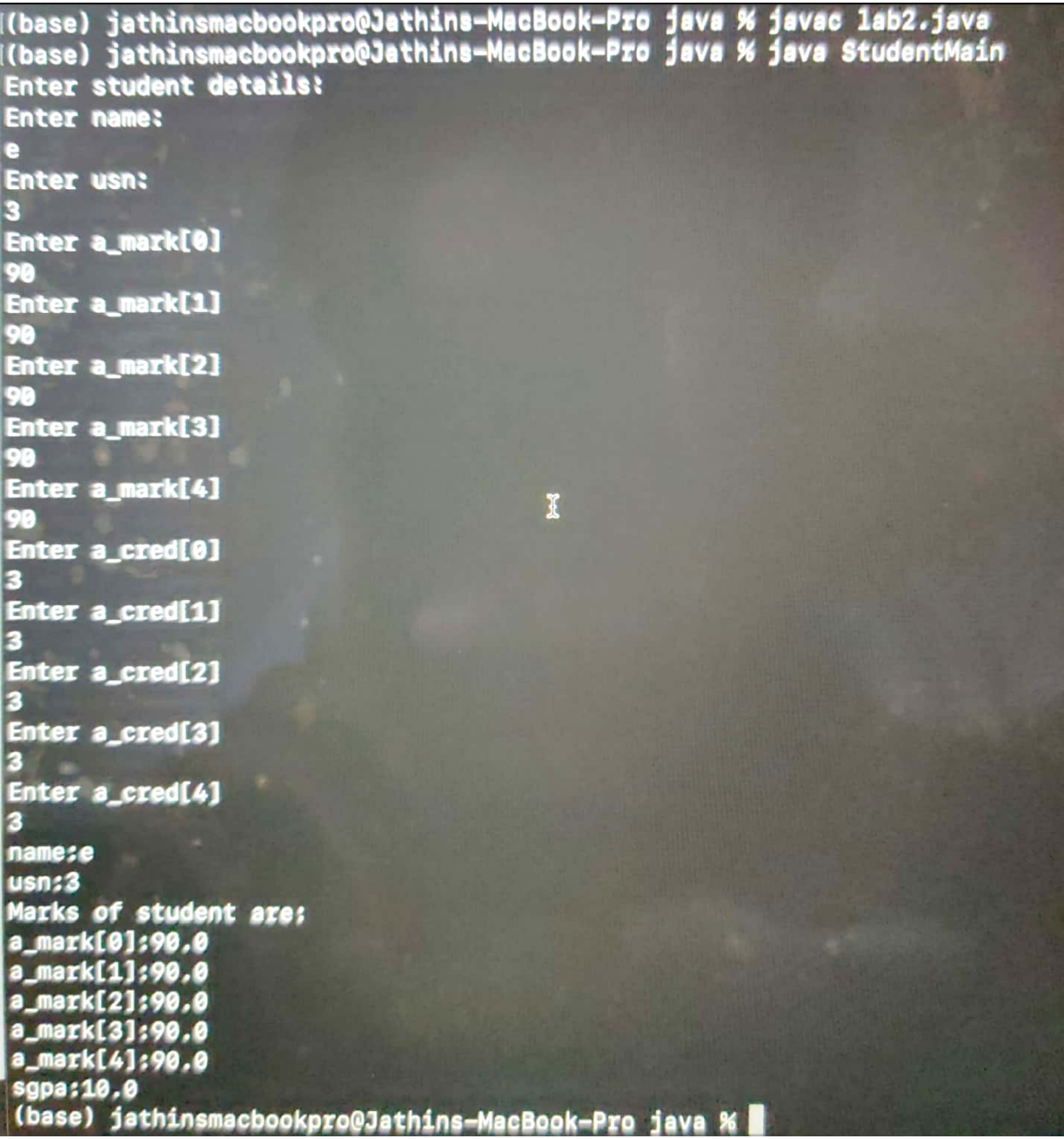
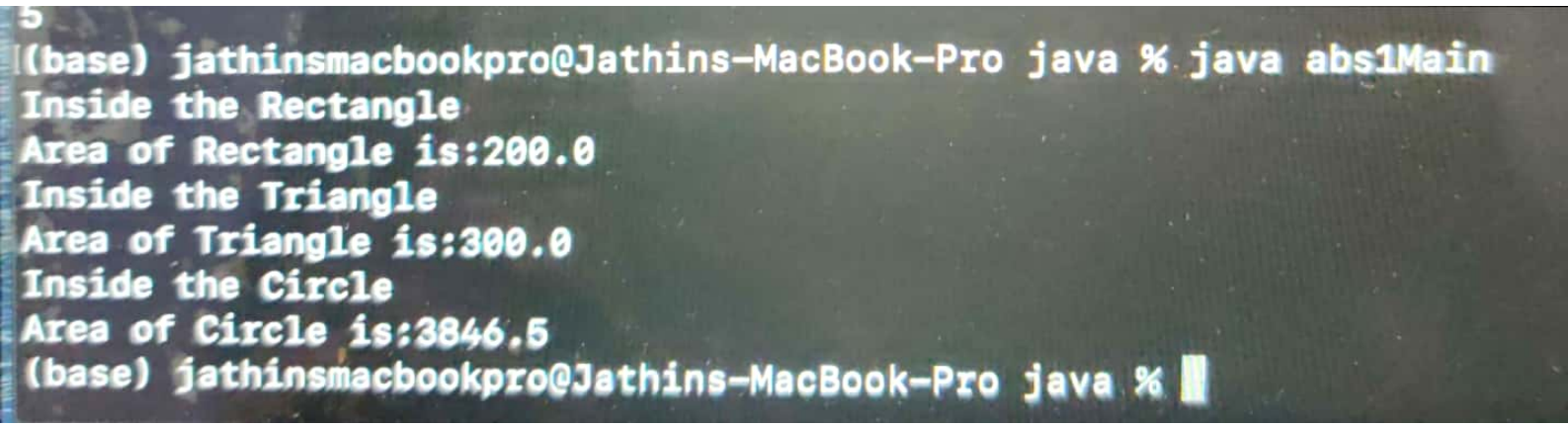
```
        case 2: S.display();
                break;

        case 3:
            System.out.println("Enter amount to be
                    with drawn:");
            amount = SI.nextDouble();
            S.withdraw(amount);
            break;

        case 4:
            n=0;

        default: System.out.println("Invalid Input");
            }
    }
    break;

    default: System.out.println("Invalid Input");
    }
}
}
```

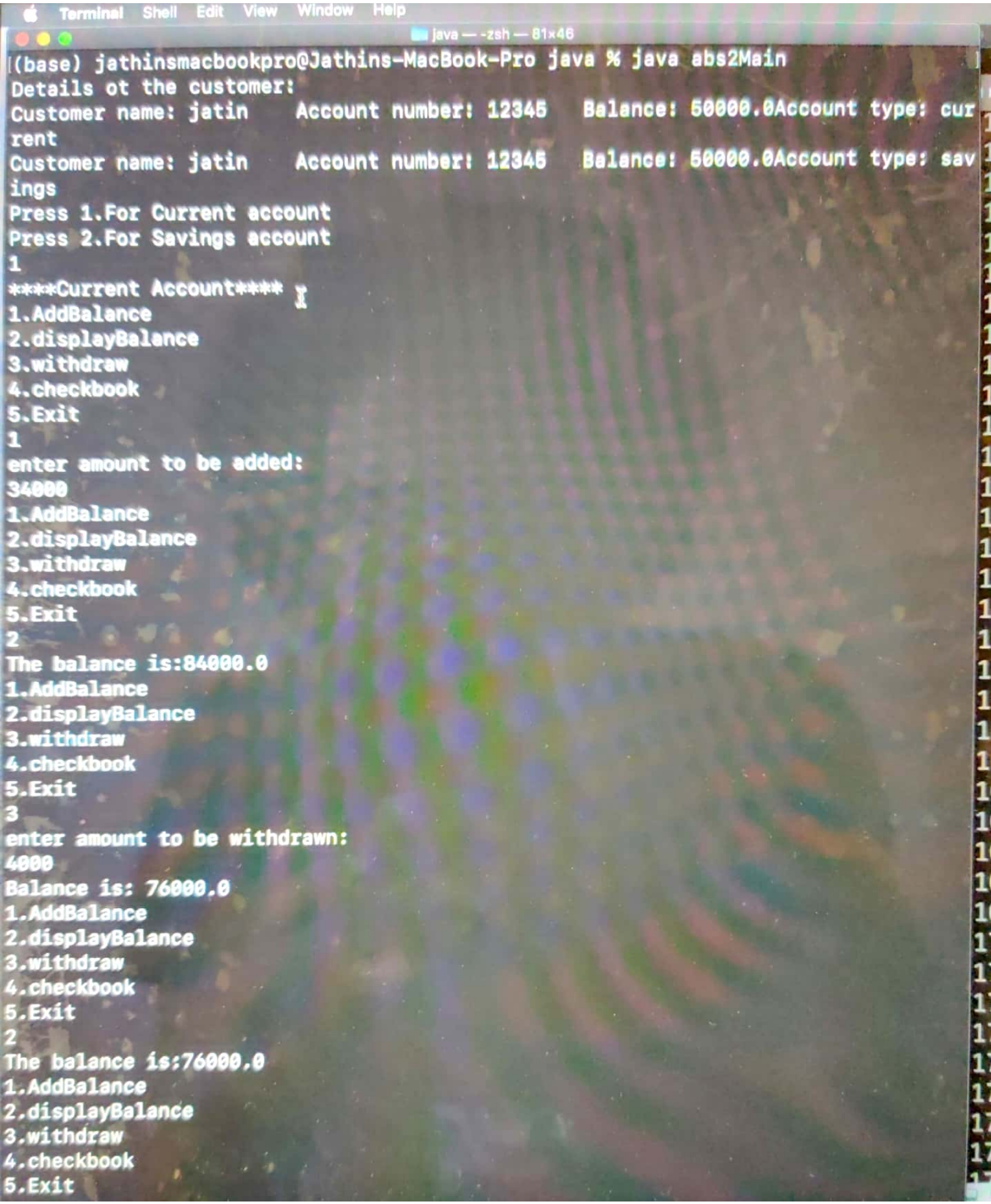
```
(base) jathinsmacbookpro@Jathins-MacBook-Pro java % java equation
Let the quadratic equation be of the form ax^2+bx+c=0

Enter value of a
1
Enter value of b
2
Enter value of c
3
No real roots

(base) jathinsmacbookpro@Jathins-MacBook-Pro java % java equation
Let the quadratic equation be of the form ax^2+bx+c=0

Enter value of a
1
Enter value of b
-2
Enter value of c
1
Roots are Real and equal
Roots is
1.00
(base) jathinsmacbookpro@Jathins-MacBook-Pro java % java equation
Let the quadratic equation be of the form ax^2+bx+c=0

Enter value of a
1
Enter value of b
4
Enter value of c
2
Roots are real and distinct
Roots are -0.59 and -3.41
(base) jathinsmacbookpro@Jathins-MacBook-Pro java %
```





```
(base) jathinsmacbookpro@Jathins-MacBook-Pro java % javac lab3.java
(base) jathinsmacbookpro@Jathins-MacBook-Pro java % java Bmain
Enter number of books
3
Enter details of book:0
Enter name of book
math
Enter author of book
xyz
Enter price of book
234
Enter number of pages of book
456
Enter details of book:1
Enter name of book
science
Enter author of book
cvb
Enter price of book
234
Enter number of pages of book
987
Enter details of book:2
Enter name of book
java
Enter author of book
rst
Enter price of book
134
Enter number of pages of book
345
Details of book0:
name: math
author: xyz
price: 234.0
number of pages: 456
Details of book1:
name: science
author: cvb
price: 234.0
number of pages: 987
Details of book2:
```





```
2.displayBalance
3.withdraw
4.checkbook
5.Exit
3
enter amount to be withdrawn:
4000
Balance is: 76000.0
1.AddBalance
2.displayBalance
3.withdraw
4.checkbook
5.Exit
2
The balance is:76000.0
1.AddBalance
2.displayBalance
3.withdraw
4.checkbook
5.Exit
3
enter amount to be withdrawn:
75500
A penalty of Rs. 125.0has been charged as minimum balance is not satisfied
Updated Balance: 250.0
Cannot withdraw
1.AddBalance
2.displayBalance
3.withdraw
4.checkbook
5.Exit
2
The balance is:250.0
1.AddBalance
2.displayBalance
3.withdraw
4.checkbook
5.Exit
4
Enter the name of the reciever:
john
Enter amount to be debited to reciever:
150
Amount of 150.0sent tojohn
Balance: 100.0
(base) jathinsmacbookpro@Jathins-MacBook-Pro java %
```

```
Enter name of book
math
Enter author of book
xyz
Enter price of book
234
Enter number of pages of book
456
Enter details of book:1
Enter name of book
science
Enter author of book
cvb
Enter price of book
234
Enter number of pages of book
987
Enter details of book:2
Enter name of book
java
Enter author of book
rst
Enter price of book
134
Enter number of pages of book
345
Details of book0:
name: math
author: xyz
price: 234.0
number of pages: 456
Details of book1:
name: science
author: cvb
price: 234.0
number of pages: 987
Details of book2:
name: java
author: rst
price: 134.0
number of pages: 345
(base) jathinsmacbookpro@Jathins-MacBook-Pro java %
```