NAME:PIYUSH KUMAR

USN:1BF24CS216

PROGRAM 1

| | | | |
|---|---|---|---|
| 1 | 1 | 10 | Develop a Java program that prints all real solutions to the quadratic equation $ax^2+bx+c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate $b^2-4ac$ is negative, display a message stating that there are no real solutions. |

```
-JAVA\1bf24cs216\" ; if ($?) { javac QuadraticEquationRoots.java } ; if ($?) { java QuadraticEquationRoots }
Enter coefficient a:
1
Enter coefficient b:
2
Enter coefficient c:
3
The roots are complex:
root1 = -1.0 + 1.4142135623730951i
root2 = -1.0 - 1.4142135623730951i
PS C:\Users\Lenovo\Desktop\JAVA BOOKS AND NOTES\Demo\OOPS-JAVA\1bf24cs216>
```

PROGRAM 2

| | | | |
|---|---|---|---|
| 2 | 1 | 10 | Develop a Java program to create a class Student with members usn, name, an array credits and an array marks. Include methods to accept and display details and a method to calculate SGPA of a student. |

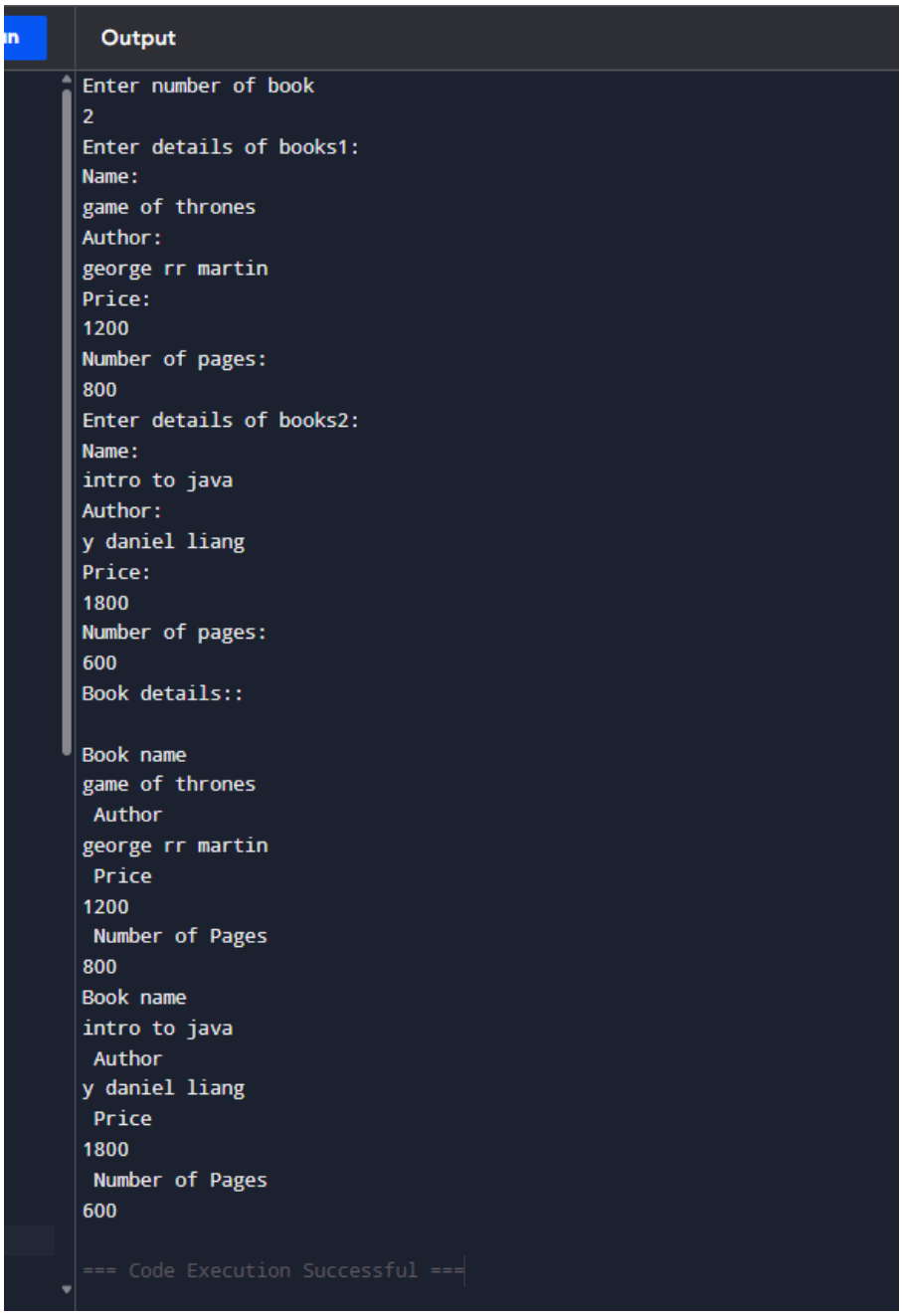
**Output**

```
Enter name and USN:
Piyush
1bf24cs216
Enter number of subjects:
3
Enter sub 1 credits
4
Enter marks obtained
100
Enter sub 2 credits
3
Enter marks obtained
100
Enter sub 3 credits
3
Enter marks obtained
50
SGPA=8.8

=== Code Execution Successful ===
```

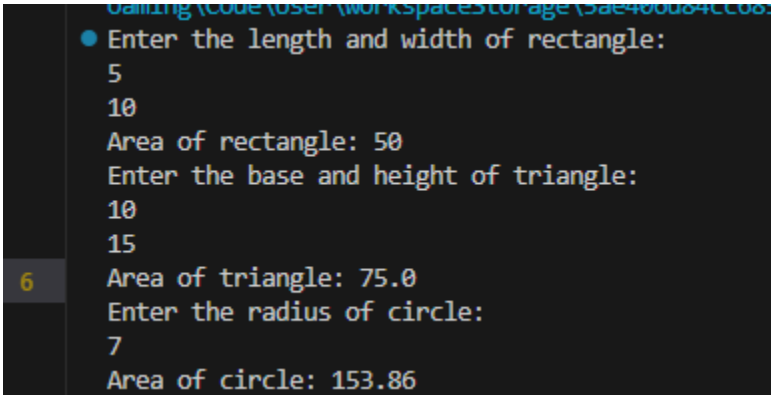
PROGRAM 3

| | | | |
|---|---|---|---|
| 3 | 1 | 10 | 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 the complete details of the book. Develop a Java program to create n book objects. |



PROGRAM 4

| | | | |
|---|---|---|---|
| 4 | 2 | 10 | Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape. |



PROGRAM 5

| | | | |
|---|---|---|---|
| 5 | 2 | 10 | Develop a Java program to create a class Bank that maintains two kinds of account for its customers, one called savings account and the other current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed.<br>Create a class Account that stores customer name, account number and type of account. From this derive the classes Cur-acct and Sav-acct to make them more specific to their requirements. Include the necessary methods in order to achieve the following tasks:<br>a) Accept deposit from customer and update the balance.<br>b) Display the balance.<br>c) Compute and deposit interest<br>d) Permit withdrawal and update the balance<br>Check for the minimum balance, impose penalty if necessary and update the balance. |

```
Enter your choice: 7

Customer Name : Piyush
Account Number: 541215
Account Type : current
Balance : 1800.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 8
Exiting
```

```
ank\" ; if ($?) { javac Bank.java } ; if ($?) { java Bank }
Create Savings Account
Enter customer name: Piyush
Enter account number: 804542
Enter type of account (saving/current): saving

 Create Current Account
Enter customer name: Piyush
Enter account number: 541215
Enter type of account (saving/current): current

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 1
Enter deposit amount: 1000
Deposited 1000.00, New Balance = 1000.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 3
Enter annual interest rate (e.g., 5 for 5%): 5
Enter time period in years: 1
Interest added: 50.00, New Balance = 1050.00
```

```
ank\" ; if ($?) { javac Bank.java } ; if ($?) { java Bank }
Interest added: 50.00, New Balance = 1050.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 2
Enter withdrawal amount: 200
Withdrew 200.00, New Balance = 850.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 4

Customer Name : Piyush
Account Number: 804542
Account Type : saving
Balance : 850.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
```

```
ank\" ; if ($?) { javac Bank.java } ; if ($?) { java Bank }
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 5
Enter deposit amount: 2000
Deposited 2000.00, New Balance = 2000.00

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 6
Enter withdrawal amount: 200
Withdrew 200.00, Balance = 1800.00
Minimum balance requirement satisfied.

 Main Menu
1. Savings Deposit
2. Savings Withdraw
3. Savings Compute Interest
4. Savings Display Details
5. Current Deposit
6. Current Withdraw
7. Current Display Details
8. Exit
Enter your choice: 7

Customer Name : Piyush
Account Number: 541215
Account Type : current
Balance : 1800.00
```

PROGRAM 6

| | | | |
|---|---|---|---|
| 6 | 3 | 10 | Create a package CIE which has two classes - Personal and Internals. The class Personal has members like usn, name, sem. The class Internals has an array that stores the internal marks scored in five courses of the current semester of the student. Create another package SEE which has the class External which is a derived class of Personal. This class has an array that stores the SEE marks scored in five courses of the current semester of the student. Import the two packages in a file that declares the final marks of n students in all five courses. |

```
Enter number of students: 1

Enter details of student 1
USN: 1bf24cs216
Name: piyush
Semester: 3
Enter 5 Internal Marks:
45
48
49
50
43
Enter 5 SEE Marks:
49
50
47
48
50

FINAL MARKS OF STUDENTS

Student: piyush  (1bf24cs216)
Course 1: 69
Course 2: 73
Course 3: 72
Course 4: 74
Course 5: 68
```

PROGRAM 7

| | | | |
|---|---|---|---|
| 7 | 3 | 10 | Write a program that demonstrates handling of exceptions in inheritance tree. Create a base class called "Father" and derived class called "Son" which extends the base class. In Father class, implement a constructor which takes the age and throws the exception WrongAge( ) when the input age<0. In Son class, implement a constructor that uses both father and son's age and throws an exception if son's age is >=father's age. |

```
Exception Caught: Son's age must be less than Father's age!
Program continues...
```

```
FatherSonHandling }
Father and Son objects created successfully.
Program continues...
```

PROGRAM 8

| | | | |
|---|---|---|---|
| 8 | 4 | 10 | Write a program which creates two threads, one thread displaying "BMS College of Engineering" once every ten seconds and another displaying "CSE" once every two seconds. |