Experiment - 3

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Subject Name: Project Based Learning in Java Lab **Subject Code: 20CSP-321**

1. Aim/Overview of the practical:
Create an application to calculate interest for FDs, RDs based on certain conditions using inheritance.

2. Task to be done/ Which logistics used:
Write a program to create an application to make an Account holders list and calculate interest for FDs, RDs based on certain conditions using inheritance.

3. Software Requirements (For programming-based labs):

- JDK-8 or any
- Eclipse-IDE for Java

4. Steps for experiment/practical/Code:

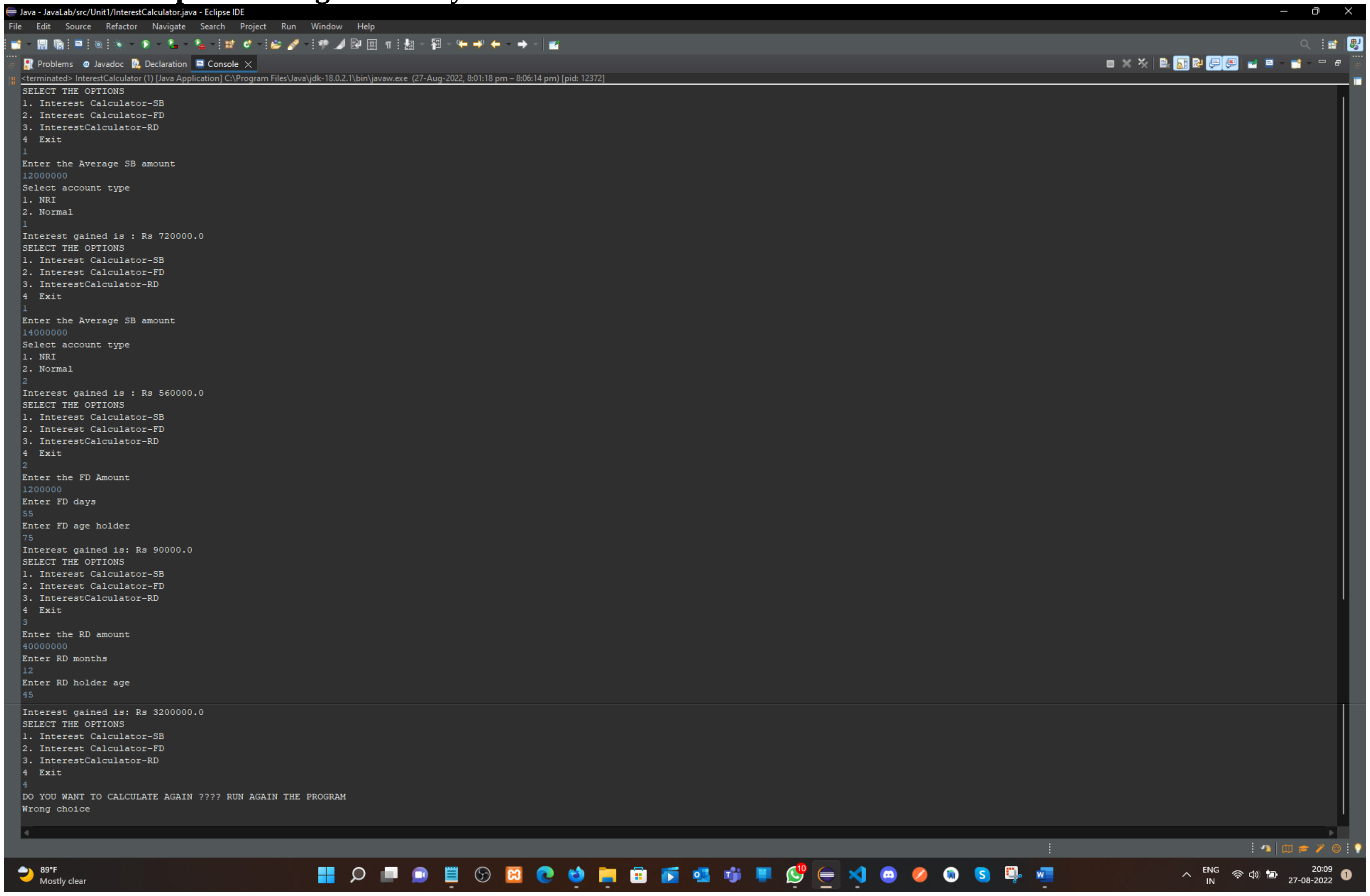
```
package Unit1;
import java.util.Scanner;

class InvalidAgeException extends Exception{}

class InvalidAmountException extends Exception{}

class InvalidDaysException extends Exception{}

class InvalidMonthsException extends Exception{}

abstract class Account {
    double interestRate;
    double amount;
    abstract double calculateInterest(double amount)throws
InvalidMonthsException,InvalidAgeException,InvalidAmountException ,InvalidDaysException;
}

 class FDaccount extends Account {
    double FDinterestRate;
    double FDAmount;
    int noOfDays;
    int ageOfACHolder;
    double General, SCitizen;
    Scanner FDScanner = new Scanner(System.in);
    double calculateInterest(double amount) throws
InvalidAgeException,InvalidAmountException,InvalidDaysException {
        this.FDAmount = amount;

        System.out.println("Enter FD days");
        noOfDays = FDScanner.nextInt();
        System.out.println("Enter FD age holder ");
        ageOfACHolder = FDScanner.nextInt();
        if (amount < 0) {
            throw new InvalidAmountException();
        }
        if(noOfDays<0){
            throw new InvalidDaysException();
        }
        if(ageOfACHolder<0){
            throw new InvalidAgeException();
        }
        if (amount < 10000000) {
            if (noOfDays >= 7 && noOfDays <= 14) {
                General = 0.0450;
                SCitizen = 0.0500; }
             else if (noOfDays >= 15 && noOfDays <= 29) {
                General = 0.0470;
                SCitizen = 0.0525;
            } else if (noOfDays >= 30 && noOfDays <= 45) {
                General = 0.0550;
                SCitizen = 0.0600;
            } else if (noOfDays >= 45 && noOfDays <= 60) {
                General = 0.0700;
                SCitizen = 0.0750;
            } else if (noOfDays >= 61 && noOfDays <= 184) {
                General = 0.0750;
                SCitizen = 0.0800;
            } else if (noOfDays >= 185 && noOfDays <= 365) {
                General = 0.0800;
                SCitizen = 0.0850;
            }
            FDinterestRate = (ageOfACHolder < 50) ? General : SCitizen;
        } else {
            if (noOfDays >= 7 && noOfDays <= 14) {
                interestRate = 0.065;
            } else if (noOfDays >= 15 && noOfDays <= 29) {
                interestRate = 0.0675;
            } else if (noOfDays >= 30 && noOfDays <= 45) {
                interestRate = 0.00675;
            } else if (noOfDays >= 45 && noOfDays <= 60) {
                interestRate = 0.080;
            } else if (noOfDays >= 61 && noOfDays <= 184) {
                interestRate = 0.0850;
            } else if (noOfDays >= 185 && noOfDays <= 365) {
                interestRate = 0.10;
            }
        }
        return FDAmount * FDinterestRate;
    }
}

class RDaccount extends Account {
    double RDInterestRate;
    double RDamount;
    int noOfMonths;
    double monthlyAmount;
    double General, SCitizen;
    Scanner RDScanner = new Scanner(System.in);
    double calculateInterest(double Ramount) throws InvalidMonthsException,InvalidAmountException
,InvalidAgeException {
        this.RDamount = Ramount;
        System.out.println("Enter RD months");
        noOfMonths = RDScanner.nextInt();
        System.out.println("Enter RD holder age");
        int age = RDScanner.nextInt();
        if (RDamount < 0) {
            throw new InvalidAmountException();
        }
        if(noOfMonths<0){
            throw new InvalidMonthsException();
        }
        if(age<0){
            throw new InvalidAgeException();
        }
        if (noOfMonths >= 0 && noOfMonths <= 6) {
            General = .0750;
            SCitizen = 0.080;
        } else if (noOfMonths >= 7 && noOfMonths <= 9) {
            General = .0775;
            SCitizen = 0.0825;
        } else if (noOfMonths >= 10 && noOfMonths <= 12) {
            General = .0800;
            SCitizen = 0.0850;
        } else if (noOfMonths >= 13 && noOfMonths <= 15) {
            General = .0825;
            SCitizen = 0.0875;
        } else if (noOfMonths >= 16 && noOfMonths <= 18) {
            General = .0850;
            SCitizen = 0.0900;
        } else if (noOfMonths >= 22) {
            General = .0875;
            SCitizen = 0.0925;
        }
        RDInterestRate = (age < 50) ? General : SCitizen;
        return RDamount * RDInterestRate;

    }

}
class SBaccount extends Account {
    double SBamount , SbInterestRate, interest;
    Scanner SBScanner = new Scanner(System.in);

    double calculateInterest(double amount) throws InvalidAmountException{
        this.SBamount = amount;
        if(SBamount < 0 ){
            throw new InvalidAmountException();
        }
        System.out.println("Select account type \n1. NRI \n2. Normal ");
        int accountChoice = SBScanner.nextInt();
        switch (accountChoice) {
            case 1:
                SbInterestRate = .06;
                break;
            case 2:
                SbInterestRate = .04;
                break;
            default:
                System.out.println("Please choose right account again");

        }
        return amount * SbInterestRate;
    }
}

public class InterestCalculator {

    public static void main(String[] args) {
        boolean val=true;
    Scanner sc = new Scanner(System.in);
    while(val) {
      System.out.println("SELECT THE OPTIONS " + "\n1." + " Interest Calculator-SB" + " \n2." + "
Interest Calculator-FD" + "\n3." + " InterestCalculator-RD" + "\n4 " + " Exit");
      int choice = sc.nextInt();
      switch (choice) {
        case 1:
          SBaccount sb = new SBaccount();
          try {
            System.out.println("Enter the Average SB amount ");
            double amount = sc.nextDouble();
            System.out.println("Interest gained is : Rs " + sb.calculateInterest(amount));

          } catch (InvalidAmountException e) {
            System.out.println("Exception : Invalid amount");
          }
          break;
        case 2:
          try {
            FDaccount fd = new FDaccount();
            System.out.println("Enter the FD Amount");
            double fAmount = sc.nextDouble();
            System.out.println("Interest gained is: Rs " + fd.calculateInterest(fAmount));
          } catch (InvalidAgeException e) {
            System.out.println("Invalid Age Entered");
          } catch (InvalidAmountException e) {
            System.out.println("Invalid Amount Entered");

          } catch (InvalidDaysException e) {
            System.out.println("Invalid Days Entered");
          }
          break;
        case 3:
          try {
            RDaccount rd = new RDaccount();
            System.out.println("Enter the RD amount");
            double Ramount = sc.nextDouble();
            System.out.println("Interest gained is: Rs " + rd.calculateInterest(Ramount));
          }
          catch (InvalidAgeException e) {
            System.out.println("Invalid Age Entered");
          } catch (InvalidAmountException e) {
            System.out.println("Invalid Amount Entered");
          } catch (InvalidMonthsException e) {
            System.out.println("Invalid Days Entered");
```

```
                    }
                    break;
                case 4:
                    val=false;
                    System.out.println("DO YOU WANT TO CALCULATE AGAIN ????" + " "
                            + "RUN AGAIN THE PROGRAM");
                default:
                    System.out.println("Wrong choice");
            }
        }
        sc.close();
    }
}
```

5. Observations/Discussions/ Complexity Analysis:

Based on the questions here I have created the abstract class named as Account, and then FDaccount, RDaccount and SBaccount class which extends the Account class and then Final class I have created the IntrestCalculator which contains the main method of java program that is based on the question.

6. Result/Output/Writing Summary:



```
<terminated> InterestCalculator (1) [Java Application] C:\Program Files\Java\jdk-18.0.2.1\bin\javaw.exe (27-Aug-2022, 8:01:18 pm – 8:06:14 pm) [pid: 12372]
SELECT THE OPTIONS
1. Interest Calculator-SB
2. Interest Calculator-FD
3. InterestCalculator-RD
4  Exit
1
Enter the Average SB amount
12000000
Select account type
1. NRI
2. Normal
1
Interest gained is : Rs 720000.0
SELECT THE OPTIONS
1. Interest Calculator-SB
2. Interest Calculator-FD
3. InterestCalculator-RD
4  Exit
1
Enter the Average SB amount
14000000
Select account type
1. NRI
2. Normal
2
Interest gained is : Rs 560000.0
SELECT THE OPTIONS
1. Interest Calculator-SB
2. Interest Calculator-FD
3. InterestCalculator-RD
4  Exit
2
Enter the FD Amount
1200000
Enter FD days
55
Enter FD age holder
75
Interest gained is: Rs 90000.0
SELECT THE OPTIONS
1. Interest Calculator-SB
2. Interest Calculator-FD
3. InterestCalculator-RD
4  Exit
3
Enter the RD amount
40000000
Enter RD months
12
Enter RD holder age
45
Interest gained is: Rs 3200000.0
SELECT THE OPTIONS
1. Interest Calculator-SB
2. Interest Calculator-FD
3. InterestCalculator-RD
4  Exit
4
DO YOU WANT TO CALCULATE AGAIN ???? RUN AGAIN THE PROGRAM
Wrong choice
```

Learning outcomes (What I have learnt):

1. Here we have learnt the Concept of Inheritance with the Abstract class

2. And finding the Interest, SB, RD & FD based on the Amount, Citizenship and Age group.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			