Experiment 3

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Subject: Java Lab **Subject Code: 22CSH-359**

Aim: Create an application to calculate interest for FDs, RDs based on certain conditions using inheritance.

Objective: To develop a Java application that calculates interest for Fixed Deposits (FDs) and Recurring Deposits (RDs) using object-oriented programming principles. The application will use inheritance to define common properties and methods for accounts while providing specific implementations for FDs and RDs based on their respective conditions.

Algorithm:

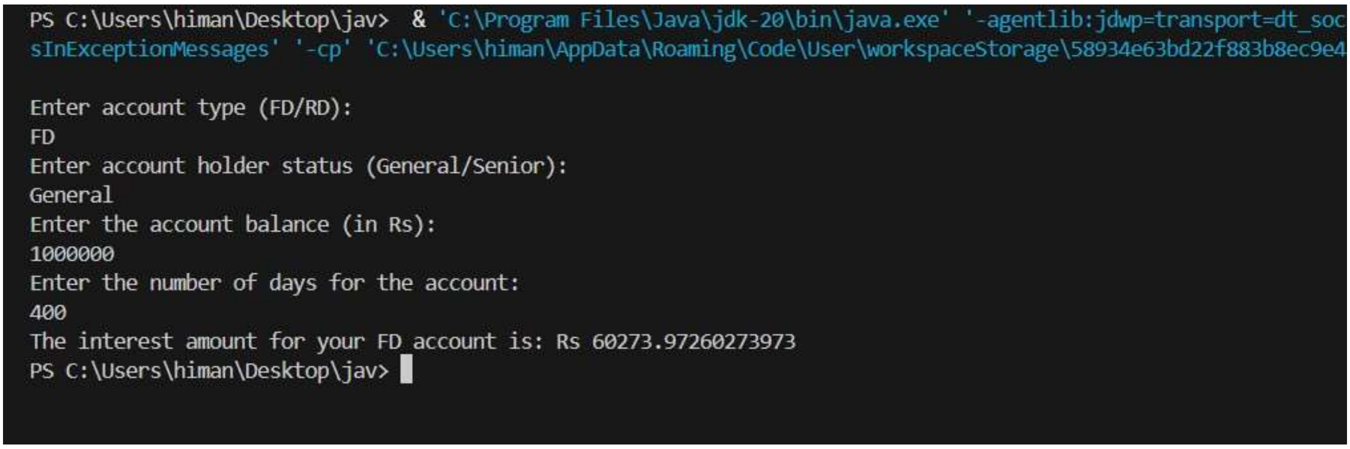
- **Create Account class** with attributes: `accountHolderName`, `principal`, `rateOfInterest`. Include methods for calculating interest (to be overridden) and displaying details.
- **Create FixedDeposit subclass** that calculates FD interest using: `principal * rateOfInterest * tenureInYears / 100`. Display FD details.
- **Create RecurringDeposit subclass** that calculates RD interest using: `(monthlyDeposit * months * (months + 1) / 2) * (rateOfInterest / (12 * 100))`. Display RD details.
- **In main method**, create instances of `FixedDeposit` and `RecurringDeposit` and display their details.

Code:

```
class Account {

String accountHolderName; double

 principal;

 double rateOfInterest;

 public   Account(String   accountHolderName,   double   principal,   double   rateOfInterest)   {

   this.accountHolderName = accountHolderName;

   this.principal        =        principal;

   this.rateOfInterest = rateOfInterest;}

   public  double  calculateInterest()  {

   return 0;
```

```
    }
      public void displayDetails() {

      System.out.println("Account Holder: " + accountHolderName);

      System.out.println("Principal Amount: " + principal);

      System.out.println("Rate of Interest: " + rateOfInterest + "%");

    }

}

   class  FixedDeposit  extends  Account  {  int  tenureInYears;  public  FixedDeposit(String

    accountHolderName,  double  principal,  double  rateOfInterest,  int  tenureInYears)  {

    super(accountHolderName, principal, rateOfInterest); this.tenureInYears = tenureInYears;

    }

    public double calculateInterest() {

      return principal * rateOfInterest * tenureInYears / 100;

    }

      public          void          displayDetails()          {

      super.displayDetails();

      System.out.println("Tenure (Years): " + tenureInYears);

      System.out.println("Interest Amount: " + calculateInterest());}}

    class RecurringDeposit extends Account { int months;

    double monthlyDeposit;

    public RecurringDeposit(String accountHolderName, double monthlyDeposit, double rateOfInterest,

     int months) {
      super(accountHolderName,                    0,
       rateOfInterest);      this.monthlyDeposit     =
       monthlyDeposit; this.months = months;
    }
    public double calculateInterest() {
      // RD interest formula: P(n(n+1)/2) * (r / 12 * 100) double
      n = months;
      return (monthlyDeposit * n * (n + 1) / 2) * (rateOfInterest / (12 * 100));
    }
    public void displayDetails() {
      System.out.println("Account Holder: " + accountHolderName);
      System.out.println("Monthly Deposit: " + monthlyDeposit);
      System.out.println("Number of Months: " + months);
      System.out.println("Rate of Interest: " + rateOfInterest + "%");
      System.out.println("Interest Amount: " + calculateInterest());
    }
}
public class InterestCalculator {
    public static void main(String[] args) {
      // Example FD account
      FixedDeposit fd = new FixedDeposit("Supratik", 100000, 5.5,
      3); System.out.println("Fixed Deposit Details:"); fd.displayDetails();
      System.out.println();
      RecurringDeposit rd = new RecurringDeposit("Supratik_22BCS11707", 5000, 6.5, 12);
      System.out.println("Recurring Deposit Details:");
      rd.displayDetails();
    }
}
```

Output:



```
PS C:\Users\himan\Desktop\jav>  & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-agentlib:jdwp=transport=dt_soc
sInExceptionMessages' '-cp' 'C:\Users\himan\AppData\Roaming\Code\User\workspaceStorage\58934e63bd22f883b8ec9e4

Enter account type (FD/RD):
FD
Enter account holder status (General/Senior):
General
Enter the account balance (in Rs):
1000000
Enter the number of days for the account:
400
The interest amount for your FD account is: Rs 60273.97260273973
PS C:\Users\himan\Desktop\jav> 
```

Learning Outcomes:

- **Inheritance**: Use of base and derived classes for shared attributes and methods.
- **Method Overriding**: Custom implementation of methods in subclasses.
- **Constructor**: Initializing object attributes using constructors.
- **Encapsulation**: Storing and manipulating data within objects.
- **Polymorphism**: Different behavior of `calculateInterest()` based on object type.
- **Interest Calculation**: Implementing FD and RD interest formulas.
- **Class Interaction**: Creating objects and calling methods to display details.