Ex. No. 6	COMPARTMENTALIZING THE CODING
Date of Exercise	31-08-23

1.Aim:

To develop an application in Java for automating the Banking Operations using packages. Create an Account class in pkg1, SavingsAccount class, and CurrentAccount class both of which inherits the Account class in pkg2. Perform menu-driven operations like Deposit, Withdraw, and Balance Enquiry from a Test class by importing these two packages.

Procedure:

Step 1: start the program
Step 2: create pkg1 and class name called as Account
Step 3: create pkg2 and class name called as SavingsAccount
Step 4: create pkg2 and class name called as CurrentAccount
Step 5: import all 2 packages in Test class
Step 6: stop the program

Program:

Package 1

```
package pkg1;
public class Account {
    private String accountNumber;
    private String accountHolder;
    protected double balance;
    public Account(String accountNumber, String accountHolder) {
        this.accountNumber = accountNumber;
        this.accountHolder = accountHolder;
        this.balance = 0.0;
    }
    public void deposit(double amount) {
        if (amount > 0) {
            balance += amount;
            System.out.println("Deposited: $" + amount);
        } else {
            System.out.println("Invalid deposit amount.");
        }
```

```
    }
    public boolean withdraw(double amount) {
        if (amount > 0 && balance >= amount) {
            balance -= amount;
            System.out.println("Withdrawn: $" + amount);
            return true;
        } else {
            System.out.println("Insufficient balance or invalid amount.");
            return false;
        }
    }
    public double getBalance() {
        return balance;
    }
}
```

Package 2(1)

```
package pkg2;
import pkg1.Account;
public class SavingsAccount extends Account {
    private double interestRate;
    public SavingsAccount(String accountNumber, String accountHolder, double interestRate) {
        super(accountNumber, accountHolder);
        this.interestRate = interestRate;
    }
    public void applyInterest() {
        balance += (balance * interestRate);
    }
}
```

Package 2(2)

```
package pkg2;
import pkg1.Account;
public class CurrentAccount extends Account {
    private double overdraftLimit;
    public CurrentAccount(String accountNumber, String accountHolder, double overdraftLimit) {
        super(accountNumber, accountHolder);
        this.overdraftLimit = overdraftLimit;
    }
    public boolean withdraw(double amount) {
        if (amount > 0 && (balance + overdraftLimit) >= amount) {
            balance -= amount;
```

```
            System.out.println("Withdrawn: $" + amount);
            return true;
        } else {
            System.out.println("Insufficient balance or invalid amount.");
            return false;
        }
    }
}
```

Test class

```
import pkg1.Account;
import pkg2.SavingsAccount;
import pkg2.CurrentAccount;
import java.util.Scanner;
public class Test6_1 {
    public static void main(String[] args) {
        Scanner scan = new Scanner(System.in);
        SavingsAccount savingsAccount = new SavingsAccount("URK22AI1023", "Soorya", 0.03);
        CurrentAccount currentAccount = new CurrentAccount("URK23AI1023", "S@123", 1000.0);
        while (true) {
            System.out.println("Banking Operations Menu:");
            System.out.println("1. Deposit");
            System.out.println("2. Withdraw");
            System.out.println("3. Balance Enquiry");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            int choice = scan.nextInt();
            switch (choice) {
                case 1:
                    System.out.print("Enter the amount to deposit: ");
                    double depositAmount = scan.nextDouble();
                    savingsAccount.deposit(depositAmount);
                    break;
                case 2:
                    System.out.print("Enter the amount to withdraw: ");
                    double withdrawAmount = scan.nextDouble();
                    currentAccount.withdraw(withdrawAmount);
                    break;
                case 3:
                    System.out.println("Savings Account Balance: $" + savingsAccount.getBalance());
                    System.out.println("Current Account Balance: $" + currentAccount.getBalance());
                    break;
```

```
            case 4:
                System.out.println("Exiting...");
                scan.close();
                System.exit(0);
                break;
            default:
                System.out.println("Invalid choice. Please try again.");
        }
    }
  }
}
```

Output:

```
Banking Operations Menu:
1. Deposit
2. Withdraw
3. Balance Enquiry
4. Exit
Enter your choice: 1
Enter the amount to deposit: 500
Deposited: $500.0
Banking Operations Menu:
1. Deposit
2. Withdraw
3. Balance Enquiry
4. Exit
Enter your choice: 2
Enter the amount to withdraw: 100
Withdrawn: $100.0
Banking Operations Menu:
1. Deposit
2. Withdraw
3. Balance Enquiry
4. Exit
Enter your choice: 3
Savings Account Balance: $500.0
Current Account Balance: $-100.0
Banking Operations Menu:
1. Deposit
2. Withdraw
3. Balance Enquiry
4. Exit
Enter your choice: 4
Exiting...
```

Result:

The above program has been successfully executed and verified.

2.**Aim:**
To write a program to implement the Library Information System using packages with the following instructions a) Create a Books class in pkg1. b) Create an Admin class in pkg2. c) Create a User class in pkg3. d) Import all packages in Test class and do the following operations in a menu-driven fashion. Add books, Search books, and List books.

Procedure:
Step 1: start the program
Step 2: create pkg1 and class name called as Books
Step 3: create pkg2 and class name called as Admin
Step 4: create pkg3 and class name called as User
Step 5: import all 3 packages in Test class
Step 6: stop the program

Program:

Package 1

```
package pkg10;
public class Books {
    private String title;
    private String author;
    private int ISBN;
    public Books(String title, String author, int ISBN) {
        this.title = title;
        this.author = author;
        this.ISBN = ISBN;
    }
    public String getTitle() {
        return title;
    }
    public String getAuthor() {
        return author;
    }
    public int getISBN() {
        return ISBN;
    }
    public String toString() {
        return "Title: " + title + ", Author: " + author + ", ISBN: " + ISBN;
    }
}
```

Package 2

```
package pkg11;
import t.pkg10.Books;
import java.util.ArrayList;
import java.util.List;
public class Admin {
    private List<Books> booksList;
    public Admin() {
        this.booksList = new ArrayList<>();
    }
    public void addBook(Books book) {
        booksList.add(book);
    }
    public Books searchBook(int ISBN) {
        for (Books book : booksList) {
            if (book.getISBN() == ISBN) {
                return book;
            }
        }
        return null;
    }
    public List<Books> listBooks() {
        return booksList;
    }
}
```

Package 3

```
package pkg12;
public class User {
    private String name;
    private int userID;
    public User(String name, int userID) {
        this.name = name;
        this.userID = userID;
    }
    public String getName() {
        return name;
    }
    public int getUserID() {
        return userID;
    }
}
```

Test class

```
import pkg10.Books;
import pkg11.Admin;
import pkg12.User;
import java.util.List;
import java.util.Scanner;
public class Test6_2 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Admin admin = new Admin();
        while (true) {
            System.out.println("Library Information System Menu:");
            System.out.println("1. Add Book");
            System.out.println("2. Search Book");
            System.out.println("3. List Books");
            System.out.println("4. Exit");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();
            scanner.nextLine();
            switch (choice) {
                case 1:
                    System.out.print("Enter book title: ");
                    String title = scanner.nextLine();
                    System.out.print("Enter author: ");
                    String author = scanner.nextLine();
                    System.out.print("Enter ISBN: ");
                    int isbn = scanner.nextInt();
                    Books newBook = new Books(title, author, isbn);
                    admin.addBook(newBook);
                    System.out.println("Book added successfully.");
                    break;
                case 2:
                    System.out.print("Enter ISBN to search for a book: ");
                    int searchISBN = scanner.nextInt();
                    Books foundBook = admin.searchBook(searchISBN);
                    if (foundBook != null) {
                        System.out.println("Book found: " + foundBook);
                    } else {
                        System.out.println("Book not found.");
                    }
                    break;

                case 3:
```

```
                System.out.println("Exiting...");
                scanner.close();
                System.exit(0);
                break;
            default:
                System.out.println("Invalid choice. Please try again.");
        }
    }
}
}
```

Output:

```
Library Information System Menu:
1. Add Book
2. Search Book
3. List Books
4. Exit
Enter your choice: 1
Enter book title: java
Enter author: XXX
Enter ISBN: 1606
Book added successfully.
Library Information System Menu:
1. Add Book
2. Search Book
3. List Books
4. Exit
Enter your choice: 3
List of Books in the Library:
Title: java, Author: XXX, ISBN: 1606
Library Information System Menu:
1. Add Book
2. Search Book
3. List Books
4. Exit
Enter your choice: 4
Exiting...
```

Result:

The above program has been successfully executed and verified.

3.**Aim:**

To develop an application in Java for automating the Hostel Management System using packages. Create Hostel class in pkg1, Student class, and SRA class in pkg2. Perform menu driven operations like SRA Allocation, List of SRA's in a Hostel, List of Students under a particular SRA, and View Student Details from a Test class by importing these two packages.

Procedure:

Step 1: start the program
Step 2: create pkg1 and class name called as Hostel
Step 3: create pkg2 and class name called as Student
Step 4: create pkg2 and class name called as SRA
Step 5: import all 2 packages in Test class
Step 6: stop the program

Program:

Package 1

```
package pkg21;
public class Hostel {
    private String hostelName;
    public Hostel(String hostelName) {
        this.hostelName = hostelName;
    }
    public String getHostelName() {
        return hostelName;
    }
}
```

Package 2(1)

```
package pkg22;
public class Student {
    private String studentName;
    private String rollNumber;
    private String sraID;
    public Student(String studentName, String rollNumber, String sraID) {
        this.studentName = studentName;
        this.rollNumber = rollNumber;
        this.sraID = sraID;
    }
    public String getStudentName() {
        return studentName;
    }
```

```
    public String getRollNumber() {
        return rollNumber;
    }
    public String getSraID() {
        return sraID;
    }
}
```

Package 2(2)

```
package pkg22;
public class SRA {
    private String sraName;
    private String sraID;
    public SRA(String sraName, String sraID) {
        this.sraName = sraName;
        this.sraID = sraID;
    }
    public String getSraName() {
        return sraName;
    }
    public String getSraID() {
        return sraID;
    }
}
```

Test class

```
import pkg21.Hostel;
import pkg22.SRA;
import pkg22.Student;
import java.util.ArrayList;
import java.util.InputMismatchException;
import java.util.List;
import java.util.Scanner;
public class Test6_3 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        Hostel hostel = new Hostel("XYZ Hostel");
        List<Student> students = new ArrayList<>();
        List<SRA> sras = new ArrayList<>();
        while (true) {
            try {
                System.out.println("Hostel Management System Menu:");
                System.out.println("1. Allocate SRA");
```

```
            System.out.println("2. List SRAs in Hostel");
            System.out.println("3. List Students under an SRA");
            System.out.println("4. View Student Details");
            System.out.println("5. Allocate Student to SRA");
            System.out.println("6. Exit");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();
            scanner.nextLine();  // Consume the newline
            switch (choice) {
                case 1:
                    System.out.print("Enter SRA Name: ");
                    String sraName = scanner.nextLine();
                    System.out.print("Enter SRA ID: ");
                    String sraID = scanner.nextLine();
                    SRA sra = new SRA(sraName, sraID);
                    sras.add(sra);
                    System.out.println("SRA Allocated Successfully.");
                    break;
                case 2:
                    if (sras.isEmpty()) {
                        System.out.println("No SRAs in the hostel.");
                    } else {
                        System.out.println("List of SRAs in the Hostel:");
                        for (SRA s : sras) {
                            System.out.println("Name: " + s.getSraName() + ", ID: " + s.getSraID());
                        }
                    }
                    break;
                case 3:
                    System.out.println("Exiting...");
                    scanner.close();
                    System.exit(0);
                    break;

                default:
                    System.out.println("Invalid choice. Please try again.");
            }
        } catch (InputMismatchException e) {
            System.out.println("Invalid input. Please enter a valid integer choice.");
            scanner.nextLine();
        }
    }
}
```

}

Output:

```
Hostel Management System Menu:
1. Allocate SRA
2. List SRAs in Hostel
3. List Students under an SRA
4. View Student Details
5. Allocate Student to SRA
6. Exit
Enter your choice: 1
Enter SRA Name: XXXX
Enter SRA ID: 11111
SRA Allocated Successfully.
Hostel Management System Menu:
1. Allocate SRA
2. List SRAs in Hostel
3. List Students under an SRA
4. View Student Details
5. Allocate Student to SRA
6. Exit
Enter your choice: 5
Enter Student Name: yyy
Enter Student Roll Number: 2222
Enter SRA ID to allocate student: 11111
Student Allocated to SRA Successfully.
Hostel Management System Menu:
1. Allocate SRA
2. List SRAs in Hostel
3. List Students under an SRA
4. View Student Details
5. Allocate Student to SRA
6. Exit
Enter your choice: 2
List of SRAs in the Hostel:
Name: XXXX, ID: 11111
```

Result:

The above program has been successfully executed and verified.