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Subject : Java With Lab **Section : 903-B[DL]**

1). Easy Problem Code

:

```
import java.util.*;


class Employee {
   int id;
   String name;
double salary;


   public Employee(int id, String name, double salary) {
       this.id       =       id;
this.name     =     name;
this.salary = salary;
   }


   @Override     public String toString() {        return "ID: " + id +
", Name: " + name + ", Salary: " + salary;
   }
}


public class EmployeeManagement {     private
ArrayList<Employee> employees = new ArrayList<>();
private Scanner scanner = new Scanner(System.in);

   public void addEmployee() {
        System.out.print("Enter Employee ID: ");
int id = scanner.nextInt();
scanner.nextLine();
        System.out.print("Enter Employee Name: ");
        String name = scanner.nextLine();
System.out.print("Enter Employee Salary: ");        double
salary = scanner.nextDouble();        employees.add(new
Employee(id, name, salary));
        System.out.println("Employee added successfully!");
    }

    public void updateEmployee() {
        System.out.print("Enter Employee ID to update: ");
int id = scanner.nextInt();        for (Employee emp :
employees) {
            if (emp.id == id) {
scanner.nextLine();
                System.out.print("Enter new Name: ");
emp.name = scanner.nextLine();
System.out.print("Enter new Salary: ");
emp.salary = scanner.nextDouble();
                System.out.println("Employee updated successfully!");
                return;
            }
        }
        System.out.println("Employee not found!");
    }
    public void removeEmployee() {
        System.out.print("Enter Employee ID to remove: ");
int id = scanner.nextInt();         employees.removeIf(emp
-> emp.id == id);
        System.out.println("Employee removed successfully!");
    }

    public void searchEmployee() {
        System.out.print("Enter Employee ID to search: ");
int id = scanner.nextInt();         for (Employee emp :
employees) {
            if (emp.id == id) {
System.out.println(emp);
                return;
            }
        }
        System.out.println("Employee not found!");
    }

    public void displayEmployees() {
if (employees.isEmpty()) {
            System.out.println("No employees found.");
        } else {
            for (Employee emp : employees) {
                System.out.println(emp);
            }
        }
    }
    public static void main(String[] args) {
        EmployeeManagement em = new EmployeeManagement();
        Scanner scanner = new Scanner(System.in);

        while (true) {
            System.out.println("\nEmployee Management System");
            System.out.println("1. Add Employee");
            System.out.println("2. Update Employee");
            System.out.println("3. Remove Employee");
            System.out.println("4. Search Employee");
            System.out.println("5. Display Employees");
            System.out.println("6.          Exit");
System.out.print("Enter   your   choice:   ");
int choice = scanner.nextInt();

            switch (choice) {
case 1:
                em.addEmployee();
                break;
case 2:
                em.updateEmployee();
                break;
case 3:
                em.removeEmployee();
                break;
case 4:
em.searchEmployee();
```

```
                break;
case 5:
                em.displayEmployees();
                break;
case 6:
                System.out.println("Exiting...");
scanner.close();                return;
default:
                System.out.println("Invalid choice! Try again.");
            }
        }
    }
}
```

2).Medium Problem Code

:

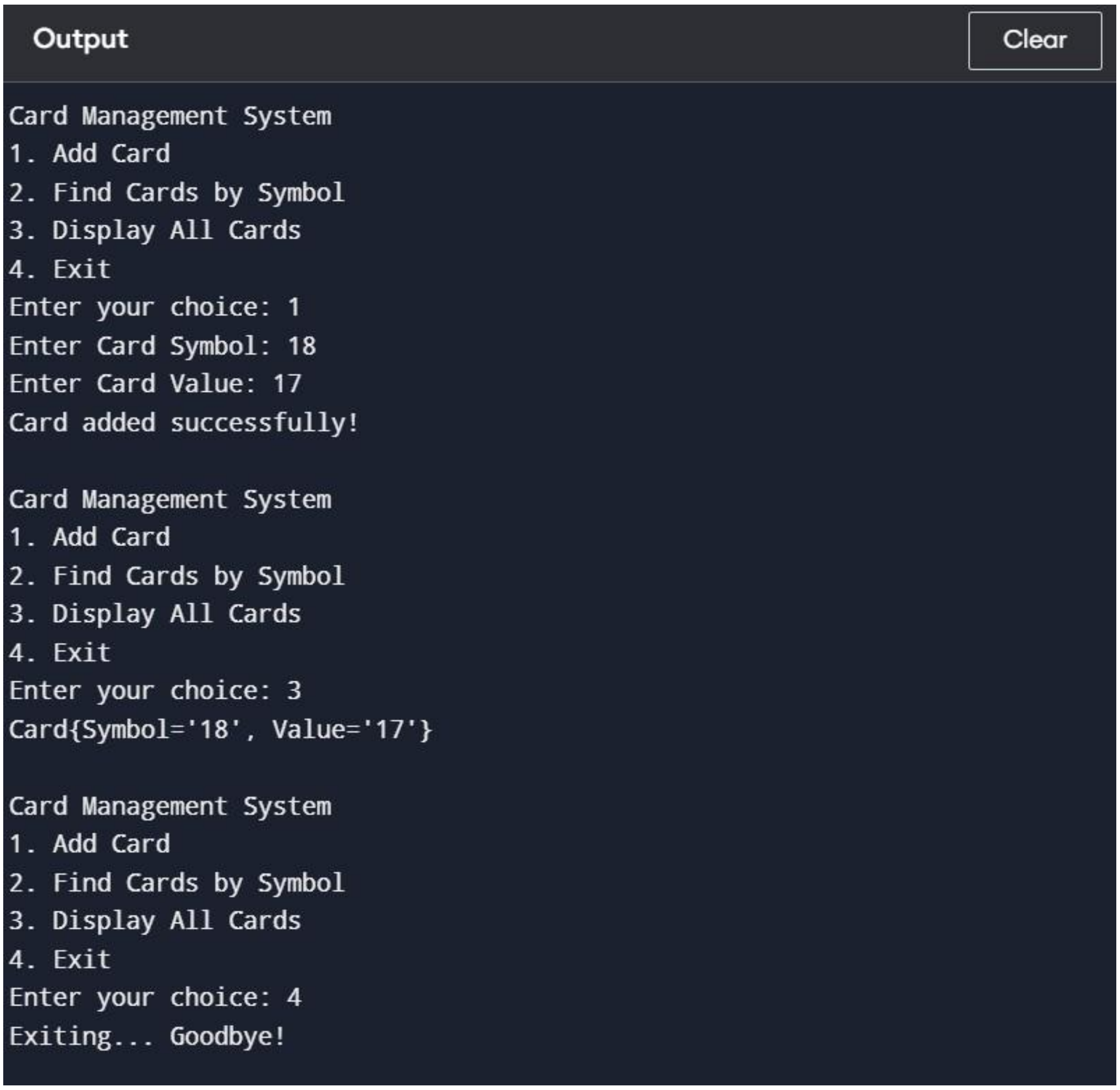
```
import java.util.*;


class Card {     private
String symbol;
private String value;


    public Card(String symbol, String value) {
this.symbol = symbol;        this.value =
value;
    }

    public String getSymbol() {
return symbol;
```

```
    }

    public String getValue() {
return value;
    }

    @Override     public String toString() {         return
"Card{Symbol='" + symbol + "', Value='" + value + "'}";
    }
}

class CardCollection {     private
Collection<Card> cards;

    public CardCollection() {
cards = new ArrayList<>();
    }

    public void addCard(String symbol, String value) {
cards.add(new Card(symbol, value));
        System.out.println("Card added successfully!");
    }

    public void findCardsBySymbol(String symbol) {
boolean found = false;
```

```
        for (Card card : cards) {            if
(card.getSymbol().equalsIgnoreCase(symbol)) {
System.out.println(card);                found = true;
            }
        }
        if (!found) {
            System.out.println("No cards found for symbol: " + symbol);
        }
    }

    public void displayAllCards() {
if (cards.isEmpty()) {
            System.out.println("No cards available.");
        } else {            for (Card
card : cards) {
                System.out.println(card);
            }
        }
    }
}

public class Main {     public static void
main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        CardCollection collection = new CardCollection();

        while (true) {
            System.out.println("\nCard Management System");
```

```
          System.out.println("1. Add Card");

          System.out.println("2. Find Cards by Symbol");

          System.out.println("3. Display All Cards");

          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 Card Symbol: ");

                String symbol = scanner.nextLine();

                System.out.print("Enter Card Value: ");

String          value          =          scanner.nextLine();

collection.addCard(symbol, value);

                break;

case 2:

                System.out.print("Enter Symbol to Search: ");

String searchSymbol = scanner.nextLine();

collection.findCardsBySymbol(searchSymbol);

                break;

case 3:

                collection.displayAllCards();

break;               case 4:

                System.out.println("Exiting... Goodbye!");

scanner.close();
```

```
                return;
default:
                System.out.println("Invalid choice. Please try again.");
            }
        }
    }
}
```



```
Card Management System
1. Add Card
2. Find Cards by Symbol
3. Display All Cards
4. Exit
Enter your choice: 1
Enter Card Symbol: 18
Enter Card Value: 17
Card added successfully!

Card Management System
1. Add Card
2. Find Cards by Symbol
3. Display All Cards
4. Exit
Enter your choice: 3
Card{Symbol='18', Value='17'}

Card Management System
1. Add Card
2. Find Cards by Symbol
3. Display All Cards
4. Exit
Enter your choice: 4
Exiting... Goodbye!
```

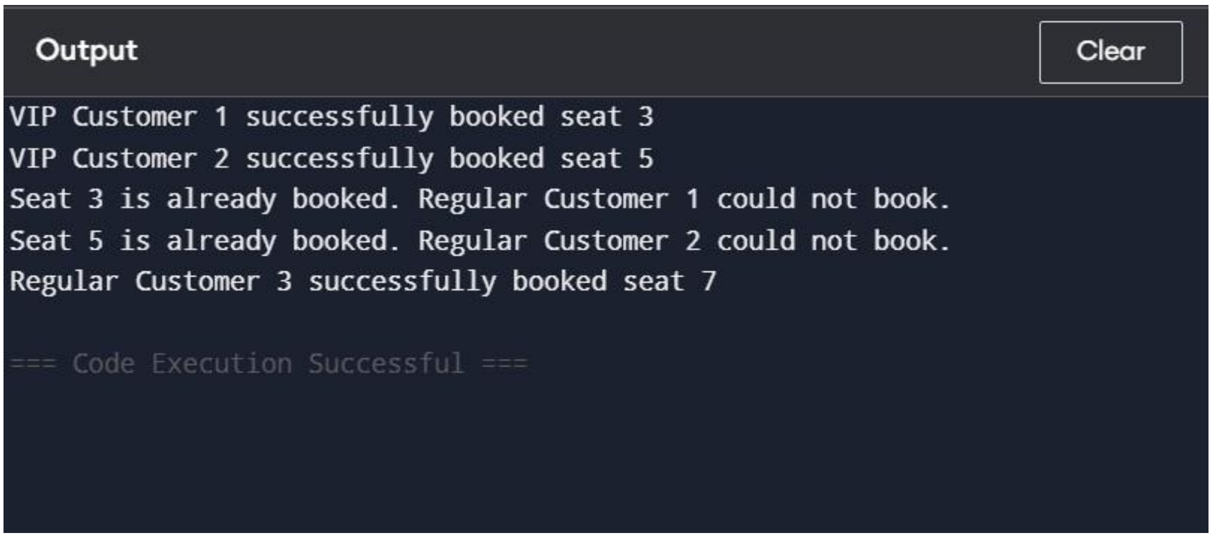
3).Hard Problem

Code:

```
import java.util.concurrent.locks.*;
```

```
class TicketBookingSystem {     private static final int
TOTAL_SEATS = 10;     private boolean[] seats = new
boolean[TOTAL_SEATS];     private final Lock lock = new
ReentrantLock();

    public void bookSeat(int seatNumber, String customerName) {
        lock.lock();
try {
            if (seatNumber < 0 || seatNumber >= TOTAL_SEATS) {
                System.out.println(customerName + " tried to book an invalid seat.");
                return;
            }
            if (!seats[seatNumber]) {
seats[seatNumber] = true;
                System.out.println(customerName + " successfully booked seat " + seatNumber);
            } else {
                System.out.println("Seat " + seatNumber + " is already booked. " + customerName
+ " could not book.");
            }
        } finally {
lock.unlock();
        }
    }
}

class Customer extends Thread {
    private TicketBookingSystem system;
private int seatNumber;    private String
customerName;

    public Customer(TicketBookingSystem system, int seatNumber, String customerName, int
priority) {        this.system = system;        this.seatNumber = seatNumber;
this.customerName = customerName;
        setPriority(priority);
    }

    @Override     public void run() {
system.bookSeat(seatNumber, customerName);
    }
}

public class Main {     public static void
main(String[] args) {
        TicketBookingSystem system = new TicketBookingSystem();

        Customer vip1 = new Customer(system, 3, "VIP Customer 1", Thread.MAX_PRIORITY);
Customer vip2 = new Customer(system, 5, "VIP Customer 2", Thread.MAX_PRIORITY);
        Customer regular1 = new Customer(system, 3, "Regular Customer 1",
Thread.MIN_PRIORITY);
        Customer regular2 = new Customer(system, 5, "Regular Customer 2",
Thread.MIN_PRIORITY);
        Customer regular3 = new Customer(system, 7, "Regular Customer 3",
Thread.NORM_PRIORITY);
```

```
        vip1.start();
vip2.start();
regular1.start();
regular2.start();
regular3.start();
    }
}
```



```
VIP Customer 1 successfully booked seat 3
VIP Customer 2 successfully booked seat 5
Seat 3 is already booked. Regular Customer 1 could not book.
Seat 5 is already booked. Regular Customer 2 could not book.
Regular Customer 3 successfully booked seat 7

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