Ex. No. 7	EXCEPTION HANDLING
Date of Exercise	21-09-2023

1) Aim :

To write a java program to create a menu driven program in java to perform the operations on an integer queue and to create custom expetations to deal.

Procedure :

1. Start the program.

2. Create the required classes.

3. Create custom expectation class.

4. Insert queue operation to understand full or not.

5. Create queue operable interface and implement .

6. Give the input and get the output.

7. Stop the program.

Program :

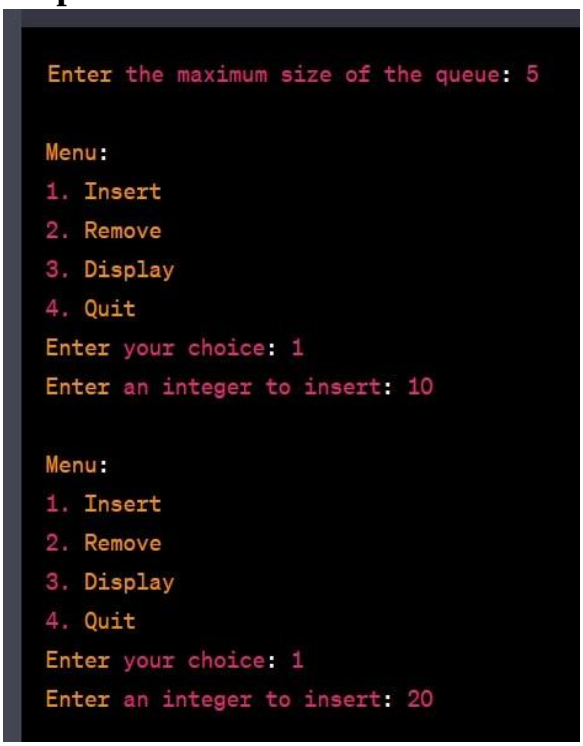
```
import java.util.LinkedList;
import java.util.Queue;
import java.util.Scanner;

class NonIntegerValueException extends Exception {
    public NonIntegerValueException(String message) {
        super(message);
    }
}
class QueueFullException extends Exception {
    public QueueFullException(String message) {
```

```
        super(message);
    }
}
class QueueEmptyException extends Exception {
    public QueueEmptyException(String message) {
        super(message);
    }
}
interface QueueOperations {
    void insert(int value) throws QueueFullException;
    int remove() throws QueueEmptyException, NonIntegerValueException;
    void display();
}
class IntegerQueue implements QueueOperations {
    private Queue<Integer> queue;
    private int maxSize;

  public IntegerQueue(int maxSize) {
        this.maxSize = maxSize;
        this.queue = new LinkedList<>();
    }

    @Override
    public void insert(int value) throws QueueFullException {
        if (queue.size() >= maxSize) {
            throw new QueueFullException("Queue is full. Cannot insert.");
        }
        queue.add(value);
    }

    @Override
    public int remove() throws QueueEmptyException, NonIntegerValueException {
        if (queue.isEmpty()) {
            throw new QueueEmptyException("Queue is empty. Cannot remove.");
        }
        int value = queue.poll();
        if (value < Integer.MIN_VALUE || value > Integer.MAX_VALUE) {
            throw new NonIntegerValueException("Non-integer value found in the queue.");
        }
        return value;
    }
```

```
    @Override
    public void display() {
        System.out.println("Queue elements: " + queue);
    }
}

public class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the maximum size of the queue: ");
        int maxSize = scanner.nextInt();
        QueueOperations integerQueue = new IntegerQueue(maxSize);

        while (true) {
            System.out.println("\nMenu:");
            System.out.println("1. Insert");
            System.out.println("2. Remove");
            System.out.println("3. Display");
            System.out.println("4. Quit");
            System.out.print("Enter your choice: ");
            int choice = scanner.nextInt();

            try {
                switch (choice) {
                    case 1:
                        System.out.print("Enter an integer to insert: ");
                        int valueToInsert = scanner.nextInt();
                        integerQueue.insert(valueToInsert);
                        break;
                    case 2:
                        int removedValue = integerQueue.remove();
                        System.out.println("Removed element: " + removedValue);
                        break;
                    case 3:
                        integerQueue.display();
                        break;
                    case 4:
                        System.out.println("Exiting program.");
                        scanner.close();
                        System.exit(0);
```

```
                default:
                    System.out.println("Invalid choice. Please try again.");
            }
        } catch (QueueFullException | QueueEmptyException | NonIntegerValueException e) {
            System.err.println("Error: " + e.getMessage());
        }
    }
  }
}
```

Output Screenshot :



```
Enter the maximum size of the queue: 5

Menu:
1. Insert
2. Remove
3. Display
4. Quit
Enter your choice: 1
Enter an integer to insert: 10

Menu:
1. Insert
2. Remove
3. Display
4. Quit
Enter your choice: 1
Enter an integer to insert: 20
```

Result :

The above program has been successfully executed and verified.

2) Aim :

To write a java program to create a menu drive to automate the ATM operations by demonstrating the concepts of interfaces.

Procedure :

1. Start the program.

2. Create a class called Invaliedpinexpen

3. Use the superkeys in the program .

4. Use the words catch,try,final,etc in the program.

5. End the program.

Program :

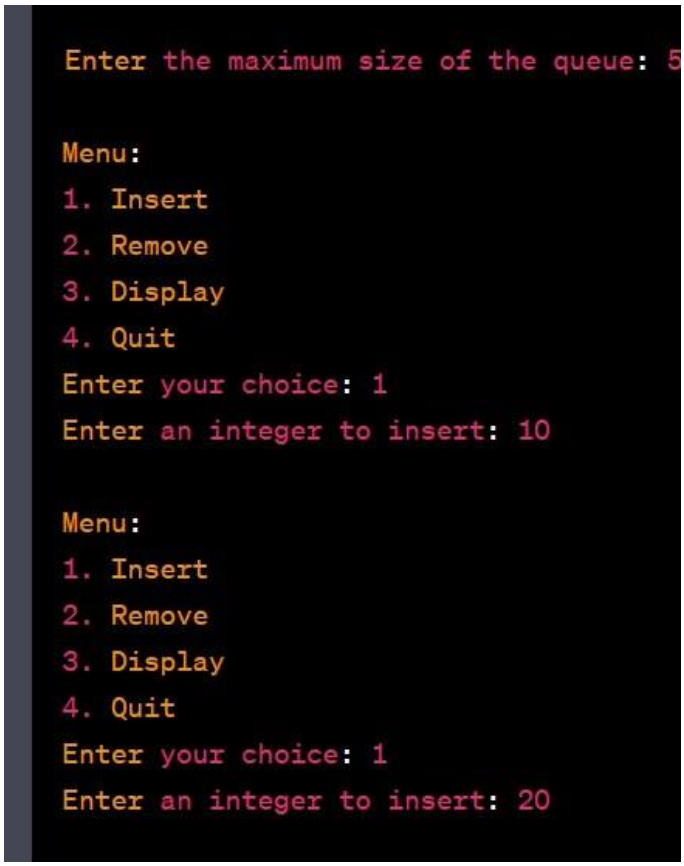
```
import java.util.Scanner;
class InvalidPinException extends Exception {
    public InvalidPinException(String message) {
        super(message);
    }
}
class InsufficientBalanceException extends Exception {
    public InsufficientBalanceException(String message) {
        super(message);
    }
}
interface ATMOperations {
    void checkBalance();
    void deposit(double amount);
    void withdraw(double amount) throws InsufficientBalanceException;
}
class ATM implements ATMOperations {
    private double balance;
    private int pinAttempts;

    public ATM(double initialBalance) {
        this.balance = initialBalance;
```

```
        this.pinAttempts = 0;
    }

    @Override
    public void checkBalance() {
        System.out.println("Current Balance: $" + balance);
    }

    @Override
    public void deposit(double amount) {
        balance += amount;
        System.out.println("$" + amount + " deposited successfully.");
    }

    @Override
    public void withdraw(double amount) throws InsufficientBalanceException {
        if (balance >= amount) {
            balance -= amount;
            System.out.println("$" + amount + " withdrawn successfully.");
        } else {
            throw new InsufficientBalanceException("Insufficient balance. Unable to withdraw $" +
amount);
        }
    }
    public boolean validatePin(int enteredPin) throws InvalidPinException {
        int correctPin = 1234; // Replace with your actual PIN
        if (enteredPin == correctPin) {
            pinAttempts = 0; // Reset PIN attempts on successful validation
            return true;
        } else {
            pinAttempts++;
            if (pinAttempts >= 3) {
                throw new InvalidPinException("Invalid PIN entered 3 times. Card is blocked.");
            }
            throw new InvalidPinException("Invalid PIN. Please try again.");
        }
    }
}

public class Main {
    public static void main(String[] args) {
```

```
ATM atm = new ATM(1000.0); // Initial balance

Scanner scanner = new Scanner(System.in);

while (true) {
    System.out.println("1. Check Balance");
    System.out.println("2. Deposit");
    System.out.println("3. Withdraw");
    System.out.println("4. Exit");
    System.out.print("Select an option: ");

    int choice = scanner.nextInt();

    switch (choice) {
        case 1:
            atm.checkBalance();
            break;
        case 2:
            System.out.print("Enter the deposit amount: $");
            double depositAmount = scanner.nextDouble();
            atm.deposit(depositAmount);
            break;
        case 3:
            try {
                System.out.print("Enter your PIN: ");
                int enteredPin = scanner.nextInt();
                if (atm.validatePin(enteredPin)) {
                    System.out.print("Enter the withdrawal amount: $");
                    double withdrawAmount = scanner.nextDouble();
                    atm.withdraw(withdrawAmount);
                }
            } catch (InvalidPinException e) {
                System.out.println(e.getMessage());
            } catch (InsufficientBalanceException e) {
                System.out.println(e.getMessage());
            }
            break;
        case 4:
            System.out.println("Thank you for using the ATM. Goodbye!");
            System.exit(0);
        default:
```

```
                System.out.println("Invalid option. Please try again.");
                break;
            }
        }
    }
}
```

Output Screenshot :



```
Enter the maximum size of the queue: 5

Menu:
1. Insert
2. Remove
3. Display
4. Quit
Enter your choice: 1
Enter an integer to insert: 10

Menu:
1. Insert
2. Remove
3. Display
4. Quit
Enter your choice: 1
Enter an integer to insert: 20
```

```
1. Check Balance
2. Deposit
3. Withdraw
4. Exit
Select an option: 3
Enter your PIN: 1234
Enter the withdrawal amount: $700
$700.0 withdrawn successfully.

1. Check Balance
2. Deposit
3. Withdraw
4. Exit
Select an option: 4
Thank you for using the ATM. Goodbye!
```

Result :

The above program has been successfully executed and verified.