JAVA PROGRAMMING

SECTION 2-3 PRACTICE

1. Update the JavaBank.java application to use the toString() methods to display the bank account details to the text area in the Java application. a. Update the myAccounts array definition to use the AbstractBankAccount class as its base class. b. Update the displayAccountDetails() method to accept a single parameter of type AbstractBankAccount named account. c. Call the account objects toString() method to provide the text for the JTextArea. d. Update the method calls to displayAccountDetails() to pass a single account object as an argument. Ensure that all displays are carried out through the displayAccountDetails() method.

```
import javax.swing.*;

import java.awt.event.ActionEvent;

import java.awt.event.ActionListener;

public class Bank {

        // AbstractBankAccount class

        public abstract static class AbstractBankAccount {

            protected String accountNumber;

            protected double balance;


            public AbstractBankAccount(String accountNumber, double balance) {

                this.accountNumber = accountNumber;

                this.balance = balance;

            }


            public String getAccountNumber() {

                return accountNumber;

            }

            public double getBalance() {

                return balance;

            }
```

```
    @Override
    public String toString() {
        return "Account Number: " + accountNumber + "\nBalance: " + balance;
    }
}

// SavingsAccount class
public static class SavingsAccount extends AbstractBankAccount {
    private double interestRate;

    public SavingsAccount(String accountNumber, double balance, double interestRate) {
        super(accountNumber, balance);
        this.interestRate = interestRate;
    }
    @Override
    public String toString() {
        return super.toString() + "\nInterest Rate: " + interestRate;
    }
}
// CheckingAccount class
public static class CheckingAccount extends AbstractBankAccount {
    private double overdraftLimit;
    public CheckingAccount(String accountNumber, double balance, double overdraftLimit) {
        super(accountNumber, balance);
        this.overdraftLimit = overdraftLimit;
    }
    @Override
    public String toString() {
        return super.toString() + "\nOverdraft Limit: " + overdraftLimit;
    }
```

```
    }
    // JavaBank application
    private AbstractBankAccount[] myAccounts;
    private JTextArea displayArea;

    public JavaBank() {
        myAccounts = new AbstractBankAccount[5]; // Example array size
        displayArea = new JTextArea(10, 30);
        // Example account initialization
        myAccounts[0] = new SavingsAccount("12345", 1000.0, 0.05);
        myAccounts[1] = new CheckingAccount("67890", 500.0, 100.0);
        JFrame frame = new JFrame("JavaBank");
        JButton displayButton = new JButton("Display Account Details");
        displayButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                displayAccountDetails(myAccounts[0]); // Display the first account details as an
example
            }
        });
        frame.add(displayButton);
        frame.add(new JScrollPane(displayArea));
        frame.setLayout(new BoxLayout(frame.getContentPane(), BoxLayout.Y_AXIS));
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.pack();
        frame.setVisible(true);
    }
    private void displayAccountDetails(AbstractBankAccount account) {
        displayArea.setText(account.toString());
    }
```

```
        public static void main(String[] args) {
            new JavaBank();
        }
    }
```

2.
```
package bikeproject;
public class BikeProject {
    // BikeParts Interface
    public interface BikeParts {
        // Constant declaration
        public final String MAKE = "Oracle Bikes";

        // Required methods after implementation
        public String getHandleBars();
        public void setHandleBars(String newValue);

        public String getTyres();
        public void setTyres(String newValue);

        public String getSeatType();
        public void setSeatType(String newValue);
    }

    // MountainBike Class implementing BikeParts interface
    public static class MountainBike implements BikeParts {
        private String handleBars;
        private String tyres;
        private String seatType;

        @Override
```

```
public String getHandleBars() {
    return handleBars;
}

@Override
public void setHandleBars(String newValue) {
    handleBars = newValue;
}

@Override
public String getTyres() {
    return tyres;
}

@Override
public void setTyres(String newValue) {
    tyres = newValue;
}

@Override
public String getSeatType() {
    return seatType;
}

@Override
public void setSeatType(String newValue) {
    seatType = newValue;
}

// Displaying the bike details
```

```
    public void displayBikeDetails() {
        System.out.println("Bike Make: " + MAKE);
        System.out.println("HandleBars: " + getHandleBars());
        System.out.println("Tyres: " + getTyres());
        System.out.println("Seat Type: " + getSeatType());
    }
}

// Main method to test the implementation
public static void main(String[] args) {
    MountainBike myBike = new MountainBike();
    myBike.setHandleBars("Drop");
    myBike.setTyres("Off-road");
    myBike.setSeatType("Comfort");

    myBike.displayBikeDetails();
}
}
```

3.

```
package bikeproject;
public class MountainBike implements MountainParts {
    private String suspension;
    private String type;

    @Override
    public String getSuspension() {
        return suspension;
    }

    @Override
```

```
    public void setSuspension(String newValue) {
        suspension = newValue;
    }

    @Override
    public String getType() {
        return type;
    }

    @Override
    public void setType(String newValue) {
        type = newValue;
    }

    // Displaying the mountain bike details
    public void displayBikeDetails() {
        System.out.println("Terrain: " + TERRAIN);
        System.out.println("Suspension: " + getSuspension());
        System.out.println("Type: " + getType());
    }

    public static void main(String[] args) {
        MountainBike myBike = new MountainBike();
        myBike.setSuspension("Full");
        myBike.setType("Trail");

        myBike.displayBikeDetails();
    }
}
```

Final program:

```
import javax.swing.*;
import java.awt.event.ActionEvent;
import java.awt.event.ActionListener;

public class IntegratedProject {
    // AbstractBankAccount class
    public abstract static class AbstractBankAccount {
        protected String accountNumber;
        protected double balance;

        public AbstractBankAccount(String accountNumber, double balance) {
            this.accountNumber = accountNumber;
            this.balance = balance;
        }

        public String getAccountNumber() {
            return accountNumber;
        }

        public double getBalance() {
            return balance;
        }

        @Override
        public String toString() {
            return "Account Number: " + accountNumber + "\nBalance: " + balance;
        }
    }
```

```
// SavingsAccount class
public static class SavingsAccount extends AbstractBankAccount {
    private double interestRate;

    public SavingsAccount(String accountNumber, double balance, double interestRate) {
        super(accountNumber, balance);
        this.interestRate = interestRate;
    }

    @Override
    public String toString() {
        return super.toString() + "\nInterest Rate: " + interestRate;
    }
}

// CheckingAccount class
public static class CheckingAccount extends AbstractBankAccount {
    private double overdraftLimit;

    public CheckingAccount(String accountNumber, double balance, double overdraftLimit) {
        super(accountNumber, balance);
        this.overdraftLimit = overdraftLimit;
    }

    @Override
    public String toString() {
        return super.toString() + "\nOverdraft Limit: " + overdraftLimit;
    }
}
```

```
// JavaBank application
public static class JavaBank {
    private AbstractBankAccount[] myAccounts;
    private JTextArea displayArea;

    public JavaBank() {
        myAccounts = new AbstractBankAccount[5]; // Example array size
        displayArea = new JTextArea(10, 30);

        // Example account initialization
        myAccounts[0] = new SavingsAccount("12345", 1000.0, 0.05);
        myAccounts[1] = new CheckingAccount("67890", 500.0, 100.0);

        JFrame frame = new JFrame("JavaBank");
        JButton displayButton = new JButton("Display Account Details");

        displayButton.addActionListener(new ActionListener() {
            @Override
            public void actionPerformed(ActionEvent e) {
                displayAccountDetails(myAccounts[0]); // Display the first account details as an example
            }
        });

        frame.add(displayButton);
        frame.add(new JScrollPane(displayArea));

        frame.setLayout(new BoxLayout(frame.getContentPane(), BoxLayout.Y_AXIS));
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.pack();
        frame.setVisible(true);
```

```
    }

    private void displayAccountDetails(AbstractBankAccount account) {
        displayArea.setText(account.toString());
    }
}

// BikeParts Interface
public interface BikeParts {
    // Constant declaration
    public final String MAKE = "Oracle Bikes";

    // Required methods after implementation
    public String getHandleBars();
    public void setHandleBars(String newValue);

    public String getTyres();
    public void setTyres(String newValue);

    public String getSeatType();
    public void setSeatType(String newValue);

    public String getSuspension();
    public void setSuspension(String newValue);

    public String getType();
    public void setType(String newValue);
}

// MountainBike Class implementing BikeParts interface
```

```
public static class MountainBike implements BikeParts {
    private String handleBars;
    private String tyres;
    private String seatType;
    private String suspension;
    private String type;

    @Override
    public String getHandleBars() {
        return handleBars;
    }

    @Override
    public void setHandleBars(String newValue) {
        handleBars = newValue;
    }

    @Override
    public String getTyres() {
        return tyres;
    }

    @Override
    public void setTyres(String newValue) {
        tyres = newValue;
    }

    @Override
    public String getSeatType() {
        return seatType;
```

```
}

@Override
public void setSeatType(String newValue) {
    seatType = newValue;
}

@Override
public String getSuspension() {
    return suspension;
}

@Override
public void setSuspension(String newValue) {
    suspension = newValue;
}

@Override
public String getType() {
    return type;
}

@Override
public void setType(String newValue) {
    type = newValue;
}

// Displaying the bike details
public void displayBikeDetails() {
    System.out.println("Bike Make: " + MAKE);
```

```
        System.out.println("HandleBars: " + getHandleBars());
        System.out.println("Tyres: " + getTyres());
        System.out.println("Seat Type: " + getSeatType());
        System.out.println("Suspension: " + getSuspension());
        System.out.println("Type: " + getType());
    }

    public static void main(String[] args) {
        MountainBike myBike = new MountainBike();
        myBike.setHandleBars("Drop");
        myBike.setTyres("Off-road");
        myBike.setSeatType("Comfort");
        myBike.setSuspension("Full");
        myBike.setType("Trail");

        myBike.displayBikeDetails();
    }
}

// Main method to run the entire project
public static void main(String[] args) {
    // Start JavaBank application

    // Test the MountainBike class
    MountainBike myBike = new MountainBike();
    myBike.setHandleBars("Drop");
    myBike.setTyres("Off-road");
    myBike.setSeatType("Comfort");
    myBike.setSuspension("Full");
    myBike.setType("Trail");
```

```
        myBike.displayBikeDetails();
    }
}
```

```
Bike Make: Oracle Bikes
HandleBars: Drop
Tyres: Off-road
Seat Type: Comfort
Suspension: Full
Type: Trail
```