JAVA PROGRAMMING CAT

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Question one: [5 marks]

```
public class FibonacciEvenSum {


  public static void main(String[] args) {

    System.out.println("Sum of even-valued Fibonacci terms not exceeding 4 million: " +
sumEvenFibonacci(4000000));

  }


  public static int sumEvenFibonacci(int limit) {

    int sum = 0;

    int a = 1;

    int b = 2;


    while (a <= limit) {

      if (a % 2 == 0) {

        sum += a;

      }

      int next = a + b;

      a = b;

      b = next;

    }


    return sum;
```

```
    }
}
```

Question two: [10 marks]

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

public class PalindromeChecker extends JFrame {
    private JTextField numberField;
    private JButton checkButton;
    private JLabel resultLabel;

    public PalindromeChecker() {
        setTitle("Palindrome Checker");
        setSize(300, 150);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(null);

        JLabel promptLabel = new JLabel("Enter a number:");
        promptLabel.setBounds(20, 20, 100, 25);
        add(promptLabel);

        numberField = new JTextField();
        numberField.setBounds(120, 20, 150, 25);
        add(numberField);

        checkButton = new JButton("Check");
```

```
    checkButton.setBounds(90, 60, 100, 25);
    add(checkButton);

    resultLabel = new JLabel("");
    resultLabel.setBounds(20, 100, 250, 25);
    add(resultLabel);

    checkButton.addActionListener(new ActionListener() {
        @Override
        public void actionPerformed(ActionEvent e) {
            String input = numberField.getText();
            if (isPalindrome(input)) {
                resultLabel.setText(input + " is a palindrome.");
            } else {
                resultLabel.setText(input + " is not a palindrome.");
            }
        }
    });
}

private boolean isPalindrome(String number) {
    int length = number.length();
    for (int i = 0; i < length / 2; i++) {
        if (number.charAt(i) != number.charAt(length - i - 1)) {
            return false;
        }
    }
```

```
        return true;
    }

    public static void main(String[] args) {
        SwingUtilities.invokeLater(() -> {
            PalindromeChecker checker = new PalindromeChecker();
            checker.setVisible(true);
        });
    }
}
```

Question three: [15 marks]

```
import java.util.Scanner;

public class ArrayExercise {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        int[] numbers = new int[15];

        // (a) Accepting input and storing in the array
        System.out.println("Enter 15 integer values:");
        for (int i = 0; i < 15; i++) {
            numbers[i] = scanner.nextInt();
        }

        // (a) Printing the values stored in the array
        System.out.println("Array elements:");
        for (int num : numbers) {
```

```
    System.out.print(num + " ");
}
System.out.println();

// (b) Checking if a number is present in the array
System.out.print("Enter a number to search: ");
int searchNumber = scanner.nextInt();
boolean found = false;
for (int i = 0; i < 15; i++) {
    if (numbers[i] == searchNumber) {
        System.out.println("The number found at index " + i);
        found = true;
        break;
    }
}
if (!found) {
    System.out.println("Number not found in this array");
}

// (c) Sorting the array in ascending order
java.util.Arrays.sort(numbers);
System.out.println("Array sorted in ascending order:");
for (int num : numbers) {
    System.out.print(num + " ");
}
System.out.println();
```

```
        // (d) Creating a new array in reverse order
        int[] reversedNumbers = new int[15];
        for (int i = 0; i < 15; i++) {
            reversedNumbers[i] = numbers[14 - i];
        }
        System.out.println("Array in reverse order:");
        for (int num : reversedNumbers) {
            System.out.print(num + " ");
        }
        System.out.println();

        // (e) Calculating the sum and product of array elements
        int sum = 0;
        int product = 1;
        for (int num : numbers) {
            sum += num;
            product *= num;
        }
        System.out.println("Sum of array elements: " + sum);
        System.out.println("Product of array elements: " + product);
    }
}
```