

## Lab Final Question (Object Oriented Programming)

**Q1. Write a C++/Java program to create a function that returns a pointer to an array of integers.**

**C++**

```
#include <iostream>
using namespace std;
int* createArray(int size) {
    int* arr = new int[size];
    for (int i = 0; i < size; i++) {
        arr[i] = i + 1;
    }
    return arr;
}
int main() {
    int size;
    cin >> size;
    int* arr = createArray(size);
    cout << "Array elements: ";
    for (int i = 0; i < size; i++) {
        cout << arr[i] << " ";
    }
    cout << endl;
    delete[] arr;
    return 0;
}
```

**Q2. Write a C++/Java program that demonstrates the implementation of a parameterized constructor.**

**C++**

```
#include <iostream>
using namespace std;
class Student {
    string name;
    int age;
public:
    Student(string n, int a) : name(n), age(a) {}
    void display() {
        cout << "Name: " << name << ", Age: " << age;
    }
};
int main() {
    Student s("Alice", 20);
    s.display();
    return 0;
}
```

**3. Write a C++/Java program using a class and method to calculate the sum of three user-input numbers.**

**C++**

```
#include <iostream>
using namespace std;
class SumCalculator {
```

public:

```
int calculateSum(int a, int b, int c) {  
    return a + b + c;  
}  
  
void getInputAndCalculate() {  
    int num1, num2, num3;  
    cout << "Enter three numbers: ";  
    cin >> num1 >> num2 >> num3;  
    int sum = calculateSum(num1, num2, num3);  
    cout << "Sum of the three numbers is: " << sum << endl;  
}
```

};

```
int main() {  
    SumCalculator calculator;  
    calculator.getInputAndCalculate();  
    return 0;  
}
```

**4. Write a C++/Java program to calculate the area of the rectangular room using method overloading.**

**C++**

```
#include <iostream>  
  
using namespace std;  
  
class Area {  
public:  
    int calculate(int length, int width) {
```

```

        return length * width;
    }
    int calculate(int side) {
        return side * side;
    }
};

int main() {
    Area a;
    cout << "Area (rect): " << a.calculate(4, 5) << endl;
    cout << "Area (square): " << a.calculate(5);
    return 0;
}

```

**5. Write a C++ /Java program to calculate area and volume of any room using single inheritance.**

**C++**

```

#include <iostream>
using namespace std;
class Area {
public:
    int calculateArea(int l, int w) {
        return l * w;
    }
};

class Volume : public Area {
public:

```

```

    int calculateVolume(int l, int w, int h) {
        return calculateArea(l, w) * h;
    }
};

int main() {
    Volume v;
    cout << "Volume: " << v.calculateVolume(2, 3, 4);
    return 0;
}

```

## 6. Write Java program to use method overriding.

```

class Animal {
    void sound() {
        System.out.println("Animal makes a sound");
    }
}

class Dog extends Animal {
    @Override
    void sound() {
        System.out.println("Dog barks");
    }

    public static void main(String[] args) {
        Animal a = new Dog();
        a.sound();
    }
}

```

```
}
```

**7. Write a Java program for adding applet to HTML file.**

### **Java Applet**

```
import java.applet.Applet;
import java.awt.Graphics;

public class HelloApplet extends Applet {
    public void paint(Graphics g) {
        g.drawString("Hello, World!", 20, 20);
    }
}
```

### **HTML File**

```
<applet code="HelloApplet.class" width="300" height="200"></applet>
```

**8. Write a Java program that demonstrates the implementation of a interface.**

```
interface Drawable {
    void draw();
}

class Circle implements Drawable {
    public void draw() {
        System.out.println("Drawing a circle");
    }

    public static void main(String[] args) {
        Drawable d = new Circle();
        d.draw();
    }
}
```

```
}  
}
```

**9. Write a C++/Java program to concatenate two strings entered by the user.**

**C++**

```
#include <iostream>  
using namespace std;  
int main() {  
    string s1, s2;  
    cout << "Enter two strings: ";  
    cin >> s1 >> s2;  
    cout << "Result: " << s1 + s2;  
    return 0;  
}
```

**10. Write a Java GUI program to convert Celsius temperature into Fahrenheit using a button. When the button is clicked, the program should convert the temperature to Fahrenheit and display the result in a label.**

```
import javax.swing.*;  
import java.awt.*;  
import java.awt.event.ActionEvent;  
import java.awt.event.ActionListener;  
public class CelsiusToFahrenheitConverter extends JFrame {  
    private JTextField celsiusField;  
    private JLabel resultLabel;
```

```
public CelsiusToFahrenheitConverter() {
    setTitle("Celsius to Fahrenheit Converter");
    setSize(350, 200);
    setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    setLayout(new GridLayout(3, 2, 10, 10));
    JLabel celsiusLabel = new JLabel("Enter Celsius:");
    celsiusField = new JTextField();
    JButton convertButton = new JButton("Convert");
    resultLabel = new JLabel("Fahrenheit: ");
    convertButton.addActionListener(new ActionListener() {
        @Override
        public void actionPerformed(ActionEvent e) {
            convertTemperature();
        }
    });
    add(celsiusLabel);
    add(celsiusField);
    add(convertButton);
    add(resultLabel);
    setLocationRelativeTo(null);
    setVisible(true);
}

private void convertTemperature() {
    try {
```



```

        double celsius = Double.parseDouble(celsiusField.getText());
        double fahrenheit = (celsius * 9 / 5) + 32;
        resultLabel.setText("Fahrenheit: " + fahrenheit);
    } catch (NumberFormatException e) {
        resultLabel.setText("Invalid Input!");
    }
}

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

```

**11. Write a Java swing GUI program to calculate the sum of two numbers entered by the user using text fields, a button, and a label to display the result.**

```

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

public class SumCalculator extends JFrame {
    private JTextField num1Field, num2Field;
    private JLabel resultLabel;

    public SumCalculator() {
        setTitle("Sum Calculator");
        setSize(350, 200);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    }
}

```

```

setLayout(new GridLayout(4, 2, 10, 10));
JLabel num1Label = new JLabel("Enter first number:");
num1Field = new JTextField();
JLabel num2Label = new JLabel("Enter second number:");
num2Field = new JTextField();
JButton addButton = new JButton("Calculate Sum");
resultLabel = new JLabel("Result: ");
addButton.addActionListener(new ActionListener() {
    @Override
    public void actionPerformed(ActionEvent e) {
        try {
            double num1 =
Double.parseDouble(num1Field.getText().trim());
            double num2 =
Double.parseDouble(num2Field.getText().trim());
            double sum = num1 * num2;
            resultLabel.setText("Result: " + sum);
        } catch (NumberFormatException ex) {
            resultLabel.setText("Invalid Input!");
        }
    }
});
add(num1Label);
add(num1Field);
add(num2Label);

```

```

        add(num2Field);
        add(addButton);
        add(resultLabel);
        setLocationRelativeTo(null); // Center the window
        setVisible(true);
    }

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

```

**12. Write a Java swing GUI program to calculate the subtraction of two numbers entered by the user using text fields, a button, and a label to display the result.**

```

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

public class SumCalculator extends JFrame {
    private JTextField num1Field, num2Field;
    private JLabel resultLabel;

    public SumCalculator() {
        setTitle("Sum Calculator");
        setSize(350, 200);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new GridLayout(4, 2, 10, 10));
    }
}

```

```

JLabel num1Label = new JLabel("Enter first number:");
num1Field = new JTextField();
JLabel num2Label = new JLabel("Enter second number:");
num2Field = new JTextField();
JButton addButton = new JButton("Calculate Sum");
resultLabel = new JLabel("Result: ");
addButton.addActionListener(new ActionListener() {
    @Override
    public void actionPerformed(ActionEvent e) {
        try {
            double num1 =
Double.parseDouble(num1Field.getText().trim());

            double num2 =
Double.parseDouble(num2Field.getText().trim());

            double sum = num1 * num2;

            resultLabel.setText("Result: " + sum);
        } catch (NumberFormatException ex) {
            resultLabel.setText("Invalid Input!");
        }
    }
});
add(num1Label);
add(num1Field);
add(num2Label);
add(num2Field);

```

```

        add(addButton);
        add(resultLabel);
        setLocationRelativeTo(null); // Center the window
        setVisible(true);
    }

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

```

**13. Write a Java swing GUI program to calculate the multiplication of two numbers entered by the user. Use text fields for input, a button to perform the calculation, and a label to display the result.**

```

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

public class SumCalculator extends JFrame {
    private JTextField num1Field, num2Field;
    private JLabel resultLabel;

    public SumCalculator() {
        setTitle("Sum Calculator");
        setSize(350, 200);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new GridLayout(4, 2, 10, 10));

        JLabel num1Label = new JLabel("Enter first number:");

```

```
num1Field = new JTextField();
JLabel num2Label = new JLabel("Enter second number:");
num2Field = new JTextField();
JButton addButton = new JButton("Calculate Sum");
resultLabel = new JLabel("Result: ");
addButton.addActionListener(new ActionListener() {
    @Override
    public void actionPerformed(ActionEvent e) {
        try {
            double num1 =
Double.parseDouble(num1Field.getText().trim());
            double num2 =
Double.parseDouble(num2Field.getText().trim());
            double sum = num1 * num2;
            resultLabel.setText("Result: " * sum);
        } catch (NumberFormatException ex) {
            resultLabel.setText("Invalid Input!");
        }
    }
});
add(num1Label);
add(num1Field);
add(num2Label);
add(num2Field);
add(addButton);
```

```

        add(resultLabel);

        setLocationRelativeTo(null); // Center the window

        setVisible(true);
    }

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

```

**14. Write a Java swing GUI program to calculate the division of two numbers entered by the user. Use text fields for input, a button to perform the calculation, and a label to display the result.**

```

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

public class SumCalculator extends JFrame {
    private JTextField num1Field, num2Field;
    private JLabel resultLabel;

    public SumCalculator() {
        setTitle("Sum Calculator");
        setSize(350, 200);
        setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        setLayout(new GridLayout(4, 2, 10, 10));

        JLabel num1Label = new JLabel("Enter first number:");

```

```

num1Field = new JTextField();
JLabel num2Label = new JLabel("Enter second number:");
num2Field = new JTextField();
JButton addButton = new JButton("Calculate Sum");
resultLabel = new JLabel("Result: ");
addButton.addActionListener(new ActionListener() {
    @Override
    public void actionPerformed(ActionEvent e) {
        try {
            double num1 =
Double.parseDouble(num1Field.getText().trim());
            double num2 =
Double.parseDouble(num2Field.getText().trim());
            double sum = num1 * num2;
            resultLabel.setText("Result: " / sum);
        } catch (NumberFormatException ex) {
            resultLabel.setText("Invalid Input!");
        }
    }
});
add(num1Label);
add(num1Field);
add(num2Label);
add(num2Field);
add(addButton);

```



```
        add(resultLabel);  
        setLocationRelativeTo(null); // Center the window  
        setVisible(true);  
    }  
    public static void main(String[] args) {  
        new SumCalculator();  
    }  
}
```