



# **MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

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## **University Examinations 2024/2025**

SECOND YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE BACHELOR OF SCIENCE IN DATA SCIENCE, BACHELOR OF SCIENCE IN COMPUTER SCIENCE, BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY, BACHELOR OF SCIENCE IN COMPUTER SECURITY AND FORENSICS, BACHELOR OF SCIENCE IN MATHEMATICS AND COMPUTER SCIENCE, BACHELOR OF SCIENCE IN MATHEMATICS

### **CIT 3203: OBJECT ORIENTED PROGRAMMING II**

**DATE: JANUARY 2025**

**TIME: 2 HOURS**

**INSTRUCTIONS:** Answer question **one** and any other **two** questions

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#### **QUESTION ONE (30 MARKS)**

- a) Explain the evolution of Java GUI technologies. (6 Marks)
- b) What is exception handling in Java? Explain the use of try, catch, and finally blocks with an example. (6 Marks)
- c) What is polymorphism in Java? Explain the difference between compile-time and runtime polymorphism. (6 Marks)
- d) What is an event source object? What is an event object? Describe the relationship between an event source object and an event object. (6 Marks)
- e) Explain the concept of multiple inheritance and how it is achieved in Java using interfaces. Provide an example to demonstrate this. (6 marks)

## **QUESTION TWO (20 MARKS)**

- a) Explain briefly the key features of Java that make it platform-independent? (5 marks)
- b) Debug the following code: (5 marks)

```
Class Person{  
    String name;  
    int age;  
    Person(String n, int a) {  
        name = name;  
        age = a;  
    }  
}
```

- c. Write a JavaFX program to create a form with text fields for name and age, and a button to submit the data. (10 Marks)

## **QUESTION THREE (20 MARKS)**

- a) What is dynamic method dispatch? Provide a code example to demonstrate it. (5 Marks)
- b) Write a JavaFX program where a TextField allows the user to enter their name, and upon clicking a button, the entered name is displayed in a label. (8 Marks)
- c) Debug this JavaFX program which throws a Null Pointer Exception. Explain why the error occurs and fix it: (7 Marks)

```
import javafx.application.Application;  
import javafx.scene.Scene;  
import javafx.scene.control.Button;  
import javafx.stage.Stage;  
Public class Main Extends Application{  
    Button btn;  
    public void start (Stage stage) {  
        btn.setText("Click me");  
        btn.setOnAction(e->System.out.println ("Clicked"));  
        Scene scene = new Scene(btn, 200, 100);  
        stage.setScene(scene);  
        stage.show();
```

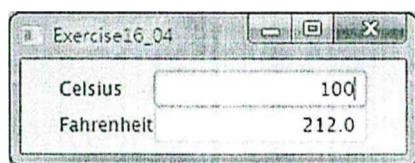
```

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

```

#### QUESTION FOUR (20 MARKS)

a) Write a program that converts Celsius and Fahrenheit, as shown in Figure below. If you enter a value in the Celsius text field and press the Enter key, the corresponding Fahrenheit measurement is displayed in the Fahrenheit text field. Likewise, if you enter a value in the Fahrenheit text field and press the Enter key, the corresponding Celsius measurement is displayed in the Celsius text field. (10 Marks)



b. Explain the role of the Scene and Stage classes in JavaFX. (4 Marks)

c. Explain how abstraction differs from encapsulation in object-oriented programming. (6 Marks)

#### QUESTION FIVE (20 MARKS)

a) Write a JavaFX program that demonstrates the use of ComboBox to select items from a dropdown and display the selected item in a label. (10 Marks)

b) Explain the difference between setOnAction0 and setOnMouseClicked0 event handlers in JavaFX. Provide a scenario where each would be appropriate. (6 Marks)

c) Debug the following program. It should change the button text to "Clicked" after the first click, but the label is not updating: (4 Marks)

```

import javafx.application.Application;
Import javafx.scene.Scene;
import javafx.scene.control.Button;
Import javafx.stage.Stage;
Public class Main Extends Application{
    Button btn;

```

```
public void start(Stage
stage) {
    Button button=new Button ("Click me");
    Button.setOnAction(e->{
        Button.setText("clicked");
    });
    Scene scene = new Scene(button, 200, 100);
    stage.setScene(scene); stage.show( );
}

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