MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 300: COMPONENT PROGRAMMING

DATE: **TIME:**

INSTRUCTIONS

i) **Answer question ONE and other TWO questions**

ii) **Write on both sides of the answer sheet**

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Explain the THREE models used in Component Programming (6 marks)

b) Define

i) Component (2 marks)

ii) Session Bean (2 marks)

c) Distinguish between Java Bean and EJB (4 marks)

d) Below is a piece of code that implements a simple bean. Answer the questions below it

```
public class MyBean implements java.io.Serializable
{
protected int theValue;
private String s = "Welcome to Machakos University";
// constructor for the class
//setters
//accessors
}
```

i) What is the purpose of serializable in the code provided above (2 marks)

ii) Create a constructor for the class (2 marks)

iii) Create setter methods for the class (2 marks)

iv) Create accessor methods for the class (2 marks)

e) Explain any THREE important parts in CORBA architecture (6 marks)

f) Explain Component Parts of .NET Framework (2 marks)

QUESTION TWO (20 MARKS)

a) Distinguish COP from OOP (8 marks)

b) A SavingsAccount component has the following properties: An int data field named id for the account; A double data field named balance for the account; A double data field named annualInterestRate that stores the current interest rate; A Date data field named dateCreated that stores the date when the account was created; The accessor and mutator method for id, balance, and annualInterestRate; The accessor method for dateCreated; A method named getMonthlyInterestRate() that returns the monthly interest rate; A method named withdraw that withdraws a specified amount from the account; A method named deposit that deposits a specified amount to the account; pressButton, addListenerEvent and removeListenerEvent

i) Draw a component chart for the SavingsAccount component (6 marks)

ii) Construct a component table for the SavingsAccount component in question (b) above**.** (6 marks)

QUESTION THREE (20 MARKS)

a) Briefly explain THREE main programming paradigms in the last century (6 marks)

b) Discuss fundamental principles in component-based software engineering (8 marks)

c) Create a JavaBean component that displays the current time and date (6 marks)

QUESTION FOUR (20 MARKS)

a) Explain how a Message-Driven Bean (MDB) work (6 marks)

b) Use an example to explain THREE models in a component infrastructure (6 marks)

c) Create a Bean Component that creates an Account object with an account ID of 1122, a balance of $20,000, and an annual interest rate of 4.5%. Use the withdraw method to withdraw $2,500, use the deposit method to deposit $3,000, and print the balance, the monthly interest, and the date when this account was created. (8 marks)

QUESTION FIVE (20 MARKS)

a) Explain THREE major goals of COP (6 marks)

b) Discuss the main objectives of EJB Container (6 marks)

c) Design a Java CORBA component that provides services of a calculator. The calculator has the functionality to perform addition, subtraction, multiplication, and division of two real numbers. It can also detect a zero divisor in division operation. (8 marks)