



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)